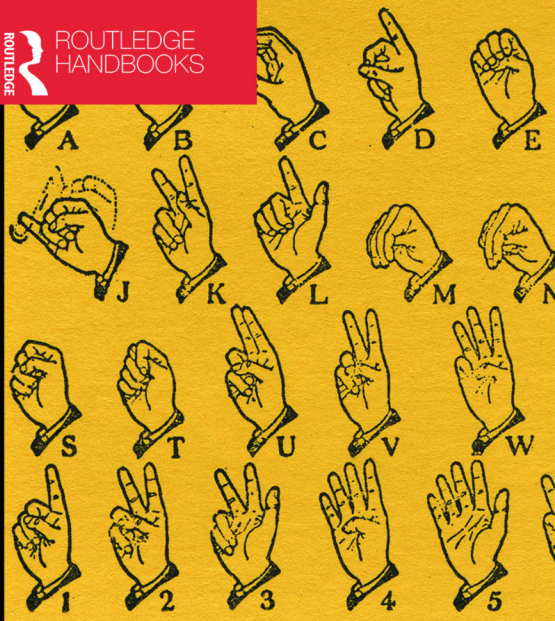


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The Routledge Handbook of Sign Language Pedagogy

Edited by Russell S. Rosen

The Routledge Handbook of Sign Language Pedagogy

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Russell S. Rosen is Associate Professor and Coordinator of the Program in American Sign Language at the City University of New York, College of Staten Island.

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*This book is dedicated to my late wife
Violet Bieber Stein-Rosen*



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Introduction

Pedagogy in sign language as first, second, and additional language

Russell S. Rosen

The *Handbook of Sign Language Pedagogy* covers pedagogy and sign language as first (L1), second (L2) and additional (Ln) language. Sign language pedagogy encompasses the instruction, curriculum, and assessment that involve the use of sign languages. It is developed by teachers to use, teach, and assess, and for the learners to learn and be evaluated in using sign language to communicate about scholastic and life-related matters. Very little research has examined the L1 and L2/Ln pedagogy of sign languages. Historically and in common with minority languages, pedagogical practices and materials in sign languages in most of the world were based on practical experiences, informal mentoring, and the influence of available materials, rather than from a body of research and formal training in language pedagogy practices. The studies that focus on pedagogy practices with sign languages are emerging. This leaves many of us wanting an ephemeral “record” of that body of knowledge.

The motivation for this volume is created by recent research studies on sign language and pedagogy, and a paucity of spaces where all studies are packaged together. This *Handbook* seeks to provide a comprehensive overview of the field of L1 and L2/Ln sign language pedagogy, and a useful resource for teachers, educator practitioners, learners, policymakers, and researchers. The contributions represent international perspectives and best practices, and can serve as a springboard for further works in pedagogy.

A history of sign language research and practice

This volume follows five decades of sign language linguistic research and practice. As Veditz, formerly President of the National Association of the Deaf in the US at the turn of the twentieth century, remarked, if there are deaf people, there will be sign language. As anthropologists and sociologists have discovered, there are sign languages in every corner of the world, from small geographically isolated villages to metropolises. Sign languages are used by not only deaf people, but also hearing people to communicate with each other. In order for them to be able to use sign languages to communicate, they would need to first learn it. Some people, primarily deaf children and hearing children of deaf adults, learn sign languages as their first languages. Other people, most of whom are hearing and deaf people who learned spoken or different sign languages first, learned sign languages as their second or additional languages. They learned sign

languages from different constituencies such as teachers, families, and friends. Sign languages are taught and learned under various settings such as homes; schools, colleges, and universities; social service agencies; religious organizations; and community centers.

That people are teaching and learning sign languages drew the attention from researchers and practitioners worldwide. Sign language research was initiated in the 1960s in the US, with studies on sign language linguistic structures and its acquisition by children who are native users of sign languages. Since the 1960s, there is a growth in research studies in the psycholinguistics and sociolinguistics of sign languages. At that time, however, most of the schools and programs for deaf children have favored the oral-aural approach, that is, the use of speech and hearing to learn scholastic subjects. Studies have demonstrated the unequal success of the approach, and many schools turned to the manualist approach, that is, the use of sign language as the language of instruction at the schools for the deaf.

The studies that legitimize sign language have empowered individuals in the Deaf communities worldwide for increased societal acceptance of their language, community, and culture. Because of the research findings, coupled with the increased mobilization of Deaf communities worldwide, there is an increase in the number of nations that recognize sign language as bona fide spoken languages. This recognition is accompanied by the requirement that the learners take it for academic credit in educational institutions, and for schools to use it with signing deaf learners.

It was not until the 1980s that there was a growth in the enrollment of classes in sign languages as L2/*L_n* for academic credit in educational institutions. They are primarily taken by individuals who speak and hear, and whose L1 tends to be spoken and written languages. The studies that were published since then looked at the psychological and psycholinguistic processing of sign languages and sign language acquisition by hearing learners who learn sign languages as their L2/*L_n*. Since the late 1980s to the early 2000s, there was a proliferation of sign language education programs in education institutions, and sign language teachers and interpreters in colleges and universities, and elementary- and secondary-level regular and special education classrooms. This was followed by an increase in the number of higher education programs that prepare individuals to become sign language teachers, and teachers and interpreters for the deaf and hard of hearing. The studies on sign language pedagogy, that is the use of sign language in instruction, curriculum, and assessment, followed.

Recent developments in sign language pedagogy

Different constituencies are involved in the development and execution of sign language pedagogy. The constituencies of sign language pedagogy are teachers, educator practitioners, curricular and instructional developers, sign language interpreters, policymakers, researchers, and parents. Each has different areas of knowledge and skills regarding pedagogy and use of sign languages. Teachers need to know about teaching, instructional materials, and evaluation of their learners. Educator practitioners include psychologists, social workers, interpreters, and evaluators, and they need to know how to use sign language to communicate and work with their deaf clientele base. Curriculum and assessment developers create sign language curricula, instructional materials, assessment test materials, procedures, and scoring systems, and they need to know about sign language linguistics, learning, acquisition, use, and assessment forms, procedures, and scoring rubrics. Interpreters need to know sign language linguistics and translation processes, and sign language systems used in the Deaf community and their clientele. Policymakers need to know sign language policy and practice in sign languages that shape its dissemination and use, and the standards that will ensure quality in teaching, learning, and evaluation in sign language pedagogy.

Researchers need to know the conditions that enable nations to recognize sign languages and offer it as a language for its inhabitants to learn and use; the factors that shape teaching and learning processes; and the effectiveness of curriculum and assessment designs.

Learners of sign languages may learn it as a L1, L2, or L_n , may it be third language, fourth language, or so on. The designation of the learners of sign languages into modality groups is based on the modality of the languages they know prior to learning sign languages. The learners who learn a sign language as another sign language are seen as One Modality and Language Second, or M1/L2. If a learner learns L1 in the oral and aural modality, and learns a second language in the visual-gestural modality, it is M2/L2. Learning a language of the same modality and a language of different modality entails different teaching and learning processes.

In addition, there are two cases of sign language pedagogy. In the first case, sign languages are used to teach, learn, and assess in academic subject matters, including sign language linguistics and literature. In the second case, sign languages are used to teach, learn, and assess in sign languages. Both approaches are used with native child users of sign languages and hearing learners, and with deaf learners who are either late deafened or were raised in spoken and written languages.

What remains are questions about sign language pedagogy. The questions are: How do the teachers teach sign languages? What and how do they learn how to teach? How do the teachers and learners use sign language to teach and learn academic and other scholastic subjects? How can the teachers tell that their learners are actually learning, acquiring, and using sign languages? These questions raise issues about instruction, curriculum, and assessment in sign languages as L1 and L2/ L_n . There are published studies of descriptions of the use of sign language to teach academic subjects to deaf and hard of hearing who are users of sign language as their L1. They looked at how sign languages help signing deaf learners learn scholastic subjects such as reading, writing, and mathematics. Recent studies have looked at the psychological and psycholinguistic processing of sign languages and sign language acquisition by hearing learners who learn sign languages as their L2/ L_n . However, as previously mentioned, the studies in sign language pedagogy are scattered across journals, books, and conference proceedings.

The Handbook of Sign Language Pedagogy

The *Handbook* is an overview of the current research studies and pedagogical practices in different aspects of the L1 and L2/ L_n pedagogy in sign languages. There are four parts in the *Handbook*. Part I covers standards in sign language pedagogy. Part II contains chapters on the pedagogical uses of sign languages with children who are L1 users of sign languages. Part III includes chapters on the pedagogical uses of sign languages with learners of sign languages as their L2/ L_n . Part IV comprises of chapters that discuss the different constituencies of sign language pedagogy such as learners, parents, and sign language interpreters. Part V contains chapters on resources that are used in sign language pedagogy. In each chapter, an introduction, theoretical perspectives, pedagogical applications, and future trends in research and practice are proffered. The introductory section outlines problems and issues in the area. The theoretical perspectives section is a discussion of the main concepts and theories. The pedagogical applications section explicates the programs, services, and strategies in sign languages. The section on future trends contains suggestions for future research topics and practical applications.

For the purposes of this book, the chapters focus on M1/L1 sign language users who are deaf and hard of hearing children, and M2/L2 and M2/ L_n for the learners of sign languages who are largely hearing. In addition, for the purpose of discussion on pedagogy, the L2 is combined with L_n into L2/ L_n to refer to learners who learn sign languages as another language, may it be their second, third, or additional language. The rationale is that the distinction between L2 and L_n has

not been ascertained by research studies to play a role in pedagogy. It has only been ascertained to play a role in language learning process and acquisition, and will be treated accordingly when research studies and subject populations are discussed in the chapters.

In Part I, one chapter examines the standards for sign language pedagogy. Standards are necessary to ensure conformity and standardization in knowledge and skills in pedagogy. Without standards in sign language pedagogy, teachers and practitioners were left to their own understanding of what language, linguistics, pedagogy, culture, and learning are, with the result being nonconformity and nonstandardization in sign language instruction, curriculum, and assessment. There are standards in many countries, and no standards in a few countries. Russell S. Rosen in Chapter 1 explores the issues of standards and its development, constituencies, and impact on pedagogical practices. In countries where there are standards in pedagogy, the standards are shaped by several institutional sources in public policy, research studies, pedagogical practices, and language communities. The constituencies of sign language pedagogy are teachers, learners, and practitioners. Different social institutions, which are the government education bodies, organizations of teachers, practitioners and researchers, and the deaf communities, have different standards and areas of jurisdiction for the different constituencies. Across the countries that have standards, they have different standards and configurations among the institutional sources for first, second, and additional languages. For purposes of explication, different models of standards in the US and the UK are discussed. Rosen argues that it is imperative that standards are established to ensure a level of quality, expectations, and attainments in knowledge and performance that are valued for sign language pedagogy in society to enhance professionalization and scholarly approach to pedagogy and learning, and that are emblemized in the form of degrees, certifications, licensures, and accreditations. The teachers should follow the standards in their development of curriculum and instruction strategies to ensure that the learners' learning outcomes will meet the standards.

Part II looks at sign language pedagogy, in particular the preparation of educators, the use of sign languages to teach and assess in scholastic subjects in classrooms with learners who are native L1 users of sign languages, and the political issues with L1 sign languages. The chapters cover teacher preparation and qualification, teaching approaches and strategies, the uses of sign language to teach reading, writing, mathematics and literature, the uses of different tests and assessment procedures, and the politics of sign language pedagogy in L1 classrooms.

No individuals should become teachers and users of sign language in classrooms with deaf and hard of hearing children without demonstrating that they have the knowledge and skills in sign language and pedagogy. There is a constant need for teachers who are competent not only to teach sign language as a L1, but also use sign language to teach scholastic subjects in classrooms of deaf and hard of hearing learners who are native L1 users of sign language. The pedagogical and sign language knowledge and skills are attainable at teacher preparatory programs. Katharina Urbann, Thomas Kaul, Leonid Klinner, Alejandro Oviedo, and Reiner Griebel wrote about sign language teacher preparation, qualifications, and development in Chapter 2. They looked at teacher preparation programs (TPP) that prepare individuals to become sign language teachers who will teach and use sign languages in L1 classrooms. The TPPs offer coursework, projects, and practicum experiences that focus not only on the teaching of scholastic subjects, but also deaf children's sign language development, Deaf culture, and sign language assessment. Urbann, Kaul, Klinner, Oviedo, and Griebel propose that, since the emphasis in the L1 classrooms is on the development of literacy in written and signed languages, TPPs should offer a bilingual and bimodal orientation that enable children to acquire both written and sign language literacy. The coursework, projects and experiences should be in the areas of linguistics, Deaf Studies, sign language assessment, sign language teaching, sign language curriculum development, language

acquisition, language acquisition, and research on bilingually educated deaf children. TPPs should also provide opportunities for future teachers to get involved in and maintain contact with the deaf community. The teachers should have an open and positive attitude and a keen interest in teaching sign language. An example of a TPP program with the above features from the University of Cologne is described.

L1 teachers develop different teaching approaches and strategies using sign languages that may affect learner proficiency in not only sign languages, but also scholastic subjects. Carolina Plaza-Pust discusses the different L1 sign language teaching approaches and strategies in Chapter 3. Research shows that sign language proficiencies are positively correlated with L2 written language proficiencies, reading comprehension, and spoken language use. In L1 classrooms, sign language is used as the language of instruction in not only sign language, but also scholastic subjects including written and spoken languages. Modeling after Cummins' Linguistic Interdependence Hypothesis, Plaza-Pust calls for the creation of sign bilingual classrooms that are built on the following assumptions and components: Sign language is the primary language of deaf learners, used as the language of instruction in L1 classrooms, helps deaf children develop metalinguistic awareness of the properties of the two languages, and aids the learning of spoken and written languages. For the signing deaf children, both written and spoken languages are viewed as second languages. Deaf learners' diverse social and cultural community affiliations and bilateral and identity developments should be promoted in bilingual classrooms. In bilingual classrooms teachers and learners make language choices and code-switch across languages based on individual and situational factors, such as to introduce a concept and vocabulary, translate across languages, and connecting and contrasting between sign and written languages. The order in the use of languages may vary, and translanguaging is found useful in some classrooms where languages of different modalities alternate between teachers and learners.

Sign language can be used to teach scholastic subjects, including teaching and learning how to read. In Chapter 4, Laurene E. Simms and Jean F. Andrews describe the uses of L1 sign languages to teach reading. Reading is an act of recognizing words and comprehending written or printed text, which requires language abilities in phonology, vocabulary, and semantics; high learner motivation; well-defined curriculum; and resourceful home and school experiences. In spite of orthographic differences between written words and signs, deaf native users use sign languages to process reading. Deaf bilinguals use sign language to mediate print, or use sign, spoken, and written languages to read. Modeling after Cummins' Linguistic Interdependence and Threshold Theory, Simms and Andrews argue that learners' proficiency in L1 sign language can be transferred to their L2 written and print languages. The learners would need to attain a high level of L1 competence to access L2 print and written languages and gain linguistic and cognitive benefits. In bilingual reading classes teachers and learners use simultaneous communication or total communication environments to support print literacy. A Reading-Thinking-Signing (RTS) strategy for the teaching of reading is proposed. It presupposes that reading comprehension involves both decoding ability and linguistic knowledge. Teachers in bilingual reading class use sign languages to teach decoding, language, and comprehension. Teaching strategies are proffered. Reading begins with word recognition, word-sign correspondences and its meanings, proceed to reading the whole text and, using sign languages, discussing its contents and progression, and ending with a discussion of language structures and textual cohesion.

Sign language can also be used to teach how to write as a scholastic subject. Krister Schönström and Ingela Holmström discuss the use of L1 sign languages to teach writing in Chapter 5. As an act of composing a text, writing is a problem-solving, decision-making and self-regulating process. Good writing skills require motivation and psychological, linguistic, pedagogical, social, and transcription skills. According to Holmström and Schönström, variation in writing skills among

deaf learners point not to deafness, but pedagogy as the problem. If sign languages are deaf learners' L1 languages, written languages are their L2 languages. There are similar developmental stages in grammatical constructions in writing among the deaf and hearing L2 written language learners. They make errors in inflectional morphology, contain limited vocabulary, and infrequently use cohesion markers. In writing classes with deaf learners sign languages are used to make sign-word correspondences, translate from sign language to written language, compare and contrast linguistic structures of two languages, develop and discuss ideas, and develop outlines. Examples from Sweden and Denmark are exemplified. Teachers identify literary objectives for learners. The teachers and learners follow writing processes used by expert writers, discuss ideas for writing, and compare sign and written languages. The teachers transfer control of text writing to the learners. They use sign languages including fingerspelling and chaining reading texts with signs to scaffold learners' writing process. The learning process becomes authentic when learners and teachers generate, revise, and publish textual pieces for an audience.

Like reading and writing, sign language can also be used to teach and learn mathematics as a scholastic subject. Christopher Kurz and Claudia Pagliaro explore the uses of sign languages in mathematics classrooms in Chapter 6. Mathematics is a language, and language is used to develop and manipulate mathematical concepts to express wants and needs in quantity, quality, size, amount, and time on a daily basis. Deaf children experience delayed mathematical language acquisition, highly variable language pedagogical approaches, and lack of access to mathematics vocabulary in sign languages in the K-12 classrooms. Mathematical concepts tend to be expressed in written form, and deaf children's reading difficulties magnified their difficulties in mathematical learning. Studies show that higher levels of metalinguistic awareness in sign languages are positively correlated with higher levels of mathematics achievement. Modeling after Cummins' Linguistic Interdependence Theory, Kurz and Pagliaro argue that signed language proficiency is transferable to written language proficiency, and that sign language as a language of instruction supports the learning of mathematical concepts for deaf children. They propose an academic sign language system built on semantically accurate sign vocabularies for teachers to use in their teaching of mathematics. A semantically accurate sign or classifier maps the underlying meaning onto numbers and other mathematical concepts such as numerator, denominator, fraction, proper fraction, mixed number, digit, base, exponent, subscript, superscript, coefficient, variable, term, and place value. Teachers and learners use the semantically correct mathematical sign vocabularies to count, create categories, memorize, draw space, and discuss story problems.

One of the aims of sign language education for deaf and hard of hearing children is to develop skills in sign language, which is sign language literacy. Sign language literature is a useful resource with which the children develop sign language literacy. In Chapter 7, Russell S. Rosen discusses the teaching of sign language literature in L1 classrooms to aid learners' sign language linguistic and critical literacy development. Sign language literature, like spoken and written language literature, are texts that contain thoughts, feelings, perspectives, experiences, and stories. Individuals watching and signing literary works learn how sign language is structured and its contents expressed in sign languages. In deaf education classes the tendency is for teachers to use sign language to teach sign language translations of written literature. Sign language literature is not written but contains works in sign language in various genres, namely, sign language stories, stories in sign language, handshape stories such as alphabet and number stories, and sign language poetry. Rosen proposes that teachers use literary works conducted in sign languages, either live or on videos, to aid deaf children develop their ability to use sign languages to express ideas, thoughts, messages, communicate with, and watch and understand other signers. In sign language literature classrooms teachers and learners use sign language to draw information from,

retell, discuss, and develop sign language literary works. They learn how sign language literary works are created using the phonological, morphological, morphosyntactical features including classifiers, syntactical, semantic, and pragmatic features of sign languages. They also use sign language literary works as archetypes to create their own stories. Examples of lesson structures for comprehending and creating sign language literature are given.

To ensure that the learners are mastering sign languages, they need to take tests and other assessments. Teachers and educator evaluators develop the assessments. Tobias Haug, Wolfgang Mann, Joanna Hoskin, and Hilary Dumbrill examine different sign language tests and assessment procedures in Chapter 8. Assessment tests and procedures in L1 sign languages are developed to assess and monitor deaf children's native sign language development. However, the development of assessment tests and procedures has been delimited by several factors such as the limited research studies that are available on the structure and acquisition of sign languages, the small size and heterogeneity of the deaf population, and the heterogeneity of deaf children in terms of their language acquisition. The psychometric properties of validity and reliability in assessment tests are described. Haug and colleagues propose an argument-based framework in assessment, which are that assessment results and research findings are used to justify claims on the children's mastery of L1 sign languages. In this sense, they suggest that within the argument-based framework, construct validity is to be the standard to justify scores and claims. Different tests and assessment instruments in different sign languages that are used by teachers and practitioners at schools are arranged and reviewed by language target such as vocabulary and grammar; test response solicitation such as receptive and/or productive skills; target group such as babies, toddlers, and children; the sign language(s) for which tests are initially designed; and the sign language(s) for which the tests are adapted.

The provision of sign languages in education with deaf and hard of hearing individuals is made possible by the political forces that enabled the allocation, distribution, and use of sign languages in L1 classrooms. Ronice Müller de Quadros and Robert Hoffmeister exemplify the politics of L1 signed language pedagogy in Chapter 9. Sign language pedagogy has been besieged by issues of power, status, and policies regarding language and culture for deaf individuals among the medical and audiological practitioners, hearing educators, and members of the Deaf World. These groups differ in perspectives on signed language, that is, whether it is a problem, a resource, or a right. Research in neurolinguistic imaging show that brain has the capacity to segment the linguistic stream in signed languages as they do in spoken and written languages. Deaf children have certain epistemologies or "ways of knowing" in their learning, particularly in the reading process. Quadros and Hoffmeister take the position that signed languages are L1 for deaf people because it is visual and easily accessed and acquired through the eyes, and should serve as a resource in L1 pedagogy. L1 signed language and Deaf culture should be incorporated in the school curriculum. The curriculum should take a sign language-and-written language bilingual-bicultural orientation. Instruction and learning in L1 sign languages should align with L1 signed language acquisition. Deaf cultural information should be used in classrooms to aid Deaf cultural identity development. Teachers in deaf education classrooms should employ strategies that enhance reading and writing abilities of deaf children using signed languages. An example is the Reading-Thinking-Signing (RTS) strategy in the teaching and learning of reading, whereby deaf children develop and connect fingerspelling ability, vocabulary, and reading comprehension using multimedia products in text, pictures and images, and sign languages.

Part III examines the teaching, assessment, and politics of sign language in classrooms with learners who are L2/*L_n* learners of sign languages. The chapters cover teacher preparatory programs, course design in L2/*L_n* pedagogy, teaching approaches and strategies in L2/*L_n* classrooms, the teaching of sign language fingerspelling, vocabulary, and grammar, sign language

literature, L2/*Ln* sign language tests and assessment procedures, and the politics of teaching sign languages to L2/*Ln* learners.

While there is a worldwide growth in classes in sign language as L2, a few countries offer teacher preparatory programs (TPP) in L2 sign language pedagogy. Teachers and practitioners who do not enroll in a TPP tend not to have a foundation in language, learning, and culture, and practical experiences in pedagogy. They would depend on their intuitions and presumptions. Individuals wishing to teach sign language as L2/*Ln* should enroll in a TPP. In Chapter 10, Russell S. Rosen and James Woodward examine L2/*Ln* sign language teacher preparation, qualifications, and development. The offerings in TPPs vary by national and local education regulations in countries where the TPPs are located. Rosen and Woodward describe a few exemplars in L2 sign language TPPs in the US and in Asia. They propose that TPPs should prepare individuals to become professionals as teacher-researchers who teach in a highly scholarly manner and as a contextualized, investigatory, cultural, and problem-solving endeavor. To this end, the TPPs should offer coursework, research, and practicum experiences on language, linguistics, anthropology, sociology, culture, arts and literature, pedagogy, language learning process and acquisition, curriculum development, assessment, and classroom behavior management. The individuals who are interested in becoming L2 sign language teachers should have learner teaching and practicum experiences and conduct classroom research studies.

Teachers who are teaching sign languages as L2/*Ln* would need to know curriculum and how to develop courses in L2/*Ln* classrooms. Alejandro Oviedo, Reiner Griebel, Thomas Kaul, Leonid Klinner, and Katharina Urbann proffer course design in L2/*Ln* sign language pedagogy in Chapter 11. In countries where there are courses in L2/*Ln* sign languages, the curricula tend to be adaptations in forward design fashion from curricula used in L2/*Ln* spoken languages. Currently, the curricula are learner-centered and grounded on standards, research studies, and learner outcomes. Instruction is conducted with activities and tasks. Different curricula such as Frankfurt, Grundkurs, Desire, LIBRAS, Australian Auslan, and Confederación Nacional de Sordos de España (CNSE) are reviewed. Each curriculum is analyzed for content, process, and outcomes. The content includes vocabulary, grammar, pragmatics, sociocultural contents, and functions and forms of sign languages. The process includes teaching messages, uses of sign languages, and teacher and learner characteristics and styles. Outcomes include knowledge and communicative skills based on standards. Oviedo and colleagues found that the different curricula vary in content, process, and outcomes. They propose that educator practitioners should consider the content, methodology, outcomes, time distribution, and course planning in curricula design that is learning-centered and forward-designed.

The issue for the teachers is the technique in teaching, including curriculum and instruction, that will generate higher learner outcomes. Due to limited theoretical and empirical knowledge in L2/*Ln* sign language pedagogy, signed language teachers rely on their intuition and understanding of language and culture. Different teaching approaches and strategies in L2/*Ln* sign language are reviewed by Elideia L.A. Bernardino, Maria C. da C. Pereira, and Rosana Passos in Chapter 12. Current instructional methods are language-centered, learner-centered, and learning-centered. They posit that sign language teachers should be transformational intellectuals and critical pedagogists, or agents of change, that have the potential to affect the lives of their learners. Opportunities should be created for teachers and learners to immerse themselves into Deaf cultures and participate in the deaf community. Modeling after Kumaravadivelu, Bernardino, Pereira, and Passos proffer a Post-method Pedagogy as an alternative approach in teaching technique. In this approach, teachers experiment with pedagogical solutions in a scholarly fashion that considers their teaching, learner outcomes, and the sociocultural environment of classrooms along the parameters of particularity, practicality, and possibility. In the Post-method Pedagogy,

the parameters include particularity in goals, lessons, content, and setting for particular learners; practicality in teaching that connects learners with contents; and possibilities for learner learning subjectivity and self-identity. The teachers need to devise clear objectives, learner learning goals, instructional materials, teaching and learning equipment, lesson procedures, and evaluation, and take into consideration the needs and motivations of learners, the availability of resources, the teachers' qualifications, the learning environment, learners' cultures, and the time available for instruction.

One of the topical areas in the teaching and learning of sign languages is L2/*Ln* is fingerspelling. Leah C. Geer discusses the teaching of L2 sign language fingerspelling in Chapter 13. Fingerspelling is the manual representation of printed alphabets. They are used in sign languages to represent print alphabet, and names and words from spoken languages for which there is no sign and may become lexicalized as a sign. The issue for L2/*Ln* learners is the production and reception of the shape and movement of the hands and fingers as fingerspelled alphabets are produced. L2/*Ln* learners perceive and produce fingerspelled words with marked shape more than unmarked shape. The length and alphabetical order in words in spoken languages are not the same as the fingerspelled string in sign languages. L2/*Ln* learners would need to be taught not only sign language fingerspelling of spoken language alphabets, but also lexical items. Geer suggests that teachers teach learners how to develop a flow in fingerspelling of a word that is not "bouncing" or "stamping." Fingerspelling should not be produced solely in the alphabetical order of letters in words. L2/*Ln* learners should be given direct access to lexical items and models of fingerspelling, the opportunity for consistent practice and be given feedback from teachers. An RSVP curriculum in the teaching and learning of fingerspelling is described.

Another topical area in the teaching and learning of sign languages as L2/*Ln* is vocabulary. In Chapter 14, Rachel E. Traxler and Kimi Nakatsukasa explore the teaching of L2 sign language vocabulary. In order to communicate and understand others, one needs vocabulary knowledge. L2/*Ln* learners of spoken languages rely on their L1 mental lexicon to connect with target L2/*Ln* vocabulary. L2/*Ln* learners of sign languages, in cases where they are L1 users of spoken languages, would need to learn target vocabulary in a visual-manual modality by connecting it with their L1 mental lexicon in the oral-aural modality. In addition, there is weak correspondence across sign language lexicon and spoken language lexicon. The issue for the teaching of L2/*Ln* sign language vocabulary is the mapping of meaning onto form, and form onto meaning in the languages. Research shows that some learners benefit from using or voicing L1 lexicon to aid in their learning of sign vocabulary. Other learners prefer learning sign vocabulary without using or voicing their spoken language lexicon. Because of variations in learners' processing abilities, teachers should differentiate their instruction, incorporate voice-on and voice-off instruction, and have the learners practice in comprehending and producing sign vocabulary.

Still another topical area in the teaching and learning of sign languages as L2/*Ln* is grammar. Russell S. Rosen in Chapter 15 reviews the teaching of L2 sign language grammar. Grammar, which contains morpho-syntactic devices for stringing words together into phrases and phrases into sentences, is another area that individuals need to know in order to express thoughts, have conversations, and understand other people. Grammar varies by topics, contexts, and relationships. To teach sign language grammar is to explicate rules and its usage in different contexts and for learners to develop grammar competence to have meaningful communication within the different contexts. Due to its visual and manual nature, certain features in sign languages distinguished it from spoken languages, which are non-manual facial and bodily expressions, constructed action, and classifier systems. There are different pedagogical approaches in sign language grammar. The approaches are behaviorism, rationalism, communication, conversationalism, cognitive linguistics, and translanguaging. They vary in topics, linguistic structures, and emphases on vocabulary and

grammar. The different approaches are premised on different assumptions about the linguistics and psychology of learning grammar that are based on the prevailing theories and approaches in linguistics, the psychology of learning and teaching, and the values of a society that dictate topical content. Pedagogically, grammar can be taught in various ways, namely, translations, drills, and rote memorization; analyzing linguistic rules; developing through communication; talking about content; and performing tasks. Other considerations such as the use of gestures, written language, cognitive strategies, and corpora in grammar teaching and learning are discussed.

Sign language literature is also another topic for teaching and learning sign languages in L2/Ln classrooms. Rachel Sutton-Spence discusses the teaching of sign language literature in L2/Ln classrooms in Chapter 16. As in Chapter 7, sign language literature includes works of artistic and cultural merit that are produced by deaf people using sign languages to reflect their worldviews. There are different genres of sign language literature and they are fiction and nonfiction, sign language folklore, poetry, and translations. Teachers who teach sign language literature should focus on its language and literary components, and demonstrate how sign language is used to produce literature. Teachers can provide their own literary works or draw on videos of sign language literary works. Teaching lessons entail analyzing the literary and linguistic aspects of sign language literature and teachers construct activities for learners to analyze and comprehend literature and develop stories. They should cover topics such as the notions of literature, sign language literature and its cultural roles and social contexts, oral literature, deaflore, narratives, cinematic stories, deaf humor, signing techniques, storytelling techniques, story structure, poetry and prose, styles, and future literature. Learners participate as audience members and create literature. In addition, there are five constituencies with whom sign language literature is used as part of pedagogical practice, each with different emphasis on the language and literary aspects. They are learners in courses and programs in conversational sign language, Deaf culture, sign language linguistics, sign language literature, and interpretation. Specific strategies in the teaching of literature for the different constituencies are suggested.

As there is an increased professionalization in L2/Ln sign language pedagogy, and a growth in the number of teachers, learners, interpreters, and other practitioners who teach, learn, and use sign languages as their L2/Ln, there is also an increased need to assess their sign language skills. In Chapter 17, David H. Smith, Jeffrey Davis, and Dan Hoffman discuss L2/Ln sign language tests and assessment procedures. They argue that the development of assessment instruments and procedures would need to follow the standards that are created by the governmental education entities, which use test results to help them determine whether to grant diplomas, certifications and credentials to learners, teachers, interpreters, and other practitioners. Smith, Davis, and Hoffman examine the *who*, *why*, *what*, and *how* of L2/Ln sign language assessments. The *who* is the audience for which the tests are designed. The *why* is the test purposes and its alignment with standards for diplomas, certifications, and credentials. The *what* is the psychometrics of validity and reliability and the domain areas of sign languages linguistics that the tests are assessing. The *how* is the test procedures and formats. The available L2/Ln sign language assessment tests and procedures are evaluated in terms of the above concerns. The remaining issues that need to be addressed are the use of the assessments cross-sectionally and longitudinally, inter-tests reliability, the highly subjective nature of evaluator ratings, and adaptations of available L2/Ln sign language assessments to countries where there are no assessments of their sign languages.

The acceptance, locations, and offerings of sign languages as L2/Ln depend on the countries' view of deaf people and their language, community, and culture. Timothy Reagan examines this issue in his exposition of the politics of L2/Ln sign language pedagogy in Chapter 18. Nations develop language policy and planning (LPP) that determines the selection, acceptance, and implementation of foreign or world languages. The nations' LPPs for foreign and world

languages are frequently shaped by their attitudes towards different language communities, and delimit the course offerings, curriculum, instruction and assessment of the L2/*L_n* languages. As the LPPs of the nations change, the pedagogy for L2/*L_n* languages also changes. While there is a worldwide proliferation of classes and programs in L2/*L_n* sign languages, political issues in nations affect the recognition, status, and distribution of L2/*L_n* sign languages in education for its inhabitants. The political issues for L2/*L_n* sign languages pertain to whether there is a disability, civil, and/or legal right for it to be offered in education. Reagan looked at the history of the US' LPP towards ASL as a case example, and described how the American LPP shapes L2 ASL pedagogy. L2 ASL pedagogy is tied with developments in deaf education. At American schools for the deaf in early nineteenth century, sign language was seen as the language of disability, and manual English was taught to hearing learners for educational and religious purposes at educational and religious institutions for the deaf in a laissez-faire fashion. The view of ASL evolved in late twentieth century into a language rights issue that was built on a civil rights model that promotes deaf-hearing communication, and the learners are taught ASL structural forms and communicative functions that follow government-mandated standards in general education institutions.

Part IV looks at the characteristics of different learners of L1 and L2/*L_n* sign languages. The chapters cover typical and atypical learners, interpreting learners, and (hearing) parents of deaf children. Teachers in L1 and L2/*L_n* classrooms where signed language is used as the language of instruction often encounter diversity in learning abilities among learners, including language aptitude and phonological short-term and working memories. Jenny L. Singleton, David Quinto-Pozos, and David Martinez examine the issues of typical and atypical signed language learners in Chapter 19. Typicality as measured in performance in signed language ability occurs when an individual falls within group mean, and atypicality occurs when an individual falls more than one standard deviation from the mean, although these are not the sole criterion, as assessment of individuals' language abilities need to derive from different data types. Signed language acquisition by native deaf children is found to parallel spoken language acquisition by hearing children. There are similar receptive and productive errors in the acquisition process for both languages. Some individuals do not progress in vocabulary, grammar, discourse, and narrative ability. They have developmental language disorder in their L1 signed languages, which may carry over to their L2 learning. Singleton, Quinto-Pozos, and Martinez find that learning signed language such as ASL is just as difficult for learners with attention deficiency disorders, and propose that those learners can make progress with therapeutic intervention, an area that is in need for signed language therapists. For some hearing learners with diagnosed spoken language or learning difficulties, signed language may be a viable L2/*L_n* option.

Deaf children are largely born to hearing parents, and the parents tend not to know, much less use, sign language. In many countries the parents tend to have their deaf babies receive neonatal hearing screening and early intervention services that focus on oral and aural language development. This has created communication difficulties and delays in the language development of many deaf children. In Chapter 20, Kristin Snoddon discusses sign education for parents, particularly those who speak and hear. Parent sign language education is based on the advocacy for deaf children to support communication between parents and deaf children. Snoddon proposes that parent sign education builds on the premises that deaf children are children, use sign language, are not ill, and will become adults and live with both deaf and hearing people. A plurilingual pedagogical approach that combines sign with written and spoken languages is suggested for parents to learn sign language as L2/*L_n*. Examples of parent sign education from the US, Canada, and Australia, and European and Scandinavian countries are described. Schools for the deaf and regulatory education bodies in these countries provide home visiting and outreach services to the families with teachers, social workers, parent educators, child psychologists, and deaf native

users. The home visiting services are given a few days weekly to support deaf children's language development through sign language in play and informal teaching. The schools also provide courses in sign language, storytelling, and child language development for the parents.

Some individuals who wish to become sign language interpreters would need to learn sign languages. Melanie Metzger, Keith M. Cagle, and Danielle I.J. Hunt in Chapter 21 explore the role of signed languages in interpreter education, both in the teaching and the use of L2/*L_n* signed language in interpreting classrooms. The development of signed language interpreter education has been need-driven, rather than theory-driven. Interpreter education programs were often developed to meet a legislated need and focus on signing and voicing skills. Research in the education of interpreting learners and the process of interpretation are emerging. Metzger, Cagle, and Hunt took a survey of interpreter training programs particularly in the US as an example and found variations in enrollment and exit requirements, course content, sign language form of instruction, and language immersion. The most pressing future trend is towards a research-driven and evidence-based pedagogy of interpretation studies. Metzger, Cagle, and Hunt suggest that interpreter training programs offer interpreting learners a variety of interpretation courses that focus on cognitive processing in interpretation; translation, consecutive, and simultaneous interpreting skill development; sign systems used in the deaf community; and ethical decision making and business practices. Classes in interpretation should focus on the transfer of meaning between a sign language such as ASL and a spoken and written language such as English. The grammar-translation and Direct Method approaches should be used in the teaching of sign languages to interpreting learners since these approaches allow the learners to compare the two languages' lexicon, grammar, and semantics.

Part V proffers the resources that are used in sign language pedagogy. In particular, the chapters discuss the technologies and sign language corpora that can be used in both L1 and L2/*L_n* sign language classrooms. Technology has increasingly played an important role in teaching thanks to recent developments in human-machine interaction, robotics, and smart devices. Hatice Kose and Pinar Uluer review the uses of technology in sign language teaching and learning in Chapter 22. The sign recognition systems include kinect and body sensors to record and show signs. The e-learning platforms contain dictionaries and instructional materials such as lessons, videos, and assignments. Robots have the capacity to communicate with learners. Virtual reality and avatar-based systems provide environments and virtual individuals with which learners perceive and express information in sign language. These developments enabled practitioners and researchers to recognize sign language, translate signs to words and vice versa, generate signs and words, and serve as e-platforms for courses, instructional materials, and presentation of lessons. While technology does not substitute teaching, it has become an assistive tool for practitioners and researchers. Examples of technological devices that can be used in sign language classrooms are smart mobile-internet based applications, e-learning platforms, and robotics. Teachers who use technology in sign language classrooms can use different technologies such as web platforms on computers, mobile applications, and humanoid robots to create and review materials; record and translate signs; and teach, tutor, assess, and provide feedback and corrections to learners. Learners use the technologies to learn, review, and receive feedback and corrections, and to translate, answer, record, and create their materials.

Corpus in sign languages has increasingly been used by teachers and in classrooms as a resource in the teaching and learning of sign languages. Lorraine Leeson, Jordan Fenlon, Johanna Mesch, Carmel Grehan, and Sarah Sheridan reviewed the use of corpus in L1 and L2/*L_n* sign language pedagogy in Chapter 23. A corpus is a collection of vocabularies, phrases, and sentences that are drawn from spoken and printed texts that is representative, installed in machine-readable form, and acts as a standard reference in languages. Corpora have a role in research as well as in

pedagogy. Sign language corpora contain information about language form, function, variation, and grammatical structures based on frequency patterns and register-specific discourse in sign languages. It also contains videos of signers signing exemplars in sign language lexical, phrasal, and grammatical structures. Leeson, Fenlon, Mesch, Grehan, and Sheehan suggest that the corpora can be used in a number of ways that promote active learning. Examples of corpus-based sign language teaching from Sweden and Ireland are described. Modeling sociotechnical theory, they proposed that language learners develop the corpora to install vocabularies, phrases, and sentences on the computer, and use the corpora to discover patterns and make generalizations about sign language form and use. Teachers develop exercises for the learners to identify, search, and observe concordance patterns in lexical, phrasal, and syntactical features of sign languages. To support learners, teachers provide feedback and direct them towards particular components in the corpus.

Considerations on terminology

There are areas for consideration regarding the terms that are used in the chapters of the *Handbook*. They are the distinctions between the terms “Deaf” and “deaf,” and “signed” and “sign” language. The terminologies are constantly debated in the research community. The former debate pertains to the perceptions of deafness, and the latter debate hinges on the linguistic congruence with other languages.

Regarding the terms “Deaf” and “deaf,” the argument is that the latter term refers to the audiological condition and the former refer to the cultural condition of deafness. Individuals are considered as “deaf” individuals if they experience a lack of hearing, hearing difficulties, or limitations; do not use sign language but largely use speech to communicate; and do not involve in the Deaf community and cultural activities. Individuals are considered as “Deaf” may or may not lack or experience hearing limitations, but prefer to use sign language to communicate, and participate in the Deaf community and cultural activities. The terms are intrinsically vague. Regarding the term “deaf,” an argument is that it can be taken as a generic term that encompasses all individuals who lack or have hearing limitations regardless of language preference for communication. Another argument for the use of the “deaf” term is that there are individuals who may be born as culturally Deaf, particularly to signing Deaf parents, but can in the process prefer not to use sign languages or participate in the Deaf community and cultural activities. Regarding the term “Deaf,” an argument is that there are hearing individuals who use sign languages as their preferred language of communication and participate in the Deaf community and its cultural activities, which suggest that the lack of hearing or hearing difficulties are not necessary conditions for the designation.

Regarding the terms “signed” and “sign” language, the argument hinges on the conjunctions between languages of different modalities. The argument for the use of the term “signed” with the “-ed” ending is that researchers use the term “spoken” to refer to the languages that are grounded on the oral and aural modality. By implication, the term “signed” with the “-ed” ending should refer to the languages that are grounded on the visual and manual modality. Another argument holds that the linguistic constructions of the languages that are “signed” are comparable to the languages that are “spoken,” which should justify the use of the term “signed languages.” However, a contrastive argument can be made that the term “signed” aligns the languages to the oral and aural modality of “spoken” languages. Because the two languages differ in modality, the visual and manual languages should be called as “sign” languages. Still another argument in favor of the term “sign” is that it includes the different languages of the world such as American Sign Language, British Sign Language, French Sign Language, German Sign

Language, Sign Language of the Netherlands, Swedish Sign Language, Japanese Sign Language, and all other sign languages. In this case, “signed” is not designated in, and “sign” is seen as a generic term that refers to all formally named sign languages of the world.

The contributors of this *Handbook* varied in the terms they chose to use in their chapters. Some contributors used the term “deaf” while other contributors used “Deaf.” One chapter uses “d/Deaf.” In addition, some contributors used the term “sign” while others used “signed.” Only in a few chapters the contributors wrote their decision to use the terms based on their arguments regarding the issues they examined. Most chapters did not contain an explanation of the choice of terminologies. This might create confusions across the chapters about the terms and the languages and constituencies to which the terms refer.

The decision of the editor for the *Handbook* is as follows. Only the term “sign” is used in the titles of chapters and the whole *Handbook*. Within each chapter, the contributors choose the “sign” and “signed,” and the “deaf” and “Deaf” terms based on their viewpoints regarding the issues and its constituencies they present. To standardize terminologies is to create a uniformity of the constituencies throughout the *Handbook* that masks the complexities of the issues. The chosen terminologies reflect the contributors’ tackling of the pedagogical issues and its constituencies. The contributors of the chapters were given the discretion as to the terms they decide to use in their chapters, and express their own views on the issues.

Part I

Standards



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Standards in sign language pedagogy

Russell S. Rosen

Introduction

Teachers and educational practitioners conduct pedagogical activities in sign language as L1 and L2/ L_n with children and adults. They develop curriculum, instruct, and evaluate their learners' learning. Underlying the pedagogical activities are presumptions about the aims and effectiveness of language instruction and the content domains in instruction, curriculum, and assessment. The presumptions are dictated by the goals of a community of language users. The community goals pertain to the domains and levels of achievement and the means for reaching it.

However, in many countries there are no standards in sign language pedagogy. Consequently, there is nonconformity and nonstandardization in sign language instruction, curriculum, and assessment. Teachers and practitioners often revert to their own understanding of what language is, how to teach it, how learners learn, and how to assess learners' language knowledge and skills. Without an understanding of language, its transmission, and assessment among teachers and learners, a plethora of knowledge and skills may result, with the consequences being the lack of uniformity in language constructions, the teaching and learning of the language, and language abilities among teachers and learners within and across sign language classes.

There is a need to ensure conformity and conjunctions in sign language pedagogy in classes within and across countries. In addition, there is a need to enhance quality assurance in language pedagogy, the professionalization of teachers, and the use of research- and evidence-based data to guide pedagogical language activities. These needs for quality assurance provide the impetus for the development of standards not only in language instruction, curriculum, and assessment, but also language classes and programs, teacher preparatory programs, and teacher development and qualifications. Below are the theoretical constructs in standards.

Theoretical perspectives

Standards are a set of domain areas and a level of quality, expectations, and attainments in knowledge and skills in the domain areas. They are the "ought to haves" in knowledge and performance that are deemed as important in society. It is a value system, a product and a process. In

standards, the value system is a set of domains that is worth knowing and skilling on, the product is a set of benchmarks, and the process is a series of protocols that reach the benchmarks. The purposes of standards are to ensure that individuals have the knowledge and understanding of the concepts in a domain area and skills in performing tasks effectively. Individuals who meet the standards are endowed with recognition.

The standards in pedagogy contains benchmarks, or milestones, of knowledge and skills in the domain areas of instruction, curriculum, and assessment. They also include protocols, or procedures, for performances that demonstrate the knowledge and skills that meet the benchmarks. The benchmarks and protocols in the standards are measured as outcomes in rubrics that are used to determine qualifications (Taut & Sun, 2014). Individuals in the fields of pedagogy who meet the standards are endowed with different forms of recognition such as degrees, certifications, licensures, and accreditations. The standards are developed to ensure higher learner achievement and teacher quality, and bring professionalism into the field of language pedagogy and learning (Phillips, 1999; Call, 2018). By focusing on the quality and assurance in pedagogy, the standards have an impact on language teaching, course design, testing, and educational policy (Cox, Malone, & Winke, 2018), and learners' learning performances (Troia, Olinghouse, & Wilson, 2016). Research studies found that learner outcomes are positively correlated with board certified teachers who meet the standards (Belson & Husted, 2015), and where assessments are closely aligned with the standards (Troia, Olinghouse, & Zhang, 2018). This chapter does not cover interpreters; it covers the constituencies that are involved in instruction, curriculum development, and assessment.

There are different standards for different constituencies of pedagogy, which are learners, teachers, practitioners, and teacher training programs. Different social institutions hold the responsibility to develop, oversee, and monitor standards for the different constituencies. In addition, standards vary by countries, states and provinces, and by sources within the countries. The standards and its constituencies and controlling institutions in sign language pedagogy are discussed below.

Standards in sign language pedagogy

Different sources contribute to the development of items in the standards for curriculum, instruction, and assessment. The constituencies in sign language pedagogy use standards to ascertain their knowledge and skills in curriculum, instruction, and assessment for degrees, certifications, licensures, and accreditations. The following information on standards in each area of pedagogy is drawn from works by Phillips (1999), Ricento (2006), and Tollefson (2013).

Standards for curriculum

The standards for curriculum cover the scope and sequence of content topics; lesson plans and its learning objectives, teaching goals, prerequisite knowledge, sign vocabulary and grammar, conversation tasks, instructional materials, and assignments; and evaluation of learners' learning and teachers' teaching. The standards for curriculum in L1 and L2/*L_n* sign language classrooms are similar, with one difference based on the goals and ideologies of governmental education bodies that develop the standards. The similarities are that the curriculum tends to begin with basic everyday and high-frequency vocabulary and basic grammatical structures, and ends with inflected forms, complicated grammatical structures, and discourses. It also includes information about culture such as the language community and their history, beliefs, behaviors, traditions, arts, and literature. The difference is that in L1 curriculum, teachers and learners use sign language to teach and learn academic subjects, including sign language.

Standards for instruction

The standards for pedagogy for instruction cover teaching strategies, materials, and medium of presentation, and its appropriateness for the topics and learner population under instruction. They also include the use of language to teach sign language and the use of sign language to teach academic subjects. For L1 sign languages, the standards for instruction concern the materials and strategies for using sign language to teach academic subject matters and transmitting sign language to deaf and hard of hearing learners who use sign language as their L1. For L2/*L_n* sign languages, the standards for instruction concern the materials and strategies for transmitting sign language to L2/*L_n* learners. Standard-bearing educational bodies determine the domain areas in instruction.

Standards for assessment

The standards for assessment cover content domains, test formats, test administration, assessment procedures, media, and rubrics. The standards for assessment are twofold. One is to assess learning outcomes, the other is to assess teacher qualifications. The tests and assessments are measured against a rubric that indicates stages of attainment in language and culture that are in conjunction with the standards for learner learning outcomes and teaching skill assessments. For L1 learners, the standards pertain to knowledge and skills in content areas of academic subject matter, and knowledge and skills in sign language for communication purposes. For L2/*L_n* learners, the standards for learning objectives include the knowledge and skills in sign language, and about deaf people, community and culture. The standards for qualifications of teachers of L1 sign languages are knowledge and skills in deaf education theories and pedagogies, psychology of deaf children, and literacy. The standards for qualifications of teachers of L2/*L_n* sign language classrooms include knowledge and skills in linguistics theory and applications; sign language and deaf people, community and culture; and knowledge and skills in pedagogy.

Sources of sign language standards

The standards are developed by different sources and there are different standard-bearing institutions. The institutions that are standard bearing develop standards and monitor its fulfillment by its constituencies. A discussion of the role of the different sources in standards development is given below.

Sign language policy and planning

The standards on sign language pedagogy is ascertained by the language policy and planning (LPP) of national and local governments. Governments create policy and planning on language in its creation, status, selection, codification, recognition, and implementation, as well as migration, reductions, and closures in society (Haugen, 1983; Hornberger, 2006; Ricento, 2006). There are several aspects of LPP, and the aspects that are relevant in pedagogy are language recognition, status, scope, and implementation. Governments ascertain the status of languages, including its standardization and uses (Kloss, 1968). They create criteria for implementation and allocation of languages in schools and society, and the learning and acquisition of languages (Cooper, 1989). LPPs are developed amidst the complex interplay of social, cultural, and political forces. The forces may lead governments to recognize or not recognize languages, increase or decrease the number and distribution of languages, and to choose between monolingualism and multilingualism for its populace. The LPPs also determine the standards of qualifications for the awarding of degrees, certifications, licensures, and accreditations to different constituencies in pedagogy.

Different countries have different standards based on their different value systems and goals regarding languages. For instance, the US sees English as a globalized language, favored monolingualism for its inhabitants, and offer other languages as a means for them to participate in the world's peoples and cultures. The European Union favors plurilingualism as transculturality and translanguaging as a method of instruction. China sees the learning of other languages, primarily English, as a tool to obtain scientific and cultural information from the world, and to participate in globalization for nationalistic purposes.

The countries also vary in the statuses of sign languages. The countries' attitudes and LPP toward languages other than their mother tongue, coupled with their attitudes and LPP toward sign languages, shape sign language distribution, allocation, standards, pedagogy, and purposes. Some countries view sign languages as not languages and that deaf communities do not exist, in which case they do not recognize or legitimize it, and do not prepare standards. Once a country recognizes sign languages, it would need to create mechanisms to ensure that the languages are offered, the teachers are teaching it, and the learners are learning it. It creates standards in learner outcomes and teacher qualifications. Some countries see sign language as a disability language, in which case sign languages tend to be offered in service professions for interpreters, social workers, and psychologists to learn and use it to work with deaf people. Still other countries view sign languages as a tool and a means to introduce spoken and written mother tongues; under this view sign languages tend to be used in schools and educational programs for the deaf by teachers who use sign languages to teach academic subjects and mother tongues. A few countries view sign language as a culture and deaf people as a cultural and linguistic community. In this case they tend to offer sign languages as one of the foreign or world languages at schools.

Different governmental bodies within countries create different educational programs for different constituencies of sign language pedagogy. The standards for L1 in public policy are built on the value system of governments and localities pertaining to the purposes of education of the deaf and the hard of hearing. Governments devise curricula in deaf and hard of hearing education, including subject matters, number for credits to award, and degree requirements, and create items and criteria in learner and teacher qualifications, examinations, and certifications. The standards for L2/ L_n in public policy are built on the value system of governments and localities that pertain to language learning and the learning of different languages, peoples, and cultures. They develop curriculum topics and its scopes and sequences. They establish requirements for learner and teacher world language programs, including courses and course credits, and also create items and criteria in learner and teacher qualifications, examinations, and certifications.

Research studies

The items in standards may derive from research studies in pedagogy. Research studies conducted by scholars in the areas of pedagogy produce longitudinal, synchronic and cross-sectional diachronic evidence that demonstrate the characteristics, performances, trends, and achievements in pedagogy. The research studies that focus on sign language as L1 and L2/ L_n look at its linguistic aspects; acquisition; the effectiveness of sign language use in teaching, curriculum, and assessment; the history, sociology and anthropology of deaf people, community, and culture; and the effectiveness of learning sign language to learn scholastics and literacy skills. Findings from research studies become parts of the benchmarks and milestones in standards. Governments and education agencies determine standards, and the items and criteria that governments and education agencies create in their standards as they appear in learner degree and teacher certification examinations are guided by research studies in sign language and culture.

Practitioners

Practitioners such as educators and educational developers are another source of standards. They provide instruction, develop curriculum, and prepare assessments for children to learn, use, and demonstrate their knowledge and skills in sign languages. The professional organizations of practitioners, guided by their experiences, knowledge and skills in pedagogical activities, provide recommendations for instruction, curriculum, and assessment in the development of standards. They advise and recommend in the areas of language and communication; the scope and sequence of linguistic aspects of sign languages; and uses and strategies with sign languages in the teaching and learning of scholastic subject matters. The practitioners also advise on teacher training programs where teachers receive preparation according to standards. They also give advice on standards in assessment to ensure quality teaching and learning. For L1, the practitioners provide advice in the use of sign language to teach scholastics and literacy. For L2/Ln, they provide advice in the use of languages in the teaching and learning of L2/Ln sign languages.

Deaf community

Deaf community is another source of standards. Individuals in the Deaf community are knowledgeable about sign language and Deaf culture. In essence, they live the beliefs, traditions, and history of their community. They develop cultural artifacts of arts and literature, major cultural events, ways of life, social and cultural institutions, and worldview throughout its history based on their deafness, use of sign language, their visual orientations, and their relationship with the majority culture of speaking and hearing people. Members of language communities inform standard developers by creating the concepts and items in the standards for sign language pedagogy regarding the constitution of their community and culture; the major events in community history; the language they use; the arts and literature they created; the main cultural activities they conducted within their communities; and experiences in their relationship with the majority (speaking and hearing) culture.

Standard-bearing social institutions

There are different institutional bodies that offer recognition of sign language and develop standards in sign language pedagogy. The major institutional bodies that are both the sources and developers of standards are the national, state and local governments; organizations affiliated with governments; colleges and universities; professional organizations; and language communities. They established the domain areas, concepts and constructs; provide mechanisms and skill tasks for the execution of knowledge and understanding of the concepts and constructs; and set expectations for its maintenance and enhancement. Social institutions and their ideologies and practices determine standards. Different institutional bodies develop and oversee different standards for different constituencies in sign language pedagogy, including learner outcomes and teacher qualifications for learner and teacher degrees; licensure of teachers and practitioners; and accreditation of, admission into, and graduation from TPP programs in L1 and L2/Ln sign languages.

These standard-bearing institutions also differ in the degree of enforcement of the standards and the constituencies they serve. The standards may either be legally or not legally binding to its constituencies. The standards that are developed by governmental education institutions cover learner degrees and teacher licensures; the standards that are developed by practitioner organizations cover teacher and educator membership; and the standards that are developed by

language communities are advice for individuals who wish to work with certain populations. Only the standards that are developed by the government educational institutions are legally binding and enforced as an act of law. The standards that are legally binding pertain to the requirements for degrees and certificates for learners, and licensure and credentialing for teachers and practitioners. The standards that are not legally binding to its constituents tend to be developed as criteria for membership and accreditation of individuals and programs. The standard-bearing institutions of which standards are not legally binding tend to consist of professional organizations of researchers, teachers, educator practitioners, and programs. The organizations of practitioners may be affiliated or not affiliated with government bodies. Their standards are not legally binding unless they are contracted with the governmental bodies to give assessments on learner and/or teacher qualifications. Professional organizations can enforce their standards for membership purposes, but they can only give recommendations to governing bodies in the development of items and protocols in standards. Language communities do not create standards, but they provide advice to standard-bearing governmental education bodies.

Standards as a web of interconnections

There is a web of interconnections between public policy, research, practice, and communities in the development of standards for pedagogy. Public policy is influenced by the value system of the countries and localities, findings from research studies, recommendations from the practitioners, and information from community members. Research studies are guided by theories of learning, teaching, testing, practitioners' experiences, and the life ways of language communities. Pedagogical practice is shaped by public policy, research studies, practitioners' experiences with past practices, and developments in language communities. The developments in language communities are often shaped by its value systems and developments in general society that dictate their life ways, which in turn provide new information for research, practice, and public policy.

In addition, there is a cycle in the development of standards (cf. Tollefson, 2013). The cycle begins with the recognition of the problems and issues in the instruction and acquisition of languages. Examples are concerns about learner outcomes and teacher quality, which call for a revisit to the standards (Call, 2018). Following this are expressions of concerns and suggestions for changes made by organizations of researchers, teachers, practitioners, and language communities. Researchers conduct studies on instruction and learning and inform the findings about effective practices in pedagogy. The researchers, practitioners, and members of language communities meet with and provide new findings to government agencies that oversee education. The cycle ends with the governments developing and disseminating standards for instruction, curriculum, and assessment for its schools. In cases where the standards do not reflect the instruction, curricular, and assessment practices, they become the problem and the topic for further action. The governments reconsider and remake the standards, and the cycle repeats.

Educators such as teachers would need to modify their instruction and curriculum to align with standards. In times of changing standards, teachers often find themselves taken aback and unprepared to teach following the new standards (Lovett & Lee, 2017). For teachers who do not know how to translate standards to teaching and developing curriculum (e.g., McBride & Goedecke, 2012), modify curriculum to meet changing standards (Sleeter & Carmona, 2016), or modify curriculum to respond to changing demographics of the learner (Ellis et al., 2017), there are researchers and practitioners who aid in interpreting the standards and suggest curriculum modifications and teaching strategies (e.g., Crawford, 2011).

There are different standards for L1 and L2/Ln sign language pedagogies across countries and institutions based on different constellations of government structures and institutional sources

of public policy, research studies, practitioners, and language communities. Different countries have different standards based on different ideologies regarding languages, peoples, and cultures. For instance, Zhang and Yin (2014) compared Chinese standards and US standards in literacy. The US standards emphasize reading, writing, speaking, listening, and teaching aims, contents, language skills, and use of technology. Chinese standards emphasize knowledge and ability, process and methods, and emotion, attitude, and values. Standards that are developed globally are subjected to its further shaping by national and regional needs and discourses (Fenwick, 2017). In addition, there are different configurations in the web of interconnections between public policy, research studies, pedagogy practices, and language communities in the development of standards for first, second, and additional languages within and across countries. The following is an exposition of the different standards that are developed in different countries where sign language pedagogy is provided.

Pedagogical applications

Standards in sign language pedagogy are found only in countries of which LPPs allow recognition of sign language through constitutional or legislative means as a minority language that is embedded within the country where a mother language is a spoken language. There are different levels of recognition of sign language. They include implicit recognition based on common practices. Examples of common practices are sign language use in schools for the deaf with deaf and hard of hearing children, and in colleges where learners who wish to work with deaf people are required to learn their sign languages so they can communicate with them at their places of employment. The recognition of sign languages also include explicit recognition in the form of legislation. The legislations may be constitutional modifications or additions to existing laws and regulations. In countries where sign language received explicit recognition, governments develop guidelines that are either suggestive for institutions to follow and is not legally binding, or are required and legally binding, particularly in cases where individuals who work with deaf people need to demonstrate sign language knowledge and pedagogy skills as a part of their education, degree, certification, and licensure requirements.

Countries vary in the mechanisms through which their LPPs operationalize for sign languages. Many countries have legislation that recognizes sign language for communication and a few countries require its inhabitants to take sign language for diplomas, certificates and licensure. Even fewer countries developed standards for education purposes in L2/*L_n* classrooms. That countries adopt L2/*L_n* standards indicate their support for integrating the general population with deaf community and to have general society people expand their repertoire of foreign or world languages so they can communicate with different people using different languages and following different cultures. Almost no country has developed standards for sign language in L1 classrooms at schools and programs with deaf and hard of hearing children. That almost no country develops L1 sign language standards may attest to the power of spoken languages in education and the expectation of its children to master spoken language literacy in their home countries. In addition, some standards in certain countries apply to either L1 or L2/*L_n*, and standards in other countries apply to both L1 and L2/*L_n* languages.

For purposes of explication, two models of standards are discussed here. A brief history and participants in the development of standards in the standard-bearing institutions are first given. Following this is a discussion of the different standards. The discussion of each standard includes the purposes and constituent audiences; a description of the domains, topical areas, and language structures; the benchmarks, scoring system, and levels; and a description of the protocols, including conversation tasks and instruction, for meeting the standards. Examples are selected to

show transformations in LPP and attitudes and its effects on sign language recognition, distribution, and allocation. They are the US and UK.

International inter-government standards

International inter-government organizations and collaborative efforts develop standards that are based on language rights and the diversity of languages and cultures across countries. Examples are the European Union's *The Common European Framework Reference For Languages – Standards* and the PRO-Sign consortium in the EU.

The European Union (EU) is a multilingual and multicultural constellation of 28 countries in Europe. They seek to promote plurilingualism and linguistic diversity for Europeans so they can communicate with each other across linguistic and cultural boundaries, and to ensure standardization of expectations in linguistic and cultural knowledge and skills for language learners, educators, and practitioners. To this end, the EU developed *The Common European Framework Reference for Languages* (CEFR), which is a set of standards for teaching, learning, and assessment, and includes levels of proficiency. The standards contain personal, social, occupational, and educational topics and situations, and are fulfilled in tasks through a communicative approach in language instruction. The sign language learner is expected to understand and speak everyday expressions, phrases, and sentences; ask and answer simple questions; describe and exchange information, experiences, thoughts, viewpoints, and give reasons; understand and communicate main ideas of text; interact with native speakers, and give viewpoints; and use language under different situations and topics. CEFR sets six levels of benchmark proficiency and three pairs of designation, and allows split-levels. They are A1 and A2 (termed as “Waystage”); B1 (termed as “Threshold”) and B2 (“Vantage”); and C1 (“Effective Operational Proficiency”) and C2 (“Mastery”) levels. CEFR sets assessment protocols and curriculum guidelines for each level. Assessment under CEFR guidelines include reading and listening, spoken production and interaction, and writing. Scoring for test performance cover the range, accuracy, fluency, interaction, and coherence in spoken language use. CEFR guidelines also contain curriculum guidelines and assessment measures on topics and language structures for all levels, that start with basic vocabulary and grammar with topics on personal information and daily activities at the A1–A2 level and ends with complex linguistic structures and social and cultural topics at the C1–C2 level. CEFR requires that children and adults have different assessment scales each with age-appropriate topics, tasks, and situations.

There are ongoing attempts by deaf and hearing people in the European Union to develop and align national sign language curricula to CEFR. The ProSign Project was established in early twenty-first century to develop European standards for sign language proficiency levels for professional purposes for sign language teaching, Deaf studies, and sign language interpreting programs (Leeson & Byrne-Dunne, 2009; Leeson & Grehan, 2009). Participants from EU countries worked together at PRO-Sign workshops to align the sign language curriculum in the different EU countries with CEFR standards (Council of Europe 2001; Leeson et al., 2016). As of 2018, not every EU country completed curriculum alignment to CEFR Standards A1 through C2. Leeson et al. (2018) reported that 23 countries have developed curricula for A1 through A2, and a handful of countries completed curricula for A1 through C2.

National government standards

In some countries, national governments provide recognition of sign languages and develop standards for instruction, curriculum, assessment, learner outcomes, teacher qualifications, and teacher training programs in either L1 or L2/*L_n* or both sign languages. They outline coursework, projects, and practical experiences as the domain areas in curriculum, instruction, and

assessment, and establish benchmarks for learner diplomas, teacher certifications, and practitioner licensures. The learners, teachers, and practitioners are given assessments that assess their knowledge and skills in the domain areas. An example is British Sign Language in the United Kingdom.

The standards for teaching and learning British Sign Language (BSL) in the United Kingdom (UK) were developed as a result of a collaborative effort by a consortium of British universities including Lancaster University, University of Central Lancashire (UCLAN), and the DCAL Centre of the University College London (UCL). The BSL curricula are based on the work that was done by the CEFR PRO-Sign Project for A1 through B2. The BSL curricula for CEFR C1 and C2 are currently not available.

The standards for teachers of BSL as both an L1 and L2 were developed by the Institute of British Sign Language (iBSL), which is a UK awarding organization that is accredited by the Office of the Regulator for Qualifications and Examinations (Ofqual). The iBSL provides qualifications, or certificates, in BSL Studies for individuals who teach BSL as L2/Ln to children and adults, teachers of deaf children who are L1 BSL users, communication support workers, interpreters, and professional and lecture positions at colleges and universities (Institute of British Sign Language, 2018). The iBSL Level 6 Award in BSL Studies is the qualifying level for individuals in the fields. The qualification consists of three mandatory units, which are BSL linguistics and theory, and the ability to understand and use BSL in a wide range of work situations. The iBSL assesses receptive skills, translation skills, project presentation, narrative, group debate, a written or signed essay, observations where questions are answered on paper, and live observations using BSL. Information about cultural conventions is included.

No deaf and hard of hearing children who use BSL as their L1 language are assessed in BSL signing knowledge and skills. They are assessed in academic subjects of English language reading and writing, mathematics, sciences, social studies, history, and a world language for diplomas. Teachers use BSL as the language of communication and instruction with the deaf children who use BSL. Teachers in the UK who are working for the Mandatory Qualification in teaching deaf children and young people would need to have the professional qualities, attributes, knowledge, understanding, and skills in deaf people and their language and environment, deaf education, and pedagogy (Simpson, 2017). All current and prospective trainee teachers must pass the skills tests in numeracy and literacy before they are recommended for the award of qualified teacher status (QTS). In addition to the above, teachers of the deaf using BSL in L1 classrooms would need to be certified in deaf and hard of hearing education. Three different degrees lead to qualified teacher status (QTS) for teaching at different scholastic grade levels. The Bachelor of Education (BEd) degree is awarded to individuals to become primary school teachers, and the Bachelor of Arts (BA) or Bachelor of Science (BSc) degrees are awarded to individuals to become secondary school teachers. Individuals in fields other than education can apply for a postgraduate teacher training program by taking a subject knowledge enhancement (SKE) course that is available in math, physics, languages, biology, chemistry, computing, English, geography, and design and technology.

Provincial government standards

In other countries, intra-national state or provincial governmental agencies and departments give the recognition of sign language and the standards for diplomas and licensure. They develop standards for learner diplomas, teacher certifications, and partition licensure to individuals within the state or province. This is found for American Sign Language (ASL) in the US. In the US, state education departments oversee the provision of world, foreign, and modern languages in both K-12 schools and colleges and universities. The states that recognize ASL oversee its provisions

as the language of communication in L1 classrooms and as a world, foreign, or modern language in L2/*L_n* classrooms. They met with a consortium of researchers in colleges and universities, professional organizations of teachers of sign language, leaders from the American Deaf community, and parents of deaf children met and developed standards for sign language pedagogy in curriculum and assessment in the 1990s and 2000s. The New York State Education Department is one example.

The New York State Education Department (NYSED), through its education policy Board of Regents, in 1991 recognized American Sign Language (ASL) as a Language Other Than English (LOTE) for instruction and learning in elementary, middle, secondary, and collegiate education. The NYSED recognized that the general population have negative attitudes towards deaf people who use ASL, misconceptions about signed languages, and lack awareness of the Deaf community. As the general society learn about ASL, deaf people, and their community, there will be better communication between themselves and the deaf community. In 1992 an ASL Advisory Group of ASL programs and deaf educational institutions, teachers, and researchers from the field of ASL, the parents of deaf children, and staff of the NYSED developed the Teacher's Guide for Modern Languages for Communication (New York State Education Department, 1992). They largely cover ASL as L2/*L_n*. Learners earn LOTE credits for after two years of study for a general diploma and three years of study for a college-preparatory diploma. They also developed guidance for local school districts to develop curricula and programs in ASL. They do not develop standards for instruction, leaving teachers, schools, and school districts to develop instructional strategies that will meet their learners' unique needs and learning process.

In the NYSED's LOTE standards for ASL, the learning outcomes for learners are based on their ability to use ASL to communicate about topics under different situations, and to demonstrate knowledge of deaf people, community and culture. The topics for communication pertain to personal information, social life, and the environment. There are specific learning outcomes for each of the three instructional levels, Checkpoints A, B, and C, each covering one instructional year. There are two standards, one for communication skills and the other for cultural understanding. For communication skills, the learners should be able to use appropriate vocabulary and grammar in ASL to communicate with deaf people; tell stories, repeat, rephrase, and present on topics on personal information, social life, and the environment; and to involve themselves in the deaf community and their cultural activities. For cultural understanding, the learners should be able to use ASL and discuss the concepts of culture; identify cultural traits and patterns in the deaf community, and culture; and to compare different subcultures groups within the deaf community. Sign accuracy and the scope of topics are measures of proficiency.

NYSED provides two different sets of assessments in ASL. One is for learners who seek to earn LOTE credits, and the other for individuals who want to become teachers of ASL. For learners, there are two examinations, one on signing skills and the other on cultural understanding. A scoring system is provided, and learners who pass will earn a diploma credit in ASL. Teachers of ASL need to take the New York State Teacher Certification Examination (NYSTCE). There are three parts in the examination for teachers of ASL. They are Liberal Arts, Science and Technology (LAST), which is a test of general knowledge; Test of Written Skills (ATS-W); and the Content Area for ASL with tests in expressive sign production and comprehension, the knowledge of ASL structures and comparisons, and content knowledge in pedagogy. Teachers also need to prepare an Education Teacher Performance Assessment (EdTPA) project with lesson plans, justifications for lessons by citing scholarly literature for support, videotapes of themselves teaching, explanations of teaching strategies, and evaluations of learner homework and test questions and scores. Certificates are awarded to teachers who pass the examinations.

In addition, teachers use ASL as the language of instruction and communication with L1 native child users of ASL in a few schools, particularly in schools for the deaf and mainstreaming programs. Like in the UK, no deaf and hard of hearing children who use ASL as their L1 language are assessed by the NYSED for their ASL signing knowledge and skills. NYSED also does not provide standards in teachers' sign language skills. They do not assess teachers in sign language skills and their skills in using sign language as the language of communication and instruction with the learners who use it as their L1 language. Teachers only need to take the NYSTCE and conduct EdTPA. Teachers of children who are deaf and hard of hearing take the Content Area Test for Deaf and Hard of Hearing covering pedagogical knowledge in deaf education. Some questions pertaining to use of sign language to teach concepts are included in the teaching strategy subtest. Teachers are awarded certificates upon passing the examinations.

National professional organizations

Professional organizations of education practitioners develop standards for best practices and accreditation of practitioners. An example is the American Sign Language Teachers Association (ASLTA) in the US.

ASLTA developed the *Standards for Learning American Sign Language* (Ashton et al., 2014) that follows the *Standards for Foreign Language Learning for the Twenty-First Century* which are developed by the American Council on the Teaching of Foreign Languages (ACTFL), a leading organization of practitioners in world languages as L2 (American Council on the Teaching of Foreign Languages, 2006). The ACTFL standards are the 5C's for teaching and learning, which are communication, cultures, connections, comparisons, and communities. While the standards are developed primarily for L2/*L_n* learners, many of the sequences of skills and knowledge contained in these standards may be adapted for L1 learners. ASLTA translated ACTFL's 5C's into the following: cultural knowledge of deaf people, and their products and perspectives; connect with, acquire information about, discuss, and provide deaf cultural viewpoints about other disciplines through ASL; compare ASL and deaf culture with other languages and cultures; and using ASL to participate in local and global deaf communities and become lifelong learners. The ASLTA standards are the ability to communicate and have a conversation in ASL, comprehend and interpret live and videotapes of ASL performances, and present information using ASL about ASL and Deaf culture. Topics and benchmarks for each standard are given at K, 4th, 8th, 12th, and 16th grades. ASLTA also provides evaluations of lesson and assessment plans, videotaped teaching, and interviews, and award two-leveled certifications, certified and master, to teachers of ASL. Many US state education departments, such as New Jersey and California, adapted the ASLTA standards. While the following are not part of its standards, ASLTA recommends the use of equipment with a robust ability to display video-based media, classrooms that are large enough to accommodate learners seated in a semi-circular arrangement, and limiting enrollments to 20 or fewer learners per class for effective ASL teaching and learning.

National deaf community organizations

Language communities provide information to government-associated standard developers on language rights, expectations, cultural information, and language structures and practices. One example is the National Association of the Deaf in the US. The National Association of the Deaf (NAD) is a civic, advocacy organization of, by and for deaf people. They do not create standards, but position papers on ASL and deaf education. The NAD proposes that ASL is used at home and schools to facilitate child language development. Schools for the deaf should also offer ASL-English bilingual education, work with signing deaf people, and increase access for deaf children in their programs and services. As described earlier, the NAD in collaboration with other organizations has been working with federal and state governments in developing their standards.

Future trends

As Cox, Malone, & Winke (2018) remarked, further work is needed in the field of educational standards. Changing learner and teacher populations challenges the field, and may affect the design, implementation, and appropriation of the standards (Cox, Malone, & Winke 2018). We need more information on the effects of language learning standards on world language instruction, curricular and assessment practices. To these ends, the following are suggested areas for future research studies and pedagogical practices.

Research studies

Future research studies need to look into the history and impact of standards. There is a need to study the history of the process of standard development, its participants, constituents, impact, and coverages. There is a need to conduct historical studies on the political, social and cultural forces that shape institutional acceptance of sign language, and the development of standards within and across countries, which may inform the countries that do not recognize sign language or do not have standards for the provisions of sign languages. Future studies should also look at the impact of standards on learning and teaching outcomes. In particular, research should study the relationship between standards and its impact on learner learning and teachers' teaching. The impact of standards on learner achievement needs to be looked at to see if the standards are enhancing learners and teachers to higher outcomes, which is what it is supposed to do. Standards should be evidence-based and should be an ongoing process. Since standards, including domain coverage, theoretical coverages, and institutional coverage, are based on the personal, political, social, and cultural forces, it is important to study how changing sociocultural conditions affect standards. In particular what need to be studied are how changing ideologies shape domains, how changing understanding of the linguistics of sign language shape the communications structures in standards, and how changing standard-bearing institutions with its constellations of ideologies, missions, and practices shape the constituents in the standards.

Pedagogical practices

The enforcement of standards remains an issue. Brady and Bates (2016) found that standards on quality assurance can limit and subvert teaching and learning. Different teachers add or enact their own standards based on their cultural backgrounds, ideologies, the organizational structures they work in, and their personal and professional socialization (Varghese, 2008). Challenges to standards on teaching on its dualism between theory and practice, and reductionism into discrete elements (e.g., Sinnema, Meyer, & Aitken 2017), led to attempts to wholistic, integrative, inquiry-based, and interdisciplinary teaching approaches (e.g., Sinnema, Meyer, & Aitken 2017; Drake & Burns, 2004). Some standards have missing domains, and they are filled: an example is in Cyprus where there are no teacher standards that meets learners' culture and needs, and the teachers met with school administrators and government officials to modify and add standards, and they are constantly evaluating and evaluating the standards (Alibab Erden & Ozer, 2013). Other challenges are that the standards do not change teacher beliefs and behavior and performances in classrooms (Abdel & Muhammad, 2012). Troia and Graham (2016) found that some teachers do not feel that some of the items in the US Common Core for writing and language standards are rigorous, do not reflect learners' cultures and needs, are too numerous to cover, and/or omitted some key aspects of learning, and

could not fit all learners. One study found that teachers' perspectives on standards-based instructional practices, classroom management, and external testing do not have coherence and alignment, only that they are modestly correlated (Bonner, Torres Rivera, & Chen, 2018). Troia and Graham (2017) also found that teachers who have positive attitudes and beliefs in teaching tended to view the standards positively and were better prepared to teach (Troia & Graham, 2016). Different learners experience different aspects of the ACTFL's 5C's standards in the US. They focused on communication and community, and not much on cultures and comparisons and connections (Magnon, Murphy, & Sahakyan, 2014).

Standard development should be an ongoing process involving teachers, practitioners, and learners. They continually assess, reevaluate, and modify the standards based on learner and teacher outcomes in domain areas and the changing situation of the language and culture of signing deaf people. The standards should reflect the contemporaneous use of language and cultural practices in the signing deaf community under different social and cultural contexts.

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Part II

L1 sign language pedagogy



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L1 sign language teacher preparation, qualifications, and development

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Introduction

A quote that is attributed to Bonaventura Parents' Organization in Denmark says: "if I accept another person's language, I have accepted the person ... if I refuse the language, I thereby refuse the person, because the language is a part of the self" (Pribanic, 2006: 233). Teachers in general would agree with the content of this quotation: It is every teacher's duty to accept their learners and their identity. Learners' identities are closely linked to language, and vice versa. For Deaf children, sign language should be offered as their first language (L1) as sign language remains the only barrier-free language that they can access.

One might be wondering why, for instance, hearing English native speakers in English-speaking countries attend compulsory English classes throughout their school years whereas Deaf children are not taught sign language. Why is something that may seem so obvious not taken for granted? Some exceptions can be found from an international perspective. Why there are exceptions, and how sign language teachers for children whose L1 is sign language are prepared and qualified, are discussed in this chapter by taking a look back, a look around, and a look ahead towards future trends.

The teacher preparation programs (TPP) for sign language teachers is diverse and heterogeneous. They differ within and across countries. In some countries, such as Belgium, there are no TPPs for L1 sign language teachers. Generally, the availability and content of TPPs depends on political frameworks, ideological constraints (e.g., oral vs. sign), and educational practice.

Looking back

From a historical point of view, one milestone is crucial when considering sign language to be an important factor in educating Deaf children. It is Stokoe's (1960) analysis of American Sign Language (ASL), since it substantiated the linguistic status of sign languages. Stokoe's work was a starting point of a scientific journey to investigate the richness and specificities of a visual-gestural language (Emmorey, 2002; Klima & Bellugi, 1979; Sandler & Lillo-Martin, 2006). Stokoe's discovery led to a shift of perspective regarding sign languages and Deaf people in general. An era of broad scientific research analyzing Deaf people and their language began.

Scholars from other scientific disciplines such as psychology, sociology, anthropology, and education began researching sign languages, Deaf culture, and Deaf people. This development led to an empowerment movement by Deaf people (Jankowski, 1997). Empowered by research, Deaf people postulated their right to use sign language and to naturally use sign language in the education of Deaf children.

As a result of these developments, it was suggested that sign language is and should be the native language (L1) of Deaf children. Bilingual bimodal education concepts were developed, examined, and approved in the 1980s in Scandinavian countries, Great Britain, and the US, and since the 1990s in Germany (Ahlgren, 1994; Günther & Schäfke, 2004; Günther & Hennies, 2011; Pickersgill & Gregory, 1998; Svartholm, 1993). The main goal was to provide an educational setting for Deaf children to acquire a sign language as their L1 within a natural language acquisition process. Currently, research in sign bilingual acquisition processes are rather devalued due to the early diagnosis of hearing losses and the availability of better technical hearing facilities, which enables Deaf children to acquire a spoken language (Dammeyer & Marschark, 2016; Knoors & Marschark, 2012; Swanwick, 2015). Yet, Deaf children's prerequisites to acquire a sign language as an L1 differ widely.

Theoretical perspectives

L1 sign language teacher preparation should be based on considerations regarding sign language as L1, the population of d/Deaf children, and the TPPs in general.

Language considerations for sign language as L1

The acquisition of a sign language as L1 is a complex process. Deaf children grow up in an educational environment with a learner population that is characterized by diversity and heterogeneity. A Deaf child can be born to hearing parents or Deaf parents, or to parents from other countries using different spoken and/or sign languages. Deaf children's language development varies depending on their parents' hearing status and whether they use a spoken or sign language, and the quality and quantity of the parent-children communicative interactions (Koester, 1995; Koester & Lahti-Harper, 2010; Spencer, 2003).

The Deaf children of Deaf parents who are fluent in sign language are able to acquire a sign language as their first natural language. The Deaf parents who communicate in sign language are able to provide an extensive and comprehensive language environment that enables their Deaf children to acquire a sign language as a L1. The children perform the same language milestones and developmental stages in sign language as hearing children in their spoken language development. Past studies have shown that the signing Deaf children of the signing Deaf parents have achieved an age-appropriate vocabulary and grammar development (Chen Pichler, 2012; Lillo-Martin, 2015; G. Morgan & Woll, 2002).

Demographics of deaf and hard of hearing children

In most places worldwide, 90–95% of Deaf children have hearing parents (Mitchell & Karchmer, 2004; Schein, 1987), who have no experiences in using sign language. Under these conditions the Deaf children of hearing parents do not grow up with the prerequisites for acquiring a sign language. Generally, they are not able to acquire sign language as an L1 through direct interaction and communication with Deaf sign language users. The children's sign language proficiency differs depending on their opportunities to get in contact with competent sign language users

and language role models. In most cases the acquisition process is significantly and noticeably delayed. The chance of acquiring a sign language as a L1 in a native fashion declines with age; the older the child is, the poorer the possibility (Cormier et al., 2012). Galvan (1999) revealed that delayed sign language acquisition negatively impacts the flexion system and the language's complexity. Late learners seem to perceive signs more holistically compared to the analytic perception that captures phonemes and morphemes by native signers. The onset of language acquisition also has an impact on sentence processing in sign language, including the ability to analyze syntactic structures (Boudreault & Mayberry, 2006). Furthermore the sign vocabulary is limited and varies dramatically (Anderson, 2006; Lederberg & Spencer, 2001). Compared to native signers, early and late learners' acquisition process noticeably differs in its depth and breadth, which also influences the learning process of other languages (Mayberry & Lock, 2003).

According to Newport (1988), the crucial factor for developing a language system is age of language acquisition, not the time of exposure to a sign language (Mayberry, 1993). As Deaf children of hearing parents lack high exposure to sign language in its depth and breadth, the language input is incomplete and reduced, which also impacts the Deaf children's cognitive and social development (Figueras, Edwards, & Langdon, 2008; Hauser, Lukomski, & Hillmann, 2008; Hintermair, 2014; Morgan et al., 2014).

In this context the term "first language" (L1) is unclear. Four scenarios for sign language learners are defined in scholarly literature (Mayberry, 1993; Newport, 1988; Ortega, 2016):

1. Native Signers: Deaf children of Deaf adults, who undergo a typical sign language acquisition comparable to the acquisition of a spoken language by hearing children (Hänel-Faulhaber, 2012; Lederberg et al., 2013; Schick, 2011).
2. Early signers: Early signers are in most cases Deaf children of hearing parents, the latter of whom are often not competent sign language models for their Deaf children. The hearing parents might learn sign language after the diagnosis. Regarding the children, their first contact to sign language starts either in early education or at school by the age of 3 to 6 years, depending on the educational concept.
3. Late signers: Late signers are children, who are exposed to sign language after the age of six or even later. They may have received an oral or auditory verbal education or they are children of immigrants or refugees, who tend to have minimal opportunities to acquire a sign language. In some cases their language input is dramatically reduced. A late language acquisition has a negative impact on the linguistic development on all levels of linguistic structures.
4. Home Signers: If Deaf children have no access to a sign language environment and grow up among hearing people, their hearing family members may develop a basic idiosyncratic sign system (i.e., home signs) to manually communicate with their Deaf children on a very basic level.

When Deaf children enter classrooms where sign language is used, they get in contact with more than one language within a bilingual-bimodal language acquisition. In doing so, they are exposed to a written and sign language. For Deaf children of hearing parents, this situation is challenging since both languages are not fully accessible. Furthermore, the language acquisition process of bilingually educated children differs from monolingual children growing up using one language (De Houwer, 2009; Plaza-Pust & Morales-López, 2008). For the Deaf children who use sign language as their L1, and who particularly hailed from non-signing hearing parents, the main goal would be to set up a language environment that will enable them to be educated with a sufficient language contact in depth and breadth with native signers such as signing educators who may serve as their language role models. In order to fulfill these goals

and prepare individuals to use sign language to teach scholastic subjects in L1 classrooms, sign language TPPs are necessary.

Program considerations for TPPs

Worldwide, the teacher preparation programs in L1 sign languages are largely housed in programs in Deaf education. However, the development of teacher preparation programs in Deaf education has been controversial due to different language approaches. Most programs were designed in the tradition of oral approaches in the US (Israelite & Hammermeister, 1986) and Europe. In such programs, sign language was given either minimal or no consideration. Since the 1980s, there is an increase in the number of TPPs that offer sign language in their curriculum (Jones & Ewing, 2002). The TPPs in Germany slowly embed sign language in its curriculum since the 1990s (Günther & Schäfke, 2004).

The demographic changes among Deaf learners that led to increased diversity and heterogeneity, coupled with the inclusion movement in special education, have become issues that impact on the structure and content of Deaf TPPs in general (Swanwick et al., 2014). As Johnson (2013) remarked,

That history is one of need, opportunities, accomplishments, and controversies. It is not one of consensus, collaboration, or responsiveness to the changing demographics, educational placements, or instructional needs of learners who are Deaf and hard of hearing.

Ibid.: 440

In our experience, the shift from a single approach, such as the oral approach, to a different approach takes time, and needs political influence and patience. Setting up a second pillar, which is sign language, does not imply setting up an additional isolated route, but building bridges between spoken language- and sign language-oriented approaches. In most cases, these programs are bilingual programs. Furthermore, there is an “ever-expanding array of knowledge, skills, and experiences needed by teachers of learners who are Deaf and hard of hearing” (Johnson, 2013: 441). Teachers should be equipped to prepare learners to a life after school. This requires the teachers to acquire communicative competencies, problem-solving abilities, and collaboration skills.

Teachers from TPPs in L1 sign language should have an open and positive attitude and a keen interest in not only teaching but also using sign language to teach scholastic subjects. In addition to a high level of language competence, their attitude is closely linked to their contacts and commitment to the sign language community. The TPPs need to make political decisions on expectations for their learner-teachers. Its success is dependent on the political climate of the societies where Deaf education is offered. For instance, in 1981 the Swedish parliament agreed on an overall bilingual approach and called for a bilingual shift within the TPPs and the school curriculum (Svartholm, 1993).

The UN Convention on the Rights of People with Disabilities (UNCRPD, 2006a), which was ratified by 174 countries including member states of the European Union, except Ireland,¹ proclaimed that people who are Deaf have the same human rights as every person in all areas of life. These rights include the right to receive education. In addition, Article 24 of the UNCRPD is dedicated to education and called for qualified sign language teachers to facilitate “the learning of sign language and the promotion of the linguistic identity of the Deaf community” (UNCRPD, 2006b). In this light, teachers, in particular Deaf teachers, should be recruited for all levels of education and receive training to become educators in sign language, Deaf culture,

and teaching methods for Deaf children using sign language as the language of instruction. The presumption is that Deaf children, in their language and cultural realities, are bilingual and bicultural (Grosjean, 1992, 2010). Bilingual-bicultural approaches are and should be important parts of TPPs.

There is a “two-sided” qualification for L1 sign language teachers. On the one hand, there is the formal qualification in the areas of linguistics, Deaf Studies, sign language assessment, sign language teaching, sign language curriculum development, language acquisition, and research. On the other hand, there is the issue of involvement with the linguistic and cultural community to build positive attitudes towards Deaf people. The issue regarding the involvement of future L1 sign language teachers in the Deaf community, particularly if they are not Deaf themselves, is challenging for sign language TPPs on whether it can be fostered within the TPPs. This issue needs to be resolved in the process of planning and developing a L1 sign language TPP. De Weerd, Salonen, and Liikamaa (2016) sum up their desired profile of a sign language teacher teaching sign language as L1. For them, the teachers should have an open and positive attitude and a keen interest in teaching sign language. In addition to a high level of language competence, the teachers should maintain contact with, and be committed to the sign language community.

Looking around: international perspectives

Arguments in support of TPPs in L1 sign language are given in the previous section. The following is an exposition of L1 sign language TPPs and the qualifications of L1 sign language teachers around the globe. It seeks to explore who offers the TPPs and how the teachers become qualified.

Who offers L1 sign language TPPs?

L1 sign language teacher preparation, qualifications, and development programs are mainly offered through universities, colleges, temporary projects, and other providers, such as initiatives by the Deaf community. In most cases, it is difficult to ascertain if a TPP prepares L1 sign language teachers, or sign language teachers for the education of Deaf learners in general. The authors could not identify a single program that focuses mainly on the qualification on L1 sign language teachers. The TPPs in sign language Deaf education are the focus in the ensuing discussion.

How are L1 sign language teachers qualified?

The TPPs that are offered have varied in timeframe, prerequisites, content, and emphasis on sign language. They are described below.

Timeframe. Existing TPPs in Deaf education with emphasis in L1 sign language worldwide vary in timeline for completing program requirements. The programs offered can roughly be separated into full-time and part-time programs. Full-time programs include bachelor or master degrees. Examples of existent full-time sign language Deaf education TPPs are Gallaudet, Madonna University, Boston University, and the California State University at Northridge in the US, Berlin University in Germany, and the University of the Witwatersrand Johannesburg in South Africa. Learners who enroll in part-time programs start their practical teaching experiences and earn credentials as fully qualified teachers of Deaf children. Part-time programs are available for teachers who hold teaching credentials, which may or may not be for teaching Deaf children, and who enroll for courses in deaf education, sign language, and using sign language in teaching scholastics. Examples of part-time TPPs are the Victoria University of Wellington in New Zealand, the La Trobe University in Australia, Gallaudet University, and McDaniel College

in the US, and at the Universities of Hamburg and Cologne in Germany. A possible advantage of part-time programs is that the teaching experience that learners bring with them to TPPs enables them to directly link their newly gained theoretical knowledge to the actual education of Deaf learners.

Prerequisites. The existing L1 sign language TPPs also vary in the prerequisites for enrollment. Some part-time programs require individuals to hold a basic teaching degree and/or experience in working with Deaf children. Other part-time programs require a certain level of sign language skills. Gallaudet University's ASL diagnostics and evaluation services assess individuals' signing skills and attain Level 4 of the *American Sign Language Proficiency Interview (ASLPI)* scale. Madonna University accepts learners with an Intermediate American Sign Language II level. The Deaf applicants at Hamburg University need to demonstrate skills in German Sign Language at the C1 level based on the Common European Framework Reference for Languages (CEFR). The University of Berlin also assesses the sign language proficiency of their applicants. In addition, almost all TPPs are open to learners of any hearing status. A few programs are exclusively designed for Deaf learners. Examples are Hamburg University in Germany and Victoria University of Wellington in New Zealand.

Content. While there are variations among TPPs in timeframe and prerequisites, there are some similarities in the content of the TPPs. There are some TPPs that focus on the acquisition and teaching of sign language. The TPPs that offer coursework in L1 sign language teaching are Madonna and Gallaudet University in the US, Victoria University of Wellington in New Zealand, the University of the Witwatersrand, Johannesburg in South Africa, and Cologne University in Germany. Other TPPs are designed as "mixed models" and include course topics such as auditory-oral approaches and spoken and written language literacy. Such TPPs are found in a special education course offered by the University of Newcastle in Australia and in the Program in the Teaching Learners who are Deaf or Hard of Hearing at the Ontario College of Teachers in Canada. They are not considered as the TPPs that offer L1 sign language teacher preparation.

Linguistics. In order to be able to teach sign language, knowledge in sign language linguistics is needed. TPPs include either specific courses in the linguistic structure of sign languages, such as offered in the Deaf education program at Gallaudet University, or combined courses in linguistics with sign language instruction, such as offered at the University of the Witwatersrand in South Africa.

Deaf Studies. The academic field of Deaf Studies comprises interdisciplinary approaches to the study of Deaf individuals, communities, and cultures as they have evolved within a larger context of power and ideology. The TPPs that offer L1 sign language teacher preparation tend to include Deaf Studies curricula. They include courses such as literary tradition in the Deaf community, Deaf culture and society, sign language in society, Deaf literature and Drama, and Deaf folklore. The coursework offers perspectives from anthropology, linguistics, literary theory, bilingual education, and cultural studies that revolve around gender, disability, and ethnic studies. Although this wide diversity of disciplines offers multiple perspectives, the field's fundamental orientation is derived from the notion that Deaf people are not defined by their lack of hearing, but by linguistic, cultural, and sensorial ways of being in the world (Bauman & Murray, 2010).

Sign language assessment. Teachers need to be able to assess the learners' sign language learning development. The TPPs that have been surveyed in the above include courses in sign language assessment instruments and procedures. The assessment of any sign language proficiency is impeded by an insufficient number of standardized assessments tools. An overview of existent L1 sign language assessment instruments can be found in the Sign Language Assessment Instruments website (www.signlang-assessment.info/index.php/tests-of-l1-development.html).

The listed instruments were designed to assess the development of a sign language as L1 in Deaf children and subsequently plan intervention if needed.

Sign language teaching. The TPPs that are surveyed offer not only theoretical coursework but also offer practicum coursework in sign language teaching. The practicum courses provide an overview of instructional strategies and materials. Some TPPs offer courses such as methods on sign language teaching, and they are found at La Trobe University in Australia and at Gallaudet University in the US. Other TPPs offer practicum coursework in not only L1 sign language but also bilingual and L2 teaching, such as Boston University in the US, University of Newcastle in Australia, and in Berlin and Cologne, both in Germany.

Sign language curriculum development. Teaching methods are embedded within a sign language curriculum. A sign language curriculum includes concepts, domain areas, lesson structures, and instructional materials that involve the use of L1 sign language to teach scholastic subjects. There is a variation among TPPs in whether they offer coursework in L1 sign language curriculum. Some TPPs, such as Gallaudet University, Boston University, and the Victoria University of Wellington, offer coursework in L1 sign language curriculum.

Language acquisition. In order to assess the learners' language development and provide appropriate sign language teaching, an understanding of the acquisition of sign language is necessary. Courses in language acquisition provide information on the linguistic concepts of languages and the stages and processes in mastering its linguistic features. This includes sign language and its acquisition by individuals who are Deaf. Many TPPs include courses on general language acquisition in their programs. Gallaudet University and the University of Hamburg offer courses in L1 acquisition.

Research. A few TPPs include a course in research. The course tends to include information on research inquiry, research designs, and protocols for conducting research studies. In the course, learners connect not only sign language research with practice but also practice with research. They are offered at Boston University and Gallaudet University.

Practicum. Particularly in the full-time TPPs identified in the above, learners with no prior working experience with Deaf children prior to enrollment are required to undergo a practicum or internship experience. Practical experiences enable learners to apply in practice their acquired theoretical knowledge in sign language teaching. In practicum seminars, they bring back their teaching experience for further analysis and reflection. The course provided by the University of Hamburg is not inevitably designed for teaching German Sign Language at a school for Deaf children.

Current issues in L1 sign language teacher qualification and development

Besides the academic qualification of sign language teachers, one issue remains about the preparation of some L1 sign language teachers. In some countries, such as Germany, non-academically qualified sign language teachers work at schools teaching sign language. This presents a question regarding the qualifications of the non-academically trained Deaf sign language teachers (De Weerd, Salonen & Liikamaa, 2016). Another issue regards the continuing professional development of qualified L1 sign language teachers. They need to continually update themselves on new developments in sign language teaching and research. There are resources that the teachers can access for the new developments. For example, the website www.signteach.eu was designed for sign language teachers as well as educators for sign language teachers. It provides resources for sign language teaching such as lesson plans and podcasts, and information such as conferences, presentations, and publications. The video inserts in the website are shown in different European sign languages and International Sign.

Pedagogical applications

In recent years, the demand for sign language teaching in Deaf schools had increased. There is a shortage of L1 sign language teaching material. There are insufficient training opportunities for current and future teachers in sign language studies or related fields that would allow them to amplify their knowledge of sign language linguistics, pedagogy, and other qualification areas that are discussed in the above. There is a need to increase the number of TPPs that focus on the use of L1 sign language pedagogy for scholastic subjects, and to develop L1 sign language teaching materials. One example of a TPP that proffers resources, coursework, and practicum experiences for individuals who want to become L1 sign language teachers is at the University of Cologne. The program is described below.

L1 sign language TPP at the University of Cologne

As Borgardt points out, “besides bilingual teaching, the subject DGS [German Sign Language] is the other important pillar of sign language at school” (Borgardt, 2012: 393; quotation translated from German). For Borgardt, sign language as a subject should be offered in bilingual teaching just like hearing German native speakers in German-speaking countries join compulsory German classes throughout their school years. Influenced by this quote, a working group headed by Kaul at the University of Cologne designed a program to qualify educators to teach DGS as a subject with a focus on DGS as a L1. In 2015 the first group of teachers enrolled for the additional subject DGS (Kaul, Griebel, & Klinner, 2016). The program is designed for four semesters, the equivalent of two years. The timeline in the University of Cologne L1 Sign Language TPP is shown in Figure 2.1.

DGS as a subject is currently under plan as an additional course within or on top of Cologne’s current Deaf Education teaching degree program.

The prerequisite for enrollment in the program is a Masters degree in Deaf education, which is also offered at Cologne. Cologne’s Master of Arts program in Deaf education includes coursework and practicum in special education with a focus on Deaf education. The coursework in the Deaf education program includes theories of teaching, curriculum, and assessment, and the socialization and communication of Deaf children. The coursework provides the foundation for the teaching of DGS as a subject matter. In addition, a screening was developed to test the

<i>Bachelor and Masters Degree in Deaf Education (10 semesters) and B1-GERS Sign Language Proficiency</i>				
1st semester	Sign Language Practice and Linguistics I			E-Portfolio
2nd semester			Deaf Studies	
3rd semester		Sign Language Practice and Linguistics II	Sign Language Curriculum Development	
4th semester			Sign Language Assessment	

Figure 2.1 Timeline in the University of Cologne L1 Sign Language TPP

applicants' proficiency in DGS. The learners need to attain an entry level of B1 of the CEFR in DGS. The areas of language competence were assessed in conjunction with CEFR, and they are reception, production, and interaction. Applicants that satisfy both prerequisites are eligible to join the program.

The program consists of four main subject areas: German Sign Language linguistics, Deaf Studies, sign language curriculum development, and sign language assessment.

German sign language linguistics I and II

In this module, the learners learn linguistic theories and approaches, and develop competencies in the features and structures of DGS including phonology, morphology, syntax, pragmatics, and text linguistics. This linguistic competence is designed to enable the learners to improve their DGS signing skills and reach C1 Level of the CEFR, which assesses their ability to understand complex and longer texts in DGS.

Deaf studies

In this course in Deaf Studies, learners learn about the historic development of sign language at schools, the history of sign language teaching, and the history, culture, and challenges of the sign language community. Built on their previous knowledge on the socialization of Deaf children from other Deaf education courses, the learners also learn about the social environment of Deaf children. The learners also learn about resources that emphasize Deaf empowerment, enable Deaf children to get involved with the sign language community, and develop their identities outside of the school setting. Examples of the resources for the Deaf children are the Deaf youth organizations and camps such as the European Union of the Deaf Youth (EUDY), and Frontrunners deaf camp in Denmark.

Sign language curriculum development

In the sign language curriculum development course, learners learn about theories and practices in sign language curriculum. They apply what they learned about DGS linguistic structures and Deaf Studies and develop sign language curricula, lesson plans, and instructional materials for their L1 sign language teaching. They also evaluate and adapt teaching materials for differentiated instruction to Deaf children with heterogeneous learning and communicative characteristics.

Sign language assessment

This course is an introduction to sign language assessment and its psychological, linguistic, and sociolinguistic domains. As mentioned earlier, there are a few standardized assessment tools available in L1 sign language. In the course, the learners apply their linguistic and diagnostic knowledge to the design of sign language assessment. They learn to develop qualitative, individualized sign language assessment tools in congruence with the different profiles and social and communicative backgrounds of different learning groups. They will learn to analyze assessment results to ascertain sign language development, acquisition, and proficiency of the L1 sign language users.

E-portfolio

The Cologne L1 Sign Language TPP provides learners with an e-portfolio. Throughout the four semesters, learners collect, record, brainstorm, and elaborate ideas, discussions, and content in the courses in the e-portfolio. The e-portfolio is used as a platform where the learners reflect on what they learn and connect theoretical knowledge with teaching experiences.

One of the crucial questions regarding sign language teaching is who is allowed to teach sign language. The most important is the qualification of the sign language teacher regardless of his or her hearing status. They need to have pedagogical and methodological skills, and the ability to teach sign language and Deaf culture in an authentic way. Deaf teachers may have the advantage to offer learners an authentic and enriching experience to learn sign language based on their special insights into Deaf culture. Hearing sign language teachers do bring special strengths to the learning experience for learners. They can function as an ambassador for the “hearing world” by showing understanding for Deaf culture through interaction within the Deaf community and their ability to communicate in sign language at a competent level of proficiency.

The TPPs discussed above share some similarities regarding the content of the programs. Most programs include theoretical and pedagogical course offerings in linguistics, Deaf Studies, sign language assessment, sign language acquisition, sign language teaching, sign language curriculum development, research, and practicum experiences. However, several gaps remain in TPP programs that can be addressed in future research studies and pedagogical practices.

Future trends

Research studies and pedagogical applications are closely linked. If evidence-based practices are provided, effective pedagogical applications can be realized and highly qualified future teachers can be successfully trained. For future research as well as the teaching in the classroom, the question regarding the direction sign language TPPs is: Are the programs designed for teaching learners who are users of L1 sign language?

Future research studies

Late sign language learners represent an increasing part of sign language learner group. The preparation of future sign language teachers need to be able to offer an adequate, data-based language education for this group. In case of the preparation of L1 sign language teachers, research on late learners' sign language development is lacking since the main focus on L1-sign language acquisition had been on the early language development of Deaf children of Deaf parents. Research is needed in the language development of late L1 sign language learners. Once data becomes clearer, the quality of sign language educators and their teaching can be further enhanced.

There are currently no assessment instruments and protocols for evaluating L1 sign language TPP programs. They are needed to assess whether they prepare effective teachers using L1 sign language to teach scholastics, including sign language. A TPP evaluation instrument needs to be developed (cf. Jacobowitz, 2005) with information on the assessment items that can be garnered from sign language TPP learners, alumni, and teacher educators. Results of TPP evaluation may provide information for improving the quality of TPPs.

Future pedagogical practices

The content of teacher preparation courses should include information about the variegated target groups that are to be taught by the future sign language teachers. More specifically, there is the necessity to develop or modify in courses with information in linguistic, psychological, sociological, and pedagogical theories and evidence-based sign language pedagogical tools including assessment tools and teaching methods that are adapted to the heterogeneous and bilingual groups of young sign language users.

Many universities require the passing of a sign language proficiency test as a prerequisite for enrollment in specific courses. Some develop their own assessment instruments with their own standards. Others use common standards such as the CEFR for designing their own assessment instruments. There is a need to create a national sign language proficiency interview and a standardized test of knowledge of sign language within countries and for their sign languages. Data from national sign language proficiency interviews may enable comparisons of the proficiency of sign language teachers. A standardized sign language test containing domains and scope that model after the Test of English as a Foreign Language (TOEFL), which assesses reading, listening, speaking, and writing skills in the English language, may provide clarity to the assessment of the teachers' sign language proficiency.

A platform with database of TPPs that provide L1 sign language teaching education needs to be developed for inter-TPP collaboration and support in research and practice. With continued research in the area of L1 sign language acquisition, coupled with a sharper focus on L1 sign language teaching and teacher qualification, the preparation of teachers to use sign languages to teach scholastic subjects to young users of L1 sign languages can be improved. Only if sign language teachers accept sign language as part of their individual language repertoire, they accept the persons they teach, and offer the language input needed as what the Danish Bonaventura Parents' Organization hoped that every good teacher strives for and teach Deaf children in the way they deserve.

Note

- 1 The United States of America have signed but not ratified the convention yet.

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L1 sign language teaching approaches and strategies

Carolina Plaza-Pust

Introduction

Although a majority of deaf children are born to non-signing hearing parents, in many schools and classrooms worldwide sign languages are taught and used with deaf learners who use sign language as their first language (L1). Scholars understood that deaf children growing up with sign language as their L1 or primary language benefit from their access to a natural language early on since it contributes to their cognitive, communicative and social development. Their sign language knowledge provides the foundation for their literacy development and access to the scholastic curriculum.

The support for sign language learning and use by learners who are L1 users of sign language in classrooms is commonly associated with a bilingual/bicultural approach to deaf education. This approach also supports the learning and use of oral (spoken and written) language, which is considered as a requisite for full participation in the general society. In deaf education classrooms, sign languages are not only taught but are also used to teach scholastic subjects. The professionals who develop and implement teaching approaches in bilingual education programs deal with practical challenges in incorporating sign language in teaching strategies, materials, and assessments (Komesaroff, 2001; Morales-López, 2008; Pérez Martín et al., 2014; Plaza-Pust, 2016b). In addition, the provision of sign bilingual education, much like Deaf education in general, is in some places worldwide vulnerable to changing socio-political contexts and ideological controversies. Consequently, some of its key objectives, notably an early exposure to and acquisition of sign language, remain unfulfilled.

There are studies that examine whether sign language teaching and learning in bilingual education benefits deaf learners. However, variations in bilingual education practices across schools and classrooms call for caution against a generalized assessment of this type of education (Plaza-Pust, 2016b). Faced with an increasing heterogeneity of the deaf learner population, current sign language pedagogical practices in bilingual schools and classrooms are evolving toward more individualized and differentiated language planning with the deaf learners.

Theoretical perspectives

The theories regarding L1 sign language teaching revolve around the notion of sign language as the natural first language of deaf children, its contribution to the children's development of oral language literacy, and its role in the children's academic achievements in general. These chief theoretical percepts are discussed next.

Sign language as the natural L1 of deaf children

Despite the low to nonexistent use of sign language particularly in families of non-signing hearing parents and deaf children, sign language is viewed as the primary or most natural language of all deaf children because it is fully accessible to them (Günther, 1999; Vercaingne-Ménard, Parisot, & Dubuisson, 2005, among others). From a psycholinguistic perspective, scholars have remarked on the relevance of natural and fully accessible language input during the sensitive period for language acquisition. Studies on sign language acquisition by deaf children underscored the relevance of appropriate input conditions in terms of timing, quantity, and quality (Singleton et al., 1998). Mayberry and colleagues (see Mayberry, 2007, for a summary) showed that poor or a lack of access to language during the sensitive period for language acquisition affects deaf learners' L1 sign language and L2/*L_n* oral language competences. Their findings are indicative of a fundamental sense in which "L1 and L2 acquisition are clearly interdependent" as "[d]elayed exposure to an accessible L1 in early life leads to incomplete acquisition of all subsequently learned languages" (Mayberry, 2007: 543).

Deaf learners who grew up in a non-signing environment at home tend to experience a delay in their acquisition of sign language. Their language socialization in the classrooms involves fewer one-to-one interactions than that of deaf children growing up in a native sign language caregiver-child context (Singleton & Morgan, 2006). The development of a "mutual and visually based system of engagement" by deaf children interacting with their deaf parents is assumed to play a key role in their cognitive, communicative and academic development (Singleton & Morgan, 2006: 352). Crucially, it is understood that children growing up with experiences of meaningful interaction at home develop a sense of "knowing how to learn" (Singleton & Morgan, 2006: 352), which will ease the transition from home to school with respect to learning and communicative practices. For instance, gaze plays an important role in visually oriented communication strategies, either to give a turn or to exclude from communicative interaction (Bagga-Gupta, 2000; Kuntze, Golos, & Enns, 2014; Leroy, 2010). The hearing non-signing parents, by contrast, need support to learn to use visually oriented engagement practices with their deaf children.

A few studies have documented developmental delays in learners without a sign language background at home, based on a comparison of their MLU (mean length of utterance) values with those of children who are native in the language (cf. Klatter-Folmer et al., 2016 for Sign Language of the Netherlands (NGT) and Dutch deaf learners). Some scholars have remarked on difficulties some learners have in producing specific sign language constructions such as classifier constructions and reference maintenance in discourse (cf. Tuller, Blondel, & Niederberger, 2007 for LSF/French) and cohesion in narrative discourses with referential loci, reference forms, and spatial relations (Plaza-Pust, 2016a; Schick, 2006). Several scholars have drawn attention to the lack of appropriate tests and assessment procedures that are needed to identify potential developmental delays in a group of learners who are vulnerable to the effects of language deprivation (e.g., Rosen, 2017).

A critical issue raised in the literature on the use of sign language as a language of instruction in bilingual programs is whether sign language skills help deaf children develop their written literacy skills. Several scholars conducted research studies to determine the impact of sign language skills on written language skills of the deaf children. They found that sign language proficiencies positively correlate with L2 written language proficiencies (cf. Hoffmeister, 2000; Padden & Ramsey, 2000; Strong & Prinz, 2000 for ASL/English; Dubuisson, Parisot, & Vercaingne-Ménard, 2008 for LSQ/French; Niederberger, 2008 for LSF/French). In addition, compared to other factors such as home language or age at enrollment at schools, sign language proficiency was found to be the best predictor of high literacy skills in reading comprehension and spoken language use (cf. Singleton et al., 1998; DeLana, Gentry & Andrews, 2007), and mathematics (Hrastinski & Wilbur, 2016). Padden and Ramsey (2000) observed that high reading skills positively correlated with high skills in fingerspelling and translating signs into written English. A longitudinal study of a Quebec bilingual program revealed positive correlations between Quebec Sign Language (LSQ) narrative discourse skills and high reading comprehension skills in French (Dubuisson, Parisot, & Vercaingne-Ménard, 2008). Vocabulary scores for sign language and written language were found to correlate positively, and vocabulary knowledge, not parental hearing status, has been identified as one of the strongest predictors of reading skills (Hrastinski & Wilbur, 2016). For example, Hermans, et al. (2008) observed that deaf children with large vocabularies in NGT also have large vocabularies in written Dutch. They also found that the deaf children who were dominant in sign language “interpret the meaning of new reading vocabulary within the existing language and conceptual systems” (Hermans et al., 2008: 525).

Cummins’ Interdependence Hypothesis

From an educational linguistics perspective, the use of L1 sign language in classrooms with signing deaf children has been widely advocated on the basis of Cummins’ (1991) Interdependence Hypothesis. This hypothesis distinguishes between conversation and academic language proficiency (also referred to as contextualized and decontextualized language use). Crucially, it is assumed that academic skills in L1 and L2/*L_n*, unlike conversational skills, develop interdependently and make up what is referred to as the “Common Underlying Proficiency” (CUP). Linguistic minority children who do not develop academic skills in their L1 at home may benefit from compensatory measures in school. For Cummins, teaching in the minority language (L1) fosters the children’s mastery of literacy related tasks in the majority language (L2/*L_n*) as they benefit from a transfer of the skills developed first in their L1.

Cummins’ work has guided the development of the bilingual approach in deaf education using sign language (Kuntze, 1998; Strong & Prinz, 2000). Cummins’ model also serves as the basis for the hypothesis of the transfer and facilitation of sign language skills on literacy skill development (Niederberger, 2008; Strong & Prinz, 2000). However, critics have argued that sign languages have no facilitating effect on oral language literacy because sign languages have no written form that could be used in literacy related activities. As Mayer and Leigh (2010) argued, “there are no specific text-based proficiencies to transfer from a signed L1 to a spoken L2” (ibid.: 181). Against the backdrop of the ongoing debate, Cummins (2006) warned against losing sight of the core argument in favor of L1 sign language support, which is that L1 sign languages provide “a potent tool for thinking and problem-solving” (ibid.: 2). He further explained that the transfer of L1 to L2, such as from L1 American Sign Language (ASL) to L2 written English, represented “an additional bonus rather than the primary rationale for developing learners’ ASL conceptual and academic proficiency” (ibid.: 2).

Pedagogical practices

A history of pedagogical practices

The history of sign language in deaf education needs to be understood in relation to general society's changing views on deafness, language, and speech (see Plaza-Pust, 2016b, for a detailed discussion of the early history of deaf education). The 18th and 19th centuries witnessed the establishment of schools for deaf children and the use of sign language as the language of instruction, which was termed the "manual method" in several countries worldwide. This method first came into use in the late eighteenth century in France, where the first public school for deaf learners, the French National Institute for Deaf-Mutes in Paris, was founded. The founder of the Paris school, de l'Epee, recognized sign language as the natural language of deaf individuals. He developed a signed system that he called "methodical signs" to teach deaf learners written language (Leroy, 2010). This system contained the signs used by deaf individuals in Paris and additional invented signs to convey the grammatical properties of French. The impact of his teaching method went well beyond Paris as several schools in other countries such as Italy and Brazil adopted his method. One of the Paris teachers, Clerc, established the American Asylum for the Deaf in Hartford (Connecticut) in 1817 with Gallaudet. Teachers trained in the method at the Hartford school later established other schools for the deaf throughout the US.

The nineteenth century not only witnessed an increasing number of institutions and professionals that were dedicated to the teaching of deaf learners but also an increased diversity in teaching methods. The influence of advocates of an education exclusively oriented toward the use of speech and hearing as the communication means used in schools for the deaf, referred to as the "oral method," grew significantly at the time. They led the movement that culminated at the International Congress on the Education of the Deaf in Milan in 1880. At the Congress, delegates voted in favor of banning the manual method from educational institutions with deaf learners. Consequently, many schools for the deaf worldwide adopted the oral method and banned sign language from their classrooms. However, schools for the deaf remained important sites for the acquisition and use of sign language, not only because, particularly in the US, they continued to use the manual method but also because many deaf children continued using sign language outside the classroom in those schools that employed the oral method.

Sign language was reintroduced as a language of instruction in several deaf education programs worldwide a century after the Milan Congress. The impetus to the re-inclusion of sign language in deaf education in the late twentieth century was created by a convergence of several factors. They are research studies that documented low academic achievements of orally educated deaf learners and higher academic achievements of signing deaf children of deaf parents, an increasing critique of the oral approach and other approaches that incorporated speech used in combination with signs such as Total Communication, and parents' dissatisfaction with the available educational options and demand for sign bilingual education. These developments led to the implementation of first experimental sign bilingual classes in many countries worldwide, including Germany (Günther, 1999), France (Leroy, 2010), Italy (Teruggi, 2003), Australia (Komesaroff, 2001), Spain (Morales-López, 2008), The Netherlands (Schermer, 2012), and Sweden and Denmark (Mahshie, 1995).

Current pedagogical practices

Bilingual education currently represents one educational option among others for deaf children in many countries. With regard to the status attributed to sign language, the educational options

available are on a continuum that ranges from the exclusion of sign language in strictly monolingual and oralist classrooms to its inclusion as a language of instruction and as an academic subject in sign bilingual classrooms.

Sign bilingual education: key components and variables

There are four essential components of sign bilingual education. They are:

- (1) The promotion of sign language as the primary language of deaf learners and its use as a medium of instruction (the key defining component);
- (2) The promotion of the acquisition of the oral language as a second language;
- (3) The aim to enhance deaf learners' metalinguistic awareness about the properties of the two languages they acquire and about their bilinguality; and
- (4) The promotion of deaf learners' development of diverse cultural affiliations in deaf and hearing communities to enhance their social, emotional, and identity development.

The manner in which these components are implemented is affected by several factors. Over the last decades, deaf education has migrated from special schools to regular education schools. The inclusion of sign language in regular education schools has been executed in different ways, including the use of sign language interpreters in classrooms, co-enrollment of deaf and hearing learners in classrooms, separate classrooms of deaf learners that are taught by specialist staff, and the engagement of special staff competent in sign language such as tutors, speech therapists, and support teachers. The first programs in co-enrollment were established in the US in the early 1980s (Antia & Metz, 2014) and in other countries such as Austria, Hong Kong, Italy, The Netherlands, and Spain in the early twenty-first century (Antia & Metz, 2014; Krausneker, 2008; Tang, Lam, & Yiu, 2014). In these programs, deaf and hearing learners are co-taught by regular education teachers and teachers for the deaf, many of whom are deaf.

Sign language as the primary language of deaf learners

The support of sign language as the primary language of deaf learners requires a holistic language planning approach. The approach includes the necessary measures to ensure an early exposure to and acquisition of the language by deaf children, as well as offering sign language as an academic subject and its use as a language of instruction of scholastic subjects in classrooms. However, there is a discrepancy between theory and practice when it comes to sign language teaching and use with the deaf children who are enrolled in sign bilingual education programs.

The early support of sign language in education is challenged on several fronts. Major hindrances include the medical professionals who exclusively support speech and hearing habilitation, the predominantly oralist orientation of early intervention programs, the late transfer of deaf learners from oralist programs to sign bilingual programs, and an insufficient number of available sign bilingual programs worldwide (Plaza-Pust, 2016b). Because of these hindrances, many deaf children who are enrolled at bilingual programs have little or no sign language competence (Leroy, 2010). In addition, the increase in the number of young deaf infants with a cochlear implantation (CI), such as in the Netherlands where 98% of the infants are implanted by age 1 (Hermans et al., 2014), needs to be considered. The increased cochlear implantation of deaf children has affected deaf children's opportunities to acquire and use sign language in their classrooms. It has also affected the provision of sign bilingual education for deaf children (Rinaldi, et al., 2014). For instance, in some bilingual early intervention programs such as the state-wide Colorado Home Intervention Programme in the US, children with a CI are provided not only with auditory-oral therapy, but also with sign language instruction by a deaf adult once

a week (Yoshinaga-Itano, Baca, & Sedey, 2010). Many deaf education programs do not include sign language in classrooms, and the Colorado program is an exception rather than the norm.

Deaf peers frequently play a prominent role as language partners of the children at the schools that include sign language in classrooms (Singleton & Morgan, 2006). According to Humphries (2013), the engagement of learners as a part of the learning community represents a paradigm shift in deaf education from a teacher-centered instruction to decentralized learning opportunities so that learners may benefit from “negotiating meaning and sharing knowledge with each other” (ibid.: 19). Hence, the teaching and learning of sign language in bilingual classrooms is characterized as a mixture of instructional strategies and peer-to-peer interactions as it has been described for the co-enrollment program in Madrid (Pérez Martín et al., 2014). While young infants’ attainment of the language is enhanced through an early “language bath,” later language development is promoted through “language immersion” (Nussbaum et al., 2012).

Unfortunately, there are insufficient studies on the sign language competences that are attained by the deaf learners in bilingual education programs. There is a lack of standardized assessment instruments for many sign languages that could be used to assess deaf children’s development. The information on deaf children’s sign language development is frequently drawn from informal descriptions of their sign language competences. The lack of standardized assessment instruments, coupled with an overreliance on informal assessments, created limited data based strategies in sign language instruction (Beal-Alvarez, 2016) and the establishment of “appropriate pedagogical objectives for deaf children” (Power & Leigh, 2011: 38). In addition, there are insufficient developmental studies that document the development of the language in children who are born to native signers. Developmental data obtained in such longitudinal studies would aid in the identification of stages and processes in sign language acquisition. These insights would allow for a comparison of developmental trajectories in different acquisition scenarios.

Sign language as an academic subject

Sign language is offered as an academic subject in some deaf education programs. Unfortunately, information on the inclusion of sign language as an academic subject, the number of hours dedicated to, and materials used for its teaching and learning is scarce. Although sign language curricula were reported to be available in 22 of the 39 European countries surveyed by Becker et al. (2017), the curricula were often available only at a regional level and in few educational institutions. Different schools employ different teaching methods (Pérez Martín et al., 2014). Where special education curricula are offered, sign language is taught as an academic subject. Where they are not, teachers need to find creative solutions compatible with the ordinary curriculum (Leroy, 2010). For deaf learners who are educated in a bilingual program, the formal teaching of sign language tends to cover the contrastive properties of sign language and written language, and is scheduled at a time when the metalinguistic competence of the properties of a language is particularly relevant, such as when the teaching of a written language becomes an issue (cf. Leroy, 2010). However, there is paucity in curricula and teaching materials for the teaching of sign language in mainstreamed classrooms with deaf children who are native users of sign language.

Sign language as a language of instruction

One crucial variable in bilingual education pertains to the choice of the main language(s) of instruction. Several scenarios are reported, although the exclusive use of sign language as the language of instruction is rare. In the Nordic countries (Sweden, Norway, and Denmark) sign language is a language of instruction in special education curricula (Swanwick et al., 2014). In other countries, such as the US or France, there is variation in the use of sign language and

spoken language within and across bilingual education programs (cf. LaSasso & Lollis, 2003; Leroy, 2010). However, little is known of the materials available for the teaching of content matter where sign language is used as a language of instruction. Commonly, resources have been oriented toward the creation of materials used for the teaching of sign language (Becker et al., 2017), rather than the use of sign language to teach scholastic subjects. This volume includes chapters that provide materials for the use of sign language to teach scholastic subjects, and the reader is referred to them.

In addition, there is the issue of the use of sign language in the bilingual classroom. In some programs, such as the co-enrollment program in Madrid (Pérez Martín et al., 2014) and the bilingual program in the Kendall Demonstration Elementary School (KDES) in the US (Nussbaum et al., 2012), sign language use in the classroom is determined by topic, person, time, and activity. Sign language use is also influenced by the diversity of the deaf learner population and their language skills since it requires teachers to consider their different learning needs and language competencies on an individual basis (Power & Leigh, 2011). In some programs, children are grouped together in classrooms according to their language skills and preferences. However, the benefits attributed to such clustering practices have been called into question. Hermans et al. (2014) observed such practices in some bilingual settings in the Netherlands and concluded that the benefits of such clustering practices are insufficiently known because the number of learners grouped together was generally small, and the groups included children of different ages.

Another critical issue concerns teachers' sign language competence. Several surveys on bilingual education programs showed that not all teachers and other professionals were fluent in sign language (LaSasso & Lollis, 2003; Komesaroff, 2001). The European survey conducted by Becker et al. (2017) revealed that teacher preparation in sign language is only available in a few countries. Hence, professionals not native in the language are confronted with the task of learning the language outside of their teacher preparation programs. Teacher qualifications not only bear on the quality of the educational program. Grimes, Thoutenhoofd, and Byrne's (2007) survey on deaf education in Scotland revealed how teachers' sign language abilities shaped their teaching approach with the signing deaf children. The teachers who are skilled in sign language tended to follow the bilingual approach, and teachers with no or poor sign language skills tended to use simultaneous communication (that is, talk and sign) in classrooms (Grimes et al., 2007).

Instructional strategies

The instructional strategies that are adopted in bilingual programs involve the use of sign language, written language, and visual media. Bilingual education recognizes deaf children's need to learn visually and be able to access both sign and written languages. Learners' active participation in learning is essential. Teaching and learning in the bilingual classroom are "joint construction(s) of knowledge" (Singleton & Morgan 2006: 355). For the knowledge construction to be successful, it is essential to consider the relevance of visual communication strategies for the deaf children. However, little is known about "what is (co)occurring and (co)constructed in instructional interactions" (Bagga-Gupta, 2000: 97). Several scholars found that the use of visual media facilitated the teaching and learning of sign language and content matter in bilingual classrooms (Bagga-Gupta, 2000; Gárate, 2012; Power & Leigh, 2011; Singleton & Morgan, 2006; Kuntze, Golos, & Enns, 2014).

Several studies documented differences in deaf and hearing teachers' visual and linguistic strategies in their teaching of signing deaf children (see Singleton & Morgan, 2006 for a review). Different teachers draw on their individual repertoires, skills, and beliefs about using sign, spoken, and written languages. Smith and Ramsey (2004) studied the discourse practices of a native signing deaf teacher, and found that the teacher used visual media; covered complex

language structures; elicited more learner responses, thoughts and statements; employed eye gazes for attention and comprehension; and permitted peer discussions. Such teaching strategies are not only a result of the hearing status of teachers, but also of differences in language proficiency.

“Teacher talk” has been found to vary not only in relation to teachers’ individual habits, language and cultural knowledge but also the type of school setting (Humphries & MacDougall, 1999). Hermans, et al. (2014) found variation in bilingual classroom teaching strategies across school settings in the Netherlands. They observed that teachers engage less in whole class teaching and more in working with individual learners in special school classrooms, and teach the whole class to a greater extent than working with individual learners in the mainstreamed and co-enrollment classrooms.

Spoken language and written language as L2

Sign bilingual education programs differ in the status accorded to the written language and the spoken language. Many programs, particularly in Sweden, Quebec, France, and Germany (cf. Vercaingne-Ménard, Parisot, & Dubuisson, 2005; Leroy, 2010; Günther & Hennies, 2011) give prominence to written language over spoken language because of the full visual accessibility of print. The teaching and learning of the written language in bilingual programs is guided by the need to support deaf children’s literacy development and not their speech development.

Communication practices in bilingual classrooms

Research on communication practices in the classroom showed that teachers and learners use their knowledge of sign language and oral language in creative ways to foster deaf children’s bilingual language development and their metalinguistic awareness about the contrastive properties of the two languages (Günther & Hennies, 2011). Advocates of a translanguaging approach argue that language mixing should be the norm in sign bilingual education. The translanguaging approach requires that language users draw on “a unitary linguistic repertoire to make meaning and to negotiate particular communicative contexts” (cf. Vogel & García, 2017: 1). However, critics of this unitary translanguaging approach argued that learners in sign bilingual classrooms do not profit from a constant simultaneous use of both languages but profit from their alternate use (Millet & Mugnier, 2004; Pérez Martín, Valmaseda Balanzategui, & Morgan, 2014).

In bilingual classrooms, teachers and learners make language choices and switch between languages based on individual and situational factors (Günther & Hennies, 2011; Krausneker, 2008; Vercaingne-Ménard, Parisot, & Dubuisson, 2005). Gárate (2012) described the following uses of the two languages in the classroom:

- (a) Focus on content and use of codeswitching to emphasize a concept, introduce vocabulary, and support the connection between the languages;
- (b) Preview-view-review with both languages to access the content (the order in the use of languages may vary);
- (c) Translation and comparison of the characteristics of each language are used purposefully to enhance the learners’ understanding of both meaning and form; and
- (d) Translanguaging by alternating between the two languages in input and output to the learners.

The instructional techniques that are used to connect sign language and written language involve the alternate use of writing, fingerspelling, signing, and speaking (Padden & Ramsey, 2000). Example (1) from Humphries and MacDougall (2000: 90) illustrates the technique for chaining or sandwiching sign, written, and spoken languages in a lesson.

- (1) (VOLCANO) (V-O-L-C-A-N-O) (“volcano”) (point) (V-O-L-C-A-N-O)
initialized sign + fingerspelling + printed word + pointing to word + fingerspelling

During text production and comprehension activities, teachers and learners move between the languages. In text comprehension activities, learners code-switch between sign and spoken languages as a strategy in their retelling of a written story (referred to as storysigning) or engage in a sentence-by-sentence translation of a written story into sign language (referred to as storyreading). In text production activities, the learners plan the writing process first in sign language, and then translate into written language (Krausneker, 2008).

Millet and Mugnier (2004) observed different reactions by the deaf and hearing teachers to the learners’ responses in French Sign Language (LSF) and written French during text comprehension activities. Deaf teachers are found to validate the children’s responses in either language, reflect on the differences between both languages, and tap on the learners’ metalinguistic awareness of the different features of each language. Hearing teachers tended to only confirm the correctness of the learners’ French production.

Bilingual learners’ pooling of resources

Frequently in deaf education classrooms, communication occurs not only in sign language or spoken language, but also in mixed systems such as manually coded sign language and simultaneous communication (SimCom). Scholars have been concerned about the impact of language mixing on deaf learners’ bilingual development.

Several scholars examined bilingual learners’ mixed productions of sign and spoken languages in terms of vocabulary size and syntactic complexity (Swanwick, 2016; Rinaldi et al., 2014). Klatter-Folmer et al. (2006) studied Dutch bilingual deaf learners’ production of mixed NGT/Dutch utterances and found increases in MLU over time. They did not observe an increase in MLU in utterances with only NGT or spoken Dutch. Klatter-Folmer et al. (2006) concluded that “mixing is a crucial communicative instrument for the deaf children” (ibid.: 245) Rinaldi (2008) pointed out that in bilingual classrooms the one person–one language principle is seldom adopted in practice. A flexible use of the different languages is encouraged for the purpose of communicative efficacy in the classroom.

Language mixing has been observed as a developmentally constrained phenomenon in longitudinal studies of German Sign Language (DGS)/German bilingual deaf learners. Studies by Günther et al. (2004) and Plaza-Pust (2016a) found that DGS borrowings in written productions are subject to individual variation. The DGS borrowings were found to decrease with the learners’ attainment of L2 written German. Plaza-Pust (2016a) observed that some of the errors produced by bilingual deaf learners in their written German were also found in the written productions of hearing monolingual and child L2 learners of German. For example, DGS, unlike German, has no copula verbs. In the acquisition of German, copula verb drop has been found to occur in the bilingual deaf learners’ written German and in hearing learners of spoken German. This observation suggests that copula verb drop is a developmentally constrained phenomenon, particularly during the early stages of language acquisition, and not the result of interference of L1 sign language.

Deaf learners' diverse cultural affiliations

Among its many objectives, sign bilingual education seeks to provide a culturally responsive environment at the programmatic level with the primary objective of preparing signing deaf learners “for life in two cultural and language communities” (Power & Leigh 2011: 39). Sign language is regarded as the unifying element of the Deaf community and a marker of deaf individuals' identity (Holcomb 2013). Deaf culture is a set of beliefs, behaviors, and traditions of deaf people, and it is intimately linked to the learning and use of sign language and to the “seeing way of life” (Hoffmeister 2007: 2). Signing deaf professionals play a key role in promoting Deaf culture in education as they work with deaf learners and instill in them an awareness of “what it means to be Deaf” (Singleton & Morgan, 2006: 359). The inclusion of Deaf culture and history as scholastic subjects on the sign bilingual curriculum is commonly advocated as a means to “promote a sense of pride, reinforce identity, and strengthen socio-psychological development of Deaf children” (Smith, 2013: 4).

In practice, the notion of biculturalism in the education of deaf learners remains controversial (Mugnier, 2006). Changes in educational placements have affected the main patterns of transmission of Deaf culture. The mainstreaming of deaf children in regular schools has reduced the opportunities for deaf children to meet and interact with signing adult deaf role models. In fact, many children might not ever meet a deaf adult or socialize with deaf peers (Kuntze, Golos, & Enns, 2014). In addition, the controversy about the promotion of biculturalism in deaf education is reflected in the different views about the role and place of sign language in deaf education. One view holds that sign bilingualism is the intended outcome of the inclusion of sign language in classrooms with signing deaf learners. Another view holds that sign language is an “educational tool,” in which case sign bilingualism is considered as a transitory phenomenon. This dilemma has also been observed in the education of other linguistic minority groups (Plaza-Pust, 2016a).

Future trends

Sign language use in early intervention programs and for all scholastic subjects, and the development of scholastic skills using sign language, are the areas that deserve further attention in future research studies and pedagogical applications.

Future research studies

Language used for academic purposes does not constitute a monolithic skill but rather involves the choice of particular syntactic structures, discursive means, and registers. Studies are needed to examine how bilingual deaf learners differentiate registers and styles in L1 sign language and L2 written language. In addition, the recent call for a revision (rethinking) of sign bilingual education, its status as an option in deaf education, and its objectives needs to be understood as a response to changing opportunities of deaf children to acquire and use spoken language (Knoors & Marschark, 2012; Swanwick, 2016). These changes have revived the debate over the most useful approaches to account for the abilities and needs of an increasingly heterogeneous deaf learner population. There is a consensus, however, that there is no “one-size-fits-all” education approach that would do justice to the abilities and needs of all deaf children (Knoors & Marschark, 2012; Günther & Hennies, 2011). Future research studies are needed to ascertain the fitness and effectiveness of differentiated bilingual programs and their educational offer to a diverse body of L1 sign language users in classrooms.

Future pedagogical applications

Confronted with an increasing heterogeneity of the deaf learner population, L1 sign language pedagogies need to be adjusted for children with diverse linguistic profiles and learning strategies in classrooms. As learners' profiles are neither uniform nor static, managing the dynamics of linguistic resources in the classroom becomes a core issue for teachers. Teacher training programs would need to offer coursework, projects, and practical experiences in the teaching of L1 and L2 sign language and L2/*L_n* written (and spoken) language to the heterogeneous learner body. Crucially, deaf children's different but changing needs and abilities throughout their school lives need to be monitored. Evaluation and diagnostic tools would need to be created to assess the diversity in learners' development and competences in the different languages.

Coordination of research, policy, and practice is needed to provide support for sign language in the education domain. Such coordination is necessary for advocating L1 sign language teaching within a multilingual framework of the education of a linguistically diverse deaf L1 sign language learner population.

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Using L1 sign language to teach reading

Laurene E. Simms and Jean F. Andrews

Introduction

The components for reading are multifaceted. They are phonology, vocabulary, word recognition, fluency, and comprehension (Vacca et al., 2012), and involve language abilities, motivation, curriculum, and home and school experiences (Taylor et al., 2000). Reading scholars agree that the heart of reading is comprehension of text (Mason et al., 1984). When teaching reading, teachers often overlook text comprehension, but instead target on word identification with the strategy of matching a sign to one print word, a strategy that can lead to miscomprehension (Simms, Andrews, & Smith, 2005). As such, the reader cannot focus on the meaning of the word within the context of a text (Simms, Andrews, & Smith, 2005). This is not to say that lexical and morphosyntactic knowledge is not important (Hoffmeister & Caldwell-Harris, 2014), but it highlights that comprehension skills are required beyond the word level (Bailes, 2001). Furthermore, overemphasizing the lower-level cognitive skill of word reading can limit deaf learners' opportunities for discussions in sign language about ideas about what they have read (Andrews, 2012).

Even though a sign language does not map directly onto orthography in neither alphabet nor non-alphabetic scripts, using a sign language to read print is practiced worldwide, as documented in studies from Canada (McQuarrie & Parrila, 2014), Sweden (Holmer, Heimann, & Rudner, 2016) US (Piñar, Dussias, & Morford, 2011), Germany (Kubus et al., 2015), the Netherlands (Ormel et al., 2012), Taiwan (Liu & Liu, n.d.), and China (Jones, 2013). Besides the mapping advantage, using sign language provides opportunities for learners to develop reading comprehension because it is easier to have conversations about the reading process, activate their prior knowledge, teach them grammar, give previews and summaries, and discuss text organization (Andrews, Winograd, & DeVille, 1994).

The purpose of this chapter is three-fold. It provides an international perspective on how deaf learners use their sign language to read print. The chapter describes select reading theories related to deaf learners, demonstrates how reading develops using sign language with examples of sign-print bilingual instructional strategies, and outlines future directions in research and practice.

Theoretical perspectives

Deaf bilingual, L1 and L2/Ln, and bilingual strategies

Conventional terminology for a bilingual, a first language (L1) or native language (Skutnabb-Kangas, 1984), second language (L2) and additional language (Ln), and bilingual strategies apply to hearing linguistic minorities, but not do necessarily provide a “good fit” for Deaf bilinguals (Humphries, 2016). Deaf bilinguals differ from hearing bilinguals in language access and the use of the visual gestural modality to mediate print. Deaf sign language bilinguals can be sign-print bilinguals (using sign language and writing) (Piñar, Dussias, & Morford, 2011) or they can be bimodal bilinguals (use sign language and spoken language and writing) (Nussbaum, Scott, & Simms, 2012) or even use their sign language at the sign-word level in simultaneous communication or total communication environments to support print literacy (see Moores, 2010, for a review). Deaf children of culturally Deaf parents learn a first language (L1) at birth and largely learn the written language as a second language (L2) and rarely as a third or additional language (Ln). Humphries (2016) argues that the L1 and L2/Ln distinction does not fit exactly in Deaf families as sign language and spoken language are taught in tandem through fingerspelling, writing, and reading.

Approximately 95% of deaf children have hearing parents whose heritage language is spoken (Mitchner & Karchmer, 2004). These deaf children often do not learn sign language during the sensitive period, but learn it in childhood or even in teenage and young adulthood years (Mayberry & Locke, 2003). Throughout their schooling, they have limited access to sign language models as signing Deaf teachers (Humphries, 2016). Even though it is learned later, sign language becomes their primary language and they learn written language as a “second language.” The terms “L1” and “L2/Ln” are often seen as problematic as many of deaf children of hearing parents are learning sign language and reading at the same time (Andrews & Mason, 1986; Hoffmeister & Caldwell-Harris, 2014).

Modality differences are evident for deaf learners who primarily process their language through the visual-gestural modality rather than the oral/aural modality. The patterns of brain localization for deaf native signers processing a sign language parallel those for spoken language processing in hearing native speakers (MacSweeney et al., 2008). Many sign language users are multimodal using both modalities when communicating with hearing peers or family members (Nussbaum, Scott, & Sims, 2012).

The bilingual strategies that were developed for hearing bilinguals (Baker, 2011) and adapted for use with Deaf bilinguals do not reflect their use by the Deaf bilinguals when compared with hearing bilinguals (Nover, Andrews, & Baker, 2002). One strategy is translation. Translation occupies a vital role in Deaf individuals’ reading process and communication with hearing persons. However, the translation process for deaf learners in the reading classroom involves more than converting messages from one language to another. Translation is a strategy that helps them learn the concepts about how to decode and comprehend print (Andrews, 2012).

Another strategy, codeswitching, refers to how hearing bilingual speakers often switch from one language to another across words and sentences (Riehl, 2005). For the Deaf bilinguals, codeswitching is a purpose-driven instructional strategy that relates to how the languages (sign language and the spoken and written languages) are handled or allocated in the classroom (Nover, Andrews, & Baker, 2002; Swanwick, 2017). In the studies reviewed here, codeswitching is an instructional strategy used by the teacher and occurred at the word, phrase, story, and text level. It is operationalized as a strategy used by teachers when they translate written texts either in a free or literal sense using sign language.

Still another strategy is translanguaging. Translanguaging is a process in which teachers provide input in one language, and expect the Deaf learner to respond in the other language during teacher-talk interactions (Swanwick, 2017), the reading-aloud of texts (Hoffman et al., 2017), and reading lessons (Andrews, 2012; Andrews & Rusher, 2010). In these adapted bilingual strategies with sign and written languages, deaf learners use sign language to support reading print.

Reading theories: An international perspective

To investigate how sign language supports the reading of print, researchers examined the mainstream scholarly literature for models of monolingual L1 reading (Tracy & Morrow, 2017), and L2 reading (Grabe, 2009), and developed theories using Deaf epistemology within grounded theory methodologies (Creswell & Creswell, 2017). Select reviews of theories are described below.

Cross-language transfer

The Linguistic Interdependence and Threshold Theory, a cognitive-linguistic model of language learning that was developed by Cummins (1981) in Canada for hearing learners, has been adapted for deaf learners using American Sign Language (ASL) and written English (Cummins, 2007). Its basic premise, the Common Underlying Proficiency (CUP), claims that a learner's literacy proficiency in their L1 can transfer to their learning of their L2 (Cummins & Swain, 2014). Its companion premise, the Threshold hypothesis, posits that the language learner must attain a "threshold" or a "level" of competence in a L1 prior to developing proficiencies in the L2. Critics of this theory argue that because of distinct structural and modality difference between ASL and English and because ASL does not have a written form, the conditions for Cummins' model are not met, and the transfer of meaning do not occur (Mayer & Wells, 1996). Cummins (2007) has counterargued, claiming that even though ASL and English do not share a similar structure, language transfer can occur at the conceptual and meaning-based levels, which hinges on the language user's metalinguistic awareness of the two languages.

The relationship between sign language skills and reading skills in written language were tested in several studies. Niederberger (2008) studied 39 bilingual deaf children ages 8 to 17 years who were learning French Sign Language (LSF) and French in a LSF/French bilingual school. Children were tested in LSF and written French for their narrative and morpho-syntactic expressive and receptive skills. Positive correlations were found between learners' scores in LSF narrations and written French scores. Dubuisson, Parisot, & Vercaigne-Menard (2008) examined the mastery of the spatial elements of the Langue des Signes Quebeoise (or Quebec Sign Language, LSQ), and written French of 24 deaf young deaf learners. The researchers found a positive relationship between learners' mastery of LSQ spatial markers and French reading comprehension. Hermans et al. (2008) administered tests in vocabulary and story comprehension in the Sign Language of the Netherlands (NGT) and in written Dutch to 87 elementary level deaf children. They found a strong and positive correlation between the scores in the sign vocabulary task and the reading vocabulary task, and between story comprehension scores in NGT and written Dutch.

Other studies were conducted in the US. Prinz and Strong (1997, 2000) tested 155 deaf children from ages 8 to 15, and found a strong, positive correlation between six ASL comprehension and production items and English reading and writing measures. Hoffmeister (2000) also found a high correlation between ASL comprehension of antonyms, synonyms, plural markers, and the reading comprehension scores with 50 deaf children, ages 8 to 16. Using language tasks, Chamberlain and Mayberry (2000) found a high correlation between ASL narratives and sentence comprehension and reading comprehension for 48 deaf children ages 7 to 15. Testing a set

of linguistic ASL skills with 31 deaf learners in fourth to the seventh grade, Padden and Ramsey (2000) found correlations between ASL verbal agreement productions, ASL sentence order comprehension, ASL sentence repetition, fingerspelling, knowledge of initialized signs and English reading comprehension scores.

In a larger study, Hrastinski and Wilbur (2016) studied 85 deaf learners in 6th to 11th grades in a bilingual school, and found positive correlation between ASL proficiency, academic achievement and reading comprehension. Scott and Hoffmeister (2017) studied 41 deaf learners in three schools for the deaf at the middle and high school levels and found statistically significant interactions between academic English knowledge and word reading fluency in predicting reading comprehension scores of deaf youths. ASL scores were the strongest and most consistent predictor of reading comprehension. They interpreted their findings in light of Cummins' theoretical premise that learners can utilize their L1 to support their learning of their L2 (Cummins, 2007).

McQuarrie and Abbott (2009) examined how deaf bilingual readers use the phonological structure of signs, which are handshape, movement, location, and orientation, to learn words in English in a study of 50 deaf bilingual learners, ages 7 to 18 at a school for the deaf in Western Canada. They found that deaf learners with higher ASL-Phonological Awareness (ASL-PA) scores had higher reading scores in English word recognition and reading comprehension. They interpret their results in light of their Functional Equivalency Framework, a model that holds that a strong phonological foundation in a sign language may facilitate and transfer across to English print.

Language ability and processing

Psycholinguistic theories of language processing are tested in some studies on deaf learners' reading process. One cognitive processing theory is the *Simple View of Reading (SVR)* (Hoover & Gough, 1990) that was originally developed for hearing readers. The SVR consists of two components, decoding and comprehension, and posits that a reader must be able to comprehend language as well as decode words. Chamberlain and Mayberry (2000) have applied the SVR model in their study with 48 deaf children ages 7 to 15. They found a high correlation between ASL narrative and sentence comprehension and English reading comprehension. In a meta-analysis of 25 studies, Mayberry, Del Giudice, and Lieberman (2011) found that language ability had a greater influence on reading development of deaf learners and contributed 35% of the variance in reading proficiency. These studies suggest that language comprehension skills, not skills in the decoding of words, have the greater impact on reading comprehension. Decoding may be more important than comprehension during the early stages of reading development (Chamberlain & Mayberry, 2000).

Language access

In a study that assesses whether early access to language shapes reading skills, Allen (2015) and Allen et al. (2014) examined print letter knowledge of preschool-aged deaf children over a three-year time frame. They found positive effects of early exposure to sign language on alphabet letter knowledge, sustained attention, and cognitive and behavioral milestones necessary for reading success.

In comparing the lexical processing of deaf readers in four different languages (English, German, Hebrew, and Turkish), Clark et al. (2016) tested three reading theories, which are the dual route theory, the orthographic depth theory, and the early language access theory. The dual route reading theory proposes two routes for word recognition, a direct or lexical route for words that are frequently used, and a route for decoding of individual graphemes into phonemes

(Tracy & Morrow, 2017). Clark et al. (2016) also examined the orthographic depth theory, which refers to the orthography, or script, that vary across languages. Scripts are described as phonemic and opaque orthographies. In phonemic orthographies, there is a one-to-one correspondence between its graphemes and phonemes with the spelling of words being consistent. In an opaque orthography, there is a less direct correspondence between letters and sounds, with the spelling largely not matching the phonemics of words. The orthographic depth theory suggests that opaque orthographies shape the learning of reading to a greater extent than the phonemic orthographies (Tracy & Morrow, 2017). The early access theory posits that the earlier learners are exposed to language, the better readers they will be. In the Clark et al. (2016) study, the participants included 857 deaf and hearing dyslexic children in the 3rd through 12th grades who were from countries whose script was either phonemic (e.g., Germany, Turkey), or opaque (e.g., Israel, US). Learners were administered a test to measure their perceptual processing times of words shown on a computer in the learners' respective language. The study revealed that those learners with early and full access to an early learning of languages regardless of orthographies had faster response times in the processing of print than others without early language access.

Neurolinguistics and visual-based processing (VSP)

Petitto et al. (2016) reported evidence from neurolinguistic imaging studies that the brain has the capacity to segment the linguistic stream and figure out patterns with auditory sound-based phonology and visual sign phonology. Auditory-based phonology is the sub-lexical units, or phonemes (sounds) in words. Visual-based phonology refers to segmenting the parts of signs into sub-lexical units of handshape, movement, location, and orientation. Using fMRI imaging techniques, Pettito et al. (2016) found that sound is not necessary for language and reading acquisition. The brain is sensitive to contrasting, rhythmic-temporal patterning in both spoken and sign languages that can be harnessed to promote reading skills. In other words, the deaf learner can learn to segment and pattern sign-phonetic and sign-syllabic units through fingerspelling and mouthings. These VSP segmentations of sub-lexical signs and fingerspelled letters enable the learner to make orthographic mappings of signs and fingerspelled words onto words and letters. The use of the visual modality helps the deaf reader transition from visual segmentation of visual language (sign-phonetic units) to visual segmentation of orthographic letters in print.

Deaf epistemology

Reading research studies have adopted Deaf epistemologies or “Deaf ways of knowing” in an effort to understand the literacy development of Deaf individuals (Bailes, 2001; Herbold, 2008). Personal testimonies, experiences, and accounts of Deaf people, particularly Deaf parents and Deaf teachers, are used to document indigenous literacy practices (Brueggemann, 2004; Holcomb, 2010). Deaf epistemology focuses on actual behaviors of sign language readers using bilingual strategies, rather than conventional auditory deficit models, to account for their reading skill development (Andrews et al., 2016; Andrews, Byrne, & Clark, 2015). Rather than starting with a theory before data collection and analyses, Deaf epistemology uses an inductive process where themes that are garnered from the data are categorized and analyzed to describe the reading of sign language-using individuals, and condense the findings into an indigenous theory of reading. Two studies using the Deaf epistemology framework are described next.

Mounty, Pucci, & Harmon (2013) analyzed interactive and semi-structured interview data from 12 adult sign language users to identify reading practices at home and at school. The adults were users of ASL and they read in print English. Participants described how they made the transition from “learning to read” to “reading to learn” and documented reading strategies. Mounty, Pucci, & Harmon (2013) identified four key themes: bidirectional feedback loop that

develops between ASL and English; a cultural and visual environment that supports the development of ASL and English; parents and teachers who use a variety of strategies to promote ASL development and reading proficiency; and the use of fingerspelling as bridge between ASL and English.

Hoffman et al. (2017) examined the bilingual strategies of four successful Deaf adult readers who read seven expository texts. They examined the strategies devised by the Deaf adult readers, and found that they used their ASL and Deaf culture knowledge to “think-a-loud.” They also used translanguaging, a strategy they adapted from hearing bilingual work by García and Kleyn (2016). Translanguaging is used as a purpose-driven strategy where the readers alternate languages (ASL and written English) for comprehension (Hoffman et al., 2017). Hoffman et al. (2017) found that the Deaf adult readers’ use of the strategy of translanguaging involved meta-linguistic knowledge and experiences with different reading strategies. Hoffman et al. (2017) saw that translanguaging as a bilingual strategy provides the readers with critical thinking skills, a deeper understanding of content, and knowledge of lexical and grammatical structures of the two languages used.

Development of sign language-using deaf children learning to read and reading to learn

Herbold (2008) studied the development of literacy skills of four deaf preschools for one school year. She observed and interviewed parents and deaf preschoolers at home and school. She found that deaf children of deaf parents developed strategies that were similar to hearing children, which were learning concepts about print, learning the letters of the alphabet, and learning the structure of storybooks. But she also found that the deaf preschoolers used different strategies, which were fingerspelling, initializing signs, chunking letters in a visual sequence, and writing to understand alphabetic print (Herbold, 2008).

Deaf children typically begin formal instruction in reading and “learn to read” when they enter preschool or first grade. As they progress to third and fourth grade, they “read to learn.” It takes deaf children three to four more years to learn to read compared to hearing children because they are often learning sign language at the same time they are learning to read (Hoffmeister & Caldwell-Smith, 2014). Studies show that as deaf learners progress in grades, they have difficulty with reading morphemes; vocabulary, particularly multiple meaning words; figurative language; verb particles; and syntax as well as accessing world knowledge (see Paul, 2009 for reviews; Convertino et al., 2014). The linguistic structures that deaf readers find difficult to read and comprehend are found in children’s books (Schirmer & Gough, 2005).

Reading environment

The environment that is conducive to successful reading for deaf children has been explored in several studies. Studies by Akamatsu and Andrews (1993) and Andrews and Zmijewski (1997) illustrated the visual environment that Deaf parents and Deaf teachers set up for picture book reading. They included the use of body position, eye gaze, and facial expressions; positioning the book so they can see their signs and print; and establishing eye contact and joint attention.

In addition, classrooms with deaf readers should be set up in a way that will optimize the conditions for reading activities. They include lighting and seating arrangements. Following the principles of DeafSpace, the reading classroom should be constructed in such a way that the signing Deaf learners can communicate, collaborate, read, and discuss ideas with each other, and not face architectural barrier environments in seeing other learners’ signs and facial and bodily expressions.

In contrast, hearing learners in regular education classrooms sit in rows behind each other, and communicating and interacting through talking and hearing.

Pedagogical applications

The following is an exposition of pedagogical applications for using sign language to support signing deaf children in their learning how to read and understand printed text.

Sign language – print strategies

Evidence for the use of sign language–print strategies to support reading has been reported. Yang (2006) surveyed 73 teachers in China where Deaf teachers reported that they translated Chinese text stories into Chinese Sign Language (CSL). The teachers described how CSL was used during the children’s retellings and when they asked them comprehension questions after reading the Chinese texts. Deaf teachers were found to use more analytical questions than the hearing teachers, and Yang attributed this to their fluency in CSL.

Jones (2013) interviewed six teachers and observed reading classrooms from three teachers. The Deaf teachers were found to use sign language–print mapping strategies to teach Chinese characters. She also reported that teachers used visual displays to teach concepts, the one-handed manual Chinese alphabet, and tactile strategies such as touching the throat to teach spoken Chinese. Like Yang (2006), Jones reported that Deaf teachers signed stories in CSL along with strategies such as mouthing words, writing, CSL, fingerspelling, orthographic structuring, and word morphology strategies. The use of translation and codeswitching were seen at the word and the story level with Chinese deaf children to mediate Chinese print.

In Taiwan, Liu and Liu (n.d.) conducted a shared book reading intervention that utilized bilingual storybooks and Taiwanese Sign Language (TSL) to teach comprehension and word recognition skills. Three deaf children enrolled in a hearing mainstreamed class participated in the intervention program. A native Deaf teacher signed 16 commercial Chinese storybooks in TSL for eight weeks. The children performed TSL summary, TSL story retelling, narratives, and word recognition sign language–print mapping activities. Positive gains were documented using pre- and post-test measures on word recognition test before and after the reading intervention program.

Swanwick (2017) described how teachers used translanguaging to promote dialogue in three case studies in a mainstreamed classroom in England. During teacher–talk, the teacher utilized bimodal strategies (i.e., speech and sign) depending on the learners’ communication and language needs. These conversations provided the learners with opportunities for incidental learning through peer conversations using British Sign Language (BSL) and English. The teachers were able to scaffold content learning and language constructions using the sign language–print strategy of translanguaging (Swanwick, 2017). By not rigidly separating the languages (speech and sign), Swanwick claimed that the teachers were better able to improve classroom dialogues.

Andrews et al. (2017) studied shared storybook activities between teachers and learners in grade K to third grade classrooms with 25 young, signing deaf children ages 4 to 9 for one year. They found that teachers used purposeful concurrent usage (PCU), translation (free or literal), codeswitching, expansion, and chaining strategies in shared book reading lessons. PCU refers to the teacher changing from ASL to English, and vice versa, depending on the purpose of the concept covered in the lesson. Expansion is the use of more than one sign to explain a meaning of a sign or a word. Chaining refers to the use of gestures, pictures, fingerspelling, signs, and writing to introduce or emphasize a particular concept (cf. Humphries & MacDougall, 1999).

Easy-to-read, picture and phrase storybooks were presented in both ASL and English during 20 weekly storytime sessions that included a Deaf individual signing the story. The children used fingerspelling and signs to spell, translate, recognize words, recite the story, and write the story. They employed translation, PCU, codeswitching, expansion, and chaining in the reading process. The children took pre- and post-tests, standardized tests, and early reading tasks. Andrews et al. (2017) found positive gains in letter knowledge, word recognition, and story knowledge over the year.

Wolsey, Clark, and Andrews (2018) used a quasi-experimental pre- and post-test design with an experimental and control group to test the efficacy of a ten-week ASL and English bilingual Shared Book Reading (SBR) intervention program based on McCormick and Mason (1990) with ASL translations (Andrews et al., 2017). The experimental group received the SBR program and the control group did not. The SBR intervention program includes picture books on daily activities, events, and holidays; feature drawings of children from different ethnic backgrounds; and high-frequency vocabulary, phrases, and sentences. Native Deaf signers translated the storybooks into ASL on DVDs. In the six-step SBR intervention, the learners first watched the DVDs. They retell the stories, compare with their personal experiences, select a favorite picture, draw and label the pictures with written English, and explain the meaning of the drawings and writings in sign language. Teachers used the strategies of PCU, chaining, and ASL expansions to teach story concepts and words in each step. The teachers discussed each picture with the child and documented their intent in written English. An example of visual phonology strategy was noted when one child wrote the letters BB 55 on paper, then signed BOY SAD to the teacher. (The ASL handshapes for BB 55 are similar to the ASL handshapes for the signs of BOY and SAD). Results from measures of ASL receptive skills, passage comprehension skills, and written language phonological awareness showed positive effects on measures of receptive ASL skills, book reading, and drawings in both languages in the experimental group than the control group. The drawings demonstrated the visual phonology skills of the children to transfer their sign language to print. There was no relationship between auditory phonology skills and English word identification skills.

Another study documented sign language-print strategies with a 20-year-old Deaf immigrant man from Mexico who had only basic communication skills in Mexican Sign Language (*Lengua de Senas Mexicana*, or LSM), gestures, ASL, Spanish, and English (Granda & Stoudt, 2017). A Deaf teacher and the Deaf immigrant learner met for 18 sessions in six weeks. The Deaf teacher used sign language-print strategies during the paired-reading sessions with three picture books that were selected for its culturally relevant themes and increasing levels of syntactical complexities. The Deaf teacher first read each of the three picture books in different sessions, beginning with books with the simplest level of syntactical complexity, and gave them to the learner to read and sign. He gave corrective feedback to the learner during each session. The teacher used strategies such as chaining, codeswitching, ASL expansions, and repeated readings. By the end of the six-week session, the young Deaf man was able to independently read the three picture books.

Gietz, Andrews, and Clark (n.d.) tested a visual phonology strategy in a story reading intervention using ASL stories that are written in handshape rhymes in place of print letters. Four profoundly and prelingual deaf beginning readers, aged six to eight and reading at first grade level and below, in a public school self-contained classroom participated in the group storytime intervention. They read and retold the stories using fingerspelling and signs. They were assessed whether the visual phonology strategy foster print vocabulary development. They were given pre- and post-tests on print word recognition. Test results showed significant improvement in children's print vocabulary scores, suggesting that the visual phonology strategy helped the signing deaf beginning readers enhance print word recognition skills and vocabulary knowledge.

Fingerspelling and reading

Fingerspelling consists of handshapes in sign language to represent letters of the written alphabet, and can be chunked together as lexical items in sign language. Studies of young deaf readers have shown positive associations between fingerspelling ability, vocabulary, and reading comprehension (Andrews & Mason, 1986; Haptonstall-Nykaza & Schick, 2007; Herbold, 2008; Stone et al., 2015). Fingerspelling provided deaf children with a phonological means to decode print, and it is often paired with mouthing (see Baker, 2010). Deaf children were reported to chunk fingerspelled letters into sequences that do not always follow the syllable structure of the written language. For instance, Harris (2011) observed that deaf children segment ELE-PH-ANT into three chunks rather than dividing the word as EL-E-PHANT.

Technology, sign language, and print

As smartphones, smart-tablets, and software authoring systems became “user-friendly” and accessible, multimedia and digital e-books are being created that combine sign language movies, pictures, and animation with written language. Gentry, Chin, & Moulton (2005) tested multimedia products and found that when children read the text and pictures in e-books and discuss in sign language, they performed better on reading comprehension measures than reading text alone. Augmented reality apps (Parton, 2015) and eBook designs provide additional reading experiences for vocabulary support where words are linked to sign language videos that show its definitions (Herzig & Malzkuhn, 2015; Stone, 2014). Children’s stories translated into ASL are available through YouTube, Facebook, and other social media. They are largely used as resources to aid the children to develop reading skills rather than sign language skills. The multimedia that include resources for both reading and sign language skill developments are under development (Stone, 2014).

Reading-Thinking-Signing (RTS)

The Reading-Thinking-Signing (RTS) strategy is developed by one of the chapter authors, Simms, and proffered here to encapsulate many of the sign language-print strategies that were identified in the above studies. Simms focuses on ASL and printed English. The RTS is exemplified in the below demonstration of the reading of the English sentence, *The cat runs up the tree*, which is glossed in ASL as CAT RUN UP TREE.

Before reading lesson:

Teacher: Models RTS by thinking aloud.

1. Reads silently, fingerscans each sentence.
2. Thinks silently and asks what happened in the sentence?
3. Signs or makes a drawing of what is understood.

Learner: Visually attends to teacher.

During reading lesson:

Teacher:

1. Encourages children to avoid signing word for word.
2. Shows children how to fingerscan as they read silently.
3. Shows children how to draw a picture showing the meaning of the sentence.

Learner:

1. Reads problem silently, fingerscans each sentence.
2. Thinks and asks question: What is the cat doing?
3. Signs back to the teacher what he/she understands.

After reading lesson:

Teacher:

1. Provides ongoing feedback on children's three steps, monitoring the children's errors.
2. Gives mini-lessons on comprehension of story ideas, vocabulary, sentence structures, that children had difficulty reading.

Learner:

1. Shows his/her drawing.
2. Signs, draws, writes own sentences.
3. Creates a digital multimedia PowerPoint of new sentences with drawings, photographs, signing, and writing.

The learner is shown how to read a portion of the text silently, think or reflect about its meaning, then sign the meaning in order to check for comprehension rather than signing each individual word. The above teaching strategy draws upon visual strategies such as circling, underlining, note writing, drawing, translation to sign language, fingerspelling key words, PCU, codeswitching, expansions, and chaining, and involves the use of technology such as PowerPoints, signing videos, and the multimedia.

Future trends

Future research studies

Controlled empirical studies are needed to test the efficacy of using sign language to support the process of reading print. They should include classroom intervention studies using the shared book reading paradigm to assess the deaf learners' experiences with reading, not just decoding and identifying words. Case studies using grounded theory should be conducted to understand how successful Deaf adult, youth, and young readers use their sign language to mediate print and develop reading skills.

Future pedagogical applications

Practical strategies that have been tested in classrooms, clinics, and research laboratories, and shown to enhance reading comprehension in learners, would need to be distributed to teachers who teach reading to deaf learners. E-books and software programs that include sign language and written language can be delivered to deaf learners across different languages and countries. In a survey conducted by the World Federation of the Deaf (WFD), 93 countries reported that "the quality of education for deaf people is low and the illiteracy rate is high" (Hauland & Allen, 2009: 6). Promoting deaf learners' print literacy skills is a valued educational goal worldwide. The sign language-print strategies described in the above can be a key contributor to higher print literacy skills in the signing deaf learners.

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Using L1 sign language to teach writing

Krister Schönström and Ingela Holmström

Introduction

Writing is one of the necessary proficiencies in many areas of modern life. In our current era, many occupations including manual, non-academic labor require writing skills. Now that society in general has entered the internet, writing has become the main skill to be mastered in order to be able to participate in the internet and social media. Children need to develop writing abilities at schools in order to achieve academic success in various scholastic subjects. However, research literature has consistently reported that deaf learners experience difficulty in learning to read and write. Several studies report that deaf learners lag behind their hearing peers in writing skills (see, e.g., Traxler, 2000). At the same time, there are also studies indicating that there are skilled deaf readers and writers, so the difficulty may not simply be an issue of hearing loss, but rather a pedagogical problem (Hoffmeister & Caldwell-Harris, 2014; Kuntze, 1998).

One key issue for sign bilingual education, and deaf education in general, is the variations in deaf learners' linguistic backgrounds, including their sign language proficiency. Deaf children of deaf parents often acquire a sign language as L1 in the course of natural language development, but most deaf children are born into hearing, non-signing families, and thus often acquire a sign language later in life, ultimately attaining lesser sign language proficiency (Mitchell & Karchmer, 2004). This suggests that the sign language skills of deaf children vary greatly when they begin schooling. In addition, the literature reports that deaf learners from deaf families attain greater academic success, including written language skills, than those born in hearing families (Israelite, Ewoldt, & Hoffmeister, 1992; Moores, 2001). There are also other factors that have been found to affect the linguistic development of deaf children, such as the demographics, culture, and the availability of and features in intervention programs. For example, some countries such as Norway and Sweden provide sign language programs to hearing parents, from whom their deaf children obtain a sufficient foundation in sign language (Swedish Ministry of Health and Social Affairs, 2006). Furthermore, the design of educational systems matters. Access to a signing environment with a rich input of language, peer interactions, and adult role models is a prerequisite for the children to develop communication skills and cognitive abilities (e.g., executive functions), which provides a foundation for them to develop written language skills.

Deaf learners with skills in sign language as a first or primary language (L1) are expected to learn a written language as a second or additional language (L2/L n). In this chapter, we examine the central issues in the teaching of writing to L2/L n learners, including the use of sign language as the children's L1 to teach writing, and discuss different aspects of deaf signers' writing. It should be mentioned that the settings where deaf learners are taught writing through sign languages are relatively rare worldwide (see, e.g., Strassman & Schirmer, 2012). As a consequence, examples of resources and methods, as well as reports on the efficiency of such bilingual practices, are rare. With few exceptions, such practices are found in sign bilingual programs, and to date these have not been established in every country of the world. The key questions addressed in this chapter are: What does it mean to teach writing to deaf learners using a sign language? And, in turn, what does it mean to learn to write as a deaf learner? The chapter begins with a theoretical overview of the subject, and continues with an overview of practical issues regarding the pedagogy of writing through the use of sign language. It ends with a discussion of the current situation and some considerations of future trends. It should be added that the accounts are limited primarily to the learning of English and several European languages.

Theoretical perspectives

This section is a discussion of the theoretical constructs that underlie current practices in the teaching of writing to the deaf learners using their L1 sign languages. The discussion draws from studies in writing, pedagogy, communication, cognition, bilingualism, and second language acquisition. It begins with an exposition of the constructs that are drawn from research studies on L2 writing by normally hearing children, and ends with an exposition of the constructs that pertain to the writing skills of the deaf learners.

Research in writing

Writing is an act of composing a text, involves a problem-solving, decision-making, and self-regulating process, and requires different skills. The study of writing includes describing different aspects of writing. Researchers in writing study the psychological, linguistic, pedagogical, social, motivational, and environmental aspects of writing, and memory processes and transcription skills (see MacArthur & Graham, 2016, for an overview). Writing requires linguistic knowledge in vocabulary and grammar, and as proposed in literacy studies, conceptual knowledge in the structures of discourse, rhetoric, and genres. Sociocultural studies explored writing as a social practice. In classrooms, the social practices include instruction methods, writing activities, and peer interactions. A review of the best practices of writing instruction suggests, among other things: (1) Engagement of learners to write; (2) creating a supportive writing environment; and (3) teaching writing skills, strategies, knowledge, and motivation (Graham, Harris, & Chambers, 2016). The concepts and skills associated with writing hold true for the signing deaf population. There are some differences, and they are mainly the mode of instruction and communication, and the poor access to spoken language by the deaf learners.

Concepts in the teaching of L2 writing

One model of L2 writing instruction is genre-based pedagogy, which was developed by Green and Lee in 1994 at the Sydney School in Australia (Rose & Martin, 2012). Hyland (2003) pointed out that genre is

based on the assumptions that the features of a similar group of texts depend on the social context of their creation and use, and that those features can be described in a way that relates a text to others like it and to the choices and constraints acting on text producers.

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Various genres occur in different societies, and different cultures privilege different genres. Each genre has overarching structures and language features (Gibbons, 2014). A genre-based pedagogy requires teachers to have a deep knowledge of language, culture, and context in order to teach learners the different genres and how texts are created within them (Gibbons, 2014; Hyland, 2003; Rose & Martin, 2012). Rothery (1996) outlined a teaching and learning cycle (TLC) model that consists of the stages of deconstruction, joint construction, and independent construction. Gibbons (2014) extended this model to include the following stages: (1) Building knowledge concerning the subject, field, and theme, and its words and concepts; (2) modeling and deconstructing texts, that is, examining texts from the genre in order to find representative models; (3) joint construction of texts, whereby teachers and learners work together; and (4) independent constructions, where learners write their own texts (see also Rose & Martin, 2012).

Scaffolding is central in genre-based pedagogy. It is a process where teachers guide and support the learners in their writing development. One way to use scaffolding is through the *whole language approach*, an approach that “emphasizes learning to read and write naturally with a focus on real communication and reading and writing for pleasure” (Richards & Rodgers, 2001: 108). In this approach, the teachers write for, to, and with their learners in different genres. According to Albertini (1993), writing is used for communication, self-expression, thinking, and reflection. Also, writing in a whole language approach is considered as being best learned through meaningful interaction with other (native) writers. This is in line with sociocultural theories, which emphasize that learning occurs through social interaction with others (Säljö, 2010; Vygotsky, 1978). Through the use of language, participants communicate their own experiences, knowledge, and perspectives, and learn about those of others. They discuss, imitate, negotiate, and play, while learning a great deal about the world, scholastic subjects, and ways of thinking. The language(s) used in school settings is critical for learner development.

The genre-based pedagogy is a common approach in general L2 writing instruction. However, it has not been reported in the scholarly literature that this pedagogy is used in sign bilingual education. For those who cannot acquire or use spoken languages, such as the signing deaf learners, sign languages are easily accessible and, when used as a medium of instruction in classrooms, the genre-based pedagogy has the potential to provide opportunities for teachers to teach and deaf learners to learn how to write.

A theory that is frequently used in supporting sign bilingualism and the learning of written language through sign language is Linguistic Interdependence Theory (LIT) (Cummins, 1996). A presumption of LIT is that there is a set of different cognitive skills associated with a *common underlying proficiency* (CUP) in performing cognitive demanding tasks, for example, performing academic tasks, that is common across languages. According to the percepts of LIT and CUP, if a learner has acquired those skills in L1, these skills will be transferred to the L2/ L_n as well. The percepts of CUP contrast with the percepts of *separate underlying proficiency* (SUP), which contends that the skills the learner acquires in learning a L1 cannot be transferred to the learning of a L2/ L_n .

The LIT explains why sign languages can be used to support the development of written language skills. It has gained some empirical support. Several studies have shown correlations between proficiency in sign language and proficiency in a written and spoken language (Chamberlain & Mayberry, 2008; Freil et al., 2011; Strong & Prinz, 1997). According to these

studies, sign languages help connect the signing deaf learners to written languages. However, the use of sign language knowledge and skills to learn written language has been questioned by some researchers, who pointed to the fact that sign languages have no written form, that deaf children have no access to spoken languages, and that sign language cannot be used to learn a written language (e.g., Mayer & Wells, 1996). We contend that sign language can be used to support the development of the *conceptual knowledge* that signing deaf learners need to write. For example, an explanation of narrative structures using sign language can help the deaf learners to understand it and be able to compose narratives in written languages (see, e.g., Grosjean, 2001; Rathmann, Mann, & Morgan, 2007).

The schooling experiences of signing deaf learners may influence their written production. Svartholm (2008) reported differences in written production among the signing deaf learners depending on their educational background. The learners who had been exposed to sign bilingual curricula at schools wrote texts that were longer, creative, and contained more content than those who were exposed to a non-bilingual curriculum. The bilingual learners have a stronger foundation in sign language, and sign language served as a pathway to a set of knowledge and skills that are needed for writing (see also Kuntze, Golos, & Enns, 2014).

Studies in deaf learners' writing

Early studies in deaf learners' writing looked at the linguistic accuracy in their written production. The lexical and grammatical structures the deaf writers used were analyzed and compared to the structures used in hearing learners' writings, and lexical and grammatical errors, deviations, and variations in the written production of the deaf learners were reported. Research consistently demonstrated that signing deaf learners have difficulties with vocabulary and grammar, that is, they used limited vocabulary and cohesion markers, and made erroneous use of inflectional morphology (see Albertini & Schley, 2010, and Antia, Reed, & Kreimeyer, 2005, for an overview).

As some researchers have pointed out, poor access to spoken language places deaf learners in a different L2 acquisition situation (Hoffmeister & Caldwell-Harris, 2014; see also Kuntze, 1998). The domains, stages, and varieties that are associated with hearing learners' written language skill development are different for the signing deaf learners. Research in the signing deaf learners' L2 acquisition, generally speaking, has been restricted to linguistic domains of written language and formal learning situations (see also Koutsoubou, Herman & Woll, 2007; Plaza-Pust, 2008). The sign bilingual situation of the deaf has also been described as a kind of "diglossia," that is, a bilingualism in which the choice of language that is used at any given time is rigidly based on the linguistic domain (cf. Svartholm, 2008). Against this background, deaf signing learners' learning of written language differs in several ways from that of hearing learners; sign language (L1) does not have a written form, and the deaf learners largely learn to write with poor access to spoken language that they are learning as another language (L2/Ln) (e.g., Kuntze, 1998). By comparison, hearing learners usually have a developed spoken language competence before starting to write, that is, they learn to write in a language in which they have acquired age-appropriate basic linguistic knowledge and skills. In addition, phonological awareness and phonological decoding are often mentioned in studies as contributing factors in the hearing learners' writing skill development. Deaf children, however, require different modes, pathways, and processes in learning how to write because of their hearing absence (Hoffmeister & Caldwell-Harris, 2014; Mayberry, del Giudice, & Lieberman, 2011).

Other researchers analyzed deaf learners' writing productions within the theoretical and methodological framework of L2 acquisition. They saw that deaf learners' written productions

are similar to that of hearing learners of L2 written languages, including lexical and grammatical errors, borrowings, and overuse (Berent, Kelly, & Schueler-Choukairi, 2012; Plaza-Pust, 2008; Svartholm, 2008). Deaf written language learners have been reported to follow the developmental stages in L2 grammar that is proposed by the Processability Theory (Pienemann, 1998). Processability Theory is a universal model of L2 grammar development, and contains a hierarchy of grammatical structures each of which is acquired in a specific and gradual order (Schönström, 2014). Schönström (2014) found that the development of grammar in the deaf sign bilingual children's written production in Swedish showed the same pattern as in the development of grammar in hearing L2 learners of written Swedish. Plaza-Pust (2008) studied written German productions by the DGS-signing deaf bilinguals, and found that they were bound to similar learning processes. She also found variations in their written productions, and explained that they were influenced by different degrees of multilanguage contact and multilingual competence among the deaf learners.

Research has consistently found cross-linguistic influences in L2 writing. For instance, learners were seen to use a linguistic feature from their L1 in their L2 writing (Odlin, 1989). Likewise, features in sign language are found in signing deaf learners' written productions. The use of the sign language features in written productions is also found to vary by the proficiency levels of the learners. Early studies with unimodal bilinguals showed that their writing were facilitated by an L1 translation (transfer) model whereby their L2 written texts contained the content, organization, syntactic complexity, and textual cohesion in L1 sign language, but only for low-proficiency writers. High-proficiency writers did not do translations; they made direct composition, that is, they used L2 features in their writing. Koutsoubou, Herman and Woll (2007) found that neither translation nor direct composition had any effect on the signing deaf learners' writing, however, they conducted the study with a small writing sample size.

Pedagogical practices

This section provides examples of pedagogical practices in the use of sign language to teach writing. It begins with broader pedagogical perspectives on sign language and written texts, teacher-learner and peer interactions and writing development, and scaffolding and the teaching of writing. The section continues with an exposition of approaches and techniques in using sign languages in different written composition tasks.

Content- or meaning-based instruction

In educational settings where sign languages are used, it is typical for teacher instructions, explanations, and discussions to be conducted in sign language, and learners read texts, take notes, and perform tasks in written language (see, e.g., Bagga-Gupta, 2004; Lindahl, 2015; Mahshie, 1995; Mason & Ewoldt, 1996; Tapio, 2013). This is the content- or meaning-based instructional approach. This approach has been used in sign bilingual education where sign languages are used to teach writing to signing deaf learners. For instance, Mahshie (1995) illustrated how deaf learners in Sweden and Denmark received content information in both the national sign and written languages by watching sign language videos and reading the same narratives in written language. This was followed by class discussions on similarities and differences in text structure, content, and lexicon between the languages. In line with this approach are practices where teachers use text excerpts, written sentences, or concepts that are visually accessible, either on a PowerPoint slide or a whiteboard, and guide the learners through them while giving explanations and expanded descriptions in sign language (see, e.g., Bagga-Gupta, 2004;

Lindahl, 2015). Furthermore, the teachers and learners discuss the meaning of different concepts or utterances to ensure that the learners understand the teaching content. Mason and Ewoldt (1996) described another form of instruction whereby a teacher lectured on a topic and the learners discussed it in sign language. After the discussion, the learners wrote their own essays, reports, and narratives on the topic, and presented their written works with other learners in sign language. The learners gave feedbacks to each other with suggestions on the topic, the linguistic structures, and the cohesion in their written texts.

Another approach to improving learners' skills in writing words, sentences and discourses is *Strategic and Interactive Writing Instruction* (SIWI). The SIWI approach was developed in the 2000s (Dostal & Wolbers, 2014), and shares similar features with the genre-based pedagogy for L2 writing instruction described earlier. According to Dostal and Wolbers (2014), SIWI consists of seven driving principles. They are (1) strategic, whereby learners are explicitly taught to follow writing processes used by expert writers; (2) interactive, whereby learners and their teachers cooperate and share ideas; (3) linguistic and metalinguistic, in which the learners develop competence in the L2/*L_n* at both linguistic and metalinguistic levels through natural acquisition and explicit learning; (4) balanced, whereby the teachers establish literacy objectives that the learners can meet; (5) independent control, whereby teachers first guided the learners in their writing process, and then step back and transfer control to their learners to complete their writing; (6) visual scaffolding, in which the teachers and learners use visual means to provide information and support during the writing process; and (7) authentic, in which the learners with the assistance of teachers generate, revise, and publish pieces of text for an audience.

The above forms of content-based instruction provide the learners with opportunities to use sign languages to talk about topics, construct their writing, and interact with teachers and peers during the writing process. Sign language is seen here as a driving force for building knowledge and skills in the learners on how to write. Teachers use sign language to explain concepts and skills that are required to master in writing, and give feedback to the learners during their writing tasks. The above forms of content-based instruction provides the learners with opportunities to use sign languages to talk about topics, construct their writing, and interact with teachers and peers during the writing process. Such content-based instruction is not unique to deaf education, but is common in other L2/*L_n* instruction in writing (see, e.g., Gibbons, 2003).

Interactional approaches and scaffolding

Social interaction plays a role in fostering young children's writing development (see, e.g., Dyson, 1983, 1989, 1993). Children play, talk, sign, and draw together, and, in such activities and using sign language, they learn from each other on what and how to write. Williams (1999) described an early morning activity in a classroom of four- and five-year-old deaf preschoolers where they drew, discussed about their drawings, negotiated how different the parts in the pictures are spelled in written language, including the choice of crayon color they will use, and "read" the texts on the drawings. Williams (1999) saw that the children "interacted socially around their evolving texts ... talked about the spelling of specific words, the names of the letters of the alphabet and how they are formed, the relationship of written letters to fingerspelling, and the relationship of written words to signed words" (ibid.: 207). Williams argued that the social interactions between the children helped them develop their writing skills. Interactional activities that facilitate writing skill development and are conducted in sign language are also found among learners in higher-grade levels. In higher grades, for instance, learners tend to write alone or in groups, and give suggestions, feedback, and support to each other during the writing

process. In making suggestions and giving feedbacks, the learners use sign language to fingerspell words, sign sentences in written order, and explain content and text structure.

Vygotsky's (1978) zone of proximal development (ZPD) is an important consideration for deaf learners to develop written language abilities. ZPD is a mediated interaction approach between a learner and a more knowledgeable person that is generated by the difference between what a learner can do independently and what he or she can achieve with guidance and encouragement from the more skilled peer. Deaf learners, like all other learners, should be given opportunities to learn and interact with more skilled peers in order to gain the knowledge and skills that they need to write. One problem in deaf education is, however, that class sizes are often very small, and, as a consequence, the number of peers with different levels of knowledge can be very limited (see, e.g., Easterbrooks & Baker, 2002). One solution is to bring older and younger learners together. Mason and Ewoldt (1996) described such a situation where deaf high school learners read books to younger learners, pointing to pictures and words, and signing them. Nonetheless, it is more typical that teachers work as more skilled interactional partners in classrooms.

The instructional strategies that are described above are scaffolding; they give learners the opportunity to perform tasks successfully before moving on to more difficult tasks, and mitigate the risk of frustration. However, scaffolding may be time-consuming, and learners may learn at different paces and constantly ask the teacher about, for instance, how sign language signs are spelled in written language. This process often dictates the teachers' management of lesson content and time. Swanwick (2002) observed three primary-aged learners' attempt to translate a British Sign Language (BSL) story into written English. The teacher took the time to review the BSL story repetitively with the learners. Swanwick found that the learners have different approaches to writing and asked different questions when they worked on their writing.

Fingerspelling and chaining

A common approach in instructing deaf learners is the use of fingerspelling. Research has found that fingerspelling facilitates the reading skills of deaf children. For example, Padden and Ramsey (2000) found that children's knowledge of fingerspelling in addition to sign language structures positively correlated with reading achievement (see also Leybaert, 2005; Musselman, 2000; Puente, Alvarado, & Herrera, 2006), which may influence their ability to write. Roos (2014) found that fingerspelling played a role in deaf children's writing development; the children in her study used fingerspelling when they established the order of letters in Swedish words, memorized names, and recalled words from their memory. Roos also found that the children used fingerspelling as a kinesthetic memorization technique for spelling words by holding or freezing a fingerspelled word in their hand while writing it down. The children also recalled the pronunciation of a word or a name by fingerspelling it.

An instructional strategy that employs fingerspelling is *chaining* (Bagga-Gupta, 2004; Humphries & MacDougall, 1999; Tapio, 2013). Chaining involves connecting written words, pointing, fingerspelling, and signs into a chain. For instance, a teacher may point to a written word on the whiteboard, fingerspell it, show its signed counterpart, and again point to the written word. This technique is particularly used when teachers introduce new words and highlight them in different ways to ensure that the learners understand. Humphries and MacDougall (1999) found that deaf teachers use chaining to a much greater extent than hearing teachers, suggesting that deaf teachers build upon their own experiences of learning a written language. They use sign language to discuss, explain, and interact with deaf learners, while also writing on the whiteboard, pointing to words or sentences in textbooks, on paper, and PowerPoint slides, in

effect creating linkages between the different languages that are in play in the actual classroom (see, e.g., Bagga-Gupta, 2004; Holmström & Schönström, 2018; Lindahl, 2015).

Contrastive methods

Another approach within sign bilingual education is the use of contrastive methods, whereby a written language is compared and contrasted with a sign language in terms of the linguistic properties of vocabulary, grammar, and discourse (see Hoffmeister & Caldwell-Harris, 2014; Svartholm, 2008). The text content and genre can also be compared and contrasted across languages (cf. Mahshie, 1995). The purpose of such an approach is to facilitate the learners' metalinguistic awareness of the languages. Teachers who employ the contrastive technique illustrate the similarities and differences in linguistic structures and modalities between a sign language and a written language. One illustrative example is a marked subject in Swedish. Swedish requires a marked subject in all clauses and Swedish Sign Language (STS) does not. Such difference needs to be taken into consideration when teaching learners to self-monitor and eliminate possible influence from STS when writing in Swedish. Another illustrative example is vocabulary; it is misleading to treat lexical signs and depicting signs (such as classifier constructions) in a one sign-one word correspondence with written words (Hoffmeister & Caldwell-Harris, 2014).

Hoffmeister and Caldwell-Harris (2014) suggest a model for learning by reading a written language such as English. They propose three stages. The first stage is the translation of vocabulary and phrases to sign language such as American Sign Language (ASL). In the second stage, the learners work with more complex structures, for example, idiomatic utterances, such as "look over" or "take the bus." In the third stage, differences between ASL and English are discussed in ASL. Children use their metalinguistic knowledge to compare ASL and English. Their metalinguistic knowledge becomes a source when teaching and learning to write. When teachers give feedback to learners' writing, they refer to lexical, phrasal, and sentential structures of written English using ASL and the learners' metalinguistic knowledge.

Foreign language teaching methods and translation tasks

Foreign language teaching approaches and strategies can be employed in the teaching of writing to deaf learners. For instance, teachers can use computer-mediated communication such as live chats for written language tasks. Translation is an activity that occurs in both foreign language and sign bilingual education. In sign bilingual classrooms teachers and learners translate written language into sign language (e.g., Holmström & Schönström, forthcoming). However, translation in this case does not involve the creation of word for word correspondences between the languages. It is conceptual, whereby the meaning of words gets translated, not the words. One example of the conceptual translation approach is given by Evans (2004), who studied a 4th to 6th grade classroom in Canada. The teachers translated conceptually between ASL and English, and discussed similarities and differences in meaning in the two languages. Armed with this information, the learners then begin to write.

Literal translation is another activity that is found in foreign language and sign bilingual classrooms. It involves the creation of one sign-one word correspondence. Learners sign their thoughts and translate them into a written language. This process has the potential to provide the learners with a deeper understanding of the similarities and differences between the languages. In this situation, sign language translations serve as a pathway for developing writing skills. An opposite translation procedure, that is translating written texts into sign language, has been

particularly observed in reading aloud activity. For example, one study shows deaf mothers of deaf children using this strategy to support their children's written language skills (Berke, 2013). The deaf mothers used chaining and provided definitions. Translations of written texts into sign language also serves as another pathway for developing writing skills.

In many countries, deaf learners are taught not one written language but several foreign written languages. A model of teaching a foreign language using a foreign sign language is adopted in several countries. One example is teaching English as a foreign language through the use of ASL or BSL at schools in a non-English speaking country (Pritchard, 2016). The purpose of using a foreign sign language is grounded in the assumption that the English words that are produced orally, as well as fingerspelling in a sign language, aid in the development of English writing skills. The use of another foreign sign language could also have scaffolding as well as a motivational effect in learners' learning.

There is a relative lack of research in the use of sign language to teach writing to L1 sign language-using deaf learners. This is probably caused by the rarity of sign-based educational programs worldwide. We have identified some approaches in the instruction of writing to signing deaf learners. Teachers may use different methods during different phases and topics in their lessons. In addition, there are a lack of efficacy studies in the scholarly literature.

Future trends

Future research studies

As shown in this chapter, there are many different ways to teach deaf learners writing. However, it should be noted that approaches and practices for instructing writing using sign languages have been researched far too little to make any broad claims. Therefore, we cannot state enough the importance of ascertaining the effectiveness of the different approaches. As previously mentioned, efficacy studies in different sign language approaches and methods that are used in the teaching of writing are lacking and remain in need. The approaches and methods need to be continually evaluated and improved in order to effectively teach writing to signing deaf learners. In a sign language-based classroom, variability in the deaf learners has been observed. Teachers would need to develop different pedagogies for different learners. Future research should address this issue and assess the approaches and methods that contribute to successful writing by different ability groups of learners.

Future pedagogical applications

Pedagogical practices for general L2 writing instruction are, however, genre-based, and this pedagogy may be further developed and implemented in the writing instruction of deaf learners. It may also be beneficial to work bilingually across different school subjects (e.g., STEM), in order to link between sign language and written language (cf. Holmström & Schönström, 2018; Lindahl, 2015). It is thus highly desirable that further development of methods, teaching materials, and new practices in sign bilingual pedagogy continues. With the rapid development of technology in recent decades, there are increased opportunities for communication, for example, through social media, as there are greater possibilities for using sign language, for example, via vlogs, announcements, and YouTube, as well as for communicating in written mode through direct messages, for example, emails and online chatrooms. This greater accessibility to written communication modes through technology could also be an important source on which to build better practices and materials for sign language pedagogy.

With the increase in the number of deaf learners with cochlear implants (CI), this generation of learners may have more opportunities for learning the spoken language when compared with the opportunities that were given to previous generations of learners. This will obviously impact on their writing and the teaching of writing. However, given the variability in speech and hearing skills as well as in linguistic foundation among children with CI (Humphries et al., 2012), as well as in literacy (Mayer & Trezek, 2018), teaching them to write will remain a challenge for the foreseeable future. It is possible that many children with CI would still benefit from sign language pedagogy in order to take advantage of their full visual capacity together with their (limited) hearing capacity.

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Using L1 sign language to teach mathematics

Christopher Kurz and Claudia M. Pagliaro

Introduction

There is a close relationship between language and mathematics. Be it in the classroom or in daily conversation, language is used to express and manipulate mathematical concepts that communicate our wants (e.g., *small fries please*), explain our world (e.g., there are *seven* continents), and make our lives more efficient (e.g., taking a shortcut to save *time*). Indeed, we use natural language to communicate mathematics, and conversely, we use the language of mathematics to communicate our natural lives.

Deaf¹ people use sign language to communicate mathematical thought. However, for many Deaf learners, access to the mathematics curriculum is largely compromised by political, cultural, educational, medical, and economical influences that dictate the language and/or modality these children use. Delayed natural language acquisition, inaccessibility to natural sign language mathematics vocabulary, and highly variable language pedagogical approaches in the K-12 classrooms contribute to Deaf learners not reaching their mathematical potential (Easterbrooks & Stephenson, 2006; Pagliaro & Kritzer, 2013). Over the past 30 years, efforts to include a natural sign language as the language of instruction in education programs for the deaf have had promising results. Still, best practices in using a sign language to teach content-specific topics like mathematics need to be identified.

Theoretical perspectives

Children from birth to 5 years of age who have full access to a complete language proceed through the typical stages of language development; that is, the process whereby they come to understand and use language. From babbling to one- and two-word utterances, to fully grammatical sentences, children quickly develop access to the world and to learning about the world beyond the physical experience. Through linguistic discourse with a more knowledgeable language facilitator (e.g., a parent), a child can understand more, and at a more in-depth level, concepts concrete or abstract, present or not, prospering the child's cognitive growth. Early language acquisition has been shown to correlate positively with later academic achievement,

literacy, and higher-order thinking, as well as social and emotional well-being (Hart & Risley, 1999; Kuhl, 2010).

Unfortunately, Deaf children are often deprived of this critical period (Humphries et al., 2012). Because the vast majority of Deaf children are born into families that do not use a sign language primarily, a Deaf child's access to natural language is often hindered. Unable to communicate with their families naturally, language development and learning are delayed and cognitive progresses are held back. Access to a signed language from birth, however, greatly reduces this risk. International studies have shown that Deaf children who have early exposure to a signed language follow the same linguistic developmental stages (Petitto, 2000; Tomaszewski, 2001) and obtain the same cognitive benefits (Mayberry, 2002; Pyers et al., 2010) as hearing peers with full language access. In fact, those Deaf children who acquire sign language early in life attain greater achievement academically in all areas than do their peers who do not, including in mathematics (Nunes, 2004).

There is an undeniable direct and compulsory relationship between mathematics and language whether it is in learning mathematics, communicating mathematics to others, or using mathematics to solve a problem or answer a question. Although mathematics can be represented via a defined notation system, it is in language where those symbols literally come to life. Language, not simply communication, which can be free of syntactic and semantic rules, is the avenue by which mathematics is taught using both field-specific vocabulary (e.g., "sum" as the addition of two or more quantities) and everyday common language (e.g., numbers; using "late" to indicate arriving after a specific measure of time) (Healy et al., 2016). Further, findings (Hakuta & Diaz, 1985; Jiminéz, Garcia, & Pearson, 1996; Menéndez, 2010) supply theoretical and empirical support for the development of cognitive and linguistic knowledge and skills in a signed language and their transfer to a second language.

Cummins' (1979) Linguistic Interdependence Theory states that an appropriately developed first language (L1) improves and facilitates learning a second language (L2) by allowing information about L1 to be readily transferred to L2, regardless of modality. A strong L1 with metalinguistic awareness allows children to objectify language, analyze its parts, use languages more consciously, and transfer knowledge from one language to another. In the case of mathematics specifically, the bilingual mathematics learner thus makes associations between languages (L1 and L2), mathematical notation, experience, and concepts, defining, representing, translating, and substantiating along the way (Clark, 1975). These associations not only provide the learner with multiple pathways by which to understand mathematical concepts, but also to communicate his/her understanding in translating within and between those concepts indicating a robust and meaningful understanding (Lesh, Post, & Behr, 1987; Pagliaro & Ansell, 2008). A study by Henner et al. (2017) showed that metalinguistic awareness in sign language correlated with higher levels of mathematics achievement. However, if either language is weak, as is the case with many Deaf children, the whole system breaks down. It is critical, then, that Deaf children have a teacher "who can analyze the dominant language of these children and create second language mathematics descriptions that are meaningful based on their language's use of the mathematics concepts" (Schindler & Davison, 1985: 27–8). Deaf education teachers must know and use academic sign language.

Academic language is the level of language, including content-based terms and structures, that learners need to know to complete learning tasks in schools (Cazden, 2001; Cummins, 2000). Defined specifically as "the extent to which an individual has access to and command of ... the academic registers of schooling" (Cummins, 2000: 67) academic language derives from "expectations and norms for language use in an academic setting" (Cazden, 2001: 172) and in specific domains. Academic sign language, then, is the use of sign linguistic features that are part of the language of instruction and that promote student learning in academic contents (Baer, 2002). It includes vocabulary and structures associated with higher-order thinking in areas such

as mathematics, science, social studies, and literature. It has a formal style that includes a clear and explicit delivery of information where new signs are introduced with enriched explanations (Harris, 2016). The literature shows that the use of academic sign language in instruction supports the learning of mathematics and science concepts for Deaf children (Lang & Pagliaro, 2007) in both L1 and L2. Unfortunately, knowledge of the complex signed vocabulary necessary to communicate higher-level mathematics concepts especially is lacking (Ansell & Pagliaro, 2001; Lang, Kurz, & Kurz, 2006). Although learners, teachers, and administrators recognize that teachers' and classroom interpreters' signing abilities are crucial to learning (Graham et al., 2012), professional preparation and fluency in sign language is often insufficient to the task of conveying mathematics content (Hutter & Pagliaro, 2017; Pagliaro & Ansell, 2002). Most professionals involved in the education of Deaf learners have a limited understanding of what constitutes conceptually and linguistically accurate sign language vocabularies for such concepts.

A conceptually accurate sign language word is one that maps underlying meaning to a set of semantically appropriate sign language morphemes (Emmorey, 2003). For example, in American Sign Language (ASL), words that pertain to collective nouns, such as family, group, or class, tend to have the movement that gathers a group together as one. Underlying the understanding of conceptually accurate mathematics words in sign language is an understanding of the mathematical concept itself, that is, content knowledge. A linguistically accurate sign language word is one that follows the correct phonological and grammatical structure of sign language, ensuring that it is easily produced and correctly placed within a sentence and that it can be inflected as appropriate. Using the example of collective nouns in ASL above, the hands move in a way that is linguistically allowed. Often the ways many mathematics terms are typically expressed in sign language, however, violate conceptual and/or linguistic accuracy. This, as well as the high variability of signed terms used to represent a single mathematical concept, poses a substantial barrier for Deaf learners. When signs are contrived, confusing, and difficult to articulate, Deaf learners are less likely to draw connections between inaccurate signs and the concepts these signs intend to represent (Cavender et al., 2010), and are more likely to find discussions of mathematics concepts less engaging, even laborious. As the frequency of inaccurate ad hoc sign use increases in STEM classrooms, fluency, pace, grammaticality, and comprehensibility of instruction are more severely impacted (Lang, Dowaliby, & Anderson, 1994). In a study that investigated the impact of translating mathematic items into sign language, researchers found that variations in the teacher translations and features of sign language affected item difficulty and/or substance (Ansell & Pagliaro, 2001).

The primary reason for education professionals' inadequacy in academic sign language lies within their preservice preparation. For most educational professionals, the traditional method of learning sign language is lexical-based signing, where signs are learned in isolation and most often by a corresponding word in a spoken language, not by concept. The main issue with this method is the lack of context, an imperative aspect of true sign language, which often leads to rigidity in sign repertoire and inaccurate sign choice. Contributing to this problem is the fact that online lexical databases are often maintained by people who are not heritage sign language speakers, which leads to faulty sign production and loss of meaning. When evaluated by sign language-fluent content area experts, many invented signs are found to be inappropriate or inadequate for conveying the concept they are intended to represent (Lang et al., 2007), leaving learners to either memorize the definition for the concept misrepresented by the sign choice or accept an incomplete and faulty characterization of the concept. In addition, the majority of preparation programs in Deaf education require learners to take *at most* just four "sign language" courses (Andrews & Franklin, 1997), and the majority of those courses follow curricula that focus on social and conversational skills, not academic subjects, thus producing a workforce inadequate in effectively delivering academic concepts. Thus, most preparation programs essentially

prepare graduates for language facilitation expecting preservice teachers and interpreters to learn how to deliver academic contents in sign language on their own, on the job, and with minimal feedback. With little to no understanding of the content and/or linguistics required for accurate high-level academic sign language, signs that are conceptually and/or linguistically inaccurate are frequently invented quickly and without planning during instruction by teachers and classroom interpreters with little understanding of the impact on learning.

These findings lend theoretical and empirical support for the development of cognitive and linguistic knowledge and skills in sign language and their transfer to the second language in Deaf children. To stimulate academic cognition, educational professionals who are fluent in sign language must employ language functions for targeted learning tasks. Access to and command of academic language in L1 and L2/*L_n* is necessary for a successful scholastic career for everyone, Deaf and hearing alike.

Pedagogical practices

Sources related to sign language pedagogical practices in mathematics education of the Deaf during the nineteenth century illustrate the debate over the use of fingers when counting, the use of language versus numerical forms in arithmetic, and whether to deliver academic content in sign language first before its equivalent L2 (Kurz, 2006). The twentieth century brought new research findings related to the use of signs in the mathematics classroom for the Deaf, including sign language fluency of mathematics teachers, the potential ramifications of technical signs that are conceptually correct on learning, and language translation of story problems as discussed earlier. The remainder of this chapter includes some general suggestions as to how to advance the use of sign language as the language of mathematics instruction for Deaf learners, while also recognizing that there is much more to learn within this under-researched area. We encourage researchers and teacher-researchers to continue to seek the best, evidence-based practice. While sign language has predominately been considered in regard to instruction only, it is imperative that it be held to the same level of language value as written language throughout curriculum, instruction, and assessment. Pedagogical thought should include the impact of all languages on and within the interrelationships of curriculum, instruction, and assessment as they help drive each other in decision making and learning support. Table 6.1 outlines the language considerations for all three areas of pedagogy with the suggested format supporting Deaf learners as bilingual.

Sign language mathematics curriculum

Sign language within the mathematics curriculum should be considered along with general language learning and language planning. At a teacher conference in the mid-nineteenth century, while discussing the use of sign language in the classroom, Laurent Clerc, the French-born Deaf teacher and co-founder of the American School for the Deaf in the United States, justly lamented that whenever he signed, it disappeared into the air. Until the invention of video technology, sign

Table 6.1 Language considerations for pedagogy

	<i>Curriculum</i>	<i>Instruction</i>	<i>Assessment</i>
Traditional Format	written language	signed language + written language	written language
Suggested Format	signed language + written language	signed language + written language	signed language + written language

language vocabularies and sentences had to be described in text and/or drawn as illustrations, not nearly capturing the active, 3-dimensional essence of the language. Today, with visual technologies that can capture sign language in motion, there is an increasing number of sign language videos available online and onsite. Unfortunately, the number of sign language resources for mathematics is still rather limited, and few are currently available that present the semantically accurate signs in this chapter. We therefore advocate for a sign language based curriculum focusing on teaching mathematics. Note, we are not implying that there is a special mathematics for Deaf learners; rather, we are looking towards the development of a curriculum that is supported with accurate and appropriate sign language, is data-driven, and is true to mathematics in concept and development. We suggest that heritage sign language speakers who are Deaf and who are content experts in mathematics and mathematical concept delivery in sign language lead the field in this endeavor, similar to the involvement of mathematicians and mathematical experts who are heritage speakers of other languages. Those involved who are not heritage sign language speakers are strongly encouraged to consult with Deaf heritage sign language speakers, preferably those who are mathematics professionals (i.e., teachers, researchers, etc.), with the understanding that there may be differences in opinion regarding preferred signs (Kurz, Kurz, & Harris, 2016; Lang, Kurz, & Kurz, 2006).

In designing such a sign language mathematics curriculum, semantics must be considered. To illustrate, over the years, along with better information on how Deaf learners learn, and a better understanding of sign language as a conceptual language, there have been changes to signed words for some mathematical concepts in ASL. For example, in the past, the sign for improper fraction was made with three individual signs in sequence: not + proper + fraction, following the English equivalent, but conceptually indicating that the fraction was inappropriate, informal, or even indecent. Clearly this combination of signs is not semantically accurate nor conceptually accurate. Figure 6.1 shows the current ASL sign for improper fraction within which is embedded the meaning of the concept.



Figure 6.1 Improper fraction sign in ASL

Defined as a fraction in which the numerator is greater than the denominator, the semantically correct sign now consists of the handshape 1 on the passive hand with palm orientation downward (indicating the fraction bar) and a bent handshape L on the active hand with palm orientation toward the passive hand, first indicating the greater numerator with a wider bent L handshape above the fraction bar and then moving downward below the fraction bar with a more narrow bent L handshape indicating the lesser denominator. The morphological inclusion in the bent L shape indicates the magnitude of number, the numerator being greater than the denominator.

The appropriate sign for proper fraction would be the opposite of that for improper fraction with the numerator being lesser than the denominator. The bent handshape L handshape represents an ASL classifier for a generic number and can be used in ASL vocabularies for mathematical terms such as numerator, denominator, fraction, proper fraction, mixed number, digit, base, exponent, subscript, superscript, coefficient, variable, term, and place value (see Figures 6.2a, 6.2b, 6.2c, 6.2d for examples).

The development of a sign language based mathematics curriculum must also take into consideration the other parameters of language that provide conceptual support to the Deaf learner. Part of the responsibility in working with Deaf children in educational settings is akin to enabling them to become “language scientists;” that is, to seek out patterns of meaning in specialized vocabulary and discourse. The brain seeks these patterns within language in order to build relationships and organize knowledge for future retrieval (Hakuta & Diaz, 1985). Additionally, patterns are used to build content knowledge relationships for recall and retrieval. These language patterns can exist at the phonological, morphological, and syntactical levels. For example, in English at the morphological level, we recognize a word starting with “tri-” as indicating that the word meaning is “three” of whatever root follows. A tricycle is a bike with three wheels; a triangle has three angles. Those patterns help the receiver to break down a word and make connections to its meaning.

Czubek (2010, 2006) suggests that teachers consider and examine sign language phonology when discussing academic words and texts. Sign language phonological patterns often consist of one or more similar parameters (handshape, location, palm orientation, movement, and non-manual markers) to portray a category of vocabulary or phrases that share similar characteristics, actions, or classifications. For mathematics, the bent L handshape classifier used to represent number is one of these patterns as described above and shown in Figures 6.2a-d. Another phonological pattern inherent in ASL can be found in the signs for line, slope, intercept, and any 2-D figures (e.g., rectangle, triangle, quadrilateral, parallelogram, and trapezoid), all of which are made with two hands using the 1 handshape. Signs for any 3-D solids (e.g., sphere, cone, cylinder, prism, and pyramid) are made with two hands of the 5 handshape representing the surface of the solid. With these handshapes, the properties of the figures (2-D vs. 3-D; sides vs. faces) are represented, as is the relationship between them (conceptual accuracy), in a natural sign language form (linguistic accuracy).

In a similar way, Japanese Sign Language employs the handshape commonly seen for W (i.e., three raised fingers) for words representing mathematics, arithmetic, and number and the closed C handshape for 2-dimensional figures (Makitani & Kurz, 2018). Sign language phonological patterns are likely to help Deaf learners develop organizations and schemas of knowledge based on similar characteristics and relationships for recall and retrieval (Emmorey, Tversky, & Taylor, 2000).

In addition to the active and deliberate planning of sign language within a mathematics curriculum, educational professionals should consider sign language within instruction. In the past, this has simply presented itself as a translation of what was or would have been said in oral or

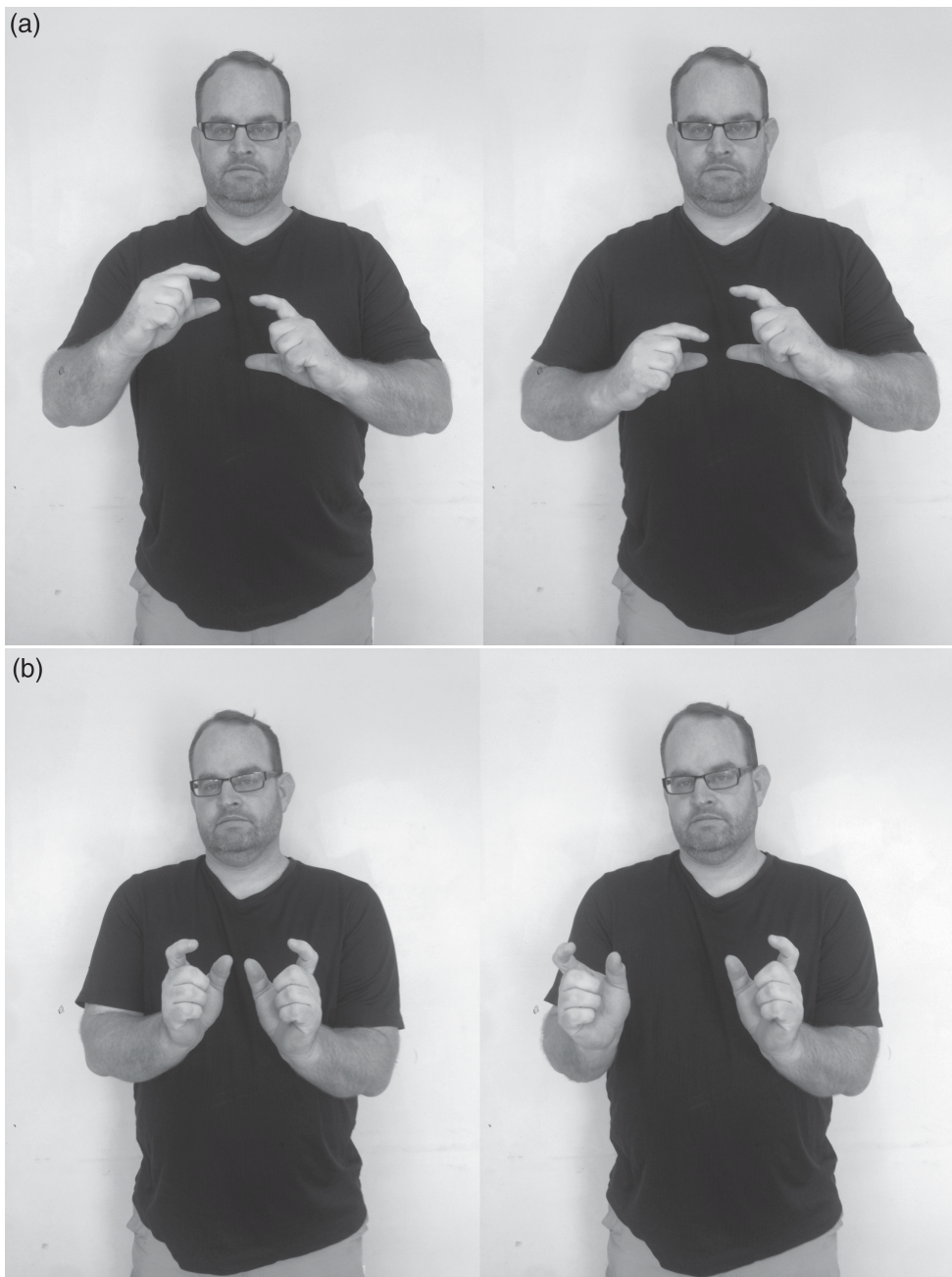


Figure 6.2 ASL mathematics vocabularies with the bent L handshape. (a) Mixed number (downward movement). (b) Place value (horizontal movement). (c) Base (clockwise movement). (d) Variable (elongated counter-clock movement)

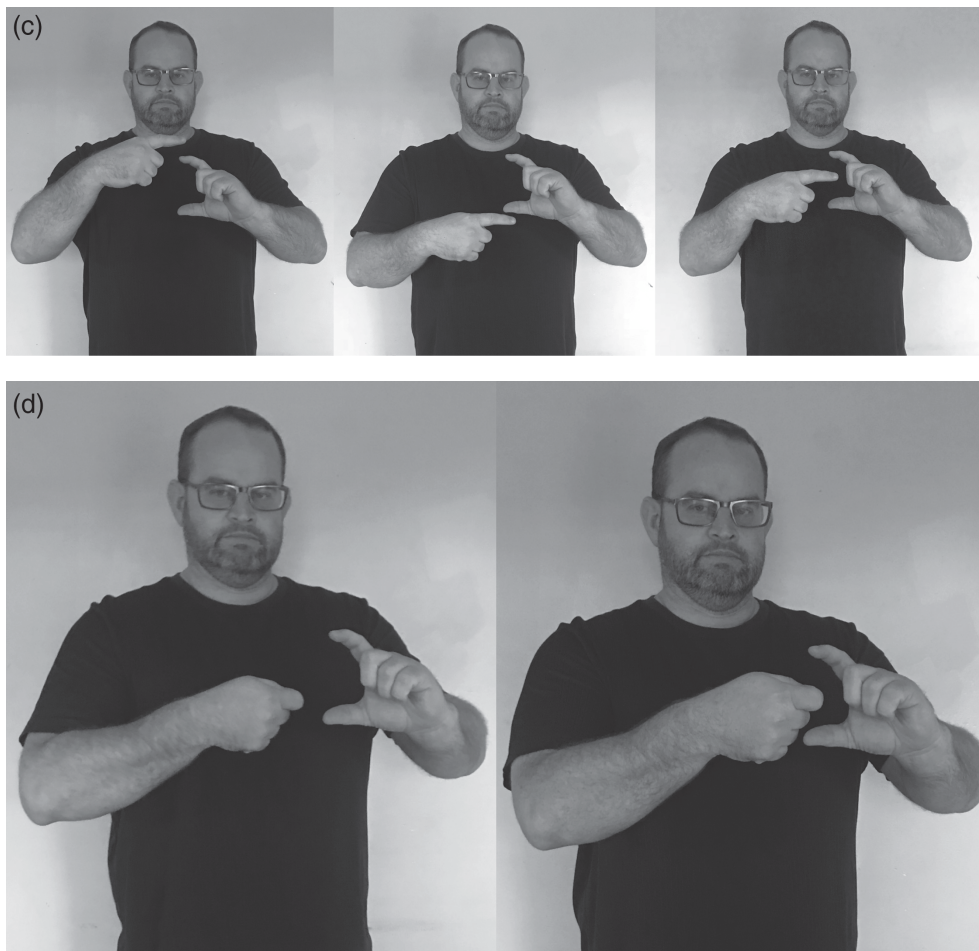


Figure 6.2 (Cont.)

written language in a more lexically based way. We advocate, however, for a more conscious use of sign language, purposeful to enhancing the learning of mathematics concepts.

Sign language mathematics instruction

As part of instruction, there are several ways in which teachers can provide Deaf learners with opportunities to analyze signed mathematics language and identify linguistic patterns and relationships as described in the previous section. We offer the following suggestions.

Sign language concept categories

We encourage teachers to help Deaf learners become “language scientists” who analyze, assemble, and organize information by linguistic features for understanding and retrieval. For example, teachers can create a sign language word map for mathematics concepts where the signs for related concepts could be displayed. For example, considering the concept of fraction signs for proper fraction, improper fraction, numerator, denominator, fraction bar, mixed number,

equivalent fraction, simplest form, factor, and multiple could be presented and examined. The map would allow them to identify sign patterns and relationships. To reinforce this during instruction, the teacher could create a sign language word wall, similar to the written language word wall, of common sign language hand configurations where teachers and learners can categorize mathematics signs based on handshape.

Similarly, teachers could build their own “sign language mathematics texts” (akin to a printed textbook) for various purposes including introduction of a concept, reinforcement, enrichment, and review. Such texts could be categorized by linguistic and conceptual properties and be available for Deaf learners as a learning tool, be it as the lecture portion of a flipped lesson or as review when needed, as many times as needed. The sign language mathematics text should include visual products, for example, videos and images, and information that explains the language–concept relationship, as well as developmental trajectories that align to the mathematics curricula in terms of knowledge and skills. Deaf learners need physical and electronic space for mathematics in sign language to enhance their language development and maintenance. By creating this space, Deaf learners can be exposed to mathematical concepts (e.g., vocabulary and phrases) at any time during learning.

Sign language mnemonics

As with other languages both written and spoken, it is imperative to allow sign language itself to teach concepts. For example, mnemonics is often used in mathematics classes as a memorization strategy to help learners recall larger pieces of information, categories, and procedural stages. The common mnemonic in English for the order of operations, or what to calculate first, second, and so on, for example, is PEMDAS or “Please Excuse My Dearest Aunt Sally,” for the words “parenthesis, exponents, multiplication, division, addition, subtraction.” The first letter of each word corresponds to the first letter of the English words in the mathematical order of operations. For non-English users, however, this mnemonic is not helpful and becomes essentially one more thing to memorize. For teachers of Deaf learners, the challenge becomes how to use sign language as a mnemonic aid to learning mathematics. For the order of operations, we might make use of the ASL number signs 1–6 in a story-like fashion with 1 showing the sign for parentheses, 2 showing the exponent (squared), 3 showing the sign for multiplication, 4 showing the sign for division, 5 showing the sign for addition, and so on. Other approaches could incorporate other phonological form patterns (e.g., handshape, movement, location, and orientation) to help Deaf learners recall and retrieve a specific mathematical concept or process.

Sign language counting strings

Another strategy for using the inherent power of sign language in mathematics instruction and learning comes from Deaf children themselves. A study by Pagliaro and Ansell (2002) found that Deaf children made use of their language as a tool to help them solve story problems. They took advantage of the ability in ASL to simultaneously represent two counting strings, one on each hand, in order to facilitate addition or subtraction operations. They also made use of the inherent cardinality in ASL number signs 1–5, switching between the sign and the elements of the set that the sign represents. Finally, the children made use of space and establishing objects on the signing shelf. Once the objects were set in particular spaces/loci, the children were free to manipulate objects mentally in and out of those spaces. The loci became like a third device (after their hands) on which to keep track of the counting strings or manipulatives. For example, one little girl continued to place three worms in separate spaces on her signing shelf until she reached the maximum 15 worms. She then looked at her signing shelf mentally counting the five spaces before answering that she would need five jars of three worms a piece in order to sell all 15 of her worms.

In addition to the use of sign language numbers and counting the strings in sign language, the fact that counting in sign is manual may facilitate mathematics learning. Research in neurocognition shows a strong relationship between finger counting and arithmetic performance given the multisensory stimulation of finger counting as well as finger gnosis (Moeller et al., 2011). Children in all cultures often use their fingers to count objects or calculate simple arithmetic. They use their fingers also to mark objects as they count as well, keeping track of the one-object-to-one label/number relationship (Alibali & DiRusso, 1999; Gelman & Meck, 1983). In an early sign language study, Deaf children outperformed hearing children on a next number in the counting string task (Secada, 1984). Secada (1984) speculated that this result was a product of the way in which some signed languages produces the counting sequence, which is moving up from one finger to the next to represent the next number. Although there is no solid evidence of such a relationship, the children in the Pagliaro and Ansel (2002) study were adept at pointing to the objects while counting with the same hand. Basically, because sign language is a visual and tactile language, the Deaf children could count and track at the same time in close proximity.

Visual physicality

An additional strategy used to enhance mathematics instruction and learning is simple, yet often forgotten. It is the *physical* way in which mathematics is taught to Deaf learners. It is always ideal to stand in close proximity to any visual information being presented, such as on a whiteboard, a map, or any form of print, in order to reduce eye fatigue. Research indicates that Deaf sign language speakers naturally sign in close proximity to the visual information on a board or book (Mather, 1989; Smith & Ramsey, 2004). For example, it is important that the teacher sign next to a mathematical equation.

Visual organizers too are helpful in organizing mathematics information in the classroom. Sets and Venn diagrams, for example, allow learners to compare between two or more entities by placing similarities and differences within the given sections. Sign language visual organizers can be used in the same way in front of the body with body shifts, or on the floor with physical circular outlines. For example, teachers and Deaf learners should shift their body to one part of the Venn diagram to list characteristics of one or two classifications (e.g., polygons with equal sides) in sign language and then shift their body to another part of the Venn diagram for more information (e.g., quadrilaterals).

Three Read Protocol for mathematics story problems

The Three Read Protocol, developed by San Francisco United School District to address bilingual learners' struggle in story problem solving, is a strategy which includes reading a mathematics story problem three times with a different goal each time. The first read is to understand the context of the story in the L1. The second read is to understand the mathematics in the story through L2 with support of L1. The third read is to elicit inquiry questions based on the story with the L1 and L2. For example, in a mathematics class with Deaf learners, the teacher would tell the story without the question in sign language, without any written input. After the delivery, the class would discuss the story until they fully understood it. The second read involves the presentation of the story in L2, again without the question. After learners read the written text, the teacher would call on a learner to come up to the screen and translate the text into sign language. Keep in mind, the learner should be able to understand the story during the first read and remember the teacher's delivery in sign language. The goal behind the second read is to understand the words in the story that denote mathematical concepts. For example, with teacher guidance, learners identify the quantities in the story and discuss the relationship between the written form and its sign language counterpart. In the final-third-read, the teacher

asks the learners to create mathematical questions based on the story. The Three Read Protocol, employed occasionally, helps Deaf learners tackle language complexity in mathematics story problems with two languages (Braid, 2017).

Sign language mathematics assessment

We strongly encourage consideration of sign language within mathematics assessment. Teachers use different types of assessments (i.e., formal, informal, formative, and summative) in different formats (e.g., teacher-posing question, worksheet, quiz, test, project, presentation, ticket-to-go, etc.) to evaluate learning. For most Deaf learners, however, these assessments are in their L2/ L_n putting them at a disadvantage. Teachers should consider the balance of assessment language inputs and be sure that learners have opportunities to demonstrate their mathematical knowledge and skills effectively in sign language and without language barriers.

We suggest that teachers should take advantage of today's technology and various software programs that allow sign language videos to be created and viewed as part of assessment, and where learners can respond in sign language as well. Examples include the use of simple presentation programs in which slides are created that can include sign language based video questions and on which learners can drag and drop their videoed sign language statements indicating true/false, matching, essay, and so on, to more sophisticated screen applications that allow multimedia inputs (i.e., picture, video, writing, etc.) and where a learner can create a screen with his/her work with a video of explanation in sign language embedded and send directly to the teacher for grading.

Naturally, if Deaf learners are providing responses to assessments in sign language, they are expected to demonstrate academic language proficiency as they progress to higher grades, as they would for written language. Thus, a sign language mathematics rubric is necessary that would allow the teacher to evaluate a learner's sign language proficiency in addition to mathematical knowledge and skills. This rubric should include evaluations of academic sign language vocabulary, especially mathematics vocabulary, structure, and fluency.

Considerations in assessment translation from L2 to L1

While we have suggested original mathematics assessment be conducted in L1, reality dictates that there will be assessments that must be translated from the Deaf learner's L2 to sign language. One of the main concerns that education and assessment professionals have when translating to sign language for assessment situations is the perception of giving away answers through signs or causing misunderstandings with inaccurate signs. As a result, they often resort to fingerspelling. Higgins et al.'s (2016) analysis of documents related to sign administration of mathematics assessment in the United States found that guidelines for signing mathematics assessment items vary, with some warning against cueing/clueing, elaboration, and clarification, and providing direction for using non-manual markers (e.g., facial expressions, body language, and objects), fingerspelling (i.e., the process of presenting each letter of an English word or term individually), and interpretation of graphics. In fact, many explicitly required that mathematical symbols and terminology be fingerspelled in order to ensure that additional construct-relevant information is not being provided to test-takers receiving the signed version of the item. For example, the ASL sign for parallel lines is two index fingers held parallel to one another. The concern is that the sign shows learners what it means for two lines to be parallel. However, this policy contradicts its goal and exacerbates the very problem that it intended to solve (i.e., interpreting from the dominant language to sign language), and differs from similar policies for other languages. We know of no opposition, for example, to using the Japanese word for "28" when translating assessments to Japanese, despite the fact that it translates literally to "two-ten-eight" and that there is research

to show Japanese children understand place-value better because of this (Hsaio, 1992). Yet, to some people, signing the following problem, “There were 5 children on the playground. 2 went home. How many children are still on the playground?” with ASL linguistic accuracy (that is, showing the 2 being taken from the 5 sign and the 5 sign then becoming the sign for 3) would be considered as “giving the answer” and therefore providing an unfair advantage (even though having and maintaining the signs for 5 and 2 on separate hands and in separate locations is mathematically incorrect).

We contend that the purpose of a language is to communicate ideas, and that teachers should not avoid using sign language words for specific concepts because it might contain conceptual properties. On the contrary, we support the use of sign language’s natural ability to express concepts as all languages do. For example, the English word “quadrilateral” imparts the property of four lines. We contend that Deaf learners who take an assessment in sign language should view the assessment as it is delivered in sign language in its true form without any signs removed or altered.

Cognitive lab findings support the idea that the translation should adhere to the linguistic rules and conventions of the language into which the items are being translated (Higgins et al., 2016). Specifically, the findings suggest that Deaf learners are better able to understand items that (1) use sign language conventions related to the order in which information is presented (e.g., the diamond set up); (2) are consistent with how sign language is used during instruction; and (3) are consistent with sign language conventions related to the use of fingerspelling (Higgins et al., 2016).

Future trends

Of course, what we present above represents a field in infancy. The more we understand sign language, the better we can design and use it in instruction and assessment to support learning.

Future research studies

Research in the area of sign language in mathematics education is paramount as we review and reflect on its use in mathematics education. Investigators might want to look at the role of L1 in Deaf children’s mathematical learning in terms of cognitive development, vocabulary development, language use, and mathematical discourse. We encourage research in this area beginning with a depth of analyses of how Deaf teachers employ language strategies in the classroom to support learning. Deaf children ideally acquire academic sign language from Deaf heritage sign language speakers who are content experts, and a Vygotskian belief of scaffolding children’s language and literacy growth heavily depends on teacher-learner interaction where language play is natural and spontaneous.

Future pedagogical practices

We call on teachers of mathematics to Deaf learners, to reflect on their sign language production for mathematics concepts and evaluate their conceptual and linguistic appropriateness. We encourage a team of Deaf heritage sign language speakers who are experts in mathematics and/or mathematics education to develop a mathematics language resource space (e.g., website, app) where mathematical concepts are presented in sign language. Educational professionals, sign language linguists, parents, and learners would benefit from using this space for everything from

learning concepts and language to curriculum development and instruction to research. The space would be a resource, in particular to those educational professionals, for whom sign language is not native.

This chapter has provided thoughts to further the use of sign language in the mathematics education of Deaf learners, providing theoretical, historical, and practical support, yet we are just learning about the impact sign language might have on the Deaf learner's mathematics understanding. Ultimately, the goal of our efforts lies in the increased achievement of Deaf learners in mathematics.

Note

- 1 “Deaf” is used thoroughly to encompass the broad range of individual with cultural and linguistic characteristics. Our choice to use “Deaf” does not exclude the population that is often referred as little “d” representations.

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Teaching sign language literature in L1 classrooms

Russell S. Rosen

Introduction

Literature comprises of literary works that display human thoughts, feelings, perspectives, experiences, and stories. Individuals read literature for personal pleasure, to learn about other people and experiences, and appreciate the diversity of lives and perspectives (Hirsch, 1988). Individuals reading literature also learn about how language is used in various ways by the literati to express themselves, and develop self-images in concordance with their perspectives and experiences. Literature comes in various genres such as essays, novels, narrations, plays, and poems, both fiction and nonfiction (Showalter, 2003). Each genre represents different ways of expression and is formulated with different linguistic structures. Literature appears in various medium such as in print, on video, and in live performance, and is expressed in different language modalities, such as spoken, written, and sign languages. Sign language literature is the focus of this chapter, and it consists of performances by individuals using sign language in creative and artistic ways, recorded on the body, and presented either live or on video recording (Sutton-Spence & Kaneko, 2016). It does not include written works since sign language is not a written language; it is performed “orally” (Sutton-Spence & Kaneko, 2016; Bahan, 2006). The literary works that originally appear live or on video, just like the literary works on paper, can be subjected to study (Czubek, 2006; Supalla & Bahan, 1992; Frishberg, 1988).

The purpose of teaching literature is to show how literary works use language to humanize, civilize, moralize, and persuade learners, and have the learners experience the lives of others and introspect on the intricacies of life (Showalter, 2003). The study of literature provides insights about (a) the human condition and variegates of the human experience, and (b) the different linguistic structures that are used in different genres that reflect the components and flow of life experience (Eagleton, 1996). Studying, understanding, and performing literature contribute to the development of literary skills (Sawyer, 1987) and personal growth and identities (Schimmel & Monaghan, 1983; McDonald, 2010). Deaf children need to learn literacy skills and themes of life. The goal of teaching sign language literature is for the deaf and hard of hearing children who use sign language as their L1 to appreciate different experiences and perspectives, and develop sign language linguistic and cultural literacy. The purpose of this chapter is to give an overview and suggestions on teaching sign language literature as literacy.

Unfortunately, the teaching of sign language literature is not yet a widely accepted or common practice in the field of deaf education. Byrne (2017) found that the common practice in schools and programs for signing deaf and hard of hearing children is that the teachers use sign language translations of written literature, and use sign language to teach the written literature. The translated sign language literature tends to focus on the general human experience. Rarely do they provide information about the deaf experience. In contrast, sign language literature is taught to American hearing learners who not only study sign language as a second or additional language, but also the cultures of deaf communities in high school and collegiate settings. Consequently, deaf children's sign language literacy is low (Kuntze, Golos, & Enns, 2014). There is a need for deaf and hard of hearing children to study sign language formally, that is, its vocabulary and syntactical, semantic, and pragmatic structures, and sign language literature as exemplars of sign language literacy skills. The study of sign language literature has the potential to meet the linguistic needs of deaf children in that they can acquire sign language naturally and become linguistically competent (Supalla & Cripps, 2008; Czubek, 2006). They can help facilitate deaf children's identity development and healthy self-image (Kuntze, 1993; Kuntze, Golos, & Enns, 2014).

While some of sign language literature is drawn from written literature, it is not the purpose of this chapter to discuss how deaf and hard of hearing children learn how to read it. In the teaching of sign language literature where the original works are in written form, there is an issue of translating the written form into sign language, including the use of gloss. For a discussion of reading process and how to use sign language to help deaf and hard of hearing children learn how to read, the reader is referred to Kuntze, Golos, and Enns (2014) and Andrews and Simms in Chapter 4 of this volume. It is also not the purpose of the chapter to show how to teach correspondences between sign and its meaning, including connection between meaning with the articulatory features of vocabulary, morphosyntactical structures such as verb inflections and constructed action, and grammar in sign language as a L1 to deaf and hard of hearing children. Instead, this chapter looks at the use of sign language to decode, understand, create, and perform literary works. It can be considered as the next step after the signing deaf and hard of hearing children learn the decoding, encoding, and meaning-sign correspondence skills in sign language.

Theoretical perspectives

When signing deaf children "read" literature, they read sign language and about ideas, people, society, and culture. In order to be able to express ideas, and understand people, society and culture, language is needed. Literature is a product of literacy. Sign language literacy, and teaching sign language literacy, involves teaching how to decode and recode signs, phrases, and sentences, to decipher cultural meanings and representations, and to construct scripts of life in literary works. Teaching sign language literature entails teaching about the themes and the language used to express the themes. As such, literacy is to be taught using and through literature.

The teaching of sign language literature in L1 classrooms is the teaching of sign language literacies. The content of literacies in sign language literature teaching and learning are the sign language used in literary works and the cultural information that is discoursed in the works. Studying sign language literature serves to aid children's development of sign language and cultural literacies. The following is a discussion of theoretical perspectives on literacy, sign language literacy, sign language literature, and the relationship between sign language literacy and sign language literature.

Literacy

Literacy is activated when individuals think, speak, write, listen, read, and sign messages. It is a set of language-related skills in the ability to understand and communicate with appropriate grammatical structures in a coherent way such that messages are carried clearly and unambiguously from interlocutors to receivers. Literacy consists of discursive systems of formulations of languages into modes of representations and textualities (Finnegan, 1992; Van Peer, 1991; Luria, 2006; Lyton & Miler, 2004; Gee, 2008), and multiliteracies (New London Group, 1996). One can speak of, for instance, cultural literacy, mathematical literacy, linguistic literacy, religious literacy, computer literacy, and geographical literacy. The discursive systems are exemplified as different ways of knowing that are governed by the cultural and social practices that shape representations, communication dynamics, values, and beliefs of a community (Gee, 2008; cf. Hirsch, 1988, McLaren, 1988). The goal of teaching literacy skills is to develop in individuals the ability to read, write, speak, listen, and/or sign messages in various media so they can participate in society and their social and cultural activities.

Sign language literacy

Sign language literacy entails the ability to sign, read signs, and use sign language to express ideas, thoughts, and messages, communicate with, and understand other signers under various contexts and media (Byrne, 2013). Researchers agree on the representations and textualities of sign language literacy. Different types of sign language literacy were proposed. They are linguistic or functional literacy, which is the ability to decode, read, and sign the literary works (Christie & Wilkins, 1977; Hoffmeister, 2000; Kuntze, Golos, & Enns, 2014); cultural literacy, which is the ability to understand the cultural information and representations in the literary works (Christie & Wilkins, 1977); and critical literacy, which is the ability to analyze, critique, and evaluate the representations in the literary works (Small & Cripps, 2004 in Snoddon, 2010). Snoddon (2010) added that while literacy in sign language community evolves as a collective social and historical invention of the Deaf community, it is integrated with knowledge of language structure and cultural information. Sign language literary works are to be studied for their linguistic constructions to explicate personal experiences and cultural representations, and as means to develop linguistic and cultural literacy (Snoddon, 2010).

Sign language literature

An object of sign language literacy is sign language literature. It comprises of literary works conducted in sign language. Performance and the use of body provides the text for stories in sign language literature (Nelson, 2006; Rose, 2006; Sutton-Spence & Quadros, 2014; Sutton-Spence & Kaneko, 2016). The works may not be necessarily about Deaf culture; they cover a wide gamut of topics. Sign language performers use sign language to create works to talk about personal topics, some of which are about their experiences as deaf persons and the Deaf culture in general. The focus of sign language literacy is not on the deaf experience or culture per se. Rather, the focus of sign language literature is largely the use of sign language to draw, elaborate, embellish, twist, weave together, and exhibit ideas, thoughts, perspectives, feelings and experiences, connected into a coherent structure and sequence of meanings. Sign language literature is the place where deaf signing children give their voice, identity, language, and culture (Kuntze, 1993; Byrne, 2013).

The teaching of sign language literature

The teaching of literature should not be any different for both written and sign language literature. It involves teaching for comprehension, which includes decoding and retelling processes. Learners “reading” literature need to be able to decode words or signs into meaning and retell what is “read.” Learners would need to understand the structure of stories, including plot and its components, structure, and progression (Rosenheim, 1960; Propp, 1968). For children “reading” sign language literature, either through live storytellers or on videos, they learn about how performers develop story scripts and complex linguistic structures in a coherent way, and how identities are developed and invested in stories that connect deaf children to the characters, communities, and cultures in the stories (Cummins, 2001), including Deaf community and culture (Snoddon, 2010). To teach sign language literature is to use literary works as archetypes to show how to structure stories and use phonological, morphological, morphosyntactical including classifiers, and syntactical, semantic, and pragmatic features of sign languages in the stories.

Literary structure

The literary system in sign language literature is not different from written literature (Bahan, 1992; Sutton-Spence & Kaneko, 2016). A literary work exudes themes about people, the environs, and their actions. Its components are the characters, settings, and actions. Its sequence may focus on either the characters, actions, and/or settings. The work may comprise of a sequence of changes in either (a) the characters as they conduct different activities under different settings; (b) the settings as they are shaped by a progression of different constellations of characters and activities that imprint on the settings; or (c) the actions that are conducted by different characters and under different settings (Propp, 1968). Bahan (1992) and Supalla and Bahan (1994a, b) added that, like oral and written storytelling, sign language storytelling can be divided and analyzed into lines, stanzas, strophes, topic units, chapters, and parts. The end of the works may include rebirth, regeneration, or closure of the characters, settings, and/or actions (Propp, 1968; Rosenheim, 1960).

Sign language linguistic system

In addition to plot structures, the teaching of literature includes an examination of the linguistic structures that are used in different genres. Linguistic structures vary by genres as well as the modality of the language used. The teaching of linguistic structures used in literature focus on how the phonological, morphological, syntactical, and semantic features are constructed and how sign order varies within and across genres. Sign language has certain linguistic features that are employed in not only comprehending but also retelling signed literature. The features are largely shaped by the visual and gestural modality. Valli (1996) and Sutton-Spence and Kaneko (2016) described different techniques that performers devised to use sign language to create visual images, stories, poetries for narrating, demonstrating, and embodying in sign language literature. They include mime and gestures; phonological features of handshape, location, movement, and palm orientation; linguistic features of constructed action, depicting verbs, and morphosyntax modifications for person, time, and place; classifier and polymorphemic sign system; and nonmanual features of facial and bodily expressions. These linguistic features of sign language are used by performers to create characters, spaces, and story plots; to anthropomorphize humans and nonhuman entities; produce signs as metaphors; and devise lines, length, rhythm, and meter in poetry. There are different styles in literary works and each style requires different constellations of literary techniques.

Literary structures and linguistic structures in sign language literature

There are different representations and textualities, or genres, in sign language literature. The genres in sign language literature are storytelling in sign language, alphabet stories, number stories, sign language stories, sign language poetry, and plays in sign language. The following are examples of story structures and linguistic systems used in sign language literature when the original works are in sign language.

In alphabet stories, storytellers use each letter of the alphabet as a handshape to create signs that depict scenes. Storytellers vary in the number and order of the alphabets in their stories. Some storytellers create stories using every letter of the alphabet in either forward or backward succession. Other storytellers use certain alphabets as handshapes to create stories. Still other storytellers create a word or concept by using different handshape for different letters of a word to represent persons, actions, or settings.

In number stories, the performers create stories using numbers as handshapes to represent entities, actions, and scenes in stories. Number storytellers also vary in the number and order of the numbers in their stories. For instance, to create stories with numbers as handshapes some storytellers use numbers 1 through 10 in either forward or backward succession, other storytellers use a few numbers, and still other storytellers use a single number.

In sign language stories, performers use personifications, that is, anthropomorphize characters, actions, and settings in stories. The storytellers mimic objects, characters, and scenes by using nonmanual and facial features to anthropomorphize objects, characters and scenes (Sutton-Spence & Napoli, 2010). In anthropomorphizing the objects, characters, and scenes, the storytellers became parts of, and are the story.

Some other performers tell sign language stories by not only personifying people, objects, and the environs but also employing surrogatism to retell their stories. In storytelling in sign language, which are essentially stories that are told in sign language, storytellers use the linguistic principles of sign languages to generate stories. A few signed literature comprise works that employ the techniques of cinematics. Cinematic techniques include performers acting to pan across scenes, track characters, zoom in and out, and create angles of vision in their stories.

Sign language poetry is created using the phonological features of handshape, location, movement, and palm orientation, non-manual features of bodily and facial expressions; use of signs repetitions and metaphors; and creation of new signs out of old signs, or new meaning to old signs (Valli, 1996; Padden & Humphries, 1988). Sign language poetry utilizes mainstreamed poetic techniques of rhyme and repetition with handshapes and signs. The articulatory features of sign language handshapes are selected and modified with rhyme and meter to create artistic effects. Valli (1996) looked at poems and found that rhymes in sign language poetry are “the repetition of the same or similar features, whether handshapes, movements, nonmanual segments, locations, palm orientation, handedness, or a combination of these, [which] occurs at determined and recognizable intervals” (ibid.: 253). Sign language poetry provides deaf children with the melodic flow of language and experience. A subgenera of sign language poetry, signed music, repetitive, melodic, and metered hand movements are pursued in similar fashion as what sound does in spoken music; signing deaf and hard of hearing people have their own “sounds” (Cripps & Lyonblum, 2017).

Plays in sign language provide opportunities for teachers and learners to work on (a) life scripts, and (b) use of sign language in discourse and conversations among characters in plays. In plays, which may or may not expose the themes in the lives of deaf people, deaf children take up the roles of characters, use sign language, have dialogues or plurilogues with each other, and offer speeches or soliloquies. Deaf children also learn about the scripts of life. People undergo different life trajectories, face different obstacles, overcome hurdles, and in doing so proceed through a

series of steps to reach their goals or destinations. In doing plays, deaf children play characters, use sign language to communicate, and go through stages in the characters' life trajectories. If a play is about the deaf experience, deaf children learn how to use sign language to talk about their life experiences, the struggles they faced, the resolutions they made, the hurdles they jumped over, and ultimately embody the stages they go through in life.

Considerations in teaching sign language literature

The following are considerations in the teaching of sign language literature, including teacher inquiries; teaching deaf experiences through sign language literature; use of live storytellers in classrooms; use of signed literary works on videotapes; and criteria for selecting sign language literary works for pedagogical purposes.

Teacher inquiries

Teacher inquiries with their learners about the plot and language in a signed literary work and the learners' own perspectives and works should be conducted as exercises in critical pedagogy, imagined participation, intellectual conviction, conflict resolution, and with empathy (Showalter, 2003). Teachers use sign language to instruct, explicate, and assess learners for their metalinguistic knowledge, analytical skills, comprehension, retelling and creating sign language literary works. In the discussion of literature, teachers and learners make cross-cultural comparisons of their life experiences with the life experiences of other peoples. To further aid in learners' mastery of the literary works, the teachers model the characters, actions, and settings in the works, and have the learners memorize, retell, and perform them (Showalter, 2003). In addition, the learners use the literary works and their literary systems as archetypes to develop their own works. Archetypes play a useful role in learning and using literature. By using the works as archetypes, learners learn that life stories follow certain scripts, and that their life trajectories can be understood as a series of scripts. The learners use the literary works as exemplars of life scripts and they fill in their life progression into slots in the scripts that are created in the literary works. They also develop literacy skills in sign language by modeling the archetypes.

Teaching deaf experience through sign language literature

Some literary works cover the themes of deaf experience. They include works on psychophysiological experiences of vision and sound; deaf identity and identity development; medical, educational, familial, employment, and social experiences of deaf people; and the construction and development of deaf community and culture (Rosen, 2016). While the focus of this chapter is not on deaf experience per se, the deaf experience is integral to sign language literature. By "reading," retelling, and creating literary work about the personal experiences of deaf people, the deaf and hard of hearing children will be able to compare their personal experience with the others' experiences and develop their own identities as signing deaf people (Schimmel & Monaghan, 1983; McDonald, 2010).

Use of live storytelling in classrooms

Schickedanz (1978) argued that storytelling creates a positive affect for learners and enhances their language development if a live storyteller performs it in the learners' classroom. Byrne (1996) studied the use of live storytelling in a classroom with deaf learners. He became the storyteller and signed a story to the learners. He observed that when he signed stories to his learners, the learners followed him, moving their bodies in alignment with him, and requested him to repeat parts of the story. Based on the results of this study, Byrne (1996) argued that story

repetition is a valuable teaching strategy. The teacher can expand or emphasize certain parts of the story in conjunction with learner interest and comprehension. A study by Beal-Alvarez and Huston (2014) found that repeated viewings by deaf and hard of hearing children of signed stories by fluent sign language storytellers resulted in higher learning outcomes for the children in comprehending the parameters of the story.

Use of videos to record and teach live literary works

Snoddon (2010) conducted an ethnographic study of how sign language literature is taught in classrooms with signing deaf and hard of hearing learners using video technology. Snoddon examined the use of video technology by second, third, and fifth grade learners in their learning of the linguistic constructions and cultural representations in sign language literature. Two deaf storytellers came to the classrooms and signed about their life experiences in the general society and the Deaf World. The storytellers' stories were videotaped and the teacher and learners analyzed them. Snoddon reported that the learners recognized the social and cultural inequities that the deaf storytellers experienced. Following their analysis of videotaped stories, the learners drafted and edited their personal stories in sign language based on the topics covered in the stories. They shared and performed their own experiences at a school-held conference and were also videotaped. Based on classroom observations, video recordings, and field notes, Snoddon (2010) concluded that video recording use by the learners helped them develop not only knowledge, but also performance skills in sign language literature.

Choosing literary works

There are works in signed literature that appear on video and are available on the market that the teacher can use in their classrooms. Teachers teaching sign language literature need to know which literary works to use and which features of sign language to study in their classrooms. According to Schuler and Meck (1992), there are considerations in choosing and sharing the literary works. They include how well a literary work portrays a theme in the story, and whether the story has a clear timeline, illustrations, and portrayals of culture. Teachers should be mindful of the emotional needs and readiness of the children to "read" the literary work based on their sign language proficiency. Teachers may look into repositories of sign language literature such as found in Sutton-Spence and Kaneko (2016) and the ASL Literature Database (Byrne, 2017). Byrne (2017) suggests that teachers who want to use the videos in the database would need to first view a number of literary works, select a literary work based on a theme, and retell the story in the classroom with signing deaf and hard of hearing learners. The materials in sign language literature that are selected for classroom teaching and learning need to display not only people in the general population, but also the deaf people. The materials also need to reflect the diversity of deaf people (Anderson & Miller, 2005).

Pedagogical practices

Recall that the purpose of teaching sign language literature is for the learners to develop sign language literacy and be able to comprehend, retell, and create literary works. There are four aspects in the teaching of sign language literacy with sign language literature. The teaching of sign language literacy using sign language literary works involves using sign language to (a) draw information from, (b) discuss about, (c) retell, and (d) develop sign language literary works. The following are suggested techniques for teaching sign language literature for the four aspects of sign language literacy.

Techniques in teaching signed literature

There are two lesson structures, one is for comprehending and retelling a literary work, and the other is for learners to create their own stories using the plot and linguistic structures in the literary work as archetypes.

Lesson structures

As mentioned earlier, the teaching of literature for comprehension purposes should not be any different from teaching literature in spoken and written literature. The following lesson structure is suggested by Supalla and Bahan (1994a, b), Showalter (2003), and Arenson and Kretschmer (2010) for the teaching of literature for comprehension purposes in L1 sign language classrooms:

1. The teacher introduces a signed literary work and preteaches learners using sign language about the topic and its contents. The teacher inquires and discusses with the learners about their experiences regarding the topic. This is used to assess the learners' world knowledge and readiness to work with the signed literary work.
2. Have learners watch the signed literary work on video.
3. The teacher checks on the learners' comprehension of the work. The teacher asks questions using sign language to ask what the signed work is about. The questions to ask are about the theme, plot structure, the main idea, characters, settings, and actions that are shown in the work. The teacher inquires of the learners how the characters, settings, and actions connect with each other, the progression in the plot, and the language and linguistic structures used in the work.
4. Learners respond to teacher questions in sign language.
5. If the learners have difficulty, the teacher reviews (a) thematic structure in the literary work, and/or (b) the sign language linguistic structures that are employed in the signed literary work. The teacher models the story in the signed literary work to explicate the work for the learners.
6. The teacher instructs the learners to prepare a grid, divided into parts or chapters in the literary work, and fill each part or chapter with (a) the characters, settings, and actions, and (b) the sequence of plot and linguistic structures.
7. The teacher asks the learners to memorize the literary work.
8. The learners then retell the plot in the literary work using sign language that should carry the same meaning as the original work.

Supalla's *For a Decent Living* (1994b) is a novella in which the protagonist is a deaf boy on a journey to find his Deaf identity. In the story, the first-person narrator draws the viewer to the protagonist's plight as a young deaf boy living on a farm with parents who do not sign (Supalla & Bahan, 1992). Escaping from his unsympathetic hearing family, he faces the continuing dilemma of proving himself to his family, the Deaf community, and the larger society. The story comprises of several chapters, and each chapter contains several parts, or strophes. Learners' comprehension of ASL and appreciation of ASL literature is enhanced as they are introduced to the art of narrative expression. The *For a Decent Living* story is part of the *American Sign Language Literature Series* (Supalla & Bahan, 1994a, b). The *Series* includes learner workbook with literal, inferential, comprehension, and literary questions pertaining to story components, structure and progression, and some background information on deaf culture. The learner materials emphasize comprehension and literary analysis of linguistic and cultural aspects in ASL narratives. It

also includes exercises for learners to retell the stories (Supalla & Bahan, 1994a). Supalla and Bahan's (1994b) *For a Decent Living* learner workbook shows how the signed literary work is to be taught:

1. The first chapter with parts, or strophes, is viewed by the whole class.
2. Comprehension check questions are given to the learners for each strophe. The learners answer each question. The teacher and the learners discuss how the performer tells, i.e., using sign language, the story.
3. Learners are divided into groups. Each group is assigned a strophe to discuss how sign language is used to perform the strophe. They practice retelling it.
4. Each group chooses one learner to retell the strophe to the class. Feedback is given to the learner who retells.
5. The learners are next given a list of literary questions. They discuss each question with the teacher.

In the *For the Decent Living* lesson, signing deaf and hard of hearing learners are given an opportunity to develop a heightened sensitivity to the concepts that are involved in telling stories. An example is the concept of first-person narrative and use of the first-person point of view. Another example involves the issue of deaf identity in families.

The following is a suggested lesson for the learners to perform a story using the story plot and linguistic structures of a story they "read" as archetypes. The teaching for performance begins with the creation of story plot and linguistic structures drawn from the story.

1. At a point after the lesson on the teaching for comprehension is completed, have the learners develop their own stories based on their personal experiences. The learners use the characters, settings, and actions, and the sequence of plot and linguistic structures, in the story as archetypes. They create a chart showing the characters, settings, and actions, superimpose their life experiences on the grid, and fill in the slots with the characters, settings, and actions in their personal experience.
2. The teacher instructs the learners to sign the stories following the sequence in the chart.
3. The teacher then asks the learners to work with each other in editing their charts and signed renditions.
4. The learners then "publish," that is, perform their stories in the classroom.

Teaching different genres in sign language literature

The following is an exposition of the different genres that are categorized by the linguistic levels in the sign language linguistic structures that are found in sign language literature, which are phonology, morphology, morphosyntax, syntax, and discourse. Teachers teach the different literary and sign language structures used in the genres and the learners use them as archetypes with which to develop their literary works.

Phonology

Sign language alphabet stories. Teachers who teach this genre need to show how literary works can be created using the letters of the alphabet as handshapes to create scenes with characters, settings, and actions. The learners can use several alphabet stories as archetypes for their own alphabet stories. They may elect to use each letter, a few letters, or one letter of the alphabet as handshape(s) to create signs that depict scenes with characters, actions, and settings. For archetypes

the learner may model their stories after several ABC stories. One ABC story that is reported in Rutherford (1993) is “The Class Reunion.” The learners can develop plot structure progression using every letter of the alphabet in succession that is found in the story. The learner may want to use the letters of a word as handshapes and use another ABC story such as Barwiolek’s signed rendition of the word GOLF. In “Golf,” Barwiolek (1993) constructed a story of a golfer placing a tee on the ground, placing a ball on the tee, swinging the ball, and the movement of the ball through the air. Barwiolek had the ASL handshape G to designate a tee and placed it on the ground, O to designate a golf ball and placed it on the tee, L for the club and swung the handshape across the ball, and F to refer to the ball and moved it outwards. In another ABC story, “Mountain,” Rennie (1990) fingerspelled MOUNTAIN by fingerspelling each letter in various heights to correspond with the contour of a mountain.

Sign language number stories. Teachers who teach this genre need to show how literary works can be created using number signs as handshapes to create scenes with characters, settings, and actions. Deaf and hard of hearing learners who want to create a number story may use the model of the number stories that are commercially published on video. They may elect to use one number, a succession of numbers, or a set of different numbers to create number stories. For instance, they may model their number story after Seago’s “The Argument” (1993 [1980]). The story employed one number handshape. In this story, Seago narrated about two people bumping into each other, having an argument, later reconsidering, and agreeing to become friends. Using both hands shaped in the 1-handshape, Seago had them moving toward each other to mean two people walking toward each other, the hands make contact meaning the people bumped each other, one hand, representing the first person, made a sign for SCOLD and the other hand, representing the second person, made a sign for INSULT. The hands wriggled, meaning both persons argued and later moved away from each other, the hands moving in opposite directions. They turned around, met again, discussed, reconsidered, agreed, and became friends, using the 1-handshape to denote the signs for TURNED AROUND, MEET, DISCUSS, RECONSIDER, AGREED, and FRIENDS. The hands then make contact with each other and move along together, as if the two people walk away together.

Morphology and morphosyntax

Sign language poetry. Teachers who teach this genre can demonstrate how sign language poetry is developed using signs and nonmanual markers to represent characters, setting, and actions, and signed in a repetitive manner to create rhyme, rhythm, and meter. Learners who wish to create sign language poetry may elect to use signs to create stories and perform using the poetic principles of repetition, rhymes, meter and stanza. For example, they may want to use Krauel’s (n.d./2018) poem entitled “Boating and Drinking” as an archetype. The poem follows the 1–2, 1–2–3 beat. The poem went like this: “Boating boating/boating boating boating/drink drink/drink drink drink/fun fun/fun fun fun/enjoy enjoy/enjoy enjoy enjoy.” Other ASL poems were performed with several handshapes and may be used as an archetype for the learners’ signed stories. In “At the Park,” Kuntze (1995) used different sets of two-handed handshapes to depict certain parts of the environs. The story begins with the baby-O handshape for flowers blooming or budding around. The 5 handshape is used to sign the grass field. The baby-O handshape is first used to sign flowers blooming or budding. The 5 handshape is used to sign for relaxing or lumbering down. The 5 handshape is next used to sign CHILDREN-ALL-OVER, to sign BABY, and then as ADULTS+++ . The U handshape is used to sign as people lying down on the grass. The bent-V handshape is then used to sign for swinging swings. The Y handshape is then used for stroller swings. The V handshape is used to sign for LOOKING-AROUND. There is in the poem repeated designation of handshapes to images in linear fashion. Some other ASL stories

were performed with several handshapes. In one handshape poetry, “Cow and the Rooster,” performed by Laird (1993), only three handshapes are used: 3, 5, and Y. Each handshape is designated differently within the main object. For example, Laird used the handshape 3 as designated for the rooster, 5 for FARM-ALL-OVER, and Y for the cow. The story begins with the handshape 5 to designate FARM-ALL-OVER, Y for COW and HIND-LEGS, handshape 3 to designate a ROOSTER and its CLAWS-ON-GROUND, and continues to tell the story of the cow and the rooster playing using the three handshapes.

Syntax

Storytelling in sign language. Teachers who teach the storytelling genre show learners how to use sign language grammar with facial and bodily nonmanual markers to create literary works. Learners can use storytelling as an archetype to develop their stories. Cinematics is a technique that is often used in storytelling. Performers storytell using signs and nonmanual markers to create angles of vision and to zoom in and out of characters and settings, and signs to track characters and pan across scenes. For an archetype, they can use Hernandez’s (2006) “Time Squared” as an example. In the story Hernandez signed scenes that incorporate different shots, zooms, and angles to depict the sky and earth, and then move to different scenes in New York City such as the Statute of Liberty and Times Square, recording “sensations and emotions” during the story in the text (Bauman, Nelson, & Rose, 2006: 112).

Sign language stories. In sign language stories, teachers show learners how literary works are created and performed using body and facial markers to connote characters, and gestures and signs to create messages or sign messages. Constructed action, an aspect of sign language grammar, is a technique performers employ to represent characters, settings, and actions. The stories involve the use of anthropomorphism and personification of entities, actions, and settings. The learners can develop stories with the anthropomorphic and personified facial expressions, gestures, and mimes using the plot structure that appears in sign language stories. One example is “Swan,” a work by Rennie (1990). In the story, Rennie personified a swan, that is, she becomes the swan with her arms flying up and down, and eyes looking downwards, and moving to the water beneath. Another example is Cook’s (2003) *From the Gator Ride to the Dentist*. He personifies people, objects, and environs in his stories. In one story, Cook talks about a boy who tells his father that he saw a print of a gator on a car ride to a dentist. He places himself in the story, taking the role of the boy, the father, and the dragon, and uses facial and mouthing expressions, exaggerated signs, and sign language classifiers to create spatial constructions of the gator, cars, and the boy. For instance, he took the role of the dragon and described his wide eyes, big teeth, and open mouth. For the boy, he used various facial expressions to denote different moods.

Discourse

Plays in sign language. In sign language plays, teachers show learners how to have discourses using sign language, and that people’s lives undergo scripts. Deaf children learn how to play characters, use sign language to get into discourses with other characters, and learn about the struggles they face, the hurdles they overcome, and their process toward their goals or destinations. Plays in sign language can be used as archetypes for the learners to develop their own plays based on their own life experiences, the people they meet in their lives, the struggles they face, the hurdles they overcome, and the scripts they develop to go towards their life-long goals and destinations. An example of a play draws from the deaf experience. It is *Sign Me Alice*, a play that was written by Eastman (1974). The play projects Deaf identity within the majority hearing culture. It is a story about Alice, who was working as a maid at a hotel, and met a doctor who offered to help her

learn manual English and the ways of hearing society so she can be a part of mainstream society. Alice was anxious to move up in the larger society, but realized that she has a Deaf identity and that ASL is the language with which she communicates. She backed off from the doctor and decided to be in both cultures. The doctor ultimately realizes the true beauty of ASL. The play is about hearing people's acceptance and attitudes toward deaf people, sign language, and communication needs, and the realization that deaf people are as normal as hearing people.

Future trends

Future trends are research studies on the relationship between literature and psychoeducational development, and pedagogical practices and curriculum development in sign language literature.

Future research studies

Research studies in the relationship between the study of literature and psychoeducational development of signing deaf and hard of hearing learners are scant. There is a need to assess how the teaching and learning of sign language literature not only meets but also enhances the literacy development of signing deaf and hard of hearing individuals. Future study should investigate how sign language literature, which carries sign language linguistic structures, helps signing deaf and hard of hearing children learn about language in general and the linguistics of sign languages in particular. There is also a need to study the relationship between sign language literature study, particularly the stories about deaf people's lives, deaf community and deaf culture, and identity development of signing deaf and hard of hearing children. Another future study should investigate how "reading" sign language literature, with a rich repertoire of life stories and biographies, open doors for deaf and hard of hearing readers to enter into the world of the deaf and to compare, contrast, and identify with their identity and being.

Future pedagogical practices

There are a few remaining issues in the pedagogy of sign language literature that need to be addressed. As mentioned earlier, schools and programs for signing deaf and hard of hearing learners tend to use sign language translations of original written literature to teach literature. The schools and programs need to integrate original signed literary works of literature in K-12 classrooms with signing deaf and hard of hearing learners. Not only does original signed literary works need to be integrated into classroom instruction, they need to be integrated into the curricular development and assessment practices. A K-12 curriculum in sign language literature needs to be developed. The curriculum needs to include the variety of storytelling teaching techniques realized through sign language literature with which the signing deaf and hard of hearing learners not only can comprehend and retell, but also create and sign literary works. In addition, learners' signed literary works need to be evaluated for their plot structure, grammar, and textual coherence. This necessitates the development of assessment forms and procedures in sign language literature.

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L1 sign language tests and assessment procedures

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Introduction

Sign language tests have been developed for different purposes (Haug, 2005), ranging from monitoring deaf children's sign language development to the assessment of sign language skills in adult learners who learn a sign language as a second or foreign language. The term "sign language test for L1 learners" is frequently used to refer to signing deaf children who acquire a sign language at home, which is different from adult learners of a sign language, that is, deaf and hearing adults who learn a sign language as a second or foreign language (e.g., Woll, 2013). However, since some adults can be considered as L1 learners, such as children of deaf adults (CODAs) and deaf adults, we use the term "young learners" or "early learners" to refer to the linguistically diverse group of deaf and hearing signing children who acquire a sign language from birth or during childhood up to 6 years old. For the purpose of this chapter, we only focus on L1 signing children. Smith, Davis, and Hoffman in Chapter 18 of this volume review the tests and assessment procedures with L2/ L_n learners. Readers interested in a more detailed discussion of sign language tests are referred to Enns et al. (2016) or Haug (2005).¹

Theoretical perspectives

Compared to spoken language assessments, the number of sign language tests that are (commercially) available is relatively small. Apart from the fact that sign language research is still a very young field, which only started in the 1960s, this shortage may be a result of specific challenges related to development and evaluation of sign language tests. One such challenge is the incomplete and limited state of research on the structure and acquisition on many sign languages.

For test developers, the difficulty does not arise solely from the lack of documentation of a particular sign language, but also when important resources like reference grammar (Palfreyman, Sagara, & Zeshan, 2015) or a sign language corpus are not available (e.g., Haug, 2017). For instance, if a corpus on the acquisition of sign language is available, this data can be used to inform test development in the form of frequency lists of signs as a foundation to develop a vocabulary test.

The incomplete state of research is only one possible challenge. Another challenge is the small size and heterogeneity of the deaf population. The small number of deaf children makes it

difficult to obtain samples that are large enough for norming purposes, that is, generate average performance scores for different ages. Although this issue might not be a big problem in larger countries such as the United States or some European countries such as Germany, it certainly poses a problem for small countries as well as countries with more than one sign language, e.g., Switzerland with three (Boyes Braem, Haug, & Shores, 2012) or Belgium with two sign languages (Van Herreweghe & Vermeerbergen, 2009).

Another issue is the heterogeneity of a group of deaf children in terms of their language acquisition. Deaf children who do not have access to a sign language within the most critical early years of their lives (up to 6 years old; e.g., Mayberry, Lock, & Kazmi, 2002; Newport, 2002) are the main target group for sign language evaluation and intervention (Haug, 2011). The reference group, however, should be deaf and hearing (near native) signing children, most of whom come from deaf families. These children serve as models against which the performance of children with late exposure to sign (most deaf children with hearing parents) can be measured to allow for standardization (Herman, 2002; Herman, Holmes, & Woll, 1998).

Different publications (e.g., Mann & Haug, 2014) and guidelines (e.g., Haug et al., 2016) deal with the development and evaluation of sign language tests for deaf children. These publications can serve as a basis for test developers to design tests in a local context.

Evaluation of sign language tests

Once a test has been developed, piloted, and revised, and a main study with a larger sample has been conducted, the test needs to be evaluated according to specific psychometric properties, which include validity and reliability. There are a number of ways this can be accomplished, some of which will be discussed next.

In order for any (language) test measurements to be trusted, evidence needs to demonstrate that the test is valid and reliable. These psychometrics are important as they make it possible to interpret and generalize the underlying construct that a test measures. The need to report psychometric values is particularly apparent for new assessments that have not yet been standardized. The following section describes the concepts of validity and reliability with concrete examples from existing sign language tests. Since most studies on sign language tests are framed within classical test theory, our examples will be presented within this framework. In addition, we will briefly cover recent approaches to validation.

Validity

Validity of a test is the understanding that a test truly measures what it is supposed to measure (Kline, 2000). This is notably different from reliability, which determines consistency of a test. There are several types of validity, each of which is briefly described below.

Content validity

Content validity refers to the degree that the instrument covers the content that it is supposed to measure (Bush, 1985). It also refers to the adequacy of the sampling of the content that should be measured. The test content in existing sign language tests is developed by collaborations with native deaf signers or practitioners working with deaf children. For instance, for developing the items of the American Sign Language (ASL) Vocabulary Test (ASL-VT), Mann and colleagues (2016) worked closely with a panel of deaf and hearing experts. These experts provided feedback related to the multiple-choice format of the test, specifically the target and distractor items. Additional feedback on the quality and clarity of the test images was gathered by a group of

hearing undergraduate learners. Mann and colleagues also used teacher ratings for the test items to evaluate the type or a combination of types of information used by children to acquire these items. Similarly, the developers of the ASL Assessment Instrument (ASLAI; Hoffmeister, 1999) worked closely with a team of native signers with expertise on language development that advised on the content for each task. In addition, each task was field-tested on a group of ten deaf adults. Only items that showed at least a 90% agreement among the deaf respondents were retained in the item pool (Hoffmeister, 1999). Evidence for content validity of a vocabulary test for German Sign Language (*Deutsche Gebärdensprache*, DGS; Bizer & Karl, 2002a) was provided by using word frequency lists for spoken German as a foundation for item selection within the targeted age range, which is children in third through fifth grades. Finally, Haug (2011) reviewed existing research studies on the linguistic structures of DGS that are represented in one British Sign Language (BSL) test in order to establish content validity during the process of adapting the BSL Receptive Skills Test (Herman, Holmes, & Woll, 1999) to DGS.

Construct validity

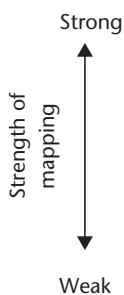
A second type of validity is construct validity. This type of validity is needed when a test measures a specific attribute or quality, for which there is no operational definition (Cronbach & Meehl, 1955). As a first step, it requires a clear definition of the construct, for example, intelligence, to be measured (Bechtoldt, 1951). The question as to which domain or construct should be measured can be determined through a review of the relevant literature, focus groups, and/or interviews (Yaghmaie, 2003). For instance, the underlying construct of the web-based ASL-VT was the assumption that two or more learners may have different knowledge about the same word or sign (Mann, Roy, & Morgan, 2016). This construct, referred to as construct of strength of form-meaning mappings, is illustrated in Table 8.1. It consists of four levels of mapping each of which represents one task in the ASL-VT. The levels range from 1 for the weakest mapping (meaning recognition) to 4 for the strongest mapping (meaning recall).

In order to provide a developmental picture of vocabulary growth in ASL, test takers' performances on the different tasks were correlated with age, followed by a comparison of their performances across tasks.

In the case of the vocabulary test for DGS (Perlesko: *Prüfverfahren zur Erfassung Lexikalisch-Semantischer Kompetenz*; Bizer & Karl, 2002a) construct validity was established by correlating intra-individual factors with the test results. These factors were, for example, (1) grade attended

Table 8.1 Construct of strength of form-meaning mappings in ASL

Type of mapping	Task description
4. Meaning Recall	Produce three ASL responses to a sign prompt
3. Form Recall	Produce the target ASL sign for a picture prompt
2. Form Recognition	Match a picture prompt with one of four ASL signs
1. Meaning Recognition	Match a prompt in ASL with one of four pictures



Source: Mann, Roy, & Morgan, 2016.

in school, (2) educational policy of the school (oral, sign, or bilingual), (3) hearing status of the parents, (4) gender, and (5) chronological age. The results show that the “knowledge of receptive vocabulary” construct was represented in the Perlesko. In comparison, developers of the Assessment for Sign Language for the Netherlands (*Nederlandse Gebarentaal*, NGT) (Hermans, Knoors, & Verhoeven, 2010) carried out three types of correlation analyses to investigate construct validity. They are correlations between test takers’ ages and test performance, between gender and test performance, and between parental hearing status and test performance. Similarly, developers of the ASL-Proficiency Assessment (ASL-PI; Maller et al., 1999), which measures expressive ASL skills in non-native learners, divided the test takers into three groups based on their different linguistic experience. They found that each group performed significantly different on the test.

An alternative approach to presenting evidence in support of construct validity was used for the Language Proficiency Profile (LPP; Bebko & McKinnon, 1993), a test that evaluates children’s overall linguistic and communicative skills, independently of any specific language or modality of expression. Each item was printed separately on a card and presented to three experts who were psycholinguists or language pathologists. They were asked to sort these items into developmental order within each subscale of the test. Results showed high agreement (84%) between raters’ ordering and the original ordering for all subscales.

Criterion-related validity

There are two types of criterion-related validity, concurrent and predictive validity. Concurrent validity is studied when “one test is proposed as a substitute for another, or a test is shown to correlate with some contemporary criterion (e.g., psychiatric diagnosis)” (Cronbach & Meehl, 1955: 282). For instance, to collect evidence for concurrent validity, the developers of the ASL-VT compared test takers’ performance on the four vocabulary tasks with their scores on the ASL Receptive Skills Test (ASL-RST; Enns & Herman, 2011). Both repeated sets of bivariate correlations and partial correlations with control for age did not show any significant differences. A closer inspection of the distribution of scores on the vocabulary tasks and ASL-RST revealed certain similarities between the ASL-VT and ASL-RST in their profiles across age bands (see Mann, Roy, & Morgan, 2016 for details).

In comparison, developers of the Perlesko (Bizer & Karl, 2002a) used teacher ratings of test takers’ vocabulary knowledge as an external variable separately for each of the three language sections of the test. These ratings were correlated with children’s test performances. There were also significantly strong correlations between the test and the tested criteria. Haug (2011) used a similar approach. He correlated the teachers’ rating of the deaf learners’ DGS skills with their raw scores on the DGS Receptive Skills Test. The results showed a strong correlation. In case of the ASL-PI (Maller et al., 1999) test takers’ performance scores were compared with their scores from two subtests of the Test Battery for ASL Morphology and Syntax (Supalla et al., 1995), namely, Verbs of Motion Production and Sign Order Comprehension, and high positive correlations were found. Bebko, Calderon, and Treder (2003) used different tests to compare to test takers’ performance on the Language Proficiency Profile depending on their ages. These included the Expressive Communication subscale of the Vineland Adaptive Behavior Scales for younger children (Sparrow, Balla, & Chicchetti, 1984) and the Bankson Language Screening Test for older children (Bankson, 1977; Bebko, Calderon, & Treder, 2003). Bebko, Calderon, and Treder (2003) found positive correlations between the scores from these tests. Hoffmeister (2000) also found positive correlations between children’s scores on the ASLAI with the Stanford Achievement Test (SAT-HI) and the Rhode Island Test of Language Structure (RITLS; Engen & Engen, 1983).

Predictive validity

Predictive validity is predicated on one or more known variables predicting the outcomes of tests, such as performance on standardized achievements tests used in schools, such as the Stanford Achievement Test (SAT-10; Pearson, 2014) and Wechsler Individual Achievement Test (WIAT-II; Wechsler, 2005). For instance, the scores of the BSL Receptive Skills Test (Herman, Holmes, & Woll, 1999) were predicted for children by their years of exposure to BSL. In the youngest age groups, children from deaf families performed better than children from hearing families. For the older age groups, there was no significant difference between native signers and deaf children from hearing families on bilingual programs, however both of these achieved significantly higher scores than deaf children from hearing families in Total Communication programs. In the latter group, those children with deaf siblings or other deaf relatives achieved higher scores than those without deaf relatives. Similarly, to gather evidence for predictive validity, the developers of the DGS Receptive Skills Test used variables such as the age of first exposure to DGS, parental hearing status, and chronological age to provide additional information that could help predict and explain performance differences (Haug, 2011).

Reliability

Reliability refers to whether the test actually measures what it is intended to measure (e.g., Rust & Golombok, 2000). Reliability is measured in different ways. The most commonly known ones are (1) stability over time and (2) internal consistency. The reliability of a test over time is known as test-retest reliability (Kline, 2000) for which subjects' scores obtained on two different occasions are correlated. The higher the correlation, the more reliable is the test. The *internal consistency* of a test refers to "the degree to which scores on individual items or group of items on a test correlate with one another" (Davies et al., 1999: 86). A measure of internal consistency includes statistical procedures such as Cronbach's alpha. A minimum value of .70 can be considered as an acceptable value for a Cronbach's alpha (Nunnally, 1978).

Additional measures of reliability include inter-rater and intra-rater reliability. Inter-rater reliability refers to the level of agreement between two or more raters on a participant's performance (Davies et al., 1999), for example, by video-recording a child's language production and then comparing the scoring of specific grammatical structures by two different raters. Intra-rater reliability refers "to the extent to which a particular rater is consistent in using a proficiency scale" (Davies et al., 1999: 91) on different occasions. Intra-rater reliability can be established by comparing the rated scores of candidates that have been tested on two occasions that are, for example, a month apart (Davies et al., 1999) by the same raters.

Hoffmeister et al. (1989) established inter-rater reliability for a narrative production test, which was part of the ASLAI by using trained raters, who evaluated the signed narratives of deaf children. Inter-rater reliability was high with .90, for both deaf and hearing raters (Hoffmeister, 1999). A similar approach was used for the Test of American Sign Language (TASL) (Strong, Prinz, & Kunze, 1994). Inter-rater reliability was investigated for each subtest "that required subjective decisions by having raters score the same set of 10 protocols, reviewing and resolving disagreements, and then scoring a second set of 10 protocols. Eventual agreement was better than 96% in all cases" (Strong & Prinz, 1997: 40). Hermans, Knoors, and Verhoeven (2010) also established inter-rater reliability for the productive measures of the NGT Assessment Instrument. Of the five productive tasks, "13 test administrators scored a randomly selected group of children within a particular age-group for the second time but now from videotape" (ibid.: 113). Applying a Spearman's rank correlation coefficient (ρ), the correlations between the raters

ranged from .78 to .92, which is considered high. To our knowledge, there is no study that has focused specifically on intra-rater reliability.

Modern approaches to test validation

In recent decades, the argument-based approach has become the standard to validate language tests. Within this framework, validity does not include different kinds of validity, such as content, criterion-related, and construct validity, but is rather viewed as a unified concept, that is, construct validity (Kane, 1992). The core of validity is not to validate a test itself but the inferences made on the basis of test score interpretation and use (Messick, 1990). As Messick (1990) argues, “test validation is empirical evaluation of the meaning and consequences of measurement” (ibid.: 1487). Whereas reliability has been viewed as a “distinct form and a necessary *condition for validity*” (Chapelle, 1999: 258), validity is seen as the type of evidence in more recent views on validation (Chapelle, 1999). The process of validation includes different rationales and types of evidence that need to be collected and used to build a validity argument.

Within an argument-based framework, five basic concepts are of importance: (1) *Claim* is “the conclusion of arguments that we seek to justify” (Fulcher & Davidson, 2007: 164); (2) *grounds* are the available evidence for the claim; (3) *warrant* is the link between the evidence (grounds) and the claims; (4) *backing* is additional support for the warrant (Fulcher & Davidson, 2007), and includes, for example previous research or experience or comes from theory (e.g., Bachman, 2005); and (5) *rebuttal* is “a counter-claim that the warrant does not justify the step from the grounds to the claim” (Fulcher & Davidson, 2007: 165). An example for an argument-based framework for sign languages is the German Sign Language Receptive Skills Test (Haug, 2011) for children. The argument framework for multiple-choice items to assess the acquisition (comprehension) of morphological constructions in German Sign Language (DGS) in deaf children 4–11 years old (from Haug, 2016) is shown in the following:

- (1) Claim: Responses to the items will lend support to claims about the acquisition process and the influence of parents’ hearing status (deaf vs. hearing) on the acquisition of DGS.
- (2) Grounds: (a) Item statistics, and (b) correlation of raw scores with external variables such as chronological age of children, age of acquisition, and parental hearing status.
- (3) Warrant: Sign language acquisition research has shown that (a) certain morphological constructions across sign languages are mastered, or acquired, when children are 10–12 years old, (b) other constructions that are mastered by age 6, and that (c) deaf children of deaf native signing parents acquire a sign language as their first language, compared to deaf children of hearing parents who might learn a sign language later.
- (4) Backing: Review of research studies that focuses at morphological constructions in DGS and the acquisition (from emergence to mastery) of these constructions in deaf children.
- (5) Rebuttal: (a) Younger children achieve higher raw scores than older children; (b) deaf children of hearing parents achieve higher raw scores than deaf children of deaf parents; (c) test items do not represent DGS constructions.

However, alternative types of statistical methods provide new standards within language testing to investigate reliability. The multi-facet Rasch measurement (Linacre, 1994) is an example. Rasch measurement “is an attempt to model the relationship between various facets of the test situation” (McNamara, 1996: 154). It can be used to investigate interactions between different facets, such as items and the raters.

Pedagogical applications

This section offers an overview of tests from different sign languages that are used by practitioners within the school context. Each test is examined on the following criteria: (1) Assessment target, such as vocabulary and grammar; (2) type of assessment, which means receptive and/or productive skills test; (3) target group, such as babies, toddlers, and children; (4) the language in which the test was originally developed; and (5) the sign language(s) for which the test has been adapted. We acknowledge that there may be other sign language tests that are not mentioned in this chapter. The reasons for not including these tests is that they may not have been published in a language that is accessible to the authors, focus on a different target population such as adults, and/or are not available to practitioners.

Assessing vocabulary in deaf children

The MacArthur-Bates Communicative Development Inventory (CDI)

Assessment target: Language development in monolingual hearing children. The CDI examines comprehension, word production, and early phases of grammar.

Format: Standardized parental checklist. Parents complete the checklist in regular time intervals by ticking off any words or signs that their child can understand and/or is able to produce.

Target population: Hearing children between 8–36 months.

Developed for: American English (CDI, Fenson et al., 1994).

Adapted for: American Sign Language (ASL; Anderson & Reilly, 2002), British Sign Language (BSL; Woolfe et al., 2010).

Perlesko: Vocabulary test for German Sign Language

Assessment target: Language development in signing children, specifically receptive vocabulary.

Format: The Perlesko uses a multiple-choice format, which requires children to either match a signed or spoken word to one of four picture choices or match a picture to one of four words in written German. In addition to German Sign Language (DGS), it can also be used to assess children's comprehension skills in spoken German, and written German.

Target population: Deaf children between 7–13 years.

Developed for: German Sign Language (Bizer & Karl, 2002b).

Adapted for: N/A.

British Sign Language Vocabulary Test

Assessment target: Language development in signing children, specifically receptive and productive vocabulary.

Format: The BSL-VT is a web-based instrument, which measures strength of vocabulary knowledge. The test consists of four tasks, which are form recall (production), form recognition (comprehension), meaning recall (production), meaning recognition (comprehension), each of which assesses a different level of deaf children's vocabulary knowledge. The same 120 items are used across all tasks to provide test administrators with a more detailed measurement of children's knowledge of each sign in an effort to guide and improve intervention (Mann, Roy, & Marshall, 2013).

Target population: Deaf children between 4–15 years.

Developed for: BSL (Mann & Marshall, 2012).

Adapted for: ASL (Mann, Roy, & Morgan, 2016), Finish Sign Language (Kanto & Mann, in preparation).

Assessing grammatical aspects in deaf children

British Sign Language Receptive Skills Test

Assessment target: Language development, specifically receptive knowledge of the following BSL syntactic and morphological structures: (1) spatial verb morphology, (2) number and distribution, (3) negation, (4) size/shape specifiers, (5) noun-verb distinction, and (6) handling classifiers.

Format: Vocabulary check and a video-based receptive skills test. Prior to the receptive skills test, a vocabulary check is conducted. The children confirm their knowledge of the 22-item vocabulary used in the main test through a simple picture-naming task that identifies signs taken from the receptive skills test. There are two versions of this task, one for the North and one for the South of the UK.

Target population: Deaf children between 3–11 years.

Developed for: BSL (Herman, Holmes, & Woll, 1999; Herman, Rowley, & Woll, 2015).

Adapted for: ASL (Enns & Herman, 2011) and German Sign Language (Haug, 2011), Finnish Sign Language (Kanto, in progress), Polish Sign Language (Enns et al., 2016), and Spanish Sign Language (Valmaseda et al., 2013)

American Sign Language Assessment Instrument

Assessment target: Conversational abilities, academic language knowledge, language comprehension, analogical reasoning, and metalinguistic skills.

Format: The American Sign Language Assessment Instrument (ASLAI) is a web-based test consisting of 12 tasks. Items are presented in multiple-choice format. Tasks in the ASLAI are in one of six formats: 1) picture to sign, 2) sign to sign, 3) picture to picture, 4) drag-and-drop sorting, 5) response-only (grammaticality judgment), and 6) video event to sign.

Target population: Deaf children between 4–18 years.

Developed for: ASL (Hoffmeister et al., 2014).

Adapted for: N/A

Assessment Instrument for Sign Language of the Netherlands

Assessment target: Phonology, morpho-syntax, and narrative skills (both receptive and productive).

Format: This assessment instrument is a computer-based test consisting of nine tasks. Formats include multiple-choice (e.g., receptive morpho-syntactic task), or retelling a picture story shown on screen.

Target population: Deaf children between 4–12 years.

Developed for: Sign Language of the Netherlands (NGT, Hermans, Knoors, & Verhoeven, 2010).

Adapted for: N/A

British Sign Language Productive Skills Test (BSL-PST)

Assessment target: Narrative skills and BSL grammar.

Haug et al.

Format: The BSL PST is a computer-based test. It uses a narrative recall format in which children watch a short language-free video and retell the story and answer questions targeting comprehension and inferring skills.

Target population: Deaf children between 4–11 years.

Developed for: BSL.

Adapted for: ASL (Enns et al., 2014), Australian Sign Language (Hodge, Schembri & Rogers, 2014), Spanish Sign Language (Enns et al., 2016), and English (Jones et al., 2015).

Nonsense Sign Repetition Task (NSRT)

Assessment target: Phonological development in sign language.

Format: The NSRT is a web-based test in which participants repeat pre-recorded, nonsense signs of differing phonetic (i.e., handshape and movement) complexity.

Target population: Deaf children between 3–11 years.

Developed for: BSL (Mann et al., 2010).

Adapted for: Icelandic Sign Language (Ivanova, 2012).

Test of American Sign Language (TASL)

Assessment target: Morpho-syntactic skills (both receptive and productive).

Format: The TASL is a video-based test consisting of six tasks. Formats include multiple-choice (e.g., classifier comprehension, map marker task) or retelling a picture story from a book without text.

Target population: Deaf children between 8–15 years.

Developed for: ASL (Strong, Prinz, & Kuntze, 1994).

Adapted for: Swedish Sign Language (Schönström, Simper-Allen, & Svartholm, 2003); French Sign Language used in Switzerland (Prinz et al., 2005).

Instrumento de avaliação da língua de sinais brasileira (IALS)

Assessment target: Morpho-syntactic skills (both receptive and productive).

Format: In the comprehension task here are a set of pictures for each level evaluated combined with a video in Libras telling a short story. The stories are produced involving different levels of vocabulary, uses of space and adding referents. The participant watches the video and chooses the pictures related to what was signed ordering the pictures considering the story told. The stories increase the complexity of matching the levels of the language developed. The second part involves production. The participant watches a short story in the video, then tells the story to someone else. This signing production is evaluated based on a chart with criteria considering the number of the events, vocabulary, uses of space, classifiers, and general vocabulary.

Target population: children from 4 to 9 years old and late learners.

Developed for: Libras (Brazilian Sign Language) (Quadros & Cruz, 2011).

Adapted for: NA.

Use of sign language assessments in practice

Whilst many assessments for sign languages have been developed over the course of the past decade, their use in everyday education and health settings raises some issues. These include

accessibility, purpose, training, and intervention planning. One issue that may affect practitioners' use of sign language assessments is that many of the existing sign language tests have been developed as part of research projects. As a consequence they tend to measure aspects of language for a purpose linked to a very specific research question. Many tests are not commercially available, suggesting that people who are interested contact the developers. (A list of existing tests is available on this website: <https://signlang-assessment.info>) This website is useful for researchers and academics, but limited information on test accessibility and usability is provided to practitioners in a clinic or educational setting. In addition, information about language assessment tools is readily available in academic papers and at conferences. However, these are not always the most effective means of informing practitioners working in schools and clinics. Even if the teachers, therapists, and assistants access this information, it is not always easy to convert a research tool described in academic terms into a functional procedure for use in the classroom (Hoskin, 2017).

Unfortunately, there is very limited literature on practitioners' use of sign language assessments. In order to encourage awareness and use of the assessments in enabling children to learn language as effectively as possible, these issues need to be addressed. For many practitioners, one key role of tests is to guide intervention planning. In some educational settings, the assessment tools that have been developed are used regularly to monitor children's progress. In other settings, the tools are used when there are concerns about a child's language learning abilities. Without appropriate knowledge of language development and disorder, the practitioners may have difficulty in both assessing accurately and translating the results into intervention targets and strategies. Understanding how and when to use these tests with children developing sign languages can be challenging for practitioners. One example of this is a paper on "narragrams" where cartoon stories from a television show are broken into mini-events for assessing children's narrative skills (Erber et al., 2016). However, the paper does not contain the story titles or mini event lists, requiring the practitioner to seek these from the authors. There are also settings where practitioners report that they do not use tools, although they have access to them. They are not sure how to interpret the results or how the results would be useful in developing any intervention.

As described above, researchers are continuing to develop sign language assessments and practitioners are striving to improve their assessment and intervention of children's sign language by using these tools. They can collaborate together in creating educational assessment instruments. One way to do this could be in the form of online resources including webinars to demonstrate test use similar to those offered for many spoken language assessments such as the Clinical Evaluation and Language Fundamentals (CELF-5; Wiig, Semel, & Secord, 2013). Another way forward is for the researchers and clinicians to work together to translate a research tool or test into a functional procedure for use in the classroom.

Technology and sign language testing

The Deafness Cognition and Language Research Centre (DCAL) in the UK has addressed the above concerns about using sign language testing in practice. They made assessment tools available in a website (www.dcalportal.org) to enable practitioners to easily access the assessments that are relevant for their work with signing deaf individuals. It raises the need for local safeguard protocols as practitioners are asked to enter confidential details including name, date of birth, and schools. Schools and clinics need to ensure that their staff are not breaking confidentiality rules. This process is not without problems, as is illustrated in the following comment from a UK-based practitioner:

The confidentiality issue has been the main barrier to me using the test. ... the language of the confidentiality agreement needs to be formal and detailed but I find that 'off putting', and sometimes inaccessible, to parents/guardians.

Dumbrill, 2018

As more assessments for spoken language become accessible online, for example, the CELF-5, and practitioners become accustomed to using online tools, some of the issues discussed above may be resolved. As practitioners grow more accustomed to incorporate online tools in their assessment routine, this is likely to lead to be a broader understanding of how to use the online format and how to deal with issues around confidentiality. In turn, this will raise manager and supervisor awareness of issues related to training, funding, and supervision in the use of online assessment tools.

Still another issue in sign language testing is test delivery. The use of computer- or web-based test formats for delivery is an obvious benefit for sign language tests (e.g., Haug, 2015). Web-based tests are particularly useful, as they allow automatic scoring of multiple-choice tests and are easily accessible from anywhere in the world where high-speed Internet is available (Haug, 2015). The shift from the traditional paper and pencil format of testing towards web-based formats for test delivery has reached the field of sign language assessment, as demonstrated, for example, by the BSL Vocabulary Test (Mann & Marshall, 2012) and the BSL Receptive Skills Test (Herman, Holmes, & Woll, 1999). In addition, these tests are part of a web-based assessment portal set up by the Deafness, Cognition and Research Centre at University College London. Another example of using a web-based format for sign language assessment is the narrative comprehension test for Swiss German Sign Language (*Deutschschweizerische Gebärdensprache*, DSGS; Haug & Perrollaz, 2015), which has been developed within the frame of the EU project SignMET. Similar to the BSL-VT and BSL-RST, this test is integrated in a purpose-build portal for sign language tests.² One of the biggest disadvantages of web-based tests, according to Haug (2015), is difficulty with the technical infrastructure, such as old hardware and software, and server connectivity. It is not always the case that test takers are familiar with the use of a computer or mobile device. A test taker's level of computer familiarity might have an impact on the test results (for a detailed discussion on web- and mobile-based testing formats, see Haug, 2015).

There are other technologies that show potential use for sign language assessment. One is automatic sign language recognition. A recent Swiss National Science Foundation project SMILE³ (Ebling et al., 2018) makes use of this technology. One of the goals of the SMILE project is to develop an automatic sign language recognition system that will be used in the context of vocabulary assessment for adult L2 learners of DSGS. The setup for such a testing scenario is that a test taker will be asked to produce a lexical sign (e.g., with a gloss or translating a written German word into DSGS) delivered on a computer screen. The produced sign will be captured by a camera, recognized by a sign language recognition system, compared to the test taker's performance with the "correct" or "acceptable" form of the sign, and feedback provided to the learner.

Future trends

Future research studies

We focus on two different strands of future research studies. The first research strand is the development and evaluation of rating scales of productive sign language tests. Some of the

above-reviewed sign language tests include rating scales of production (for example, Strong & Prinz, 1997). Issues like inter-rater reliability have been investigated. However, studies are needed to ascertain the processes in which raters come to have a mutual understanding of the rating criteria and the underlying construct of the rating scale, and to solve disagreements in their ratings. Findings from these studies may help strengthen the validity of the rating scale. The second research strand includes studies on the use of new technologies in sign language testing. Future studies should also look into new sign language technologies such as the sign language recognition (SLR) system and the SMILE project, which uses SLR, and explore how they could be applied in sign language assessment.

Future pedagogical applications

As mentioned earlier, a few sign language tests for children are commercially available. The need for such tests in schools has been pointed out in different studies (e.g., Haug & Hintermair, 2003). An area in need is training current and future teachers of the deaf, and sign language teachers, tutors, and practitioners on how to use the tests with regard to administration, score interpretation, and pedagogical implications. Finally, despite the value of tests for professionals working with deaf individuals, the existing sign language tests focus on the child's learning outcome rather than the learning process. This calls for alternative methods of testing. Dynamic assessment, which enables practitioners to make assumptions about children's response to a particular type of intervention, is an example. The research done in this area, while limited (Mann, 2017; Mann, Peña, & Morgan, 2014, 2015), looks promising.

Notes

- 1 The website Sign Language Assessment Instruments provides an overview of existing sign language tests <https://signlang-assessment.info>
- 2 <https://signlang-portal.com>
- 3 The SMILE project is a consortium of three institutions: the Idiap Research Institute in Martigny, Switzerland (lead), the University of Applied Sciences for Special Needs Education in Zurich (Switzerland), and the University of Surrey (United Kingdom).

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The politics of L1 sign language pedagogy

Ronice Müller de Quadros and Robert Hoffmeister

Introduction

When thinking about constructing and implementing L1 signed language pedagogy, one must consider a number of issues related to power, status, and public policy regarding language and culture. These include, but are not limited to, views regarding language (signed, spoken, and written), language rights, cultural diversity, empowerment, inclusion, and recognition of language communities. The widespread belief in the supremacy of spoken language drives many decisions within the educational systems worldwide (Baker, 2001). In some countries, there is a strong pressure for inhabitants to be monolingual in the dominant (spoken) language, which combines with paternalistic attitudes towards the rights and abilities of Deaf people to severely restrict or eliminate the option of positioning a signed language as the first language (L1) for Deaf learners.

Historically, the education of Deaf learners has been laboring under the tensions of three groups vying for control, with each claiming to work within an environment that will enhance learning in Deaf children. These groups are: (a) medical and audiological practitioners who take a pathological approach (Lane, Hoffmeister, & Bahan, 1996); (b) Hearing¹ educators who dominate Deaf education classrooms (Baynton, 1996); and (c) members of the Deaf World who are the products of the educational system (Holcomb, 2013). It is no accident that these three groups reflect the three language perspectives discussed by Ruiz (1984), and they are language as a *problem*, language as a *right*, and language as *resource*.

Language as a *problem* is illustrated by the belief that exposure to and use of another (second) language causes problems, difficulties, deficits, and complications for the acquisition of the (first) language in question. Oftentimes, medical and audiological practitioners define “deafness” as “the inability to hear,” which implies the inability to speak. This definition is held by the medical and audiological professionals, who also hold the view that exposure to signed language will disrupt the acquisition of spoken language. The acquisition of a spoken language by Deaf people is a primary goal for this group of practitioners because it signifies a reduction in their “deafness,” regardless of their actual audiological status. This group wields great influence on hearing teachers and educational policymakers.

Language as a *right* is illustrated in the relationship between majority and minority groups. In most societies, speakers of nondominant languages typically belong to minority speakers. Second language speakers identify with minority groups who speak the same language. Deaf people are not easily identifiable, yet they populate in all countries. Deaf people tend to seek each other out and gather in larger groups nearer to population centers (cities and towns). Communities tend to coalesce around common languages. Signed language is the attraction for Deaf people to gather and interact. As a result, Deaf communities have developed a cultural right to have a common language. However, their language and cultural rights are not always respected fully by the Hearing communities whose members view language as the *problem*.

Deaf communities worldwide advocate the last view, language as a *resource*. Several schools and programs have adopted the language as a *resource* view. In doing so, they incorporated the signed language of the Deaf community to enhance learning and achieve command of the spoken and written language of the larger Hearing community.

These three views of language permeate the education of the Deaf. Historically, the medical establishment tended to control the lives of Deaf people from birth through 3 years old. Their view that language is a *problem* is buttressed by their belief that signed languages are not true languages, or deserving of equal status with spoken languages. The pathological-medical view is a form of ethnocentrism and encompasses the belief that being hearing is the norm, therefore, to hear and repair hearing loss is the goal, which is peripheral to the language issue (see Bauman, 2004 for a detailed explanation). This ethnocentric perspective is that the sounds of a language are its basis for comprehension and learning. This negative view towards signed language in turn reduces the influence of Deaf people on Deaf educational pedagogy, leaving it under the control of Hearing people.

In this chapter, we break from the historical perspectives and assume the Deaf perspective of language as a *resource*. This chapter will cover pedagogical issues relating to language in the education of Deaf learners, including instruction, curriculum, and assessment. In doing so, we aim to counter the dominant views of language held by most Hearing professionals in education and audiology, as we deem these views harmful to the linguistic development and academic success of Deaf learners (Eichmann, 2009; Schermer, 2003; Ladd, 2003; Lane, Hoffmeister, & Bahan, 1996).

Historical impact of views about languages on Deaf children

In this subsection we provide a history of Deaf education worldwide where “speech” and “oral” views take precedence. We discuss how this narrow definition of language has impacted the role of signed language in Deaf education since the nineteenth century. We next discuss the current political issues that have evolved from these views.

Historical background

In the 1700s and early 1800s, members of the DeafWorld in France and the US greatly influenced educational practice. By the mid-1800s, the heretofore strong influence of Deaf professionals on the educational practices in the education of the Deaf was greatly diminished, to the point where Hearing educators gained control. Their views highlighting the importance of speech as the keystone of learning for Deaf learners acquired a powerful “voice” (Baynton, 1996). As this “speech” movement gained power, negative attitudes towards signed language advanced, and discussions began where the term “language” became synonymous with “speech.” Language within Deaf pedagogy thus became the *spoken* language of the larger Hearing community. As discussions of the theoretical framework of learning were built, the idea of “language” as equal to “speech”

became firmly established. Signed language was considered to be outside the definition of “language” both in general and in the education of Deaf children, so much so that in 1880, Hearing educators of the Deaf from around the world met in Milan, Italy and voted to ban the use of signed language in schools for the Deaf throughout the world. This ban removed the influence of Deaf adults from school-aged children, the youngest members of the Deaf community, who needed it most (Lane, Hoffmeister, & Bahan, 1996; Cleve & Crouch, 1989).

Throughout the world, as Hearing educators gained control of the education of Deaf learners at the turn of the twentieth century, developments in technology heavily influenced both the education of Deaf children and their (often) Hearing parents. As technology emerged, the views of the *medical* and *audiological* professionals influenced the fields of research examining *learning* in Deaf children (Lane, Hoffmeister, & Bahan, 1996; Moores, 2001; Tang, Lam, & Yiu, 2014; Quadros, 1997, 2017). Advances in audiology heavily impacted attitudes of the general Hearing community towards Deaf people, especially young Deaf children. The view that if a child is born with a hearing loss, the best approach is to “fix” or “correct” the hearing problem, or the child could not learn. Audiological professionals, dominated by Hearing people, influenced Hearing educators by focusing on fixing the ear, supporting placing hearing aids on very young Deaf children in order to make them (appear) normal. This view conditioned the general population of Hearing people to accept that if a child is born with a hearing loss, the child is destined to be unable to learn unless they acquired “speech.” This prevalent view encouraged medical professionals, notably, ear nose and throat physicians, to focus on a “cure” for hearing loss. Further technological advancements set the stage for the entry of cochlear implants, a surgically implanted hearing aid (device) designed to enhance the reception of sound in adults who had a profound hearing loss in order to make them more normal, that is, Hearing. By the twenty-first century, through lobbying by the medical profession, cochlear implants became commonplace in 2-year-old Deaf children. Currently, cochlear implants are being surgically implanted in Deaf children as young as 6 months, with bilateral implants becoming commonplace in year-old Deaf children. All of these advances in the “cure” for hearing loss were introduced and sanctioned with very little interaction or consultation with professional Deaf adult members of the Deaf World.

During most of the twentieth century, Deaf people were relegated to second-class status if they could not speak. Signed language disappeared from the education of young Deaf children, particularly in the preschool through middle school years, years known to be critical for the acquisition of language (Mayberry, 2010; Mayberry et al., 2011). Early in the twentieth century, signed language was still banned in elementary classrooms where Hearing teachers were in control, and was allowed only when oral methods failed. However, signed language remained in use in many of the schools and programs for the Deaf at the high school level. Deaf teachers tended to be placed in high school classrooms, supervised many after school activities, coached many school sports teams, and administered and supervised Deaf staff in the dormitories of the residential schools for the Deaf. The belief was that it would be easier to manage older Deaf learners if you could communicate with them, and Deaf professionals were most likely knowledgeable in signed language.

During the latter half of the twentieth century, American Sign Language (ASL) in the US was argued, and subsequently proven, to be a full language equivalent to spoken languages (Stokoe, 1960). As this view of signed language became prominent, learning a signed language as a second or additional language (L2/Ln) became very popular within the Hearing community while the development and use of cochlear implants also gained popularity within the medical community. The signed language as a second language movement was developed through the support of members of the Deaf World who found jobs as teachers of signed language in colleges and

universities worldwide. Ultimately, Deaf professionals became involved in research on the linguistic status of a signed language and its impact on learning in Deaf learners.

A relatively recent movement to teach “signs” to Hearing babies between 6 and 9 months of age has gained popularity (Daniels, 1996), which contrasts with the admonishments Hearing parents receive for not using sign language with their Deaf children. The belief that signed language exposure and use can be good for language development in Hearing babies and yet harmful to Deaf babies belies the view held by medical and educational professionals that signed languages are only “good” if they are used in the service of acquiring spoken language (Eichmann, 2009).

At present, Hearing educators of the Deaf who are against signed languages continue to create problems in pedagogy. Their continued disallowance of exposure to a signed language early in life at home and at school for young Deaf children in Hearing families has resulted in many Deaf children experiencing language deprivation (Mayberry, 2010; Hoffmeister, 1999, 2004). This focus on spoken language and listening skills has continued to cloud the issue of what the first language of a Deaf child is. Many Deaf children from Hearing families continue to arrive at school with minimal to no language skills (Henner et al., 2018).

These views have impacted Hearing and Deaf educators who wish to consider implementing bilingual pedagogy based on best practices of bilingualism as conducted in many countries. The overwhelming influence on Hearing parents and Hearing educators of medical and audiological professionals rather than linguists or Deaf professionals prevents access to and support of bilingual approaches to educating Deaf children.

A modified version of this position is advocated by some Hearing educators who “allow” signing. They require changing natural signed language word order to match spoken language word order, among other things. This is a subtle way to avoid learning and using the signed language of the minority community. This is a misdirected attempt to modify signed language in the view of signed language as a *resource*, thinking it will make spoken language more accessible via the hands. This modification created more difficulties because it is not linguistically appropriate to manipulate a language in this manner (Hoffmeister, 1996). This difference in language status deeply impacts the use of signed language by Deaf learners to learn educational content particularly when contrasted with the importance of print (spoken) language. In this manner, signed language becomes valued as a *tool*, not as a *true* and *real* language, and is used only in service to the majority spoken language and not as a full language in its own right supporting a bilingual approach (cf. Cummins, 2000; Baker, 2001).

In the twentieth century, researchers investigating signed language acquisition found that Deaf children with Deaf parents (DCDP) acquire spatial-visual languages in the same way that Hearing children acquire spoken languages and achieve the same milestones. For review of studies, the reader is referred to Newport and Meier (1986) and Hoffmeister and Wilbur (1980). However, for most of the twentieth century, even these DCDP were considered not to have a language when they arrived at school (Hoffmeister, 1978). The belief that signed languages are not full languages has had far-reaching negative effects on educational policy and Deaf learners, and it is hoped that Hearing educators of Deaf learners will recognize this and begin to acknowledge the validity of signed languages and their role in the linguistic and cognitive development of Deaf people (Mellon et al., 2015; Henner et al., 2016; Scott & Hoffmeister, 2016; Hrastinski & Wilbur, 2016).

Theoretical perspectives

In the following section, we consider the politics of promoting signed language as an L1 and the movement to educate Deaf learners as bilinguals. To do so requires a more inclusive perspective

of learning that values the history and culture of the Deaf World and the role of signed language as an L1 in a bilingual framework. The field of Deaf education continues to be influenced by a number of non-educational fields such as medicine, audiology, and speech. Therefore, the goal of this section will be to first highlight some of the viewpoints and perspectives driving the politics of Deaf education and to then provide another perspective from researchers in education, learning, linguistics, and psychology. In doing so, we aim to provide a more holistic perspective of L1 signed language pedagogy in Deaf education.

L1 politics of bilingual deaf education

Language, power, and pedagogy (see Cummins, 2000) weave a complicated tapestry of competing theoretical perspectives underlying the politics of determining the appropriate L1 for the education of the Deaf. Positioning a signed language as an L1 requires one to include theoretical perspectives from Deaf Studies, the Deaf World and its members, and the purveyors of Deaf pedagogy.

Research has demonstrated how the acquisition of signed language as L1 impacts the ability to learn second languages and educational content (Scott & Hoffmeister, 2017; Henner et al. 2016; Hoffmeister, 2000; Lieberman et al., 2014; Mayberry, del Giudice, & Lieberman, 2011; Hrastinski & Wilbur, 2016). Unfortunately, because of language politics, almost all Deaf children arrive at school with minimal language knowledge and often first encounter full access to an L1, which is signed language, at school. Thus, schools need to accept signed languages as a L1 in early education classrooms in order to guarantee its timely acquisition by signing Deaf learners. Bilingual education for Deaf children must be viewed as both positive and additive, similar to how bilingual education for Hearing children is often viewed, with full access to instruction through one's L1 supporting the learning of a L2.

In order for the signed language to truly function as an L1, it is crucial that it is taught as an academic subject, just as English is taught in Hearing schools. In other words, daily class time must be allocated to teaching about² signed language as an L1. The signed language must be treated with the same respect and status accorded to that of the spoken language component of the curriculum. For example, the amount of hours dedicated to signed language instruction in schools for the Deaf must be equivalent to that devoted to spoken language as L1 instruction such as in the English language arts (ELA) in the US. This initial and critical step is intended to give equal legitimacy to both languages at the schools.

Integrating Deaf perspectives within a bilingual framework

The bilingual approach shifts the view of Deaf child as the *problem* to the view of them as a *resource*, where they represent Deaf culture and the Deaf community, and require the larger educational system to provide Deaf pedagogy via Deaf eyes (Bahan, 2008). Deaf educators become valuable advisers and *colleagues* who work with Hearing educators in navigating the cultural, linguistic, and political terrain while creating a true bicultural environment that provides the Deaf child the underlying skills to navigate life in both Hearing and Deaf environments. Establishing equal partnerships between Deaf and Hearing personnel creates a fair and equitable education process that empowers both the Deaf learners and their educators (Shantie & Hoffmeister, 2001; Kourbetis, Karipi, & Gelastopolou, 2017).

Following Moraga (2017), Deaf educators encode Deaf pedagogy based on the following principles: Egalitarianism and collectivism (DEAF SAME-AS-ME, see Bahan, 2008); visual communication (signed language); child-centered (holistic) education; and interculturality

(group member acknowledgment). These Deaf pedagogical principles are operationalized in practice as Deaf identity development and a strong sense of belonging to the Deaf community. In this manner, Deaf educators function both as positive role models and cultural transmitters. This exposure to Deaf adults and Deaf peers in and outside of classrooms guarantees access to signed language as an L1 for all Deaf learners, regardless of the language used in their homes.

The field of Deaf Studies (Ladd, 2003; Perlin & Strobel, 2006; Hoffmeister, 1999, 2007) has highlighted the impact of language on pedagogical approaches, cultural divisions, identity issues, and power relations in Deaf education. The shared histories of Deaf people as described by Padden and Humphries (2005) are told in signed languages, the primary language of the Deaf World, and provide materials for the development of a cultural identity vis-à-vis the Hearing world. In this sense, signed languages play a pivotal role in cultural development, contributing to a strong sense of belonging to the Deaf World as well as aiding in the formation of boundaries between the Deaf and Hearing “worlds.”³

Pedagogical practices

Academic outcomes for Deaf learners in the current educational system are widely variable largely because Deaf children from Hearing families come from a wide range of language environments. Since many Deaf children of Hearing Parents (DCHP) arrive at school with minimal language knowledge, spoken or signed, the goals of early schooling are based on improving their “language” knowledge (Lane, Hoffmeister, & Bahan, 1996; Henner et al., 2018). In contrast, the typical monolingual Hearing child enters school at 4 or 5 years of age with grammatical fluency in a spoken language that is nearly at adult levels. Their educational focus is on teaching *about* the language they already know, understanding its grammar, expanding and enhancing vocabulary knowledge, and mapping the known spoken language to the printed page when they learn to read. However, it is quite different for Deaf children, where educators of Deaf children have a dual charge: One is to teach a “language” to the Deaf child, and the other is to teach *about* the “language.” Because the majority of Hearing educators are not fluent in a signed language, this task is challenging for the bilingual approach. In addition, there is no accepted curriculum for teaching signed language as an L1 in schools and programs serving Deaf learners. This results in a reliance (and over-reliance) on spoken language as the base language of instruction, even when a signed language may be implemented in the classroom as part of a bilingual framework. An example of such reliance is the manipulation of signed language elements to adhere to spoken language conventions in syntax and morphology, such as modifying a signed language to follow spoken language word order, as a means to make the spoken language “accessible” to Deaf learners (Hoffmeister, 1996). However, the result is that the Deaf learner population received inconsistent linguistic input, which has stunted their rates of academic achievement over the past five decades (Hoffmeister, 1996). To remedy this situation, the following section presents a bilingual framework designed to enhance learning in Deaf learners.

We propose the following agenda for implementation of L1 signed language pedagogical language policies at schools and programs for Deaf learners:

- 1) The curriculum incorporates both signed language as an L1 and Deaf culture (as discussed in Cummins, 2000);
- 2) Principles of instruction and learning are aligned with principles of signed language acquisition;
- 3) Deaf cultural perspectives provide foundations promoting the establishment of a solid Deaf identity;

- 4) A bilingual ASL-written English curriculum for Deaf learners is implemented where both languages are recognized and promoted as part of their everyday lives; and
- 5) Deaf children are educated in a way that amplifies and solidifies the social and educational context in a Deaf manner.

Bilingual education programming for Deaf children

Signed language instruction with Hearing families and Deaf adults

The first step to improve the language environments and language readiness of Deaf children is to address the impoverished linguistic input they typically receive at home when they have Hearing parents. Programs that utilize Deaf parent-infant professionals to work with Deaf and Hearing parents of young Deaf children as soon as the child is identified with a hearing loss are of paramount importance. Often, these programs work in concert with local hospitals through referrals soon after hearing loss is identified in infants, with Deaf parent-infant professionals interacting with families in their homes and at school sites. The specifics of these programs can vary, with some offering free or low-cost weekly home visitations and/or group signed language classes. In some cases, groups of parents meet in homes of selected parents (Hoffmeister, 1983). This structure provides an environment for Deaf parent-infant professionals to support Hearing parents in learning signed language and to function as language models while interacting with Deaf children in the home or school context. Such programs vary in duration, but many continue from time of identification until the Deaf child enters school (3 years of age in the US) or a year or two after that. Such programs lessen the burden on Hearing parents in their quest to learn signed language and allow parents to acquire signed language naturally, thus becoming signed language models themselves in a relatively short time.

These types of programs provide signed language input to the Deaf child both directly from the Deaf personnel and through the parents, which fosters a strong foundation in an L1 and facilitates school-readiness when the child is 4 years old. Upon matriculation, the Deaf child is ready to begin learning academic content, including spoken languages as second languages through print. Such programs provide critical foundation for the bilingual development of Deaf children and their readiness for bilingual education in schools. Examples of bilingual educational programming from the US, Brazil, Europe, and Asia are exemplified next.

Bilingual education in practice: US

In the US, a small number of schools and programs for the Deaf have identified themselves as bilingual and incorporate bilingual instructional practices into their curriculum. As mentioned earlier, qualified Deaf teachers need to be hired in order to balance the overwhelming majority of Hearing teachers. The bilingual programs in the US typically have a large percentage of Deaf teachers, some as high as 75%, compared to the average of 15% in typical, that is, non-bilingual schools for the Deaf (Moores, 2001). The bilingual programs for the Deaf frequently have a policy of signing at all times in public spaces and classrooms in particular.

In addition to the above-mentioned policy, we suggest that the Deaf and Hearing staff in bilingual programs meet regularly to confront attitudes and issues that exist or may arise. Bilingual schools for the Deaf must establish “safe” working environments that permit the equal exchange of opinions and open discussions that clarify behaviors and decisions that may impact cultural frameworks both positively and negatively.⁴ In some cases, it can even be advisable that professional mediators be charged with managing these types of meetings.

It is also important to follow principles for providing equal access to content knowledge in both languages. Educators must be familiar not only with the vocabulary in each language but also with the means by which each language best encodes content. In other words, they must understand how to first select and use appropriate vocabulary, and then be able to present contrastive contextual frameworks for the pertinent content, with enough language skills to be able to fill in content information when signed or print forms may not be immediately available.

Having a lexicon of appropriate signed language vocabulary for academic jargons such as in science and math is of utmost importance for all educational staff to know in their content area(s) for classroom instruction. One such resource for viewing how American Sign Language (ASL) science, technology, engineering, and mathematics (STEM) concepts and vocabulary are identified, defined, and presented in lecture format is the online ASL Concept Learning Resource program (Reis, Hoffmeister, & Laurence, 2017). Resources such as ASL CLearR (www.ASLeducation.org) assist learners and educational staff alike how to best communicate academic information in ASL and how to access it outside of the classroom.

Schools for the Deaf that follow a bilingual framework have maximized the use of technology in classrooms where highly qualified Deaf and Hearing staff fluent in signed language present academic material to their learners, followed by digitized academic material made accessible via video as homework or a resource to supplement information in English print. Accessing school content through signed language and print both in the classroom and outside the classroom provides both language modeling and informational content (Hoffmeister & Caldwell Harris, 2014). As Deaf learners improve their fluency in and knowledge of their L1 (signed language), they will then improve their fluency in and knowledge of their L2 via print (the spoken language of the majority community). The next section discusses a program in Brazil that trains Deaf and Hearing learners to become bilingual educators.

Bilingual education in practice: Brazil

Deaf researchers and specialists in Brazil are developing a curriculum for the instruction of Libras as an L1, providing not only instruction in learning about Libras and Portuguese, but also incorporating strategies following Deaf pedagogical conventions. They devised strategies that serve to enhance Deaf learners' learning in the classroom. For example, the Deaf learners have direct access to information from educators using signed language, not indirect access through signed language interpreters. For this reason, educators who are training to work in bilingual programs for the Deaf must become fluent in Libras so that they can transmit content knowledge directly.

In addition, the Deaf personnel highlighted the need to access the visual materials for Deaf learners. Krusser (2017) analyzed current available materials in order to determine where signed language could be included and in what other formats it content could be presented. Examples of video stills taken from a project in which video-books are designed for Deaf readers are shown in Figure 9.1.

The first image contains a menu with icons that are also explained in signed language. This menu allows Deaf learners to select specific sections, and the corresponding content via signed language is up to 20 minutes in duration. Learners also have the ability to rewind and replay passages already read, and to access additional material via browser links connected to specific content in the signed passages. In addition, learners control the speed of the signing up to 30 percent faster than normal. In analyzing the strategies used by Deaf learners viewing videos in signed language, it was found that videos containing signed language must be as free as possible from competing extraneous *visual* noise. Krusser (2017) also found that this set up improves the ability of Deaf learners to access and learn content.

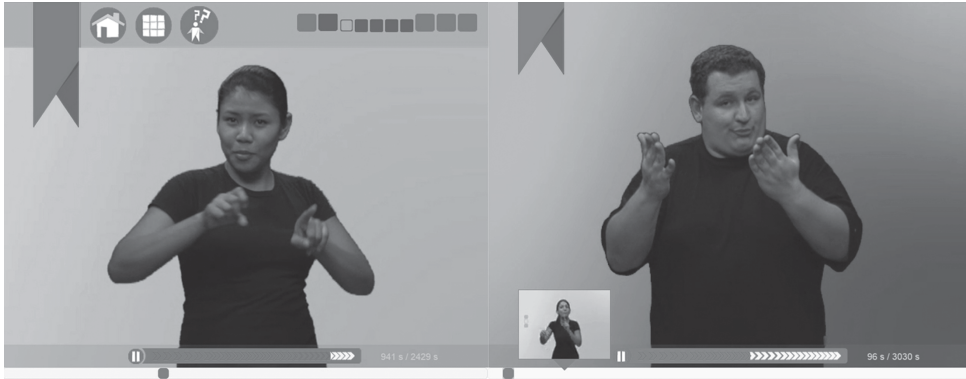


Figure 9.1 Sequence of signs with the resources from a material produced at UFSC with specific tools for sign language (Libras) videos

Source: Krusser (2017).

Bilingual education in practice: Asia and Europe

We now turn to an example of bilingual programming for Deaf learners in China. A signed language bilingual education program was designed for implementation in a regular Hearing classroom where Deaf and hearing learners were taught. This program is the Hong Kong Co-Enrollment Study (HKCES) (Tang, Lam, & You, 2014). It believes that exposure to signed language brings advantages in literacy skills and reading comprehension for all learners. It offers co-enrollment programming and “an acquisition rich environment in terms of linguistic input,” whereby both signed and spoken languages are used in instruction and communication between the deaf and the hearing participants (Tang, Lam, & You, 2014: 318–19).

The HKCES is designed to promote cross-modal and cross-linguistic interaction with the aim of improving the literacy skills of Deaf children. Results suggest a positive correlation with syntactic and morphosyntactic knowledge in three target languages: Hong Kong Sign Language, written Chinese, and oral Cantonese, indicating a transfer of grammatical knowledge between signed and spoken language (Tang, Lam, & You, 2014). This multilingual learning environment provided enough support to improve general language development for its learners.

In many countries, educators have proposed to standardize signed languages for educational reasons. These initial attempts, however, were driven by motivations based on the written languages used at school. Schermer (2003) and Eichmann (2009) studied such attempts in Holland, Germany, and England, and found that the motivations for standardization were not appropriate, as they were based on the belief that signed languages have inadequate lexicons from which to draw advanced vocabulary to correspond with that of spoken languages. This unilateral directional approach contrasts with the approach of bilingual programs, where signed and spoken and written languages share the same space, with each accorded the same rights. The standardization of signed languages based on spoken languages created political problems for Deaf communities in these countries.

In addition, the Deaf community was highly critical of proposals to substitute “new” signs for existing signs. They questioned whether it was necessary to create new signs and found it unacceptable to do so. Schermer (2003) refers to this type of approach as a hegemonic view of the language by Hearing people. This example illustrates that some Hearing professionals do

not believe that signed languages are true languages with their own process for creating new vocabulary but are dependent on spoken languages for such things. This approach is the historical continuation of the (mistaken) view that learning can only be obtained via spoken language.

Deaf bilingual education and cochlear implants

In the US, Europe, Brazil, China, and most other countries, the advance of cochlear implants corrals us within the historical perspective that educational settings for the Deaf should be monolingual, namely using spoken languages (Tang, Lam, & You, 2014; Cruz et al., 2014). The recent advances of viewing Deaf professionals as equal partners in the Deaf educational environment and the importance of signed language as an L1 for Deaf learners have been relegated to the sidelines and openly discouraged. The supremacy of speech continues to be championed by the medical and audiological practitioners. We urge educators of the Deaf to renew their respect for using both signed language and spoken language in a bilingual framework, with signed language considered a *right and resource*, and not a *problem* (Humphries et al., 2013).

Advances in technology should not hinder or alter the implementation of bilingual education for Deaf learners. Recent research regarding Deaf bilingual children fluent in a signed language acquired early and naturally demonstrates no interference with acquiring the hearing and speech skills they are capable of (Knoors, Tang, & Marschark, 2014; Davidson, Lillo-Martin, & Chen Pichler, 2014; Cruz et al., 2014). From this perspective, bilingual education must include Deaf educators teaching signed language as an L1, and using this knowledge to acquire fluency in a spoken language is critical.

For Deaf children who have a cochlear implant, it is important to note that the bilingual programs described above do not preclude the Deaf child from acquiring a spoken language, either at the same time as or after acquiring a signed language. This two-language model establishes the necessary and sufficient conditions for a Deaf child to become bilingual. When 4- and 5-year-old Deaf learners begin their schooling with a capability for communicative interaction in an accessible language, the foundation in an L1 signed language is set. They can begin a bilingual pedagogical education program with and trained professionals who are skilled in signed languages and bilingual education.

Training professional educators

In order to establish bilingual family programs and bilingual educational programs in schools, Deaf and Hearing professionals must obtain the requisite skills. There are collegiate programs that provide knowledge base and practicum experiences in different areas of expertise for individuals who want to become professionals in L2 sign language pedagogy. For instance, Boston University, which was the first to establish a bilingual (ASL and print) graduate program in the education of the Deaf in United States (Katz, 1999), provides four areas of pedagogical foundations necessary for educators of the Deaf in bilingual programs: Language, culture, subject matter content, and best instructional practices. Another example is at the *Universidade Federal de Santa Catarina* in Brazil. Established in 2006, it offers the first Brazilian four-year bachelor degree and graduate program for learners who wish to become educators of Brazilian Sign Language (Libras) and sign language translators and interpreters. The programs provide different areas of expertise and prepare educators to work with signed language as a first language as well as a second language depending on what goal the learner is pursuing (Quadros, 2014).

The programs must be able to (1) select the highest qualified candidates, and (2) to assess whether and to what degree content has been learned. The first required area of expertise is language. This is critical and requires that Hearing and Deaf educators be fluent in signed language

and be knowledgeable about its linguistic structure. It is also critical to be able to properly produce skilled signed language instructors. Once future educators have developed a solid foundation in the structure of the signed language, they can turn to learning the cultural aspects of educating Deaf children in a Hearing world. This requires a clear understanding of one's own attitude about Deaf World, Deaf culture, and how the professional fits into the framework of these two worlds (see, e.g., Bauman, 2015). After developing solid foundations in language and cultural knowledge, future educators of the Deaf can address the third requirement for working in a Deaf bilingual program, which is an understanding of the roles of each language in a bilingual framework. They must become familiar with and skilled in the academic use of both signed language and spoken language (via print) and their place in content area instruction and learning.

Successfully implementing a bilingual program for Deaf learners requires that educators be knowledgeable about best instructional practices within such a program. For example, they must be able to present high-level information using academic signed language. During the course of developing the ASL Concept Learning Resource (ASL CLear) (Reis & Hoffmeister, 2017)⁵ at Boston University, we were able to demonstrate how academic signed language is used in the presentation of science, technology, engineering, and mathematics (STEM) content. The ASL CLear provides a model for the delivery of STEM content at different language levels *and* different learning levels.

Future trends

Future research studies

We proffer the following areas that need to be covered by research related to signed language as L1 pedagogy to inform Deaf education in the development of curriculum and instructional materials and strategies in L1 teaching. Future research should address the relationship, effect, and aspects of signed language in L1 pedagogy in signed language literacy and its connections with language, culture, and identity. In particular, the impact of Deaf culture, history, and signed language literature on identity development remains to be understood and needs to be studied. Since bilingual education favors literacy development in signed and written languages, more research work is needed to assess the effectiveness of the multimodal approaches, including the role of phonological, syntactical knowledge, and contrastive studies in signed and written languages, in Deaf education pedagogy. Technology has increasingly been used in Deaf education, and research is needed to assess the impact of technological equipment and online platforms on literacy development in both signed and written language education in bilingual classrooms. These topics for future research need to account for different levels of educational programming.

Future pedagogical practices

We also proffer the following concerns that need to be addressed when signed language is considered in L1 pedagogy in the education of Deaf learners. There are general issues in bilingual education, and questions for Deaf and hearing professionals. Regarding the general issues in bilingual education, the areas for future consideration for pedagogy are: What has been or can be done by schools to create programming for bilingual pedagogy? What is the foundation for a curriculum in L1 signed language? How can we train teachers who are skilled in signed language such as ASL, Libras, and other signed languages?

In particular for Deaf and Hearing professionals, the areas to be considered for future pedagogical practices are (a) to become proficient in using a signed language as the language of instruction; (b) to teach signed language as an L1 to Deaf learners, and as an L2 for deaf and hearing children whose L1 is a spoken language; (c) to become knowledgeable about Deaf

Culture and Deaf pedagogy, the structure of a signed language, the academic use of a signed language, and in how to present a contrastive analysis of signed language and spoken language; (d) to recognize and implement efficient learning principles via Deaf perspectives; and (e) to work with parents of very young (0–5 years) Deaf children.

We believe that signed and spoken languages can and should co-exist in the education of Deaf children. We also believe that the best approach is to treat signed and spoken languages with equal respect, which requires inclusion of highly skilled Deaf professionals as teachers and leaders alongside highly skilled Hearing professionals that can culminate in producing high achieving bilingual Deaf learners. We must allow Deaf children to grow up in schools with a strong language foundation in their signed language, and to reach their potential using signed language and the spoken language on print.

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Notes

- 1 We argue for capitalizing “Hearing” in order to parallel our capitalization of “Deaf” in order to signify Deaf culture, as opposed to “deaf” which simply indicates audiological status (Hoffmeister, 1996).
- 2 Teaching language in Hearing schools is focused not on learning the language but on learning about the language, as in identifying nouns, verbs, and adjectives.
- 3 Deaf people have created a very common specific lexical sign, DEAF WORLD, to define their place in the larger world with common characteristics and a particular way of life (Lane, Hoffmeister, & Bahan, 1996).
- 4 The Learning Center for the Deaf (TLC) in its transition from Total Communication to Bilingual Education with their Deaf learners operationalized many of the suggestions included here.
- 5 This project is a collaborative effort between Boston University’s School of Education’s Programs in Deaf Studies and the The Learning Center for the Deaf, Framingham, MA., partially funded by the MA Department of Elementary and Secondary Education.

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Part III

L2/*L_n* sign language pedagogy



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L2/Ln sign language teacher preparation, qualifications, and development

Russell S. Rosen and James Woodward

Introduction

There have been classes in sign language as second and additional language throughout history. There are reports suggesting the learning of sign languages when reporting on Deaf individuals signing to strangers, colleagues, and family members in ancient Greece (Plato, 1997), the medieval era (Saint-Loup, 1993), and the Renaissance era (Montaigne, 1958); the creation of European signing schools for the Deaf in the early modern era; sign language classes in places such as churches, community centers, and agencies in Europe and the US in the 18th and 19th centuries (cf. Bauman, Nelson, & Rose, 2006); and at secondary, collegiate, and university levels since the twentieth century (Rosen, 2008; Wilcox & Wilcox, 1997). That throughout history individuals have been using sign languages to communicate would not have been made possible without teachers of sign languages.

Teachers and practitioners in sign language classes are presumed to have the knowledge and skills not only in the language, but also its transmission to learners. However, they may not have received any preparation or have any foundation by way of coursework and practical experiences in the pedagogy of sign languages as second languages (L2). There were no certification programs or processes for teachers of sign languages for most of the history of sign language pedagogy. The teachers often relied on their intuition and presumptions about sign language, learning processes, curricular topics, and evaluation of their pedagogy and learners. Actually, scholarly literature abounds with studies on the problems and issues of teachers and practitioners who do not have sufficient knowledge or skills in the language, and do not know how to develop a curriculum and assessment of learner performance (e.g., Lopez & Santibanez, 2018; Mungure, 2016).

It was not until the twentieth century that foreign or world language teacher preparation programs, and the late 20th to early 21st centuries that sign language teacher preparation programs were created at colleges and universities worldwide (e.g., Watzke, 2003). The impetus was increased government oversight of education and teacher preparation at the local, regional, and/or national levels, particularly in the US, Europe, and Asia (Watzke, 2003; Darling-Hammond, 2005; Rosen, 2008). Government education departments have increasingly created policies and requirements for individuals to become teachers and grant certifications as an emblem of the satisfactory completion of government requirements for teachers (e.g., Watzke,

2003; Christie, 2014). The preparation of teachers need to be evidence- and data-based (Watzske, 2003; National Research Council, 2010; Bransford, Darling-Hammond, & LePage, 2005; Darling-Hammond, Holtzman, Gatlin, & Heilig, 2005). Studies showed that certified teachers produced higher learner achievement gains than uncertified teachers, even when controlling for teacher experience, degrees, and learner characteristics (Darling-Hammond, Holtzman, & Gatlin, 2005). Christie (2014) and Darling-Hammond, Holtzman, and Gatlin (2005) found that teachers' effectiveness is strongly related to the teachers' teaching preparation.

Scholars in the field of teacher education in general and foreign language teacher education in particular developed the components, experiences, and qualifications of teacher preparation programs for foreign/world languages (Watzke, 2003; Pennington, 1990; Darling-Hammond, Holtzman, & Gatlin, 2005; Richards, 1990; Day, 1990; Lange, 1990; Freeman & Johnson 1998). They made suggestions regarding program design for teacher preparation program (TPPs). This chapter provides information on TPPs for individuals who want to become teachers and practitioners of sign languages as second (L2) or additional languages (*L_n*). It focuses on the TPPs that provide preservice course work and practicum experiences in places where similar coursework and practicum experiences can be offered to in-service individuals. The following sections discuss theoretical perspectives for model TTP programs and pedagogical applications in selected TPPs.

Theoretical perspectives

Principles of teacher preparation programs

Based on past research studies on TPPs, educators urge that all TTPs present a clear description of the philosophy, objectives, goals, requirements, and other operational features of the programs (Pennington, 1990; Darling-Hammond, Holtzman, & Gatlin, 2005). Researchers in TPPs such as Darling-Hammond, Holtzman, & Gatlin (2005), Richards (1990), Day (1990), Lange (1990), Freeman and Johnson (1998), and Altstaedter, Smith, and Fogarty (2016) provided suggestions, which are given here. The TPPs should clearly demonstrate the connection between content and pedagogy through coursework, research, and practicum experiences. The coursework should provide the content of teacher education, including topics on learner learning process, subject matters, teaching practices, learner skills assessment procedures, diverse learner populations, and classroom behavior management. The program should be oriented practically to the teaching tools and towards proper teaching skills, and offer opportunities for teacher development, including placement in school sites, clinical experiences with supervision, mentoring, observation and discussion, and development of learner teaching portfolios. The program should also prepare learner teachers to take assessments on teacher performance, content skills knowledge, and pedagogical strategies. The learner teachers should be encouraged to become and think like researchers and inquirers, act as facilitators and thinking coaches, conduct action research, and reflect on their teaching (Ezer, 2007; Gaskins, 1989; O'Dwyer, 2006; Cochran-Smith & Lytle, 2009; Wallace, 1998; Ramirez, 1992; Gebbard Gaitan, & Oprandy, 1990; Nunan, 1990; Bartlett, 1990).

The program should also give additional consideration to teacher-candidate workload, teaching beyond academics, and preparation for navigating the school systems (Engler & MacGregor, 2018). The duration of teaching practices and time planned for teaching should be lengthy and sufficient to cover all the aspects of the experience. Preservice teachers should also learn how to work with diverse learners (Marbley, Bonner, & McKisick, 2007) and differentiated instruction (Cooper, Kurtts, & Babar, 2008); poverty in some learners (Cho et al., 2015); social

justice in classrooms (Convertino, 2016); and individuals with disabilities in regular classrooms (Cramer, Alvarez McHatton, & Little, 2015). Other issues for program consideration are admission requirements for learners, coursework and practicum needed for training, requirements for graduation and possible certification, and job opportunities upon graduation, among others. Certification requirements need to be worked out within countries for in-country training.

Regarding foreign languages including sign languages, in addition to the above, the teachers should know the language and culture of language users. Culture needs to be added and taught in language classes and programs (Fox & Diaz-Greenberg, 2006). The teachers should immerse themselves into the language community to maintain connections and to update their repertoire of knowledge and skills in language and culture. In particular, for world languages programs, there is a need to have teachers understand the learning processes of second language learners (Tarone & Alblwright, 2005).

Teacher preparation program in sign languages

A program in the teaching of sign languages as second and additional language (L2/Ln) ought to incorporate findings in the research studies and suggestions by educators in the TPP field. The following is a description of the purpose, objectives, philosophy, knowledge base, and goals of a TPP in L2/Ln sign language.

An L2/Ln sign language TPP ought to prepare individuals to obtain a collegiate degree and teacher certification, when applicable, to teach sign language as L2/Ln as one of the languages other than native language. The program seeks to address critical issues in several areas: (a) the lack of teachers certified to teach sign language as L2/Ln to learners for credit; (b) deficiencies in theory- and research-based studies on effective sign language teaching practices; (c) insufficient knowledge of current research-based teaching practices among sign language teachers; and (d) a general lack of understanding of and sensitivity to Deaf and hard of hearing individuals.

The purposes of the teacher preparation programs are to prepare learners so as to: (a) study, develop, and disseminate theories, methods, materials, and pedagogues needed in the teaching of sign language; (b) prepare professionals to become certified teachers of sign language and are knowledgeable of Deaf culture; (c) provide an opportunity for native speakers of sign language to share their knowledge, skills, and experiences directly with the hearing population; and (d) enhance cross-cultural skills and understanding by increasing public awareness of the society, culture, diversity, talents, and aspirations of members of the Deaf community and to reduce negative attitudes, stigmatization, and misconceptions about deaf people by the general public.

The objectives of a teacher preparation program are that its learners become professionals as teacher-researchers who approach the profession of sign language teaching in a highly scholarly manner and as a contextualized, investigatory, cultural, and problem-solving event. The learners in preparation should obtain a firm foundation in anthropology, linguistics, applied linguistics, pragmatics, social psychology, cognitive psychology and information processing, schema theory, academic assessment, instructional systems design (curriculum development), subject area content, the effective schools movement, and research methodology as appropriate to the notion of teacher-as-researcher/learner, among other skills and knowledge. As a result, these individuals are prepared to instruct learners demonstrating a wide range of cognitive, social, and academic abilities, especially in schools with a high-need classification.

To this end, the program provides coursework, practica experiences, and related projects for learners in the program. Notions associated with pedagogy, school reform, and teacher-as-researchers/learners are infused as well as the direct instruction in the notion of

teacher-as-researcher/learner. Both aspects involve course infusion and direct instruction in teacher-as-researcher/learner notions and methodologies.

Philosophical orientations

An ideal sign language teaching preparation program holds certain philosophical viewpoints towards the linguistic status of sign language as a language, the Deaf community and culture, the preparation of learners into teachers of sign language, the teaching of sign language in elementary, secondary and collegiate schools, and the general principles of education, teaching, and learning.

Linguistic status of sign languages

Sign languages are recognized as naturally developed languages of Deaf and many hard of hearing people. They each possess a linguistic system with its own phonological, morphological, syntactic, and discourse structures that are in many ways distinct from spoken languages of the world. In addition, sign language users have developed a literary, albeit generally non-written, tradition in oratory, folklore, and performance art, all recorded either in printed form or in permanent media like film and video. The richness and complexity of sign languages is such that they can afford the status of a foreign language and sufficient information is known about the language that pedagogically it can be approached in manner similar to other foreign languages such as French, Spanish, German, and Latin.

Deaf community

An appreciation of sign languages entails an awareness that within various societies there are Deaf communities. Deaf communities of persons, groups, and organizations provide the basis for cultural identity and group cohesion for millions of Deaf and hard-of-hearing individuals, who share a set of characteristics that bind them together, such as knowledge of their sign languages and their traditions for social behavior.

Learner characteristics

The successful teaching of sign languages requires both communicative and linguistic approaches to the subject matter that are grounded in sound pedagogy and understanding of the characteristics of the learner. Learners in the program will receive extensive practice in curriculum design and instructional strategies based on the pedagogical principles found in different models and standards. The purpose of sign language education is to foster the development of skills in critical thinking, problem solving, discovery, and creativity within learners who may possess different talents, aspirations, developmental and learning differences, abilities, interests, emotions, and personal histories. Learning and teaching are purposeful, intentional, and socially constructed.

L2 sign language teaching

With regard to the teaching of sign language, the teachers in preparation and the learners whom they will eventually teach will be instructed in a manner that does not use voice or spoken language, in order to maximize the utilization of eyes, hands, and body postures for transmitting and receiving grammatical information in the development of receptive, expressive, and interactive language skills, while realizing that in the actual day-to-day interactions with Deaf individuals the use of voice and spoken language will vary according to the conversational demands and the preference of individual users. Likewise, it is believed that sign language teachers ought not

learn or teach vocabulary or grammatical structures strictly in isolation, but rather they will be taught to approach sign language as a modern living language and as a tool for effective communication with sign language users that will serve specific communicative purposes (functions), in particular settings (situations) about particular subjects (topics), using specific linguistic forms.

In addition, sign language teachers ought to provide insights into the nature of language, sensitivity to Deaf cultural values, customs, and traditions, and foster a sense of humanity and friendship, while placing this culture within the proper context of the Deaf and hard-of-hearing population at large and society in general. The primary goals of the teaching of sign languages to largely hearing learners is to develop functional communication abilities so as to interact with Deaf people, to develop greater understanding and appreciation of Deaf cultures, as well as their own cultures, and to expand one's definition and understanding of inter- and intra-group cultural diversity.

A model program emphasizes an analytic-diagnostic approach to instruction. Such an approach is highly learner centered, is process oriented, and emphasizes a social-cognitive information processing approach to learning. Furthermore, the program emphasizes applied linguistic and psycholinguistic approaches to the teaching of sign languages and an anthropological orientation when considering the organization of Deaf cultures and their values. Learners in the proposed program in the teaching of sign language will be "schooled," trained, and oriented to the area of "teacher-as-researcher," a notion that entails a learner-centered, cooperative learning. It also entails a constructivist's approach to pedagogy, operating ostensibly out of a framework that employs both qualitative as well as quantitative approaches in an attempt to understand the knowledge base and learning processes of learners. In doing so, teachers ought to actively investigate questions and problems that arise out of the classroom, the educational environment, and the learners that he or she teaches. In addition, the teacher should be able to consume and apply intelligently basic research to the instructional process as presented formally within journals and texts on the teaching of sign language and other second and additional languages, communication skills, Deaf Studies, curriculum design, and the cognitive, social, and affective development of the learner.

Epistemological orientations

Based on the recommendations of researchers in teacher education (e.g., Bransford, Darling-Hammond, & LePage, 2005) and foreign language educators (e.g., Nunan, 1990) discussed above, the epistemological orientations of a model sign language TPP is the knowledge base it provides to teachers in preparation, which includes coursework in linguistics, anthropology, foreign language teaching, bilingual-bicultural education; curriculum development; Deaf Studies; sign languages; anthropological approaches to communication and culture; and theories, methods and approaches in second and additional language acquisition and second language teaching. They are described below.

Introduction to sign languages, Deaf communities, and cultures

The course is an introductory survey of some of the major sign languages, sign language families, and Deaf communities around the world. Learners are introduced to concepts in the fields of linguistics, anthropology, and sociology of sign languages and Deaf communities and cultures. Topics include multilingualism; codeswitching; diglossia; language attitudes; language maintenance and shift; language and educational policy; language variation and change due to region, social class, ethnicity, gender and age; and sign language in arts and literature.

Introduction to Deaf cultures

The course is an introduction to the study of the cultures of Deaf people in selected countries throughout the world. Particular emphasis will be placed on the differences in cultures of deaf and hearing people within the same national contexts. This course introduces the historical and contemporary perspectives of Deaf people. Topics addressed include cultural identity, core values, group norms, communication, and the significant role sign languages play in Deaf cultures.

Introduction to Deaf histories

The course is a study of the histories of Deaf people in selected countries throughout the world from prehistory to the modern era. Particular emphasis will be placed on the differences in histories of Deaf and hearing people within the same national contexts and on the interpretation of historical events from the perspectives of Deaf cultures. This course will provide an in-depth investigation into the history of Deaf people as a community and its composition and connections with deaf education.

Introduction to language

Concepts in phonetics, morphology, and syntax and a basic overview of the world's major spoken and sign languages and language families, with particular reference to universal and unique characteristics of human languages, are introduced in the course. The readings in this course provide an overview of several key areas in the study of language; areas to be covered include languages diversity, language change and variation, the brain and language, as well as issues in language medium and modality. The readings in the linguistics module invite learners to explore the central components of linguistics.

Introduction to linguistics

Theories of linguistics are introduced in the course. Information about the historical development of languages and about sociolinguistic variations in language communities that are related to region, social class, age, and gender are included. Comparisons of the linguistic structures of languages are offered.

Sign language phonology

This course is an introductory study of generative phonology, phonological structures, and sign language phonology. Topics cover the articulatory features and non-manual expressions; the "phonotactic" processes is sign production; and changes in phonological processes. Learners will analyze how sign language phonology interacts with the perceptual and production system involved in the visual-gestural modality and other areas of grammar such as morphology and syntax.

Sign language lexical analysis

The course covers basic concepts in the study of the sign language lexicon. It focuses on the componential features specific to the vocabularies in sign languages, including its lexical semantics and semantic features. It also covers related topics such as taxonomy, hyponymy, meronymy, synonymy, ethno semantics, and the Sapir-Whorf Hypothesis. Examples are drawn from spoken and signed languages lexicon for exposition and analysis.

Sign language morphology

Concepts of the morphology of sign languages from a cross-linguistic and cross-modal perspective are introduced in the course. Topics include inflection and derivation morphology; modality-specific features such as the use of space and availability of paired manual articulators; and interfaces between non-manual signals and signs.

Sign language syntax

This course introduces syntactic features of sign languages that govern word order. Topics include word order, sentence types, simple and complex clauses, interrogatives, fronting, negation, and confirmation. Examples are drawn from sign language and spoken/written languages for exposition and analysis.

Non-manuals in sign languages

This course gives an overview of non-manuals in sign languages. It looks at its linguistic functions at the phonological, morphological, and syntactic levels. Topics focus on three areas: (1) mouth gestures and mouthings, (2) non-manuals as adjectives and as adverbs, and (3) non-manuals as markers of negation and interrogatives. Learners will analyze individual signs, sign utterances, and sign discourses and learn how to identify and code different non-manuals.

Readings in applied linguistics

In the course, learners will conduct extensive readings and discussion in applied linguistics, including instruction, curriculum, assessment, and acquisition. They will present and lead class discussion on selected readings, and write summaries on the readings and class discussion.

Language acquisition

Theories related to first, second, and additional language acquisition, and the difference between foreign language and native language learning, are featured in the course. Concepts such as sources of language acquisition, processes and stages, and triggers in the acquisition of higher forms, are exemplified. Similarities and differences between first, second, and additional language acquisition are highlighted.

Sign language acquisition

This course covers the main concepts and theories of sign language acquisition of deaf first language and hearing second language learners. Focus will be given to the developmental stages deaf and hearing individuals typically go through in acquiring a visual-gestural language, the errors they make, and the extent to which such a developmental pattern is parallel to that of spoken language acquisition by hearing first, second, and additional language learners.

Readings in language teaching

The course introduces learners to seminal works in applied linguistics with particular reference to language teaching. Focus is given to the principles of language teaching and syllabus design. Learners will participate in reading activities, apply the principles and methods in teaching spoken language to the teaching of sign language, and evaluate the principles and methods outlined in the works.

Methods of teaching sign languages

The course is a study of methods of teaching sign languages. Material development and analysis, lesson planning, course objectives, and evaluation methods are featured. Demonstrations in

teaching sign language are given. Learners will develop lessons and demonstrate various teaching methods in the classroom. Classroom management techniques and ideal classroom features will be discussed.

Curriculum design and materials development for sign language instruction

The course is a survey of various curricula, materials, and media used in sign language instruction. Learners will select, prepare, and adapt tasks and materials for sign language teaching. They will present and discuss different curricula and materials. They will be required to develop their own curriculum and materials for use in classrooms.

Assessments in sign language skills

This course is a review of the theories, history of methods of testing, and assessment. Techniques for learners to develop and administer sign language assessment tests and procedures for class placement interviews, course examinations, diagnosis, and proficiency levels are featured. This course also provides an overview of available sign language test batteries.

Media production in sign language

Different technologies and online platforms that are used in sign language classes are introduced in the course. Learners will learn how to use technology and online platforms to upload learning units, and record, analyze, and provide feedback to learners' work on video and online platforms. They will select a technological or online platform tool, devise lesson units, and install them in classrooms, and provide support to aid learning.

Practicum in teaching sign language

The course is supervised practicum in which learners will observe, team-teach, and participate in actual classroom teaching under the supervision of an experienced cooperating teacher. The learners are assigned to an appropriate course level. Learners will incorporate their knowledge and skills in pedagogy, sign language, and Deaf community and culture in their learner teaching. They will be observed and given feedback on their progress. The learners are required to attend a one-hour weekly seminar conducted by the project coordinator.

Research on sign language teaching

The course is supervised learner research in sign language pedagogy. Learners will learn about the notion of "teacher-as-researcher" in the course. Theories and methods in research designs are introduced. Learners select a topic of study in consultation with and under close direction of the supervisor, design, carry out a simple research project, and report their findings in class and at professional conferences. They will attend two-hour weekly seminars.

Learner participation in the Deaf community

Learners are expected to participate in the local Deaf community and their cultural activities. They will use and develop their sign language skills and knowledge and understanding about the diversity of the Deaf population, communities, and cultures.

Teacher certification

Learners who successfully complete a teacher preparatory program and who meet the requirements for state or national certification are encouraged to apply for certification as a teacher of sign language(s). Government certification requirements vary by countries and localities with countries. If a country has an association of sign language teachers, learners are

encouraged to participate and join as a member. If the association provides a teacher certification, the learners should also be encouraged to apply for the association certification.

Teacher certification examination

Learners must pass all certification examinations before a government agency will grant teacher certification. Such examinations may include a test of general knowledge, a test inspecific to Deaf community and culture, test of sign language content knowledge and skills, receptive and expressive language skills, and written assessment of languages used in the majority culture.

Entry requirements for applicants

To enter the program, an applicant would need to be at least 18 years old, have completed the highest level of formal education available to deaf individuals in the country. He or she would need to be a signer with native or native-like proficiency; a member of or willing to become a member of the national Deaf associations; is extensively knowledgeable about, and participating in, the Deaf community; and is demonstrably committed to a career in sign language teaching and/or research.

Pedagogical applications

The following are some exemplars in TPPs in L2/*L_n* sign language in the US and in Asia. Additional exemplars in Asia and New Zealand can be found in McKee and Woodward (2014). Not every TPP includes all courses described above; TPPs vary by national and local education regulations where TPPs are located. For each section, the sociolinguistic situation of sign language, education available to culturally Deaf people, establishment of teacher training programs, availability of qualified trainers, and coursework are described.

The United States

Sociolinguistic situation of sign languages

There are other sign languages native to what is now the US, such as Martha's Vineyard Sign Language, Hawai'i Sign Language, and Creolized Hawai'i Sign Language. Some of them became extinct, and others continue to be used by small numbers of people in the United States. American Sign Language (ASL) is the dominant sign language in the United States and all TPPs in the US focus on teaching ASL as L2/*L_n*.

Education available to culturally Deaf people

Formal education has been available to deaf people since the early 1800s, and university education since the late 1800s. There are BA or MA programs to train sign language teachers. Having the possibility of training at university level entails a high probability that sign language teachers obtain certification or licensure for teaching sign language as a L2/*L_n*.

Establishment of sign language teacher training programs

Harris and Thibodeau (2016) summarized the history of sign language TPPs in the United States. All graduate-level TPPs in sign language in the US were established in the 1990s and 2000s: they are Gallaudet University, the University of Colorado at Boulder, Teachers College, Columbia University, and the University of North Carolina at Greensboro. Gallaudet established the first degree program in sign language teaching in 1983, a BA degree program in Sign Communication, which was renamed as BA in American Sign Language in 1996. Gallaudet University established the Master of Arts Program in Sign Language Education in 2011.

Availability of qualified trainers

Due to the long history of deaf education in the United States, there are an ample number of qualified trainers in the United States.

Coursework

Gallaudet University's TPP in sign language is used as an example of coursework. Following is a list of courses in Gallaudet University's Master of Arts in Sign Language Education.

- ASL 709 Sign Language Media Production (3) [required]
- ASL 724 Sign Language Linguistics for Sign Language Professionals (3) [required]
- ASL 741 Methods of Sign Language Teaching (3) [required]
- ASL 743 Curriculum Development for Sign Language Teaching (3) [required]
- ASL 745 Sign Language Teaching, Culture, and History (3) [elective]
- ASL 750 Assessing Sign Language Skills (3) [required]
- ASL 752 Sign Language Practicum (3) [required]
- ASL 760 Connecting Sign Language Research to Practice (3) [elective]
- ASL 761 Seminar in Sign Language Education: Professional Preparation (1) [required]
- ASL 762 Seminar in Sign Language Education: EPortfolio (1) [required]
- ASL 770 Sign Language Planning and Advocacy (3) [required]
- ASL 777 Digital Pedagogy in the Sign Language Field (3) [elective]
- ASL 790 Sign Language Internship (3) [required]
- DST 705 Sign and the Philosophy of Language (3) [elective]
- DST 710 Literary Traditions in the Deaf Community (3) [required]
- DST 714 Critical Pedagogy (3) [elective]
- LIN 510 Introduction to First and Second Language Acquisition (3) [required]

Certification

The program of study at Gallaudet University is not designed to give teacher certification. State education departments award teacher certifications. Each state education department prepares a list of coursework, practicum experiences, a demonstration of signing skills, and a teacher certifying examination for individuals who wish to become teachers of American Sign Language. The requirements for teacher certification vary by state. Some states require certain coursework, practicum experiences and teacher certifying examination, which includes sign skills assessment. Some states rely on ASLTA for sign skills assessment. Rosen (2008) provided information on teacher certification requirements by US states.

Thailand

Sociolinguistic situation

When the first Thai Sign Language Teacher Training Program was established in 1997, four distinct sign languages had been identified in Thailand: Ban Khor Sign Language, Original Bangkok Sign Language, Original Chiang Mai Sign Language, and Modern Thai Sign Language. These four sign languages have been classified into three different language families based on lexicostatistical analysis of core basic vocabulary (Woodward, 2000). Ban Khor Sign Language is a language isolate. Original Bangkok Sign Language and Original Chiang Mai Sign Language share 65% cognates in basic core vocabulary. Modern Thai Sign Language developed out of the creolization of American Sign Language with indigenous sign languages

in Thailand and has less than 30% cognates with either Original Bangkok Sign Language or Original Chiang Mai Sign Language. All of these sign languages are highly endangered, except Modern Thai Sign Language (Nonaka, 2007; Woodward & Suwanarat, 2015; Woodward & Wongchai, 2015). Modern Thai Sign Language is used throughout Thailand by up to 67,000 signers under the age of 60 (Woodward, Danthanavanich, & Janyawong, 2015). Modern Thai Sign Language is officially recognized as a national language by the Thai Government and is used in a number of schools in Thailand. While Modern Thai Sign Language is currently robust, the fact that fewer than 100,000 people use it marks it as a potentially endangered language.

Education available to culturally Deaf people

Formal education has been available to culturally Deaf people in Thailand since the 1950s. By 1997, most culturally Deaf people had finished M-3 (9th Grade) Education, while only a tiny number of people under the age of 25 had completed M-6 (12th Grade) Education. While Ratchasuda College Mahidol University at Salaya had been established in 1992 for blind learners and for deaf learners, no formal university education for Deaf learners was begun until 1997, when the first university certificate program, a Certificate Program in Teaching (Modern) Thai Sign Language, began in 1997.

Establishment of sign language teacher training programs

Woodward (1997) discussed the establishment of the first sign language teacher training program begun in Thailand in 1997 as a result of a cooperative effort between Gallaudet University, Ratchasuda College, Mahidol University at Salaya, and The National Association of the Deaf in Thailand, funded by a grant from The Nippon Foundation in Tokyo to Gallaudet University. This cooperative effort was called The World Deaf Leadership Program, Thailand Project.

Availability of qualified trainers

A professionally trained sign language linguist who had previously worked with Gallaudet University was working at Ratchasuda College at the time the program was established. Skilled, professionally trained, deaf sign language teachers from Gallaudet University were brought in to do the initial training of the Thai Deaf people.

Courses in the certificate program in teaching Thai Sign Language

Following is a list of courses in the Certificate Program in Teaching Thai Sign Language.

- RSTS 010 Introduction to Sign Languages and Deaf Communities (4)
- RSTS 011 Methods of Teaching Sign Languages (4)
- RSTS 012 Curriculum Design & Materials Development for Sign Language Instruction (4)
- RSTS 020 Introduction to the Structure of Thai Sign Language (4)
- RSTS 021 Practicum: Teaching Thai Sign Language I (4)
- RSTS 022 Practicum: Curriculum Design and Materials for Thai Sign Language Instruction I (4)
- RSTS 030 Research on Sign Languages in Thailand (4)
- RSTS 031 Practicum: Teaching Thai Sign Language II (4)
- RSTS 032 Practicum: Curriculum Design and Materials for Thai Sign Language Instruction II(4)
- RSTS 033 Methods of Evaluating Sign Language Skills (4)

Certification

The Certificate Program in Teaching Thai Sign Language is modeled after an existing educational model that had been used in Thailand to train people with 9th Grade education in rural areas of Thailand to become professional nurses and later to matriculate to formal university training if they desired. The Program allowed Deaf people with 9th grade to become certified teachers of Thai Sign Language who could be employed in the Thai government system and to matriculate to a BA degree program at Ratchasuda College.

Viet Nam

Sociolinguistic situation of sign languages

When the first Teacher Training Program for sign languages in Viet Nam was established in 2000, three sign languages had been identified and classified into the same language family based on lexicostatistical analysis of core basic vocabulary (Woodward, 2000). Hai Phong Sign Language shares 54% cognates in basic core vocabulary with Ho Chi Minh City Sign Language and 54% cognates in basic core vocabulary with Ha Noi Sign Language. Ho Chi Minh City Sign Language and Ha Noi Sign Language share 58% cognates in core vocabulary.

Hai Phong Sign Language and Hai Noi Sign Language are endangered. There is no government recognition of these languages. The government is attempting to create “common signs” to use in the grammar of spoken Vietnamese for teaching purposes. Ho Chi Minh City Sign Language is used in Ho Chi Minh City, in the areas south of Ho Chi Minh City and as far North at Da Nang. There are up to 45,000 users of Ho Chi Minh City Sign Language (Woodward, Nguyen, Nguyen, Le, Luu, & Ho, 2015). There is no government recognition of this language. There is one school that begun in 2000 that uses this sign language variety at the Junior High School level, Senior High School level, and College level.

Education available to culturally Deaf people

Formal education had been available to a limited number of culturally Deaf people since 1896. However, from 1896 to 1975 there was only one school for deaf people in Lai Thieu, Binh Duong Province in the South of Viet Nam. From 1954–1975 Viet Nam was partitioned into North Viet Nam and South Viet Nam by the 1954 Geneva Conference. During this time Deaf people from the North Viet Nam could not attend the school in South Viet Nam. After reunification of Viet Nam in 1975 the number of schools for Deaf people increased, but the highest grade offered by the schools to deaf learners was 5th grade. In the year 2000, the Project on Opening (High School) and University Education Through Sign Language Analysis, Teaching, and Interpretation began in Bien Hoa City, Dong Nai Province in the southern part of Viet Nam. This goal of this project, funded by The Nippon Foundation in Tokyo, was to provide full bilingual education to culturally Deaf learners.

Establishment of sign language teacher training programs

Woodward, Nguyen, and Nguyen (2004) discussed the establishment of the first sign language teacher training program begun in Thailand in 2000. Unlike Thailand, in 2000 Viet Nam did not have any official organizations recognized by the Vietnamese government; and despite efforts by Vietnamese Deaf people and the World Federation, it still does not have any associations that have legal status with the Vietnamese government.

Availability of qualified trainers

Because the sign linguist, Woodward, involved in the Thai Sign Language Training Program, moved to Viet Nam for this training program and because two faculty and one graduate from the Thai Sign Language Training Program agreed to teach in Viet Nam, there was an ample number of qualified trainers for the program. Sign linguists working in Southeast Asia and professional deaf sign language teachers make periodic visits to Viet Nam to ensure the program will continue to have an adequate number of qualified trainers.

Courses in the Certificate Program in Teaching Vietnamese sign languages

Following is a list of courses in the Certificate Program in Teaching Vietnamese sign languages.

- VNSLL 111 Introduction to Deaf Cultures (2)
- VNSLL 112 Introduction to Deaf History 1 (2)
- VNSLL 113 Introduction to Languages and Linguistics (2)
- VNSLL 114 Introduction to the Formational Structure of Vietnamese Sign Languages (3)
- VNSLL 115 Introduction to the Grammatical Structure of Vietnamese Sign Languages (3)
- VNSLL 116 Introduction to the Lexical Structure of Vietnamese Sign Languages (3)
- VNSLT 121 Communication in Gestures (2)
- VNSLT 122 Methods of Teaching Vietnamese Sign Languages, Level 1 (2)
- VNSLT 123 Instructional Design for Teaching Vietnamese Sign Languages, Level 1 (2)
- VNSLT 124 Materials Development for Teaching Vietnamese Sign Languages, Level 1 (2)
- VNSLT 125 Practicum in Teaching Vietnamese Sign Languages, Level 1 (7)
- VNSLT 221 Sign Language Assessment for Teaching Vietnamese Sign Languages (3)
- VNSLT 222 Methods of Teaching Vietnamese Sign Languages, Level 2 (2)
- VNSLT 223 Instructional Design for Teaching Vietnamese Sign Languages, Level 2 (2)
- VNSLT 224 Materials Development for Teaching Vietnamese Sign Languages, Level 2 (2)
- VNSLT 225 Practicum in Teaching Vietnamese Sign Languages, Level 2 (6)

Certification

Viet Nam, like Thailand, had a certificate program for graduates of 9th grade. However, none of the Deaf learners had graduated from 9th grade. In this case, the Provincial Departments of Education and Training issued professional certificates that were valid within that Province. The Dong Nai Provincial Department of Education and Training agreed to issue certificates until the learners reached 9th grade, when Dong Nai University began issuing certificates, which are valid inside and outside Dong Nai Province. The Program allowed Deaf people who completed 9th grade education to become certified teachers of Vietnamese sign languages who could be employed throughout Viet Nam and eventually assisted Deaf people in matriculating to a BA degree program in education at Dong Nai University. In addition, certificates offered were readily approved by government officials.

Future trends

This chapter discussed the characteristics of a model sign language TTP and reviewed selected L2/*L_n* sign language TPPs in the US, Thailand, and Viet Nam. Many countries offer sign language classes but only a few offer TPP in L2/*L_n* sign language. Teachers of L2/*L_n* sign languages in countries without TPPs tend to either enroll in TPPs in other countries, or do not receive

training. In addition, not one form of TPP can work in all countries. This presents issues for future research studies and pedagogical practices.

Future research studies

Unfortunately, there are few research studies on the development of TPPs in sign languages as L2/Ln languages. TPPs should continually conduct research studies to assess the achievements of its program offering in preparing effective teachers of sign languages. In this light, L2/Ln sign language students and teacher trainers should conduct research studies on program development, teaching knowledge and skills, and L2/Ln learning in order to improve the preparation of future teachers who will teach sign languages as L2/Ln languages. In addition, in the future there may be new TPPs established in an increasing number of countries. In this case, future research studies need to investigate the political, social, and cultural conditions of the different countries that shape government policies for program development and qualifications for learners and teacher trainers, and mechanisms for program relationships with governments, particularly in the areas of teacher certification and funding for learners and programs.

Future pedagogical practices

While there is worldwide growth in L2/Ln sign language classes, there is also a growing awareness that the number of TPPs in L2/Ln sign languages needs to increase. There are still a number of basic issues regarding L2/Ln sign language TPPs that need to be addressed. One is that a number of learners who are native users of L1 sign languages are taking different sign languages as L2/Ln. A course in learning foreign sign languages, which will make learners understand how learners feel and experience when learning a foreign sign language, may need to be added to the list of courses in a TPP. There are sign language teachers and teacher trainers who migrate across countries, particularly in EU countries and Southeast Asia. TPPs need to reorient teacher preparation to avail themselves to sign language users from different countries and that take into consideration the sociolinguistic situations of sign languages in different countries. The TPPs also need to work out teacher certification requirements with governments from different countries. Whether this can be accomplished by different TPPs, a multi-national TPP, or a regional TPP for L2/Ln sign language teaching needs to be investigated. The determination of the national scope of a L2/Ln sign language TPP depends on the number of individuals who are interested and qualified in becoming teachers and trainers, connections with local, regional, and multi-national sign language communities, and the finances of the TPP.

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Course design for L2/Ln sign language pedagogy

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Introduction

Sign language L2/Ln courses are currently offered in many countries from all continents (McKee, Rosen, & McKee, 2014; Mathur & Napoli, 2011; World Federation of the Deaf, 2008). However, there are fewer countries in which curricula for sign languages have been published.¹ There are studies that discussed curriculum issues linked to the countries (e.g., for USA: Swaney, 2015; Quinto-Pozos, 2011; Rosen, 2010; Baker-Shenk & Cokely, 1980. Europe: Fries & Geißler, 2012; Álvarez García et al., 2001; Denmark, 1990; Bouchaveau, 1994; Boyes-Braem, 1994; Bergmann, 1994; Elton, 1994. Brazil: Gesser, 2010, 2006. Australia: Cresdee & Johnston, 2014). A review of these studies allows us to make some generalizations about curricula currently used for the teaching of sign languages. The sign language curricula currently in use are largely adaptations of models developed for teaching spoken languages (Napier & Leeson, 2016; Rosen, 2010). As a matter of fact, second language acquisition (SLA) research has had little impact on the design of L2/Ln sign languages' courses and curricula (Napier & Leeson, 2016; Rosen, 2010). The choice of approach is frequently shaped by the pedagogical conceptions subscribed to by curriculum designers. The following are theories of course design, including its components, and suggestions for creating courses.

Theoretical perspectives

Course design involves the creation of a curriculum with plans for instruction and assessment of learning. It needs to follow standards for learning and teaching, and include the linguistics of the language that is being taught and the topics that learners can talk about using the language. Course designs change over time, and follow research developments in linguistics, psychology of learning, teaching approaches (Rosen, 2010), and standards. Concepts of learning, instruction, curriculum, and standards that are involved in course design are discussed in the following.

Learning

Learners do not necessarily learn when we teach them, but when they are ready to learn (Pienemann, 1989). However, very little is known about the phases or stages of language

development (Ellis, 2008). In such a context, it is expected that learners synthesize the contents in order to develop competences (Richards, 2013). Most curricula present language through communicative activities (Krashen, 1982). Learners analyze the input received, and at their own pace they incorporate it into their language system (Selinker, 1972). Their motivation to develop accuracy leads them to ask about grammar (Lightbown & Spada, 2006; Nunan, 2004). Furthermore, studies show that learning is a spiral, not a linear process (Ellis, 2008): Learning frequently covers the same topics but progresses with increasing levels of linguistic and communicative complexity. Deviations from the norm are a part of the learners' language development, which by itself argues against designing courses based on content and presented in a linear and cumulative way (Mitchell & Myles, 2004), and for designing courses based on learning outcomes.

The sequence and scope of courses are determined by standards, and oriented to the competencies that learners are expected to develop in accordance with the purposes for using the language. An example of this trend can be found in the Common European Framework of Reference for Languages (CEFR; Council of Europe, 2001). The levels of language proficiency European individuals need to integrate in the European Union (EU) countries depend on the settings where the language is used. They include "basic user" (A2 level) for daily needs and activities; "independent user" (B1-B2) who use language to communicate at work; and "proficient user" (C1-C2) who use language in the production and exchange of academic knowledge (Napier & Leeson, 2016).

Instruction

Instruction is the "how" of teaching. Despite their great variety, L2/Ln teaching approaches are underpinned by two main principles: Focus on form and focus on meaning (Archibald et al., 2006). In the approaches that focus on form, L2/Ln is taught in cumulative and progressive steps. Learners are assisted in learning a certain form, which may be a word, a sentence, or a narration. Once this form is mastered, a new form is presented, and the procedure is repeated. Such approaches are *behaviorist* in orientation (cf. Hinkel, 2016). Critics of behaviorism in language learning point to empirical evidence that prove that while learning grammar increases accuracy as well as metalinguistic awareness, it does not contribute to the development of communicative competencies in L2/Ln (Swain, 1993).

Under the approaches that focus on meaning, learning occurs in meaningful contexts where language is used to communicate. Classes are organized by situations and tasks in which the learner learns vocabulary and sentences that are thematically linked to each other through simulated dialogues. These approaches are referred to as *communicative language teaching* (CLT) (Hinkel, 2016). Critics of CLT point out that although learners are able to interact using L2/Ln in the classroom, genuine communication never takes place (Kumaravadivelu, 2006). The teachers prescribed the vocabulary and sentences for their learners to use with each other. As a result, the learners have difficulty interacting with native users in real-life contexts (Fries & Geißler, 2012; Wilcox & Wilcox, 1997).

Recent alternatives to the binomial focus on form versus focus on meaning are the *task-based learning* (TBL) approaches whereby learners use L2/Ln to perform tasks (Nunan, 2004; Ellis, 2003), and *content-based instruction* (CBI) approaches whereby learners use L2/Ln as means to acquire information (Snow, 1998). When learners perform meaningful activities through L2/Ln, they focus on meaning. In the course of such activities learners often reach the limits of their own competencies because they lack words or other structures in L2/Ln, and would need to devise strategies that allow them to express or better understand the contents of the task. At that point, learners move from focus on meaning to what Willis and Willis (2007) call *focus on language*

forms. Teachers provide instruction in vocabulary instruction and explanations for grammatical structures according to context and the needs and requirements of learners, and not for their own sake (Willis & Willis, 2007; Lightbown & Spada, 2006). Following Rosen (2010), the curricula that are based on the percepts of TBL and CBI constitute the current trend in the teaching of spoken languages, what he designates as *conversationalism*.

There is evidence that shows that, regardless of approaches, the teaching of grammar accelerates L2/Ln acquisition (Pienemann, 1989). In task-based instruction, for example, parts of class activities tend to include instruction in vocabulary and grammatical topics as a corollary to the conversation tasks performed (Willis & Willis, 2007). Additionally, the language chunks that learners learn from the grammatical explanations given by the teachers are helpful for them to process L2/Ln input (Lightbown, 1998).

Curriculum

Curriculum is a guide to prepare, execute, and evaluate a course (Stern, 1983). It is the “what” of teaching. A curriculum has several essential elements. They are *contents* to be taught and learned, *teaching methodology* followed, evaluation of *learning outcomes* (Richards, 2013; Clark, 1987), materials, resources, and schedules (Wiggins & McTighe, 2006). These elements weave together into a *curriculum design* for a learning context such as L1 and L2/Ln courses for implementation in classrooms (Brown, 2007). Preparing a course requires curriculum design.

Traditionally, course designs follow a fixed order, from selecting contents, to defining a methodology, and then to describing learning outcomes. This process is seen as *forward design* (Richards, 2013). In some cases, the needs of learners and course topics shape the content and learning outcomes in courses, and the curriculum that follows this process is *central design* (Richards, 2013; Clark, 1987). In other cases, learning outcomes are emphasized in classes, and teaching methodology and content follow the items in the learning outcomes. The curriculum that follows this process is *backward design* (Richards, 2013; Wiggins & McTighe, 2006). We assume here that the structure of a course parallels with the elements in a curriculum. While content, methodology, and learning outcomes guide the design of courses, each course design option caters for different needs of the learners and requirements in the courses.

Most traditional curricula follow the forward design. This design works when the contents follow a logical sequence, as is the case of grammar contents, and when the classroom is teacher-centered. Central and backward designs are much more flexible because they are learner-centered. Their contents are not pre-established but driven by the classroom dynamics (Brown, 2007). Central and backward designs are best tailored to the needs of learners and courses. However, much more preparation and autonomy of the teachers are demanded for the development of central and backward-designed curricula (Richards, 2013; Clark, 1987).

Standards

Standards are descriptions of learning outcomes, formulated in terms of what learners can do during and at the end of instruction. Standards provide a common code for communication between the participants in the educational process (Kolomitra & Gee, 2015). A curriculum based on standards is learner-centered (Brown, 2007), and corresponds to a backward design, since it is built on the basis of learning outcomes as the final product of the instruction. While learning outcomes guide standards-based curriculum, details about methodology and contents are determined by programs and teachers. The learning outcomes for L2/Ln tend to include linguistic competencies for interpersonal communication, the use of L2/Ln as a means to

acquire, process, and transmit information (specially referring to academic discourses, see Napier & Leeson, 2016; Cummings, 2008), and socio-cultural knowledge. For instance, the standards developed by the American Council on the Teaching of Foreign Languages (1999) include not only language skills but also socio-cultural and intercultural competencies. All standards include proficiency stages. For instance, as previously mentioned, the CEFR proposes six stages from A1 to C2 for languages in the EU (Council of Europe, 2001).

Pedagogical applications

The development of a course typically includes an outline of standards, course topics, and expectations, linguistic structures of a language being taught, instruction with lesson plans and materials, and assessment items, forms, and procedures. The creation of L2/*L_n* sign language courses in a number of countries began in the 1980s. Those courses were mostly offered by local Deaf associations and planned and directed by hearing or Deaf people without pedagogical training. Courses largely consisted of lists of signs, and the order of signs often follow the order in majority, spoken languages. The hearing teachers often spoke and signed simultaneously. There are variations in sign systems that were taught, the differences between sign language and manual coding systems of spoken languages were often not clear, and the different sign systems were often used by the teachers in classrooms (Elton, 1994; List, 1994; Mally, 1993; Denmark, 1990).

Sign language courses were offered at schools and universities since the late 1980s to the early 1990s. Sign language curricula were guided by the curriculum design for teaching spoken languages. This allowed the production of the first American Sign Language curricula (Baker-Shenk & Cokely, 1980; Humphries, Padden, & O'Rourke, 1980). They included linguistic structures, socio-cultural information about Deaf people, and exercises in gestural communication (Rosen, 2010). The early American Sign Language curricula were used as a model for developing courses in other countries and their sign languages (Fries & Geißler, 2012; Beecken et al., 2002; List, 1994; Boyes-Braem, 1994; Bouchauveau, 1994; Elton, 1994; Denmark, 1990; Edenas, 1994). While some of those curricula follow the behaviorist approach, other curricula follow the communicative approach (Fries & Geißler, 2012; Gesser, 2010).

Since the 1990s, there was an increased recognition of the lack of standardization of the goals of language learning in many countries. This led to calls for the development of standards for learning outcomes in the learning of the majority languages as L1 and minority languages as L2/*L_n*. Several countries have responded. The ACTFL created the standards for foreign language learning in the US in the late 1990s and the CEFR created learning standards for the languages of the EU countries in the 2000s. The development of standards has impacted on course design in spoken and sign languages.

The introduction of standards in the teaching of sign languages is in most countries a recent phenomenon, which until now has not really been accompanied by theoretical and empirical studies. There are guidelines (see Leeson et al., 2016; American Sign Language Teachers Association, 2014; Kobylanski, 2011) and curricula (see CNSE, 2010; MEN, 2002; CVAA, 2001). Standards for sign languages are now available (American Sign Language Teachers Association, 2014; Confederación Nacional de Sordos de España [CNSE], 2010; Ministère de l'Éducation Nationale [MEN], 2002; Victorian Curriculum and Assessment Authority [VCAA], 2001) and they are adopted by an increasing number of sign language programs (cf. Napier & Leeson, 2016). The standards for sign languages are frequently adaptations of the standards that were originally developed for spoken languages. There are a few differences. Because sign languages do not have writing systems, the standards for sign languages must replace the skills related to reading and writing with the skills in "reading" and producing sign languages. The tasks consist

of interactions (Leeson et al., 2016; VCAA, 2001), and the test stimuli and responses for test takers appear on videos (ASLTA, 2014). Learning outcomes for signed languages also include socio-cultural knowledge and competences (Rosen, 2010). For more information on standards, the reader is referred to Chapter 1 of this volume.

Since the 2000s, an international movement of curricular renewal for the teaching of spoken languages became widespread. It consisted of the reformulation of standards to include learning outcomes, as they are found in Australia (Australian Curriculum, Assessment and Reporting Authority [ACARA], 2011), and the European Union countries (Council of Europe, 2001). The learning outcomes are formulated for production, comprehension, and interaction. The backward-designed curricula became favored for the teaching of L1 and L2/Ln spoken languages. The movement has impacted on sign languages.

The backward-designed curricula approach is used in the teaching of Auslan (VCAA, 2001) and French Sign Language (MEN, 2002). Each learning outcome in L2/Ln sign language teaching is formulated in general terms (e.g., “the learner should be able to view signed texts, and extract information,” VCAA, 2001, 19), and is complemented by descriptions of the knowledge and skills that need to be demonstrated by learners (e.g., “identify key signs and signed sequences; order, classify and link items from various parts of the text,” *ibid.*: 20). Both curricula contain topical units such as family, travel, and technology, with lists of grammar, discourse, and socio-cultural contents. The lessons included activities that are related to the topic and its contents. Detailed standards have been published for other sign languages such as ASL (American Sign Language Teachers Association, 2014) and sign languages in European countries (Leeson et al., 2016). In the above curricula, learning outcomes are described in more detail than content and instructional methodology.

In Germany, the CEFR standards are currently used to assess learner outcomes, but there are no CEFR-based German Sign Language curricula. A private language school and a university in Germany could offer the same A2 certificate (basic user) to their learners without any correspondence in content, methodology, and frequency of class sessions. Teachers would differ in their work, with some electing to continue working with traditional curricula, even if they are not compatible with the standards in use (personal communications with German Deaf teachers throughout 2017).

Curriculum design and current pedagogical approaches

We reviewed more than 50 documents that were used as guidelines for teaching sign languages as L2/Ln in 12 different countries. A few documents, however, can be considered as curricula. We found lists of contents and sentences with glosses. A small number were but sketches for courses, and they hardly contained descriptions of methodology or learning outcomes.

The documents that are considered as sign language curricula reveal a design based on linguistic topics, although some socio-cultural topics are included. In one type of curricula, content selection focus either on grammar containing linguistic units, or communication containing uses of grammar in social situations. Such curricula promote a teacher-centered classroom. Following Richards (2013), we label such curricula design as *forward design*. A second type of curriculum design, which is less followed than the previous one, focuses on learning outcomes in linguistic and cultural skills that learners are expected to attain at the end of a course or program (Napier & Leeson, 2016). Contents are selected according to the competences learners are expected to develop. Classroom activities comprise of tasks that are designed to generate meanings to things and actions. The teaching approach and learning evaluation used in the curricula are learner-centered. We label such curricula as *backward design* (Richards, 2013; Wiggins & McTighe, 2006).

Table 11.1 Comparison of curriculum in course design in different sign languages

		<i>Frankfurt</i>	<i>Grundkurs</i>	<i>Desire</i>	<i>LIBRAS</i>	<i>Auslan</i>	<i>CNSE</i>
Content	Vocabulary		x	x	x	x	x
	Grammar contents	x	x	x	x	x	x
	Pragmatic contents		x	x	x	x	x
	Sociocultural contents		x	x	x	x	x
	Visual-gestural communication		x	x	x	x	x
Process	Grammar-oriented	x	x		x	x	x
	Function-oriented		x	x	x	x	x
	Learner-centered		?	?	?	x	x
	Teacher-centered	x	x	x	x		
	Focus on form	x	x	x	x	x	
	Focus on language		?	?	?	x	x
Outcomes	Knowledge	x	x	x	x		
	Communication skills		x	x	x		
	Follow Standards					x	x

For purposes of explication and analysis of different approaches in course design for L2/*Ln* sign language courses, we selected six curricula from our list.² Four of them are European: “Frankfurt” (Happ & Vorköper, 2006); “Grundkurs” (Beecken et al., 2002); “Desire” (Deaf and Sign Language Research Team [Desire], 2002), and “CNSE” (CNSE, 2010). The fifth is Australian with “Auslan” (VCAA, 2001), and the last one is Brazilian with “LIBRAS” (Felipe & Monteiro, 2004). The Frankfurt curriculum consists of a single large book that serves for both the teacher and the learner. CNSE refers to the manual of Spanish Sign Language grammar (CNSE, 2010: 29). The other four curricula described consist of a curriculum book for the teacher and a workbook for the learner, as well as videos mostly containing signed examples. Table 11.1 is a comparison of the six curricula under review.

In the following, the orientations of each curriculum are explored.

Curricular orientations to course design

Different curricula have different orientations to L2/*Ln* course design. The Frankfurt curriculum focuses on grammar. The purpose of the curriculum is not to develop competencies, but to impart knowledge in DGS grammar. Learners play a passive role. They are limited to performing a series of self-assessment exercises. The domain of its learning outcomes consists of knowledge of the content. The Frankfurt curriculum is a classic example of a forward-designed curriculum.

The Auslan and CNSE curricula rely on standards in linguistic knowledge and socio-cultural competences to devise its learning outcomes. Meaningful activities in both curricula contain tasks drawn from real-life communication situations such as requesting and obtaining information using sign language. Both curricula follow a backward design and are *conversationalist* (Rosen, 2010) in orientation.

The Grundkurs, Desire, and LIBRAS curricula contain linguistic and communication topics in a forward-design approach. The curricula are segmented into class units in the different functions of language, communicative situations, and speech acts. The activities mostly consist of dialogues in different situations such as at home, school, and the market. The methodology and

learning outcomes in the curricula revolve around the communication tasks. This is typical of CLT environments. However, these activities usually lead to sessions on grammar. In this case, the learners learn the form of sign language, and are given drills and evaluated by their teachers for comprehension.

Curricular components

Different L2/Ln sign language curricula contain different components. In the following, the different curricula are analyzed for content, instructional methodology, learning outcomes, time distribution, and class planning.

Considering the contents

Curriculum content includes topics and its scope and sequence. The written presentation of course topics and its scope and sequence constitutes the course *syllabus* (Richards, 2013). In the six L2/Ln sign language curricula, the topics cover mainly the linguistic structures of sign language. With the exception of Frankfurt, where the topics are limited to morphosyntax and some aspects of discourse, all the curricula include linguistic content such as vocabulary, sentence forms, non-manual features, inflections, word order, use of signing space, discourse genres, speech acts, and explanations about the visual and gestural nature of sign languages; socio-cultural content; and elements of visual-gestural communication. The latter are mainly included as a way of facilitating access to visual-spatial modality, and as a tool used to “break the ice” and relax learners before class begins.

The scope and sequence of course topics vary across the six curricula. Frankfurt has the linguistic content in the foreground, while the rest relegates grammar to linguistic functions such as talking about oneself, requesting information, shopping in sign language, and the like. In these cases, linguistic content is connected with the communicative functions. Socio-cultural information about deaf people is not often related to the linguistic content, and appears as complementary readings. Only two curricula (Grundkurs and LIBRAS) provide socio-cultural contents for learner activities, including readings for further discussions and reflections, ideas for field experiences, and primes for task-based activities. The CNSE curriculum provides suggestions for the teachers on course content and leaves them to decide on the scope and sequence of the topics.

Considering the instructional methodology

The six curricula differ in instructional methodology. The Frankfurt curriculum includes the scope and sequence of topical content. It also includes exercises at the end of each topic in which the learners translate, complete clozes in sentences, and conduct grammatical analysis, with solutions and linguistic explanations given at the end of the book, which allows for self-assessment by the learners. In this regard, it is not the curriculum in which the learners can have a central role in their learning process. They are limited to “consume” knowledge.

A learner-centered curriculum takes into account the learning process in which the learners acquire L2/Ln (Hutchinson & Waters, 1990). With the exception of Frankfurt, all curricula contain certain learner-centered features, namely, working with activities fostering a focus on language, like TBL and/or CBI (CNSE, Auslan);³ adopting strategies to avoid stress, such as avoiding corrections, allowing learners to process new information before requiring them to produce statements in it (LIBRAS), and do relaxation exercises before starting class (LIBRAS, CNSE).

We find that, with the exception of Auslan and CNSE, all other curricula include activities that focus on form. However, we find that the activities are not meaningful. The activities that are meaningful are the tasks that enable learners to learn linguistic structures and its uses in conversations. They include activities such as presenting a particular dialogue, explaining the sentences and repeating them one after another, explaining the vocabulary used in sentences, asking learners to repeat sentences, and using sentences as templates to use new vocabulary. In the Grundkurs, Desire, and LIBRAS curricula, the activities, while connected to the topic under instruction, consist of rote memorization exercises that are favored in the behaviorist approaches (Willis & Willis, 2007) and not in learner-centered approaches. The Grundkurs, Desire, and LIBRAS are not learner-centered curricula.

Considering the learning outcomes

The six curricula also differ in learning outcomes. The Frankfurt, Grundkurs, Desire, and LIBRAS curricula contain grammatical knowledge as its learning outcome. In these curricula, learners produce decontextualized sentences and are assessed according to a prescriptive model. The Grundkurs, Desire, and LIBRAS curricula also contain communicative skills, including the selection of speech acts suitable for a certain communicative situation, requesting and obtaining information from an unknown Deaf person, and taking turns in a conversation, as learning outcomes. In addition, with the exception of Frankfurt, all curricula contain socio-cultural knowledge and competencies as learning outcomes. Pragmatic skills needed in daily communication with Deaf people, such as calling someone's attention and entering into a dialogue that is already started, are taught and assessed. All the six curricula include evaluations in productive and receptive skills. With the exception of Frankfurt, all also include interaction skills and socio-cultural knowledge and competencies. It is important to mention that the learning outcomes in the six curricula differ in the types of skills in the use of sign language. Some of them consider the skills that are needed to acquire and process information, and others consider the skills that are required for interaction.

Time distribution and class planning

In course design, consideration is given to the timeframe for individual class sessions and the coverage of topics, linguistic structures, and activities. The six curricula vary in the temporal length of classes and the time given to content topics. Some curricula describe in detail the time given to individual classes. The Frankfurt curriculum specifies in detail the timeframe for its content units and provides some examples to guide the teachers. The LIBRAS and Desire curricula divide the contents and activities into temporal units, each of which contains a number of classes, and give teachers the discretion to decide on the total number of hours available and frequency of sessions. The Grundkurs and Auslan curricula also give teachers the time to determine how long they need to cover course content units. The CNSE curriculum does not provide suggestions for the time distribution of its content units.

The six curricula also vary in the planning of class sessions. The Desire curriculum suggests two-hour class sessions beginning with a review of the contents of the previous session. The LIBRAS curriculum begins with relaxation activities. The Grundkurs curriculum begins with a dialogue on a certain subject, review of vocabulary and grammar, then continues with exercises, and ends with games and exercises that are not related to the class content. The Auslan curriculum contains activities and assessments related to a topic and include lexical, grammatical, pragmatic, and socio-cultural contents. The CNSE curriculum does not include information on class planning. Frankfurt is the curriculum that is designed for self-learning, and does not offer information for teachers to plan classes.

Remaining issues in L2/Ln sign language in course design

The remaining issues in L2/Ln sign language course design are the weak relationship between theory and practice that impact on course design, and developments in L2/Ln sign language curriculum design.

Studies in the linguistics of language, learning processes, and language acquisition determine pedagogies for L2/Ln. New research developments in linguistics, learning, and acquisition have in general lead to changes in the content, teaching methodology, learning outcomes, and standards in curriculum (Rosen, 2010; Brown, 2007). However, there is a gap between theoretical discourse and educational practices (Krashen, 1982). This gap is due to several reasons. One reason is the lack of efficient channels of communication between scientists and teachers. The scientists are usually not themselves teachers, nor do teachers usually conduct formal research in the classroom. As a consequence, they do not share a common language or a common space. Another reason is that the research studies are mostly inconclusive and they cannot therefore provide prescriptive guidance for teachers (Ellis, 2008). Finally, the lack of coordination between scientists and teachers makes it difficult to apply the findings made in laboratory conditions to the complex realities of an educational setting (Freeman & Richards, 1996).

Teachers of spoken languages as L2/Ln often use curricula previously developed by specialists in curriculum design. These specialists are usually aware of developments in second language acquisition research. In the case of sign languages, the designers are often practitioners. As a consequence, the sign language curricula reflect classroom practices more than research findings. Another interesting aspect in this regard is the strong influence that the socio-cultural developments with Deaf people and ASL in the United States have had on Deaf communities around the world. In some Latin American countries, for example, ASL curriculum remains as the chief model of local programs (cf. Oviedo & Ramírez, 2013; Parks, Williams, & Parks, 2011), and a similar situation was observed in the sign language curricula in European countries before the CEFR (Napier & Leeson, 2016; Kobylanski, 2011; CNSE, 2010). Nonetheless, recent trends in the EU and Asian countries show that the development of curricula that are modeled on the sign languages and culture of their Deaf communities is emerging.

Future trends

Future research studies

The course designs for teaching sign languages as L2/Ln are mostly based on models developed for spoken languages. There is a need for research to assess whether the designs work in the teaching of sign languages. There are currently little empirical research studies available to assess the effectiveness of the newer curricula described above. For instance, there are studies conducted with learners of spoken and written languages, and they found in favor of TBL and CBI. However, there are no studies on the use of TBL and CBI in the teaching of sign languages. Research is also needed to assess the effects of new technologies and virtual learning environments on the teaching and learning of sign languages as L2/Ln. If research demonstrates its effectiveness, the new technologies and virtual learning environments should be incorporated into course designs.

In addition, future developments in course designs in L2/Ln pedagogy depend on research findings in L2/Ln sign language acquisition. Longitudinal studies on the acquisition of sign languages as L2/Ln focusing on the development of communicative competences in real

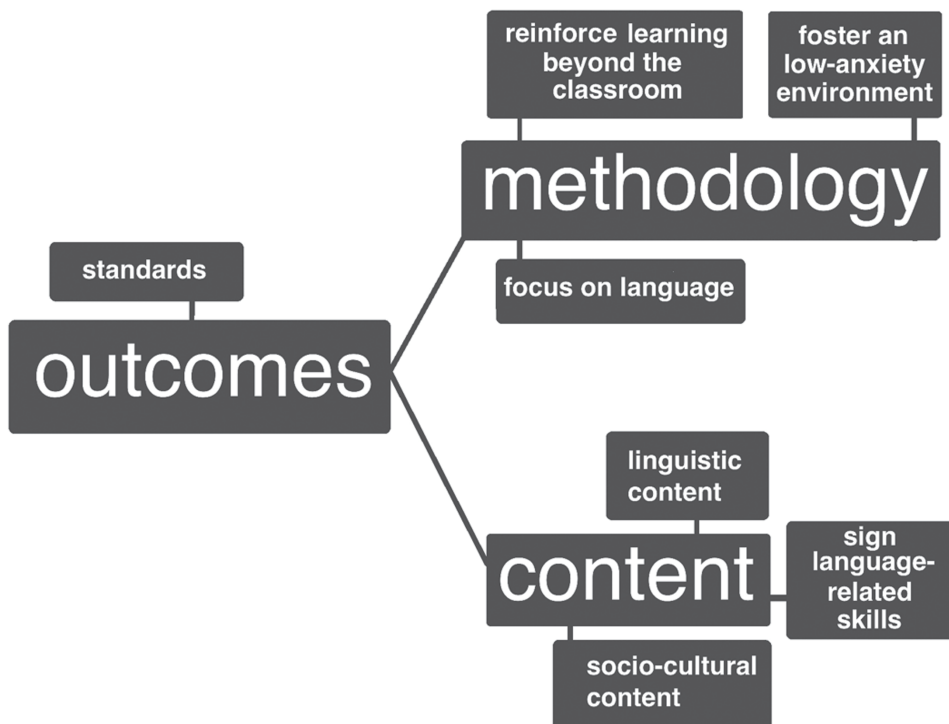


Figure 11.1 Map of course design

Source: Based on Richards 2013.

interaction (Braid, 1995), for instance, may have a great impact on the design of courses and curricula. An important variable to consider here is the effect of the acquisition of previously acquired signed or spoken languages on the acquisition of another signed language (cf. Chen Pichler & Koulidobrova, 2015; de Angelis, 2007).

Future pedagogical applications

Figure 11.1 captures our suggestions for future course design based on Richards (2013).

Modeling after Richards (2013), our starting point is the standards for learning since they shape learning outcomes. We have mentioned three standards available for sign languages CEFR (Leeson et al., 2016), American Sign Language Teachers Association (2014), and VCAA (2001). All standards share similar competences, which are socio-cultural, linguistic and information processing skills in production, comprehension, and discourse.

As described earlier, courses content includes linguistic, communicative, and socio-cultural topics. The selection and arrangement of content are first made with classroom activities (from methodology to content) and communicative skills that learners are expected to achieve (from outcomes to content). During the course of instruction, learners show their capabilities and difficulties in activities. It is at this point that teachers would be in a better position in ascertaining strategies for teaching language. It is important for teachers to ensure that the learners develop two cognitive and communicative competences related to the use of sign languages. The first competency pertains to visual-spatial thinking (Wilcox & Wilcox, 1997). The learners, particularly those

who are hearing, can sharpen their abilities to perceive and produce such spatial representations through activities such as drawing scenes or representing them with the help of toy figures. This practice can be progressively replaced by gestural representations, classifier-predicates, and constructed action. The second competency pertains to gestural expression. Training learners to perform gestural and facial expressions can help the learners overcome inhibitions of using the body as a means of communication. This activity would need to be performed in beginner courses, as it may sensitize learners about the importance of gestural expression as well as the ability to communicate without using their voices, prior to learning the vocabulary and grammatical constructions of sign languages (cf. Carver & Kemp, 1995).

The teaching and learning of L2/*L_n* signed languages may be buttressed using external contexts as resources where the learners can learn beyond the classroom, such as involvement in the Deaf community and communicating with signing Deaf people (Wilcox & Wilcox, 1997). This type of learning opportunity outside of classrooms should be anchored in the curriculum. In a study by two of the authors of this chapter, Kaul and Griebel, the learners participated in the community and signed with Deaf people, and kept learner diaries and transcribed signed videos.⁴ Kaul et al. found that they made positive self-learning experiences (Kaul, Griebel, & Kaufmann, 2014; Buisson, 2007).

The following are suggestions for teachers in L2/*L_n* sign language classrooms. Low-anxiety learning environments are found to be conducive to positive learning (Krashen, 1982), and need to be promoted in the classrooms. We suggest four strategies for teachers and other education practitioners to create low-anxiety learning environments for the L2/*L_n* sign language learners:

- (1) Introduce relaxation routines such as playing games with gestures in classrooms to allow learners to “switch on” the learning mode (Felipe & Monteiro, 2004).
- (2) Adapt language to the level of learners. When learners realize that they are following what they are being told, they feel empathy and confidence (Wilcox & Wilcox, 1997).
- (3) Repeat to reinforce newly acquired information, vocabulary in particular. This should not be seen as giving support to the behaviorist orientation. Giving feedback is found to be more helpful to learning than making corrections on learner errors (Russell & Spada, 2011).
- (4) Caution should be made when correcting learner productions. Offer examples of accepted linguistic constructions until learners become aware of their own mistakes and ask to be corrected. Opportunities for correction should arise spontaneously when learners reflect on the forms of language during class activities (Willis & Willis, 2007).

Sign language curricula largely follow the percepts of forward designs, are teacher-centered, and focus on form. They do not reflect what we know about language acquisition. Both empirical evidence and theoretical arguments suggest the appropriateness of starting with learning outcomes and adopting backward designs for teaching sign languages (Napier & Leeson, 2016). Recent studies in language learning favor task- and content-based teaching in L2/*L_n* classrooms. Sign language curricula should be revisited, revised, and reflect the current TBL-CBI pedagogical approach. This requires the curriculum to be backward designed so that teaching becomes learner-centered, and learners can perform communicative tasks under different contexts and focus on meaning using sign languages.

Notes

- 1 This description applies only to internationally accessible publications written in the main European languages. We assume that outside this linguistic landscape there are publications that we did not take into consideration here.

- 2 In the countries of the selected six curricula, they share similar characteristics that are related to the status of sign languages and their teaching. They are officially recognized sign languages, well-organized deaf communities, rich linguistic descriptions, and numerous sign language teaching programs.
- 3 Desire, LIBRAS and Grundkurs curricula do not mention TBL and CBI, but all of them include content-centered activities such as presenting expositions, discussing a topic, among others, that focus on language learning and use.
- 4 This has proved useful to stimulate metalinguistic awareness, which plays an important role in the acquisition of L2/Ln (Thomas, 1988).

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L2/Ln sign language teaching approaches and strategies

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Introduction

Good teachers are in constant search for effective strategies to teach language, including vocabulary and grammar, under different contexts. In classrooms where signed language is taught as a second (L2) and additional language (Ln), the learners are largely users of oral-auditory (i.e., spoken) languages. The challenge for teachers is to devise teaching strategies that are effective for teaching a spatial-visual language to the learners who are spoken language users. The issue for the teachers is the technique in teaching that will generate higher learner outcomes.

Brown (2001) defines *technique* as a “task, activity, procedure, practice, behavior, and even strategy” that “teachers perform in classrooms” (p. 129). The techniques that are used in classrooms are clustered together into pedagogical units and components of a lesson (Brown, 2001). A teaching strategy can be divided into: (a) curriculum, or the content of what is taught; and (b) instruction, or how the curricular content is presented to the learners. In this chapter, we present a brief history of the strategies adopted in the teaching of spoken and signed languages, and propose teaching strategies that we believe can contribute to the effective learning of signed language by the L2/Ln learners. We also discuss issues and challenges in using signed language teaching strategies and indicate future trends in the teaching of signed language as a L2/Ln.

The teaching and learning of signed language as L2/Ln

The field of signed language pedagogy has grown dramatically in recent decades in many countries. However, there is scant research in the teaching of signed languages. Research in language teaching has primarily focused on the teaching of spoken and written languages. As Quinto-Pozos (2011) points out, there does not seem to be substantial dialogue between signed language and spoken language scholars. According to Quinto-Pozos (2011), the scarcity of studies in signed language pedagogy may be because most of the professionals in the area focus their attention on teaching activities and leave insufficient time or commitment to engage in research.

McKee et al. (2014) connect the development of signed language teaching with advances in linguistic human rights. According to them, a social commitment to increasing the accessibility to signed language learning for the L2/Ln signed language learners requires that

teachers, educators, and service providers acquire proficiency in signed language. This requirement demands the development of a signed language teaching industry, the production of research, and the increased provision of resources. In spite of the increase in the number of learners interested in learning signed language as L2/Ln, the application of signed language knowledge to curriculum and teaching is still minimal compared to what is observed with spoken languages. McKee et al. (2014) point out that while signed language teaching has grown around the world, the number of publications in the linguistic and sociolinguistic aspects of signed languages exceeds the number of publications in signed language teaching and learning. Consequently, the application of theoretical and empirical knowledge about language teaching and learning is under-explored in signed language teaching and learning research and practice.

Issues and challenges in L2/Ln signed language pedagogy

As the theoretical and empirical knowledge in L2/Ln language pedagogy is little explored in signed languages research and practice, signed language teachers tend to base their methods on their intuition and understanding of language and linguistics that are developed through practical experience, available learning materials, and familiarity with their learners (Cresdee & Johnston, 2014; McKee et al., 2014, Rosen, 2010; Schornstein, 2005).

Although McKee et al. (2014) recognize that this teaching practice can be effective, they claim that it does not systematically lead to evidence-based improvements in practice in the field. According to them, the emerging status of linguistics applied to teaching signed languages reflects some structural realities surrounding the teaching of these languages. Although they recognize that conditions may vary across countries, they identified several common problems such as (a) there are a few deaf teachers of signed language and they often work in nonacademic settings, which restricts the development of a professional infrastructure; (b) signed language teaching classes are often housed under academic disciplines such as communication disorders, special education, and community education, the contexts of which are outside of the domain of L2/Ln teaching; and (c) in many countries there is a lack of specialized teacher preparation programs and qualification requirements for signed language teachers.

Theoretical perspectives

Teaching requires planning, organization, and creativity. The teacher's aim should be to create ideal conditions for learning to occur in the most effective way and in the shortest time possible. Sign language teachers, in particular, not only deal with L2/Ln teaching issues but also with the cultural and socio-historical issues which permeate the teaching of a signed language.

Kumaravadivelu (2003) identifies three groups of teachers: passive technicians, reflective practitioners, and transforming intellectuals. Teachers who are passive technicians tend to transmit the information received from experts to learners without significantly changing its content. Such teachers do not create new knowledge or theories. They only teach what is prescribed to them and return to the expert knowledge when teaching does not result in high learner outcome. Teachers who are reflective practitioners are not passive transmitters of the acquired knowledge. They are critical and imaginative in their teaching and act to solve problems. They continually plan, reflect on their lessons before and after instruction (reflection-on-action), and evaluate the effectiveness of their teaching. Teachers who are transforming intellectuals or agents of change are considered what Freire (1972, cited in Kumaravadivelu (2003)), would call as *critical pedagogists*. According to Freire, the classroom is socially constructed and historically determined,

and teachers incorporate their and their learners' experiences in the classroom as a part of the teaching and learning of languages.

The view held here is that the signed language teacher is a transformational intellectual who contributes to changing the lives of learners in and out of the classroom. For this to take place, it is up to signed language teachers to encourage learners to immerse themselves into *deaf* cultures and participate in the activities of the *deaf community* such as deaf associations, clubs, and social events. Quinto-Pozos (2011) points out that one aspect of *deaf culture* is the focus on visual communication and avoidance of the use of speech, which is a factor that shapes (diminish) the use of oral language in classrooms. For instance, Schornstein (2005), who is deaf and teaches American Sign Language (ASL), wrote that she not only avoided but also prohibited the use of speech in her class. She used interpreters in her beginning class to help learners communicate with her. She argued that her decision is a matter of respect for signed language and her teaching. Her experience raises the issue of teaching methods that teachers use in their teaching of signed language as L2/Ln.

Issue of method

In order to be able to devise a teaching approach and method, the teachers would first need to have a global understanding of the teaching and learning process and the effect of teaching on learning. The teachers would also need to devise clear objectives, learner learning goals, instructional materials and equipment, lesson procedures, evaluation, and extra-curricular activities (Brown, 2001).

Several teaching approaches and methods were devised in the twentieth century. However, there is no method that deals with all teaching and learning situations, with different languages, and with learners of different interests, cultures, and capacities (Kumaravadivelu, 2003). Teachers often revise their teaching during lessons that are not predicted by a method they use. Kumaravadivelu (2003) suggests that teaching methods should focus on three things, which are language, learner, and learning. The three things constitute a set of principles and procedures that teachers should adopt in order to accomplish the goals of language learning and teaching in the classroom. Kumaravadivelu (2003) groups together the known methods in terms of the common teaching strategies and resources that the different methods offer and classifies them into language-centered method, learner-centered method, and learning-centered method. They are described in the following.

Language-centered methods

Teachers who follow *language-centered methods* focus on form and provide the learners with linguistic structures. Vocabulary items and grammatical structures are preselected and ranked from the simplest to the most complex. The teachers teach linguistic structures through exercises. Learning a language is considered linear and additive; that is, learners learn the language cumulatively, going from simpler to more complex structures. Kumaravadivelu (2003) focuses on spoken language teaching, and cites the audiolingual method as an example of the language-centered method.

Learner-centered methods

Teachers who use *learner-centered methods* focus on not only the form but also the communication function of languages. They focus on intent and meaning behind communication and provide exercises and activities that involve different communication intents. The presumption of the

learner-centered method is that, like the learner-centered method, learning a language is linear and additive.

Learning-centered methods

Teachers who use *learning-centered methods* provide learners with opportunities for meaningful interactions in the classroom through communicative activities or problem-solving tasks. The presumption is that when learners use a language, they focus on their intent for communicating. In this way, they will learn a language more effectively than when their attention is only on learning language structures. Unlike the first two groups of methods, learning-centered methods consider the development of a L2/Ln as casual and unintentional. Kumaravadivelu (2003) cites the Natural Approach, as an example of learning-centered method.

Post-method pedagogy

Kumaravadivelu (2003) proposes a Post-method Pedagogy as an alternative approach to the above methods. For him, the teachers should be able to reassess their practice through self-analysis and analysis of learner learning outcomes. The Post-method Pedagogy approach integrates theory with practice and offers teachers the opportunity to experiment with pedagogical solutions including analyzing and evaluating their teaching, learner outcomes, and the sociocultural environment of classrooms. According to Kumaravadivelu (2003), the Post-method Pedagogy implies more than classroom strategies, instructional materials, and curricular goals. It implies a series of historical-political and sociocultural experiences that directly or indirectly influence the teaching of L2. Kumaravadivelu (2003) conceptualizes the Post-method Pedagogy as a set of parameters of particularity, practicality, and possibility.

Parameter of particularity

For a language teaching pedagogy to be relevant, the design of a teaching method needs to be particular to a specific group of teachers and learners, contains particular goals, and is conducted in a specific sociocultural situation, context, and environment. It requires teachers to self-assess, identify problems, and find specific solutions to their particular set of learners and teaching situations, contexts, and environments. This parameter is the opposite of the generic methods and practices that are found in the teaching of L2/Ln.

Parameter of practicality

The parameter of practicality requires the teacher to understand that no theory or practice is useful unless they are effectuated in practice. The teaching needs to be made practical for the learners and classroom settings, that is, the content, vocabulary, and grammar are what the learners can relate to, use in their communications, and reflect their experiences. Practical teaching implies that it is grounded on the content of instruction and the appropriation of signed language vocabulary and grammar based on conversation tasks. The teachers need to continuously reflect on their teaching, identify and understand problems, analyze and evaluate information, and choose the best alternatives. They need to see pedagogy not only as learning opportunities but also as transformative possibilities inside and outside the classroom.

Parameter of possibility

Language teaching provides learners with challenges and possibilities in their search for subjectivity and self-identity. Teachers need to be sensitive to the socio-political realities surrounding the learners and incorporate cultural information in their language teaching.

This will create possibilities for the teachers and learners to develop cultural subjectivities and identities inside and outside classrooms while teaching and learning signed languages as L2/*L_n*.

The above three parameters interact with and complement each other. The result of this relationship varies from context to context, depending on what the participants (teachers, learners, and curriculum developers) bring to that relationship. Pedagogical practices in the teaching of signed language to the L2/*L_n* learners are reviewed in the following in terms of the parameters of particularity, practicality, and possibility.

Pedagogical practices

The history of teaching strategies in signed language as an L2/*L_n* accompanies the increased research studies in signed language and the general society's changing views of deaf people and their language that led to their recognition of signed languages. For instance, in Sweden the results of linguistic research have led to the official recognition of *Svenskt teckenspråk* (STS), or Swedish Sign Language (STS), in 1981 (Nilsson & Schönström, 2014). Since 1995 STS was offered as a foreign language in addition to spoken languages such as French, German and Spanish in Swedish schools for hearing learners. Nilsson and Schönström (2014) argue that governmental support for foreign language education in Sweden caused a change in the Swedish society's view on deaf people and their language and created a need and desire for hearing individuals to learn STS. In the US, recognition of languages other than English is made at the state government level. In New York State during the late twentieth century, there was a public acknowledgment of the problems signing deaf individuals experienced in communicating with individuals who speak and hear, and the existence of the signing deaf community and organizations within the state, which led the New York State legislature to recognize American Sign Language (ASL) as the language of the deaf, and encouraged public education institutions to offer courses in ASL and deaf community and culture for academic credit (Rosen, 2008).

*History of teaching strategies in signed languages as a L2/*L_n**

Rosen (2010) analyzed the curricular materials used by ASL teachers in secondary schools, and found that these materials were based on different psychological and linguistic theories and pedagogical approaches. He identified different paradigms: behaviorist, linguistic, and conversational. In addition, he found that theories in the psychology of learning shape linguistic theories, which in turn influence instructional topics and teaching and learner learning strategies. Shortcomings in teaching and learner learning outcomes inform theories in the psychology of learning, which then shape linguistic theories, with repercussions for teaching and learning, and the cycle repeats (Rosen, 2010). Table 12.1 is a summary of the psychological and linguistic theories and pedagogical approaches.

Rosen (2010) also found that about three-quarters of the teachers used more than one curriculum and a quarter used only one. More than half of the teachers made their own materials and less than half of the others used commercially prepared ASL curricula. There are variations among the teachers in their pedagogical approaches based on their beliefs about learning, language, and pedagogy.

Teachers who are behaviorists believe that people learn by conditioning. They have their learners learn signed language by modeling, recitation, and rote memorization (Rosen, 2010). The teachers reinforce and reward the learners' learning achievements and do not punish them for their errors. They teach in small steps and work from the simplest to the more complex tasks.

Table 12.1 Psychological and linguistic theories and pedagogical approaches

<i>Psychology of Learning</i>	<i>Linguistic Theory</i>	<i>Topics</i>	<i>Strategies</i>	
			<i>Teaching</i>	<i>Learning</i>
Behaviorism	Traditional grammar	Linguistic rules (imitative)	Teachers give vocabulary	Learners recite, memorize and drill
Linguisticism	Generative / universal grammar	Linguistic rules (analysis and conversation)	Teachers give vocabulary and sentences and explain linguistic rules	Learners analyze and generate sentences using syntactic rules
Communication	Sociolinguistics	Social situations	Teachers give vocabulary and show how to use in conversations	Learners generate conversations about social situations in dialogue and monologue formats
Conversationalism	Content-based instruction (CBI) and task-based language teaching (TBLT)	Learning organized around content, not linguistic rules or principles	Teachers ask for concepts on a topic, create vocabulary, hypothesize about grammatical structures and analyze results	Learners brainstorm for concepts on a topic, engage in true conversations about a topic

Source: recreated from Rosen (2010).

Rosen identifies *A Basic Course in American Sign Language* curriculum (Humphries, Padden, & O'Rourke, 1994) as an example of the behaviorist pedagogical approach.

Teachers who are linguisticists, and who may or may not be linguists, believe that language is learned through analyzing linguistic rules. The teachers demonstrate and explain “the linguistic rules for sentential constructions and learners’ reciting those constructions and incorporating the linguistic rules” (Rosen, 2010: 361). The *Green Books* curriculum (Cokely & Baker-Shenk, 1980) is an example of the linguisticist pedagogical approach.

Teachers who are communicationists believe that people best learn language through interaction and socialization, and not by memorizing rules. Teachers create situations and social contexts and have learners engage in and learn how to use vocabulary and grammar in conversations. Rosen (2010) identifies the *Signing Naturally* curriculum (Lentz, Mikos, & Smith, 1988) as an example of the communication approach.

Problems and issues in the teaching of signed language as an L2/Ln

The curricula used in teaching ASL subscribe to the precepts of either behaviorism, traditional linguistics, and communication. Rosen (2010) notes that some of the curricula currently available endorsed old ideas, while others applied very recent ones. He found that the approaches that are followed by signed language teachers are adopted from spoken L2/Ln approaches. He states that the fact that teachers use different materials, coupled with the inconsistencies in these curricula, raised questions about teachers’ understanding of theoretical, empirical, or pedagogical

premises underlying the principles and practices of L2/Ln curriculum development and instructional strategies. Quinto-Pozos (2011) and Rosen (2015) acknowledge that there is a scarcity of studies of the impact on language learning from various teaching pedagogies of ASL as L2/Ln. As was made evident in the previous sections, the theoretically derived methods that are used by the L2/Ln signed language teachers have not been tested for their effectiveness in signed language classrooms. In our opinion, this has led to disenchantment by L2/Ln signed language teachers, who are the main agents in the teaching process, on which approach they should subscribe to.

Currently, the communicative approach is used in many ASL classes (Rosen, 2010). Rosen discussed some of the limitations of the communicationist approach. These refer to the fact that learning a language through communication privileges dialogue construction at the expense of learning linguistic rules or grammatical forms. Rosen (2010) argues that a combination of content-based instruction and task-based instruction may contribute to enhance the learning of signed languages as L2/Ln. He states that a conversationalist approach that involves specific content and tasks is the latest approach used in spoken language instruction. Recent studies have indicated that learners acquired vocabulary and grammatical rules when they are given specific content and tasks are performed better than the learners who learned languages without specific content and tasks. According to Rosen, however, no materials that subscribe this approach are available to teach signed language as a L2/Ln yet.

Considerations in L2/Ln signed language teaching approaches and strategies

Dissatisfaction with the current approaches and methods may have led teachers to rely more on their personal experiences and skills. It is for this reason that we support Kumaravadivelu's (2003) suggestion for the adoption of the *postmethod condition* since it gives autonomy and freedom for the teacher. It recognizes the teacher's potential to teach and also to act freely, even within the constraints imposed by institutions, curriculum, and textbooks. The approach enables the teacher to develop a critical approach in order to self-observe, self-analyze, self-assess, and self-improve their practice. Instead of leaving decisions about pedagogical practices in the hands of theorists, the *postmethod condition* enables teachers to generate innovative strategies oriented to their classroom and specific to their learners and localities.

For instance, Schornstein (2005) described her experience in her teaching of signed language to hearing learners. She wrote that she had to continually evaluate her teaching to meet the different needs of her learners. Her adjustments of teaching strategies meet Kumaravadivelu's (2003) parameters of particularity, practicality, and possibility. In one case, Schornstein (2005) observed that ASL learners in an interpreter preparation course did not have the intended linguistic competence and were unable to have an in-depth conversation with a deaf adult. After she taught signed language using a signed language curriculum, she realized that the learners used the curriculum only as resource materials. After analyzing her own practices, she decided to make a "process of purposeful and systematic experimentation" (Schornstein, 2005: 399) which drove her to continued modification of her teaching strategies until she came up with a strategy that she now employs in classroom. As a result of her experiments with different pedagogical practices, Schornstein added activities to the curriculum, found that her learners are able to have in-depth conversations with deaf adults, and shared her strategies with other signed language teachers.

In another case, Schornstein (2005) noticed that her learners learned signed language mainly from her and were not exposed to different signing styles in her classroom. This may have consequences for the learners in their ability to interact with different deaf signers. To remedy this, Schornstein (2005) explained to the learners about the expectation that they need to involve

in the deaf community, and have the learners paired together, hold conversations, and note different signing styles of different learner-partners. She modified her lesson plans with different goals for the learners to communicate with each other and develop signed vocabulary according to content, task, and their level of signed fluency. Schornstein's continuing adjustments of her teaching in the above cases shows how a teacher can experiment pedagogical solutions when she self-assesses, identifies problems, and devises specific solutions to her teaching.

Some signed language teachers in Brazil in recent years have used conversationalism as a teaching strategy. This approach provides opportunities for learners to engage in communicative interactions in Brazilian Sign Language (Libras) in different contexts and in the process becoming more fluent. In an effort to expand the learners' use of Libras outside of classrooms, some teachers encourage learners to participate in deaf community activities such as parties, meetings, walks, and activities with religious groups. For example, one university professor of Libras took her learners to extra-curricular meetings in a pizzeria. Some of her deaf friends attended these meetings. The learners were forbidden to use voice and instead used Libras and gesture to make themselves understood at the meetings. The learners were able to talk about various subjects, and did not restrict themselves to a pre-elaborated and decontextualized dialogue.

The above considerations lend suggestions for the components of instruction, instructional materials, course design, and lesson plans using the parameters of particularity, practicality, and possibility. They are discussed next.

Components of instruction

Learning to sign brings many challenges for adult learners. In addition to the typical requirements of L2/*Ln* learning, such as the mastery of a new grammar, understanding a new culture, and learning vocabulary, signed language learners must learn to communicate in a different modality. Besides learning signs, they should turn their attention to the handshape, location, palm orientation, movement, and non-manual markers of each sign and develop perceptual and motor skills. They also need to learn new communicative behaviors, such as looking at the signer's face, since L2 signed language learners tend to focus on the hands, resulting in the loss of important linguistic information expressed by the face (Leite & McCleary, 2008; Jacobs, 1996).

In teaching a visual-spatial language, teachers need to take into account particularities of deaf cultures and communities, as well as the learners' home cultures and communities. Teachers need to employ strategies that lead learners to use body language and facial expression in the completion of non-manual expressions that are sometimes not natural to learners, but which are part of the grammatical structure of signed language.

In addition, learners need to understand that they are learning a language that uses the whole body in a rule-governed way. This means that learning a signed language is not equivalent to substituting facial and body movements for speech. Bodily movements and facial expressions are constituent parts of signed languages and not signed languages themselves.

One of the main L2/*Ln* teaching objectives should be to increase learners' linguistic competence, which includes productive skills, receptive skills, and metalinguistic awareness (Kaul, Griebel, & Kaufmann, 2014). Metalinguistic awareness enables the L2/*Ln* learners to analyze their own linguistic knowledge and control their own linguistic processing, which may generate a higher level of competence in signed languages for the learners.

Another objective of the teacher should be "to contribute to the understanding of the 'input' of the target language" (Wilcox & Wilcox, 2005: 141). The presentation of spiraling content is a strategy that, according to the authors, "helps the learners in the acquisition of concepts of the language" (ibid.: 142). In a spiraling curriculum, teachers undergo a sequence of steps. They first introduce basic signs and grammar, and move to complex signed formations and sentence

structures. The teaching of descriptive classifiers, for instance, fits well with the spiral approach (Wilcox & Wilcox, 2005). Instructors first teach vocabulary and grammar pertaining to physical characteristics of the human body and clothing styles right from the start, and then introduce classifiers and classifier sentences. The learners use the vocabulary, classifiers, and grammar they learned to describe other people in daily conversations (Wilcox & Wilcox, 2005).

In addition, Schornstein (2005) also used signed videos as homework. Beginning learners watch ASL videos and film themselves recreating the sentences that are shown in the videos. Advanced learners, having learned how to recreate sentences in signed language, retell the stories and record their signing.

Components of instructional materials

There are instructional materials that are available for the teaching of some signed languages such as ASL. However, there are a few teaching materials available for other signed languages such as Libras (e.g., *Libras em Contexto* [Libras in Context] (Felipe & Monteiro, 2001); *Curso de Libras* [Libras Course] (Pimenta & Quadros, 2006)). According to McKee et al. (2014), it is the responsibility of signed language teachers to prepare learners not only to become proficient in the language, but also to provide learners with the pragmatic and cultural knowledge needed to interact with deaf signed language users in real-world settings.

Cresdee and Johnston (2014) propose that signed language teachers and curriculum planners use signed language corpus. Corpus is a system of utterances that are used within a language community and they are annotated and organized into linguistic structures for analysis. Instead of teachers following their intuitive knowledge about signed language linguistic structures in teaching signed language as an L2/*L_n*, Cresdee and Johnson (2014) propose that the teachers use corpus-based signed language data. According to Cresdee and Johnston (2014), data registration, organization, and storage of the structures of a language into a corpus have the potential to become tools and contribute to teachers' teaching and learners' learning of languages. The documentations and annotations of language structures in a corpus serve two functions. They serve as a data for research in L2/*L_n* signed language teaching and learning, and a resource for teachers to teach the language and for the learners to learn the language. Corpus records and annotation archives are invaluable teaching and learning materials (Cresdee & Johnson, 2014). For further discussion on the use of corpus on signed language teaching, the reader is referred to Leeson, Fenlon, Mesch, Grehan, and Sheridan in Chapter 23 of this volume.

Components of course design

Under the postmethod condition, in developing a course teachers need to take into consideration the needs and motivations of learners, the availability of resources, the teachers' qualifications, the learning environment, and the time available for instruction (cf. Wilcox & Wilcox, 2005). This applies to courses in signed language.

An important component of signed language teaching, which should be included in the design of a course is the use of videos recorded by the learners. This has been proposed by Bienvenu (as cited in Quinto-Pozos, 2011) and Schornstein (2005). Learners would need to be trained in new and current technologies for the creation of quality videos. Teachers would need to set aside the time to assess learners' videotaped works. Videos serve as a useful resource for assessing the teachers' teaching development and learners' signed language development.

Feedback is another aspect that should be considered in signed language course design. Feedback as a teaching strategy is described by Willoughby et al. (2015). Willoughby et al. (2015) interviewed six teachers of beginner Auslan classes and asked them what strategy they preferred to adopt for

correction. They analyzed the strategies used by the teachers in correcting learners' mistakes and whether the strategies supported language learning. They found that correction is more likely to be effective when it focuses on skills, is made explicitly, and is a part of a structured language teaching lesson. They also found that all teachers except one did not find that reformulation is effective as a correction strategy. Willoughby et al. (2015) continue that the teachers seemed well aware of the importance of explicit feedback to beginning learners, and most of them made use of it as their preferred correction strategy. Because they were also aware of the need to balance the desire to correct with the possibility of some learners becoming embarrassed or unmotivated, teachers developed strategies such as talking to the class about common errors rather than addressing each individual about their errors. However, some teachers believed that it was necessary to correct all the errors that they detected but, as a result, learners had few opportunities to practice the use of the language in the classroom. Other teachers did not correct every mistake but were consistent in correcting mistakes immediately and explicitly when they detected learner errors. Taken together, the observations and interviews with teachers showed that teachers adopted approaches for correcting mistakes, which reflected their teaching philosophies (Willoughby et al., 2015).

Components of a lesson plan

When preparing a lesson, it is important for teachers to use authentic language materials, especially the videos that are produced by native signing deaf individuals. Teachers should avoid outdated videos (Schornstein, 2005). The use of video is an activity which needs to be monitored by the teachers in order to avoid inappropriate uses of the language going unnoticed. For example, Schornstein describes the use of a video in which a deaf person signs according to spoken language structure and not according to ASL structure. Although both are structured in the subject-verb-object order, some ASL structures differ considerably from English. This needed to be explained to learners watching the video. Still, the use of authentic material is recommended for learners to have contact with different signers.

A relevant element that may help learners retain the content they learned is the use of glosses (Buisson, 2007; Quinto-Pozos, 2011). Many teachers do not accept the use of spoken language to teach signed language. However, Buisson (2007) evaluated the use of glosses by learners in ASL learning. A group of learners was instructed to write ASL sentences using English glosses. The other group read articles on deaf education. At the end of the study, the learners were asked to recall. The learners who used glosses showed better performance in ASL and English grammar tests. According to Buisson, the comparison between languages made it possible for learners to contrast the grammars and improve their knowledge of both languages.

Based on the premise that one of the main objectives of teaching foreign or world languages is to extend learning beyond the classroom, Rosen (2014) has studied the nature of outside-of-class spaces where learners used ASL. This author identified spaces where learners used ASL in response to interpersonal situations, such as the need to practice and to recover what had been taught in class, to share knowledge and signed songs, and to teach signs and sentences in ASL to their friends and family members. Learner participants in Rosen's (2014) study also mentioned use of ASL in spaces where it was difficult or impossible to use oral language, such as when sharing secrets or communicating without being noticed, or even in environments where they could not use their voice. A variety of signed language forms were observed, such as fingerspelling, isolated signs, phrases, and sentences. Also, the types of interaction were quite varied, including orders, questions and answers, simple narratives, and dialogues. When they signed phrases, some learners used ASL grammatical order while a few signed in English order. The learners presented variations in their use of mouth morphemes (Rosen, 2014). However, Rosen (2014) found that some learners were not accustomed to using ASL outside the classroom, for reasons including

their preference to talk and listen in spoken language only, or because they believed that ASL was used only to communicate with deaf signers who the learners did not encounter outside of class. Despite the learners' varying ASL abilities, a striking finding in this study was that in the end of the study all the learners created spaces outside the classroom to use ASL, sometimes with their hearing mates. By doing so, they were appropriating the language for their own purposes (Rosen, 2014). Observations of learners' signing also revealed that the ways in which they used ASL depended on their abilities.

The importance of using signed language in settings outside classrooms is also emphasized by Schornstein (2005). In her article, this deaf researcher and ASL teacher reports that she encouraged learners of signed language as an L2/Ln to film their interactions with deaf communities and recommends that they watch the material that is recorded. Their films become a visual record of the development of their signed language skills. Teachers can use them to evaluate not only learners' learning but also teaching. In addition to guiding learners to film their interactions with deaf communities, Schornstein (2005) recommends that teachers help learners envision the narration as a whole, and not focus on isolated signs. When learners find signs or classifiers that they do not recognize, they should consider the context in which they are being used to figure out the meaning of signs and classifiers.

Future trends

Future research studies

This section identifies some gaps in current research on L2/Ln teaching approaches and strategies. There are no studies of the impact on language learning from various teaching pedagogies of signed languages as L2/Ln (Rosen, 2015; Quinto-Pozos, 2011). As we have seen, Rosen (2010) and Wilcox and Wilcox (2005) discussed different pedagogical approaches underlying teaching books used in ASL classes as well as psychological and linguistic theories associated to them. However, it is necessary to have studies about teaching pedagogies of other signed languages, as well as other learning materials, such as books, videos, games and the impact of using them to teach signed language as L2/Ln. More studies on L2/Ln signed language teaching strategies, especially considering the diversity of learners and class time, are needed. Quinto-Pozos (2011) suggests investigating instructors' intuitions, the beliefs which ASL instructors hold and what they feel, which is effective in the teaching of that language, or what they suggest (in terms of research) for the advancement of this field of study. Works of this type may allow signed language instructors to contribute to language pedagogy discussions within the SLA research and practice field.

Most researchers of signed languages are hearing spoken language users. In this respect, it is fundamental to have deaf researchers. In Brazil, for instance, the number of deaf researchers of Libras is still very small. The presence of deaf researchers in discussions about teaching a signed language as L2/Ln is relevant for several reasons, including deaf people's knowledge of signed language use and cultural practices. More collaboration between Deaf and hearing researchers, as well as more integration between applied and theoretical signed language linguistics knowledge, can increase the number and quality of studies in signed language teaching pedagogy.

Future pedagogical practices

The use of technology in classrooms has been studied in L2 spoken language studies. However, there are few studies that discussed the application of technology in the teaching and learning of

signed language as L2/*Ln*. Fischer and Müller (2014) and Kaul, Griebel, and Kaufmann (2014) advocate the use of technology to improve learners' signed language skills and metalinguistic awareness. Fischer and Müller (2014) analyzed the use of two exercises designed as working tools in an e-learning format in order to improve the learners' receptive and metalinguistic competencies in dealing with constructed action. Kaul, Griebel, and Kaufmann (2014) developed and tested a video transcription task to increase participants' metalinguistic awareness of the non-manual features of eyebrow activation and mouth gestures. The role of technology in signed language classrooms is explored in Chapter 22 by Kose and Uluer in this volume. Cresdee and Johnston (2014) propose the use of technology to build a linguistic corpus in order to improve the knowledge base that can be used to inform language curricula and pedagogical practice. Using a digital video annotation software program, the studies show that it is possible to identify certain signed language features, such as nonmanual features of facial and bodily expressions, which are difficult for the learners to notice without the help of technology. The role of corpus in signed language classrooms is explored in Chapter 23 by Leeson et al. in this volume.

The studies presented some of the possibilities technologies can offer to improve the teaching and learning of signed languages as L2/*Ln*. Beyond these possibilities, the use of technology may contribute to the expansion of courses in L2/*Ln* signed languages in geographically large countries such as Brazil which has few schools and universities to meet the needs of its population and operate with scarce financial resources. Some Brazilian universities have chosen to offer distance learning courses to teach Libras. The use of technology in education makes it possible for signed languages to reach small and distant cities, elementary and high school teachers, university professors, and deaf learners of different ages, who have no other access to learning signed language other than by means of a distance education course. In short, the use of technology can contribute to expanding the possibilities of teaching signed languages as L2/*Ln* beyond the urban areas.

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Teaching L2/*L_n* sign language fingerspelling

Leah C. Geer

Introduction

Fingerspelling is a process used in some sign languages to represent written words manually (Padden & LeMaster, 1985, Wilcox, 1992). In American Sign Language (ASL), French Sign Language (LSF), and Mexican Sign Language (LSM), among others, one-handed manual letters represent the characters in the English, French, and Spanish alphabets, respectively. Other languages, like British Sign Language (BSL) and Turkish Sign Language (TİD) use two-handed systems.

Fingerspelling is most commonly used to represent words of the ambient language for which there is no direct lexical translation. Names, nouns, and adjectives account for 77% of fingerspelled tokens in Padden and Gunsauls (2003). Fingerspelling can also be used to show emphasis (Y-E-S-Y-E-S) or to show semantic nuance; spelling P-R-O-B-L-E-M to talk about a math problem, as opposed to an interpersonal problem is one example (Padden & LeMaster, 1985; Keane, 2014). Signed and spoken languages are in persistent contact and fingerspelling is one way to borrow words from spoken languages (Sutton-Spence, 1994; Adam, 2012) in order to extend the vocabulary of sign languages. Some deaf signers reject fingerspelling as part of their language because they feel it embodies the oppression of sign languages by spoken languages; others consider someone who fingerspells often to have native proficiency (Padden, 1991; Lucas & Valli, 1992; Sutton-Spence, 1994). Thus, the sociolinguistic situation of fingerspelling is an interesting and complex one.

The focus of this chapter is on teaching fingerspelling because it occurs frequently in some sign languages, ASL in particular. Fingerspelling may be non-native, in which case it is produced more slowly and with letters closer to their citation form. It may also become lexicalized, or nativized, through extensive phonological restructuring (Battison, 1978; Brentari & Padden, 2001, Cormier, Schembri, & Tyrone, 2008). Even in lexicalized forms, fingerspelling is structured differently than lexical signs. This could be the sticking point for adult learners who struggle with this aspect of language acquisition more than others (Quinto-Pozos, 2011; Wilcox, 1992).

This chapter provides a description of theoretical issues related to fingerspelling that bear on its instruction. A brief history of fingerspelling instruction is given first. Three currently used fingerspelling curricula are described next. Of these, two are specific to fingerspelling instruction and the other is part of an ASL text. The chapter ends with suggestions for future research projects and ways sign language teacher-scholars can improve fingerspelling teaching methods.

Theoretical perspectives

The perception and production of fingerspelling are one of the most difficult areas in ASL acquisition (Wilcox, 1992; Quinto-Pozos, 2011), and there is little empirical work which examines exactly what is happening cognitively during this process. Deaf people whose primary language is ASL vary in performance in comprehension tasks (Schwarz, 2000) and certified ASL-English interpreters who are otherwise highly skilled in ASL still struggle with fingerspelling comprehension (Patrie & Johnson, 2011). Emmorey et al. (2008) showed that retrieval of fingerspelled words and lexical signs engaged the same cortical regions, but that fingerspelling also activated a premotor region, possibly related to the motor planning and sequencing demands of fingerspelling not required for production of lexical signs. This section addresses some of the reasons learners experience difficulty with fingerspelling comprehension.

Fingerspelling is structured differently than lexical signs, which may impact language processing. Lexical signs consist of simultaneously layered linguistic features – a sign's handshape and palm orientation are articulated at some location in the signing space with the required movement while spoken languages are primarily sequentially organized (Klima & Bellugi, 1979; Brentari, 2002).

That the basic structure of lexical items is different in spoken and sign languages is relevant for two reasons. First, spoken languages are articulated more quickly than signs, in large part because they use smaller articulators. Despite this, it is possible to convey expressions of roughly equivalent meaning in the same amount of time in English and ASL (Bellugi & Fischer, 1972; Hwang, 2011). This is accomplished by simultaneously layering linguistic information. Second, linguistic structure is related to the sensory system predominantly responsible for language processing. The visual system is better suited to processing information that is layered, like sign languages, while the auditory system is better suited for processing sequentially presented information, like spoken languages (Hirsch & Sherrick, 1961; Green, 1971; Welch & Warren, 1986; Kohlrausch, Püschel, & Alpehi, 1992; Chase & Jenner, 1993; Meier, 1993; Brentari, 2002). So, while the structure of lexical signs is well suited to visual processing, the sequential structure of fingerspelling is not. This could explain why fingerspelling comprehension is more difficult (Bregman, 1990).

To combat the difficulty learners experience with fingerspelling comprehension, some instructors have developed curricula specific to this aspect of the language. Many ASL curricula are developed based on anecdotal evidence rather than theory-driven, empirically tested methods of foreign language instruction. This chapter argues that that L2 sign language instruction must commit itself to leaping into empirically tested waters, rather than relying solely on instructor intuition. Of the fingerspelling curricula detailed in this book, not all are based solely on intuition but there is still a crucial part missing. Curricula should be developed through a combination of organic classroom interactions and research. Once developed, training tools should be piloted in the classroom setting. Instructors should seek feedback from their learners and make refinements to the training as needed. Then, the program needs to be assessed experimentally, and finally returned to the classroom.

The pedagogy of fingerspelling

It is necessary to separate fingerspelling pedagogical practices developed for the purpose of teaching deaf children English and those systems developed to teach adults – most of whom are native English speakers – ASL as a second language. The focus of this review is on fingerspelling comprehension, but production will be mentioned as well. This section is divided in two: a

subsection about educational practices that involve fingerspelling and some of the empirical work that launched the field of fingerspelling studies and a subsection on why we need to continue our empirical work on fingerspelling, particularly with respect to teaching ASL as a second language.

Fingerspelling as an educational tool

Likely the best-known system of instruction involving fingerspelling is The Rochester Method. Implemented by Zenas Westervelt, Superintendent of the Rochester School for the Deaf (RSD) in 1886, Westervelt thought producing speech and fingerspelling simultaneously would provide deaf children access to English phonetic information, allowing them to more expediently acquire written language (Guillory, 1966; Rosenger-Naparsteck, 2002). As a result of this system, some of the earliest empirical examinations of fingerspelling were collected at the Rochester School.

Fant (1964), who had no association with RSD, agreed that ASL fingerspelling was a valuable tool for teaching English to deaf children. He also developed instructional materials for adults to acquire ASL, encouraging learners to avoid rigid finger movements and producing fingerspelling in a quick, smooth manner. Fant argued that fingerspelling comprehension begins with recognition of individual letters but also noted that deaf people see groups of letters, rather than individual symbols. This notion of seeing groups of letters is important and will become relevant for the discussion of currently used pedagogical practices.

Falberg (1963) encouraged ASL learners to begin with fingerspelling. Like Fant (1964), he stressed that comprehension should precede production. Falberg, however, believed that deaf people are only able to understand fingerspelling when each letter is produced clearly. A number of later experimental studies have disproved this notion (Reich & Bick, 1977; Hanson, 1981; Akamatsu, 1985; Schwarz, 2000, Geer & Keane, 2014, 2018; Geer, 2016). Guillory (1966) noted that while adult learners can learn to produce fingerspelling by studying flashcards, this will not help them to learn to perceive words as wholes. This notion of seeing the whole word seems to relate to seeing groups of letters, as Fant (1964) explained.

Reich and Bick (1977) collected segments of up to 100 contiguously produced fingerspelling utterances from teachers at The Rochester School. Researchers coded data for how closely each letter matched the citation form according to a printed chart of the manual alphabet. They found that only 20% of the fingerspelled letters matched the chart. They also noted that final letters are held longer, a finding which has been replicated (Keane, 2014). More recent and ongoing corpus work on Auslan and NZSL (Johnston, 2012), ASL (Hochgesang, 2018), and other languages should (re)evaluate the extent to which Reich and Bick’s (1977) findings hold up across languages. Table 13.1 presents the websites for various corpus/Sign Bank projects.

Reich and Bick’s (1977) findings suggest that skilled signers’ comprehension is not dependent on seeing each fingerspelled letter clearly articulated. They see groups of letters (Fant, 1964), or

Table 13.1 Corpus/Sign Bank websites for five sign languages

<i>Corpus/Sign Bank</i>	<i>Website</i>
ASL	https://aslsignbank.haskins.yale.edu/ , https://slla.lab.uconn.edu/signbank/#
BSL	http://bslsignbank.ucl.ac.uk/
NGT	https://archive.mpi.nl/islandora/object/lat:1839_00_0000_0000_0004_DF8E_6?asOfDateTime=2018-03-02T11:00:00.000Z
FinSL	https://signbank.csc.fi/
STS	www.ling.su.se/english/research/research-projects/sign-language/swedish-sign-language-corpus-project-1.59270

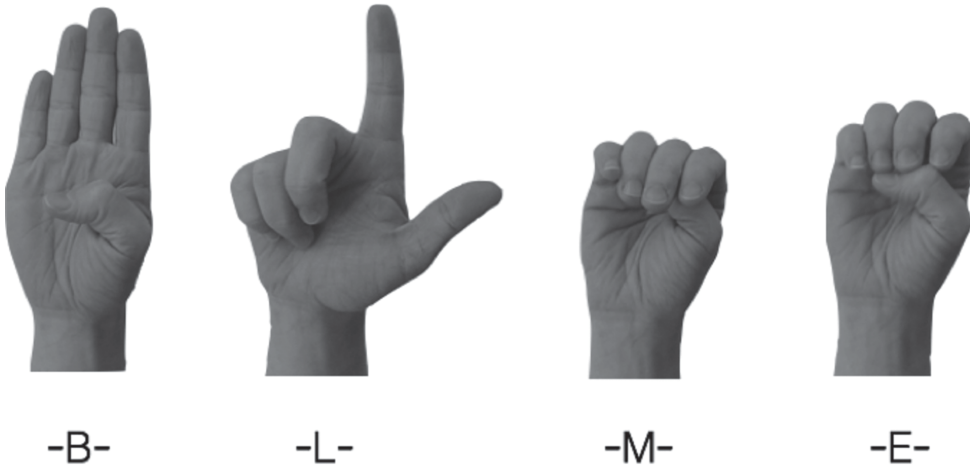


Figure 13.1 Examples of tall, up letters (-B- and -L-) and short, fist letters (-M- and -E-)

even whole words (Guillory, 1966; Hanson, 1981). In addition, Schwarz (2000) showed that even when a hold segment (held fingerspelling posture) is obscured, deaf adults are still sometimes able to understand the word. When they do not, they can make educated guesses about the missed letter consistent with the shape of the obscured letter (e.g., the letter E (short) is more likely to be mistaken for M (short), rather than tall letters L or B; see Figure 13.1). This suggests an ability to extract information from the transitions surrounding the obscured letter. Forty years of research has shown that fingerspelled letter production is highly variable yet, for the most part, this has yet to be incorporated into fingerspelling curricula. This will be addressed further in a below section.

Why empirically tested fingerspelling curricula are necessary

In an effort to draw attention to the fact that few ASL instructional materials are evaluated for their efficacy, Thoryk (2010) assessed one fingerspelling curriculum to determine if it actually helps learners improve their fingerspelling comprehension. Her article does not specify which curriculum she examined, but the method by which she explored its effectiveness is summarized below. This assessment is used to frame the discussion of currently used fingerspelling curricula and argue for more empirically tested pedagogical materials.

The supplementary fingerspelling program that Thoryk (2010) examined was developed by several individuals based on their experience in teaching at a community college. This curriculum consisted of 16 lessons on sundry topics. Preparation for pre- and post-tests is also included in the curriculum. Learners from a university with a large main campus and several smaller regional campuses participated in this study. Most of the teachers were deaf and holders of at least BA-level degrees. Learners were divided into classes that received the supplementary fingerspelling instruction or classes that did not. Results revealed that the supplementary curriculum was not effective in improving fingerspelling comprehension. Some learners in the treatment group actually performed worse on the post-test than on the pre-test (Thoryk, 2010). Finally, recognizing that fingerspelling is highly variable, learners lamented the inclusion of only one signer in the curriculum videos.

Thoryk's (2010) article uncovers a deep need for testing pedagogical materials developed for fingerspelling specifically, but also language-teaching generally. While research on sign language teaching is relatively new, the rich literature on spoken language teaching can be exploited.

Some aspects of sign language teaching may be modality-dependent, but much is not. Engaging in academic conversations in the second-language acquisition and teaching literature may afford improvements to sign language teaching practices and materials. This work, in turn, may prove useful in helping spoken L2 teachers answer questions that have long-since plagued them, by offering insights from teaching a language in a different modality.

Pedagogical practices

Teaching fingerspelling, particularly as its own course, is a budding subfield, though there is little empirical work which examines the efficacy of various teaching approaches and curricula. Fingerspelling for L2 adult learners serves a slightly different purpose than it does for skilled signers. New signers may fingerspell words for which they lack vocabulary or fingerspell to request new vocabulary. Thus, it is important to have an effective curriculum. This section addresses how fingerspelling is taught in the widely used *Signing Naturally* curriculum (Smith, Lentz, & Mikos, 2008) as well as two fingerspelling-specific curricula in fairly wide use. The first (Keast, 2017) has a basic and advanced version; the second is *Fingerspelling Word Recognition through Rapid Serial Visual Presentation* by Patrie and Johnson (2011).

Signing Naturally curriculum

The *Signing Naturally* curriculum is one of the most widely used for ASL teaching in the US and Canada. The revised and expanded Units 1–6 include several lessons on fingerspelling spread out in units 1–5 (Smith, Lentz, & Mikos, 2008). These lessons are divided into more general information and “reading tips” (Unit 1: Lesson 3), “fist letters” (-A-, -O-, -S-) (1:3), “up letters” (-L-, -R-, -W-) (2:5), “moving letter -Z-” (3:4), “down letters” (-P-, -Q-, -Y-) (3:11), “moving letter -J-” (4:6), and “-G- & -H-” (5:3).

Smith, Lentz, and Mikos (2008) begin with a general tip on fingerspelling production; learners should work on a smooth fingerspelling flow devoid of “bouncing” or “stamping” (p. 8). Their reading tips encourage learners to

- (1) recognize the shape and movement of letters and letter combinations (consistent with some of the earlier fingerspelling instructions (Fant, 1964; Guillory, 1966) and with the sensory system bearing the lion’s share of the processing load),
- (2) catch the first and last letters of fingerspelled words, and
- (3) ask for repetition when needed.

The first is the most controversial of these tips, with respect to other fingerspelling curricula and empirical work on L2 learners’ fingerspelling comprehension and methods to improve their comprehension.

The concept of “shape” in fingerspelling is not new. Akamatsu (1985) coined the term “movement envelope” to refer to the shape of the hand as it moves in the air when fingerspelled words are produced. In her work on child acquisition, Akamatsu (1985) noted that, while young children lack the dexterity to form individual letters, they are able to mimic the gestalt consistent with adult target forms. Akamatsu’s famous example is of the store named Safeway and may provide some insight as to why Smith, Lentz, and Mikos (2008) decided to split the manual alphabet into the groups indicated above. The schematic depiction of this fingerspelled form (Figure 13.2) shows two short (or fist) letters (-S-, -A-), a tall (or up) letter (-F-) followed by a short (-E-) then tall letter (-W-), followed by a short letter (-A-), and ending with a down letter (-Y-).

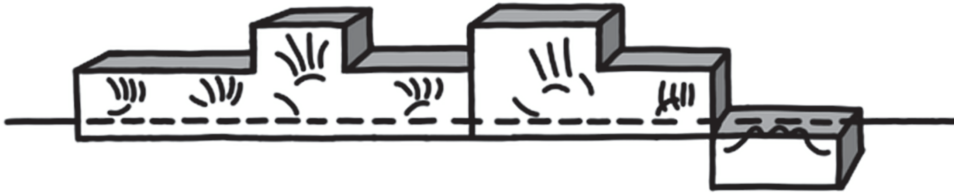


Figure 13.2 Schematic representation of fs-SAFEWAY

Source: recreated from Akamatsu (1985).

Keast (2017) also discusses the concept of “shape” as it pertains to fingerspelled words. Experimental work on fingerspelling lends credence to this analysis. Stone, Bosworth, and Petitto (2016; 2017) found that deaf adults prefer lexicalized fingerspelling that retains the same schematic shape as more carefully fingerspelled forms. Patrie and Johnson (2011) reject the notion of shape, however, arguing instead that there can be no shape to fingerspelling because the form cannot be “reinspected like a printed word” so the “shape” cannot be exploited to help read the word (p. 30). There is compelling evidence for a shape analysis even if the form cannot be reinspected; this “shape” seems to be significant in a number of ways.

From L1 acquisition research, Amakatsu (1985) shows that children are sensitive to these fingerspelling gestalts; before they have the dexterity to produce adult forms, children produce forms with a similar contour. Data from second-language learners shows that fingerspelled words with more distinct “shape,” intensified by letters with non-default orientation, like ASL letters -G- and -H- which face inward and -P- and -Q- which face down and inward, as opposed to default orientation in which the palm faces outward, are more difficult to comprehend (Geer & Keane, 2014, 2018), even with explicit phonetic training in fingerspelling (Geer & Keane, 2018). It may be possible to ameliorate this challenge with targeted training on those items with more distinct transitions, which is a type of training that has been found to be successful for L2 learners of a second spoken language (Giannakopoulou, Uther, & Ylinen, 2013).

After the general tips, Smith, Lentz, and Mikos (2008) give a number of more specific instructions for fingerspelling production, some of which are detailed in Table 13.2. As this shows, fingerspelling is presented highly prescriptively but with some acceptable variation.

These tips are simultaneously overly prescriptive and non-descript. For example, -E- is highly susceptible to influence from surrounding letters (Keane, Brentari, & Riggles, 2013) but described as having a single acceptable form. The (a) variant in Figure 13.3a is considered canonical and is the variant presented in the *Signing Naturally* text. But native and near-native signers frequently produce the other forms as well (Figure 13.3a-d). Geer (2016) and Geer and Keane (2018) show that learners benefit from explanations like the various -E- forms and when one or another can be expected. Despite the rigidity in -E- production, Smith, Lentz, and Mikos (2008) do provide a simplified explanation for variation in -R-, -X-, and -P-. What seems to be missing here is a corpus-based explanation of how they arrived at their rules or a list of references to these explanations that learners can look up if they so desire. Linking language instruction to corpora has been suggested for other sign languages as well (Cresdee & Johnston, 2014; Leeson, 2008).

The fingerspelling instructions given in *Signing Naturally* (Smith Lentz, & Mikos, 2008) are part of a larger curriculum; the focus is on developing competency in ASL as a whole. Sometimes instructors supplement *Signing Naturally*, or other ASL curricula, with a curriculum for a specific skill within ASL. Two such fingerspelling-specific curricula are discussed next.

Table 13.2 Description of how certain letters of the ASL manual alphabet should be produced

<i>Category</i>	<i>Letter</i>	<i>Instructions</i>
Fist letters	-E-	“At least two fingers must sit on the thumb” (p. 11).
Up letters	-R-	The thumb may, or may not make contact with the ring finger depending on the letter which precedes or follows the -R-.
	-X-	The default orientation of the palm is used when -X- appears word-initially, but has a different orientation when it appears word-medially or word-finally.
Moving letter -Z-	-Z-	The location of the letter -Z- influences the location of fingerspelling for the rest of the letters in the word.
Down letters	-Y-	Downward orientation specified (but practice examples are only word-medial and word-final).
	-P-	One variant specific to -P- which precedes the letters -L- and -R- and one variant for other contexts.
Moving letter -J-	-J-	Specific rules about how -J- impacts production of the subsequent vowel; each is listed individually but the result in each case is a change in orientation.
-G- & -H-	-G- & -H-	Hand position varies but text does not specify how.

Source: adapted from Smith et al. (2008).

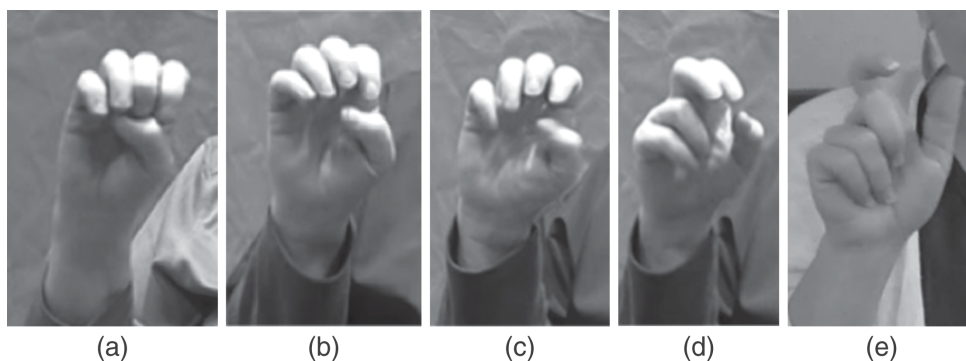


Figure 13.3 Various productions of -E-

The ASL Inside fingerspelling curricula

The *ASL Inside* fingerspelling curricula (Keast, 2017) have been adopted by around 40 US institutions in their ASL and Deaf Studies programs. The basic curriculum is designed for learners in ASL 1 or 2 and includes 13 lessons. The advanced curriculum includes 19 lessons. The following discussion focuses on the basic curriculum.

The first lesson begins with “Rules and Concepts” for fingerspelling. Three rules Keast (2017: 5, and <https://youtu.be/HCTMNOOTMxg>) shares are:

- (1) Avoid practicing fingerspelling by only spelling the alphabet in alphabetical order;
- (2) If you experience pain while you practice fingerspelling, you’re doing something wrong;
- (3) Fast fingerspelling is not (necessarily) an indication of good fingerspelling. Focus on fingerspelling clearly.

These seem to be sensible rules but learners need explication of why these rules should be observed. It should not suffice for curricula to give rules based only on intuition (Thoryk, 2010). Experimental studies that support a particular pedagogical practice or a particular rule for fingerspelling are necessary.

For example, fingerspellers should follow the first rule because certain letters and letter-combinations are produced more frequently than others (Norvig, 2017); only practicing letters in alphabetical order does not allow learners to develop a practical ability to transition from one handshape to the next. In the second rule, in cases where learners experience pain while fingerspelling, their technique may be wrong, and it would be instructive to examine articulatory issues like learners raising their arm too high in the signing space, moving their arm too much, or over rotating. The third rule states that learners should focus on clear fingerspelling, but the definition of “clear” varies by context. If a signer spells the same word several times in a discourse, it tends to get faster with each successive use (Thumann, 2012) and if one is presenting or a large audience, fingerspelling would likely be slower since it has to be comprehensible from greater distances (Quinto-Pozos, Mellman, & DeVries, 2010). This additional information is likely to be very helpful to learners.

There is one other aspect of the basic curriculum to discuss, and this involves the notion of the “shape” in fingerspelled words. In the learner instructional video, Keast (2017) explains that lexicalized fingerspelling takes on its own shape and that some letters are omitted. Learners must know how to make sense of the word, despite this. Again, further explanation would be helpful for learners. It is not always the case that letters are omitted; instead, they may undergo phonological restructuring such that they appear to be deleted. In reality, all (or most) of the letters are there but they are coarticulated extensively (Battison, 1978).

As an example, consider recreations of Keast’s productions of the words STYLE (Figure 13.4), JOB (Figure 13.5), and FIX (Figure 13.6).¹ These examples show the tendency for the parts of the fingerspelled utterance with the biggest movements to be retained. If letters are deleted, it is because they are not as visually salient and/or do not maximize changes in the openness or closedness of the hand (Brentari, 1998). These patterns hold true in longer words which may be lexicalized within the confines of a particular discourse or presentation (Brentari, 1998) and in longer words with frequently occurring letter combinations (Geer, 2016).

What each of these examples have in common is that the length of the letter string in English is not the same as the fingerspelled letter string in ASL. This is challenging for learners,

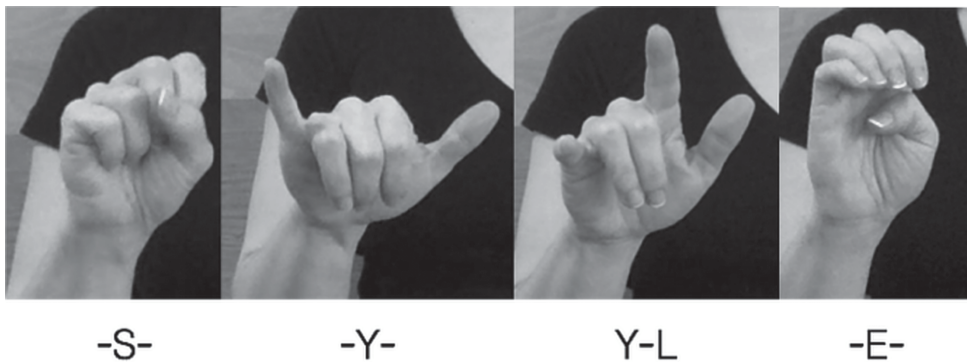


Figure 13.4 Lexicalized production of fs-STYLE

Source: recreated from Keast (2017).

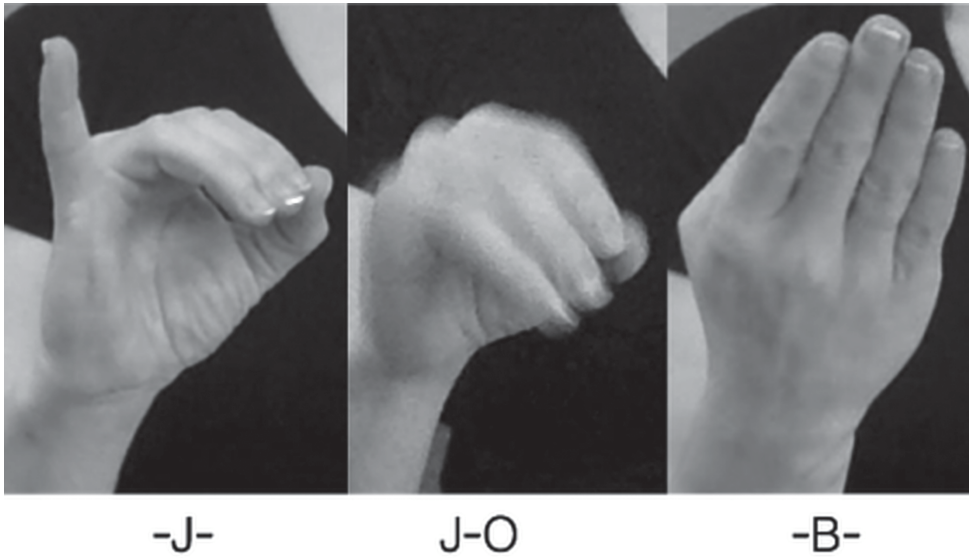


Figure 13.5 Lexicalized production of fs-JOB

Source: recreated from Keast (2017).

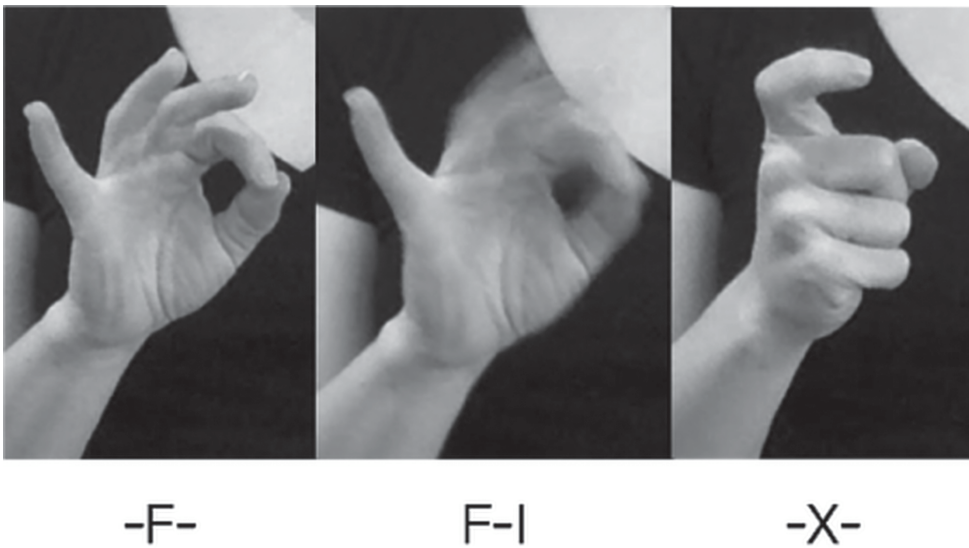


Figure 13.6 Lexicalized production of fs-FIX

Source: recreated from Keast (2017).

particularly when they are taught, and usually practice, letters in isolation. It becomes important early in ASL-learning to understand that the string length in English does not always align with the string length in ASL. The reasons string length differs should be explained explicitly to learners (Geer, 2016; Geer & Keane, 2018). Instead of only modeling fs-STYLE, also note

that -r- is deleted because the letter immediately preceding is also fully closed, so -r- deletion allows for a maximal aperture change from -s- to -y- (Brentari, 1998) and the extension of the pinky from -y- perseverates into the production of the letter -l-, resulting in an ILY handshape (Thumann, 2012; Geer, 2016). Clarify for learners that the -o- and -l- in fs-JOB and fs-FIX, respectively, are made in transition from preceding and following letters, and not deleted.

Participants in the author's dissertation study described the process in which they learned fingerspelling. They said the explicit phonetic training was helpful. Their ASL teachers had always told them to sound words out but they never felt they had the tools to do that because fingerspelled letters are often produced differently than their canonical form (recall Reich & Bick, 1977) and indeed can vary signer to signer (Keane, et al., 2013; Keane, 2014; Geer, 2016). They were appreciative of the instruction regarding the types of variation in letter formation they might encounter and why letter formation may vary (Geer, 2016; Geer & Keane, 2018). This experiment debriefing session shows that teacher-scholars need to assess the effectiveness of pedagogical tools. A non-trivial part of that process involves engaging with learners to find out what *they* find helpful and how they learn best.

Fingerspelled Word Recognition Through Rapid Serial Visual Presentation

The *Fingerspelled Word Recognition Through Rapid Serial Visual Presentation* (Patrie & Johnson, 2011) is a three-part, more advanced curriculum used in some Interpreter Preparation Programs. It includes (1) an 11-chapter text, (2) a CD-ROM, and (3) a DVD with ASL monologues with which learners can apply their new fingerspelling receptive skills.

RSVP trains learners to process serial information presented rapidly by showing Roman letters. The authors' justification for this is twofold: (a) learners are already skilled in reading English print, and (b) using English print will reduce the anxiety learners might experience with fingerspelled letters. Patrie and Johnson argue that developing this skill will transfer to fingerspelling comprehension with sufficient practice, but this claim is not compellingly supported. The letter span of English words is not always the same as their fingerspelled counterparts (recall the "style" example above) and the task of arriving at lexical meaning from rapidly presented, individual Roman letters, appears to be fundamentally different than the task of fingerspelling comprehension.

The disparity between English letter-string and fingerspelled letter-string can apply to longer, non-lexicalized, words as well. For example, the letter bigram u-r is very often produced as a single segment, as is the trigram g-h-t (Geer, 2016; Geer & Keane, 2018). Another issue with the RSVP approach, and related to letter-string, is the fact that many words involve extensive coarticulation. If learners are practicing only with printed Roman letters, they will not gain experience with the ways in which fingerspelled letters can blend together or be influenced by one another. This causes disruptions in word comprehension. Finally, and perhaps most importantly, Patrie and Johnson (2011) have not provided experimental data which demonstrate that reception of rapidly presented Roman letters transfers to fingerspelling comprehension.

There are two other aspects of the RSVP curriculum to address here. These are the topics of effective practice and direct lexical access.

Effective practice: Citing researchers who focus on the types of practice that lead to optimal improvements (Ericsson, 2001; 2003), Patrie and Johnson (2011) contend that their approach RSVP approach with printed Roman letters is a form of "effective, deliberate" practice (p. 33). This seems to misrepresent the literature they use to support their claim.

Patrie and Johnson (2011) cite Fitts and Posner's (1967) model of skill acquisition. This model states that there are three phases of learning any task. A cognitive phase in which a

learner has to think carefully about the skill figuring out exactly how to carry it out, an associative phase in which the movement is accurate, with few errors, and fairly consistent, and an autonomous phase in which the movement is, as the name suggests, more automatic and highly regular from trial to trial (Fitts & Posner, 1967). However, this model primarily refers to the production of motor skills. Fingerspelling comprehension is a language-processing task. Works by Ericsson and colleagues (Ericsson, Kramp, & Tesch-Römer, 1993; Ericsson, 2001) describe effective, deliberate practice as unenjoyable and not inherently motivating. This likely does hold true for developing the skill of fingerspelling comprehension, though this is an empirical question, but reading these works suggests that an effective and deliberate practice for fingerspelling would need to involve actual fingerspelling comprehension and not reading of Roman letters. What an effective and deliberate practice could take the form of learning to extract information from transition segments (Schwarz, 2000), attending to phonetic variation in letter production, and understanding particular letter combinations (Geer, 2016; Geer & Keane, 2018).

If Patrie and Johnson (2011) were adamant about using printed Roman letters, they would need to demonstrate that type of practice positively transfers to fingerspelling comprehension. A cursory review of classic skill transfer literature suggests this is unlikely. Early studies of motor skill transfer show that the dimensions of the skill to which you wish to transfer the originally learned skill must be similar (McCracken & Stelmach, 1977; Newell & Shapiro, 1976) and even still, skill transfer is not a guarantee (Adams, 1987). It does not appear that rapid serial visual presentation of Roman letters is sufficiently similar to rapid (mostly) serial visual presentation of fingerspelled letters.

Direct Lexical Access: Patrie and Johnson (2011) discuss Direct Lexical Access at length. Essentially, this refers to how language users come to associate meaning with a particular form. The process they describe presumes that skilled deaf signers are (rapidly) translating each fingerspelled letter to print then constructing the meaning of the word as a whole in their head. The basis of their curriculum is to teach learners to reduce the amount of time this translation task takes. The curriculum is not informed by how skilled signers learn to fingerspell, however. In fact, research strongly suggests this is not the task signers are engaging in when they read fingerspelling. If they were, Hansen (1981) would not have found that signers can comprehend fingerspelled words but not know how to spell them back, Akamatsu (1985) would not have found that children mimic the fingerspelling gestalts even before they have the dexterity to form letters individually (and deaf adults can understand these forms), and Schwarz (2000) would not have found that deaf signers can comprehend fingerspelling even when one letter posture is obscured or at least make an educated guess about what the word might have been. They state that “[p]racticing rapid serial processing with printed letters rather than watching videos of fingerspelled signs is beneficial” (Patrie & Johnson, 2011: 143) but they have not provided a compelling argument for why this should be the case.

Future trends

There has been very little experimental research on fingerspelling and in particular, experimental work on pedagogical methods for fingerspelling instruction, yet there is demonstrable need for this type of work. There are a number of ways to continue the experimental approaches discussed in this chapter. Several avenues for future research are detailed below, separated into sections on (1) future research studies and (2) future pedagogical tools.

Future research studies

Improving comprehension feedback

In their studies of cue re-weighting in Finnish and Greek learners of English, Ylinen et al. (2010) and Giannakopoulou, Uther, and Ylinen (2013) included personalized feedback in their training programs. When trials were answered correctly, participants were told their answer was right and they advanced to the next trial. On trials for which incorrect responses were provided, participants received feedback indicating this and then were allowed to repeat the trial. The feedback in the training assessed in Geer (2016) and Geer and Keane (2018) was not personalized. Future iterations of this project should personalize the feedback in the same way as the studies of Ylinen and colleagues (Ylinen et al., 2010; Giannakopoulou, Uther, and Ylinen 2013).

Targeted cue re-weighting comprehension training

In addition to changes in how feedback is delivered, the type of stimuli to which participants are exposed should be varied. Giannakopoulou, Uther, and Ylinen (2013) demonstrated that training that includes both natural and modified stimuli are more effective than natural-only stimuli. In the case of Giannakopoulou, Uther, and Ylinen the modified stimuli were those with equal vowel length, since that was the cue Greek speakers had weighted incorrectly. Geer (2016) and Geer and Keane (2018) showed that even after explicit phonetic training, learners struggle significantly more with fingerspelling comprehension when presented only with transition segments. The Giannakopoulou, Uther, and Ylinen (2013) work suggests that if learners trained more with this type of modified stimuli, in addition to natural stimuli, they would be better able to adjust their attention to information in the transition segments, which we know skilled signers make use of (Schwarz, 2000).

Unpacking issues with palm orientation

Future studies should continue to unpack the effect of palm orientation. Schwarz (2000) found an effect of the position of the masked hold, meaning that an obscured posture at the beginning of the word was more detrimental to comprehension than a masked posture later in the word. It may also be the case that the position of the letter with non-default orientation affects learner performance. For example, if a word begins with -p-, but learners perceive it as -k-, they will generate the wrong list of possible words, whereas words with -p- word-internally may be more likely to be generated in the list of possibilities learners might consider. The studies reported here did not use a word-list balanced for palm orientation, and within items with non-default orientation, balanced for position in the word (beginning, middle, or end). This is certainly something to explore in the future not only with ASL learners, but with skilled signers as well.

Understanding the role of mouthing and context

Geer and Keane (2014; 2018) and Geer (2016) tested ASL learners' fingerspelling comprehension on words in isolation, produced by a signer who did not mouth the words. The aim of these studies was to understand the aspects of the fingerspelling signal itself, which impact comprehension. Because fingerspelling does not occur like this, it would be instructive to examine how comprehension is impacted by the addition of mouthing, context, and then mouthing and context together.

Fingerspelling production

Previous research has shown that language perception often precedes production (Flege, 1995; Kuhl, 2000; Patrie and Johnson, 2011). One way to use the training program developed in Geer (2016) and Geer and Keane (2018) is to conduct a study in which participants are specifically asked to interact with the training. For example, all participants would complete the explicit training; half will be given the same instructions used in previous experiments and half will be asked to sign along with the training.

A production pre- and post-test, in addition to the comprehension test, will assess the extent to which active participation in the training is helpful for perception and production. Impressionistically, when this method was employed with the author's learners in their third and fourth semester of ASL, both production and perception improved. These students completed a review of all of their video projects at the end of the term. Several noted improvements in the fluidity of their fingerspelling production as the semester progressed, though not explicitly prompted to comment on this feature of their ASL use in particular. A controlled experiment is needed to assess this further.

Another way to gather information about how to teach fingerspelling production is to first conduct a thorough analysis of differences between skilled fingerspellers and learners. This would include an analysis of temporal properties (Quinto-Pozos, Mellman, & DeVries, 2010; Keane, 2014), coarticulatory tendencies (Geer, 2016; Thumann, 2012; Keane, 2014, Geer, 2016), as well as orientation of the palm and location in the signing space. As an anonymous reviewer noted, the lack of empirical analysis of native signers' use of fingerspelling inhibits attempts to develop research-driven targets for L2 learners.

Future pedagogical practices

As we work toward empirically based materials for fingerspelling instruction, we must also bear in mind the goal of improving fingerspelling comprehension (and production). The goal is to improve ASL proficiency generally, which requires that fingerspelling needs to be integrated with ASL instruction (a comment some of the participants in Thoryk's 2010 study shared as well).

In a translation lesson with the author's learners, several fingerspelling activities were performed. There are several tokens of the fingerspelled word PLASTIC, and each was produced slightly differently. The first activity, shown in Figure 13.7, involved production of each of the letters realized as held postures, except for -s-, which was made in transition from the -A- to the -T-. Learners had no trouble discerning the first token. However, they have had difficulty in subsequent activities when fingerspelling was produced more quickly and involved more extensive coarticulation. By the fourth activity (Figure 13.8), only five fingerspelled letter postures are realized.

In a debriefing session after the activity, learners came to understand that words can and tend to be reduced with successive uses (Thumann, 2012). When this activity was repeated later in the semester with different videos, learners reported feeling better prepared to make sense of fingerspelling with repeated uses. This suggests that, like explicit phonetic instruction, learners benefit from explicit details regarding ways in which fingerspelled words as a whole might vary within a particular discourse or monologue. A next step, then, would be to design training materials where this type of integrated fingerspelling is addressed, refine the program based on learner feedback, then assess the training experimentally.

There are many unanswered questions about how best to approach the teaching of fingerspelling. There is a particular need to address these questions because learners struggle

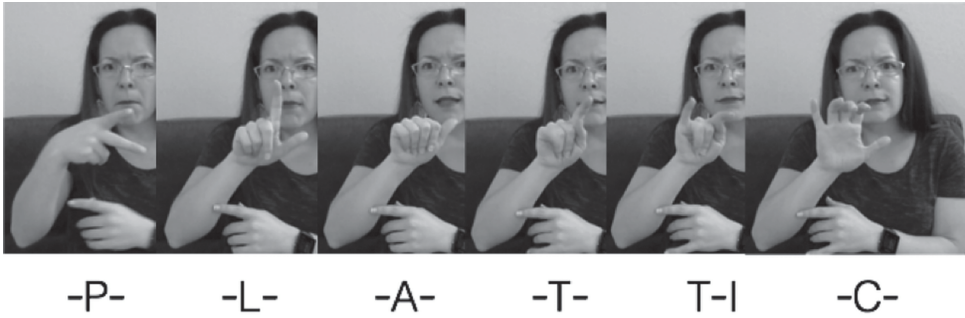


Figure 13.7 First production of fs-PLASTIC extracted from a narrative made for ASL 4 students



Figure 13.8 Production of fs-PLASTIC extracted from a narrative made for ASL 4 students

with this area of language acquisition more than others. The struggle persists even when a high degree of proficiency is attained in other areas of the language (Patrie & Johnson, 2011). These suggested future studies explore explicit training practices and how they may be useful in teaching fingerspelling. Teacher-scholars who design fingerspelling curricula must examine the efficacy of their programs in an experimental setting to better understand what works and what does not, and share with the second-language teaching literature going forward.

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Note

- 1 Images recreated from stills captured in Keast (2017) “Learner Lesson 3: Short Words,” available at https://youtu.be/J-WkiUeOa_8

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Teaching L2/*L_n* sign language vocabulary

Rachel E. Traxler and Kimi Nakatsukasa

Introduction

Vocabulary knowledge is an essential component for communicating in any language, and sign language is no exception. In order to be efficient in communication, individuals need to have skills in both vocabulary comprehension and production. Comprehension refers to the ability of the learner to understand what is said, while production is the learner's ability to produce utterances in the language. Without an understanding of vocabulary, learners are not able to comprehend discourse or produce their own ideas. For spoken languages, it is estimated that high achievement in good listening comprehension occurs when 95% of spoken discourse is understood (Bonk, 2000, as cited in Schmitt, 2008), which requires vocabulary knowledge. It is estimated that knowing 8,000–9,000 word families is necessary in order to comprehend a range of different texts within a spoken second language (L2) (Schmitt, 2008). Although it is not known how many vocabulary items are needed to communicate fluently in sign, spoken language studies suggest that acquiring sign vocabulary knowledge is essential to becoming a successful signer. Individuals' language proficiency is connected to their vocabulary knowledge that enables them to produce and comprehend information rather than getting distracted by unfamiliar words (Nation, 1994).

For learners of second languages (L2), vocabulary learning typically begins with the learners connecting an already learned concept in their native, or first language (L1) with the unfamiliar item in the target, which may be a second or additional language (L2/*L_n*). For sign languages in particular, however, there is an additional difference. In cases where native users of a spoken language as an L1 learn vocabulary in a sign language as an L2, the modality difference between spoken and sign languages may influence how they acquire sign language vocabulary. Learners of sign language as L2/*L_n* must learn within and utilize the visual-gestural plane, rather than relying on the oral-aural plane, which may complicate this transfer process. When learning a sign language as a second or additional language (L2/*L_n*), it is expected that learner's mental lexicon has been already developed in their L1. When learning a sign language such as American Sign Language (ASL), a learner who knows a spoken language such as English as L1 will need to make an extra effort to bridge L2/*L_n* sign lexicon with their L1 mental lexicon. This is exemplified when there is no one-to-one word-to-sign correspondence in lexicon. For example,

a word in spoken English “right” has several meanings: (1) right as in direction, (2) right as “correct,” (3) right as in law. “Right” is one word in English but contains many meanings each of which occupies different mental lexicon. In addition, each meaning of the concept “right” has a different sign. As the learners learn ASL, they would need to learn how to map each mental lexicon to different signs because different signs are used for each meaning, unlike words in English.

Teachers are often unsure about how to best incorporate vocabulary into their teaching practices (Read, 2004) and while there are L2/*L_n* vocabulary acquisition studies, these studies are largely in spoken L2/*L_n* languages. Despite the growing number of studies in spoken languages, research on sign language as an L2/*L_n* remains underinvestigated regarding signed language vocabulary acquisition, applicable strategies for vocabulary instruction, and teacher development and current practices. Nonetheless, the studies provide information on the process of vocabulary acquisition and the teaching of vocabulary that can be applied to sign languages. In this chapter, theories of L2/*L_n* vocabulary acquisition are introduced, followed by a description of the unique features of sign languages that need to be taken into consideration when understanding L2/*L_n* vocabulary acquisition in sign languages. Various practices of vocabulary teaching in the L2/*L_n* studies and in sign languages found in the existing studies are next presented.

Theoretical perspectives

Acquisition of vocabulary from a second language acquisition perspective

There has been extensive second language acquisition research about how L2 vocabularies are acquired. Vocabulary acquisition is a matter of *form-meaning mapping*. Research shows that for L2 learners, particularly those who are native users of spoken languages, acquiring L2 sign language vocabulary is not a simple matter of corresponding between newly learnt sign and a word in their mental lexicon. There are different processes in the acquisition of L2 sign language vocabulary by L1 spoken language and L1 sign language native users. As children begin to acquire their L1, their brain finds patterns in the L1 input that connect to specific phonemes and graphemes by being exposed to the input repeatedly (Doughty, 2003; Ellis, 2006). This connection serves as a *form*, which is combined, with *meaning*, after which it becomes vocabulary. This connection, however, becomes problematic when the L2 is phonologically or orthographically different from their L1 because learners do not process the L2 in the same way. Learners need to undergo an extensive process in establishing a new mapping for L2 vocabulary and existing mental lexicon, which may not match as shown in an earlier example of the English word “right.” In addition, learners need to construct a completely new system that connects phonemes and graphemes for the L2 by first identifying specific parameters in sign language such as handshape, palm orientation, movement, and location in L2 sign language and not in the phonemes in their L1, and then connect that with meaning. Providing vocabulary instruction may help clarify the differences between L1 spoken languages and L2 sign languages and facilitate the learners’ development of L2 mental lexicon to represent newly taught lexical signs.

L2/*L_n* sign language learners need to learn the sign parameters in order to be able to recognize and produce lexical signs. However, vocabulary learning goes beyond single lexical signs in isolation. Vocabulary learning also involves learning how to use the lexicon with proper definitions within the context of sentences and discourse. Depth of a vocabulary item can be facilitated by exposure to a word within different contexts, as the learner comes to understand the different ways and situations when a word can be used. This is an under-studied

phenomenon since L2 vocabulary acquisition studies tended to consider individual words outside of context (Read, 2004).

Laufer and Hulstijn (2001) proposed that retention of new or unfamiliar words is dependent on how these words are processed during the learning process. They propose that three factors are essential for lexical processing, including need, search, and evaluation. Need refers to the motivation the learner has to learn a particular word. The learner has to search for the meaning of the word. The learner evaluates the new word with other words. While there is a paucity of empirical studies in the lexical processing of sign vocabulary by L2 learners, we believe that the learners attend to the same factors and undergo similar processing for lexical signs.

A unique feature of sign language vocabulary learning: iconicity

While we believe that the aforementioned theories of spoken languages are relevant to sign languages, it is important to note the unique aspects for sign languages that may shape how sign vocabulary is taught and acquired. Unlike spoken languages, signs are constructed differently depending on the iconicity of signs (e.g., Rosen et al., 2015; Beykirch, Holcomb & Harrington, 1990; Baus, Carreiras, & Emmorey, 2012; Lieberth & Gambel, 1991; Campbell, Martin, & White, 1992). Iconicity refers to the connection of a sign to a referent that corresponds to an item's physical appearance or function. Spoken languages contain iconicity (e.g., the word "woof" phonetically resembles the bark of a dog), however, in sign languages, iconicity is manifested physically and visually. The physical and visual modality of sign languages allows for use of iconicity, which depicts many different concepts, including movement, object actions, individual actions, location, and shapes (Taub, 2001). For example, iconicity is present within the sign TREE in ASL as it directly resembles the shape and structure of a tree, while the sign EAT depicts the action of placing food in the mouth. This is not the case for non-iconic items. For instance, the form in the ASL sign for BLUE does not lend itself to its meaning.

It is possible that there are different processes for connecting sign lexical *form* containing the parameters with its *meaning* depending on the level of iconicity. If a sign is iconic, the production of its form reveals its meaning, and it should be easily learned. If a sign is not iconic, the production of its form does not reveal its meaning, and learning it would be more difficult than the case for iconic signs. This suggests that the process for connecting between form and meaning in L2 sign language vocabulary learning is different from L2 spoken language vocabulary learning.

However, results of studies in L2 sign vocabulary processing and acquisition are mixed. Several studies investigated the impact of learners' individual differences such as learners' proficiency levels and age on the processing and acquisition of iconic signs. Some studies such as Baus, Carreiras, and Emmorey (2012) found that iconicity in signs aid beginning learners to accurately recognize and translate sign vocabulary into spoken vocabulary, and it did not for advanced learners. Other studies such as Thompson, Vinson, and Vigliocco (2009) did not show that sign iconicity aid vocabulary learning and acquisition. Bosworth and Emmorey (2010) added that advanced adult signers did not recognize iconic signs better than non-iconic signs. Still, other studies such as Klima and Bellugi (1979) suggest that iconicity may not be relevant for the processing of language for all learners. While iconicity may strengthen the connection between form and meaning, the studies suggest that the benefits of iconicity are limited to lower level learners. We maintain that there may be an advantage for teachers to emphasize iconicity in sign lexicon in their teaching of sign vocabulary. Iconicity may aid some learners to make connections between sign form and meaning and remember vocabulary.

Other studies investigated the relationship between learners' age and learnability of iconic signs. Thompson and colleagues (2012) found that learners between 11 and 20 months were able to better identify iconic items than younger learners who were between 21 and 30 months. The younger learners were unable to make the same inferences about the meanings of the signs as the older learners. Beykirch, Holcomb, and Harrington (1990) reported that adult learners retained iconic vocabulary better over non-iconic signs. This finding is supported in the studies by Lieberth and Gambel (1991) and Campbell, Martin, and White (1992), which suggest that adult learners use iconicity as a facilitative tool to remember vocabulary as long as they connect sign form with its meaning (Klima & Bellugi, 1979). The above studies suggest that the beginning level adult learners experience faster form-meaning mapping of iconic words than non-iconic words.

Pedagogical practices

Effective pedagogical practices in classrooms include instructional strategies and activities that ensure learners' access to language, foster their learning, maintain their engagement, and are challenging. Sign language instructors have shown a wide repertoire of strategies and activities that employ learners' L1 spoken language and L2 sign language to facilitate their learning, and that includes fingerspelling for clarification or identification of vocabulary and multimedia as a medium for instruction. In the following, various teaching techniques for vocabulary teaching are explored, and strategies are proposed for instructors to apply the findings from the research studies in their own teaching.

Practices in the teaching of sign language vocabulary to L2/Ln learners

As described in the previous section, learning sign language vocabulary as L2/Ln is not a simple process for native users of spoken languages. The most intuitive way to learn vocabulary would be through exposure, which can occur implicitly or explicitly. For example, learners can acquire vocabulary incidentally, as a result of another activity, or explicitly, with direct instruction. However, as articulated by Schmitt (2008), learners may not have a sufficient vocabulary if they focus on linguistic features or communication. In order to understand this complex learning process and maximize the learning of vocabulary, some SLA researchers investigated how vocabulary can be learned effectively.

SLA research in vocabulary has implicitly recognized that many language teachers are not clear about *how* to provide effective instruction. They suggest that incorporating explicit instructions may facilitate vocabulary learning. In his seminal work, Schmitt (2008) suggested the following strategies to teach vocabulary effectively:

- (1) Use L1 to facilitate establishing form-meaning mapping for the beginning level learners (e.g., Laufer & Schmeli, 1997; Ramachandran & Rahim, 2004);
- (2) Create an activity that allows learners to engage in vocabulary as advocated in the Involvement Load Hypothesis (e.g., target vocabulary items *need* to be used to complete a task, learners need to *search* for the meaning of the vocabulary items, and *evaluate* if the vocabulary is appropriately used in the context) (Hultsjin & Laufer, 2001); and
- (3) Repeat the exposure to target vocabulary items consciously by recycling the taught vocabulary words.

Although Schmitt did not mention sign language in particular, these suggestions, we believe that they can apply in L2/Ln sign language classrooms. The instructors may sign, voice, and/or write

while teaching vocabulary, design a task which requires learners to use target vocabulary through three steps (*need, search, evaluate*), and make sure that the previously taught signs are used again throughout the semester.

There are additional considerations in the teaching of sign language vocabulary to L2 learners. First and foremost, unlike spoken languages, in sign language classrooms teachers often employ voice-off instruction, that is, no spoken language is used while teaching. Second, fingerspelling, which is a manual representation of the alphabet, is often used by teachers when teaching sign vocabulary. Third, because of the visual modality of sign language, vocabulary instruction in sign language classrooms often incorporates multimedia. These three considerations are reviewed below in light of empirical studies. This is followed by suggestions for pedagogy.

Voice-on and voice-off instruction

A topic of debate for teachers and researchers is the language of instruction that should be used in L2/Ln language classrooms and considers whether teachers should use L2/Ln or learners' native L1 to teach L2/Ln. Several researchers studied teacher use of the learners' native languages within the L2/Ln spoken language classrooms and found advantages for incorporation of learners' native L1 languages for L2/Ln learning (Nakatsukasa & Loewen, 2015; Polio & Duff, 1994; Tang, 2002). Teachers use the learners' native language to discourage undesired behavior (Duff & Polio, 1990; Macaro, 2010), facilitate L2 comprehension (Cook, 2001; van Lier, 1995), clarify task instructions (Anton & DiCamilla, 1998; de la Campa, 2009; Ellwood, 2008; Macaro, 2001; Swain & Lapkin, 2000), promote learner-teacher relationships (Brooks-Lewis, 2009), encourage task completion (Swain & Lapkin, 2000), reduce learner anxiety (see Hall & Cook, 2012, for a review), and minimize cognitive overload (Bruen & Kelly, 2017; Scott & de la Fuente, 2008). In addition, several studies reported that using learner's L1 facilitated the acquisition of L2/Ln vocabulary. Researchers found that while instructors may subscribe to a target language use policy, there is often a high ratio of native language use when teaching vocabulary (Tang, 2002; Nakatsukasa & Loewen, 2015; Polio & Duff, 1994). Tian and Macaro (2012) gaged the vocabulary acquisition of Chinese learners of English and found that using the target language for instruction was beneficial for them in cases when they need to use the target language.

Teachers' instructional language has also been a topic of debate in sign language classrooms. Although studies in L2/Ln spoken language classrooms have reported benefits for using a learner's native language as a part of instruction, the issue in the use of native language is mirrored in sign language classrooms. In sign language classrooms, the issue is the choice between the visual-gestural modality of sign language and the oral-aural modality of spoken language, the latter of which is exclusively used in L2/Ln spoken language classrooms (Hilger et al., 2015). Teachers in sign language classrooms create immersion environments by establishing "voice-off" zones where spoken language is not present, regardless of the learners being hearing or not. As a result, instruction on grammar, vocabulary, and culture is conducted through sign, gesture, pictures, and use of the dominant or majority language in writing. Teachers may incorporate props, presentations, and handouts. If spoken language is not a preferred mode of instruction in classrooms (e.g., not all the teachers and learners are hearing), teachers may choose to use the written form of the dominant language in order to aid learners in making connections between vocabulary form and meaning. Voice-off environments require learners to learn vocabulary in the visual plane and produce signs using an articulatory system that is new to the learners, particularly those who are native users of spoken languages (Hilger et al., 2015).

The debate about instructional language is further complicated in sign language classrooms by cultural considerations in pedagogy. Many teachers of sign language are Deaf themselves

(Newell, 1994; Cooper, Reisman, & Watson, 2008). Using learners' native, spoken languages would be a nonviable or unproductive option for L2/*Ln* instruction in sign language for most of the Deaf teachers. Even if spoken language is available to instructors, they may be hesitant to use it in any form. For sign language users, spoken language is inherently exclusionary and is privileged in the majority (hearing) society. For example, use of spoken language may be seen as oppressive or exclusionary within the voice-off context created within the classroom because it may be seen as marginalizing to members who do not engage with or have access to spoken language. The instructors may believe that use of the learners' native spoken languages stunts the learners' learning of sign language. In addition, voice-off communication within sign language classrooms mirrors the communication environment, that is, use of sign language, in the Deaf community. Unfortunately, there are very few studies that examine the impact of instructional language differences on the teaching and learning of sign language vocabulary. We argue that teachers and researchers should be attentive to and respectful of cultural nuances and mindful of how spoken language is often privileged in various contexts. If the studies support using spoken languages in the classroom, researchers should also offer pedagogically viable options and inclusive strategies for instructors, particularly those who are Deaf, to work with hearing, Deaf, and hard-of-hearing L2/*Ln* learners.

There are a few studies that examined the efficacy of voice-on and voice-off instruction on vocabulary learning in sign language classrooms. Rosen and colleagues (2014) examined the acquisition of ASL vocabulary words utilizing voice-off, voice-on, and mixed method instruction. In the first study (Boyle, 2011), 75 adolescent L2 learners of sign language were assessed on vocabulary about family signs and interpersonal relationships. Three conditions were used, including a voice-on, voice-off, and mixed methods group. Learners in the voice-on condition used spoken and written English while a strict no-talking policy was enforced within the voice-off class. Pictures, gestures, and visual explanations were used to explain vocabulary for the voice-off condition. The mixed method group utilized a balance of ASL and spoken and written English. Voice was used to present vocabulary, as well as written English, pictures, and both visual and verbal explanation. For all conditions, the instructor highlighted iconicity when present and reviewed production parameters for each target item. The results showed that production scores were highest in the voice-off group, followed by the mixed methods group and then by the voice-on condition. In the second experiment (Daley, 2011), 25 high school learners were assessed on job and career-related vocabulary, without use of a mixed methods group. This study also found advantages for vocabulary acquisition for the voice-off group. In contrast to the findings in Rosen et al. (2014), a study by Traxler and Nakatsukasa (2018) examined the effects of using voice-on and voice-off instruction with 26 adult learners in a beginning ASL class. Learners were assigned to one of two groups, where one group was received instruction via signs and fingerspelling (without voice) and the other received instruction using spoken English and signs (with voice). This study assessed knowledge of proper nouns exclusively (signs for countries). No significant differences between the conditions were found. The above studies show that the results are inconclusive about the role of sign iconicity in the learning of sign vocabulary.

To assess whether learners differ in the way they process sign vocabulary, DeLouise (2011) examined the characteristics of successful learners of voice-off instruction and found that success was dependent on learner's auditory and visual processing abilities. DeLouise examined the retention of vocabulary for ten beginning level ASL learners diagnosed with a language disability, or difficulties with auditory or visual-language processing. Vocabulary used in this study was from a unit about the home, including topics such as rooms, transportation, furniture, directions,

and other items within the home. Learners with high visual abilities and challenges with processing (or low processing abilities) learned vocabulary well with voice-off instruction, while learners with low visual abilities and high verbal abilities acquired vocabulary better with voice-on instruction. Considering these findings in combination with the two studies highlighted by Rosen et al. (2014), language modality and auditory visual capacities directly influence acquisition. These findings suggest that teachers should choose and utilize both learners' native and target language for instruction of sign language vocabulary depending on learners' characteristics.

The above studies have implications for teaching sign vocabulary. The studies showed that beginning level hearing learners may benefit from including spoken language as a part of instruction, and teachers should consider that learning processes for all learners are not identical. Though considerably more research is needed, teachers may choose to initially use the learners' native spoken languages to introduce signs either through speech or, if it is a nonapplicable option for the instructor, through writing. Teachers may also choose to use voice in classrooms to explain iconic sign vocabulary and sign parameters. By describing how to sign the vocabulary (e.g., explicitly showing how iconic vocabulary are constructed, reviewing the five parameters of a sign), rather than providing learners with signs and have them practice, the teachers may facilitate the learners' production and comprehension of sign vocabulary. Because learners' processing abilities may vary, teachers should attend to these individual differences, differentiate their instruction, consider voice-on and voice-off instruction when appropriate, and have the learners practice producing sign vocabulary. Additionally, many L2/Ln learners are hearing individuals. These students are learning to operate in a different modality from their native spoken language, which may be cognitively taxing and tough on learner's eyes. It may be helpful to incorporate breaks in lessons for the learners to reset their vocabulary processing in the visual-spatial plane.

Fingerspelling

Fingerspelling is a unique feature in sign languages in that it is an adaptation of alphabet systems in dominant written languages (Klima & Bellugi, 1979). For instance, ASL fingerspelling and English alphabets are related in the sense that the fingerspelled letters correspond to the letters in the English alphabet. Studies examined have found that there is a relationship between fingerspelling knowledge and reading ability. For hearing learners fluent in written and spoken English, understanding fingerspelling involves the transfer of their English reading skills to the visual/receptive context (Babbini, 1974), among other factors.¹ Fingerspelling accounts for 12–35% of ASL (Padden & Gussak, 2003) and can be used to provide clarification for vocabulary, explain a concept, or label a word for which a sign does not exist.² Because of the function and prevalence of fingerspelling in most sign languages, understanding full utterances often requires both fingerspelling and vocabulary knowledge.

Teachers use fingerspelling in classrooms to map meanings to forms of signs and to learners' L1 words (Beykirch, Holcomb, & Harrington, 1990). It is pedagogically important for teachers to verify that learners are able to understand fingerspelling correctly. Without understanding fingerspelling promptly, learners may lose the opportunity to process further information in the utterance because their attention is mostly drawn to connecting the new vocabulary item with what was fingerspelled. In addition, learners should be exposed to different styles of fingerspelling by different signers and to fingerspelling from different spatial perspectives, and from inside and outside of sentential context. This may help learners attend to the similarities in the "shapes" created in fingerspelling by different individuals. For further information on fingerspelling learning and instruction, the reader is referred to Geer in Chapter 14 in this volume.

Use of multimedia for vocabulary instruction

Technology is used in many language classrooms and multimedia has been a vehicle for sign language teaching since the 1980s (Teuber et al., 1980; Beykirch, Holcomb, & Harrington, 1990). Sign language teachers often incorporate technology with authentic materials created by members of the Deaf community, and use it to expose learners to different signers and signing styles, increase the amount of input and interaction with sign language, and provide learning opportunities such as independent learner practice outside of the traditional classroom. Technology is used in many forms for sign language learning. Sign language curriculum often comes with supplemental content on CD-Roms (see Smith, Lent, & Mikos, 2008; Zinza, 2006) and several programs are available online such as online sign language dictionaries, fingerspelling quizzes, and other content created by members of the Deaf community.

Several studies have found benefits of such technology use, particularly the video recordings, on vocabulary learning (Beykirch, Holcomb, & Harrington, 1990; Slike, Chiavacci, & Hobbis, 1989). Beykirch and colleagues taught vocabulary to college-aged learners using computer-assisted instruction and videotaped presentation. Learners in the computer-assisted condition were taught vocabulary by an animated figure on computer screen. Those in the videotaped condition viewed a video of their classroom instructor teaching the same vocabulary items. In both conditions, each sign was produced four times, accompanied with captions. Researchers examined learners' comprehension and retention of target vocabulary items and found significantly higher scores for the videotaped condition in both comprehension and retention. Beykirch and colleagues were cautious regarding their findings, however, because positive gains may have been due to learners' novelty with technology, differences in instruction speed, and instructor familiarity. Similarly, Slike, Chiavacci, & Hobbis (1989) found that the learners' comprehension scores of vocabulary items were higher after watching a videodisc containing the target vocabulary items than after attending a traditional lecture on vocabulary. These studies provide evidence that the use of technology can supplement classroom instruction, and is an effective tool for learning vocabulary in sign language. As sign languages are typically minority languages used by communities of the Deaf and have considerably less users than spoken languages, technology can serve as a useful tool for helping learners gain exposure to the language through interactions online. Yet, as technology advances, it is crucial to examine in what way technology can be used to maximize learning and what types of sign language learners (e.g., personality, aptitude) benefit most from technology-enhanced instruction.

The above studies measured the effectiveness of instruction for learning target sign language vocabulary. There is one study that investigated learner attitude toward technology use for learning sign language. Ehrlich-Martin (2006) conducted a case study to examine learner perceptions of an online video conferencing in an ASL course. Several learners experienced technical difficulties and were frustrated with their experience learning ASL virtually. The online modality may negatively influence learner's ability to engage in meaningful interactions. While videoconferencing or online courses are popular within institutions of higher education, the use of technology should be carefully introduced as it may inhibit the naturalistic discourse that exists within a face-to-face classroom. Educators, along with coordinators and researchers of sign language courses, may need to investigate how to prepare prospective learners for online or hybrid courses.

Multimedia and technology provide the platform for sign language teachers to store and draw the materials and videos of poems, news, and stories that are signed by Deaf individuals from which they introduce learners to different individual styles and regional variances in the production of sign vocabulary. However, some of the technologies have the potential to reduce

the opportunities for learner–learner peer interactions. For instance, if classes are offered using online instruction only, teachers should consider activities that bridge online studies to face-to-face interactions such as giving assignments to learners that require one-on-one interaction with classmates, the local Deaf individuals, and/or interpreting learners online (e.g., through use of video chat room, such as Skype, Facetime, and Zoom).

Future trends

The field of L2/Ln sign language research is admittedly a new field worldwide, considering that sign languages of the world were not official languages until the late twentieth century. Interest in sign languages from an educational standpoint has increased in many countries with increased number of sign language classrooms at the secondary and postsecondary levels (e.g., Rosen, 2015 for the US). At the occupational level, sign language interpreters have sought to professionalize the career and many national certifications now require prospective interpreters to obtain bachelor degrees. As a result of increased interest, desire to optimize learning and legitimize pedagogy and consideration of best instructional methods becomes increasingly important.

The studies reviewed in the above have shown differences among learners in their learning of vocabulary for comprehension and production, the influence of sign iconicity in vocabulary learning, and effectiveness of instructional languages and multimedia use in vocabulary instruction. However, compared to the studies conducted with spoken languages, there is paucity in the number of experimental and descriptive research studies on L2/Ln sign language vocabulary teaching and acquisition, and only a few studies that provide strong pedagogical implications exist (e.g., Rosen et al., 2015; Traxler & Nakatsukasa, 2018). The following are suggestions for future research studies and pedagogical applications in sign language vocabulary instruction and learning.

Future research studies

To date, little research has been conducted about how to employ different instructional techniques effectively in sign language classrooms. It is crucial for educators and researchers to conduct intervention and/or action studies that employ different teaching approaches. As researchers continue to investigate interventions for sign language learning, instructors can learn how to bridge the gaps between literature and pedagogy by conducting research in their classrooms, aligning with Rosen et al. (2015). The field would benefit from observational research (e.g., first-hand accounts by teachers of their current vocabulary teaching practices), and intervention research (e.g., the effect of identifying target items using fingerspelling or written English). These studies will help to identify the most effective teaching materials or teaching strategies for specific learner populations and will expand understanding of the specific linguistic features of sign language.

Most studies in sign language acquisition focused on Deaf learners and L1 sign language acquisition. There has not been extensive investigation of how hearing learners acquire vocabulary in L2 signed language. Though some work has focused on adult learners acquisition of sign language, more is needed surrounding hearing populations within the secondary and postsecondary classroom context to fully capture the processes of vocabulary acquisition. Because of the differences in the input modalities between signed and spoken languages, it is logical to assume that Deaf and hearing populations may experience different learning and acquisitional processes. As a result of the differences in modality between signed and spoken languages, Hilger et al. (2015) discussed that hearing sign language learners may go through additional

processes when acquiring sign language. Including hearing learners as study participants, or conducting a contrastive study between hearing and Deaf L2 sign language learners, will further our understanding of the process in learning sign languages and to provide effective teaching methods for the different cohorts of learners.

Most of the research studies conducted in sign language vocabulary measured learners' receptive skills such as recognition and comprehension (see, however Traxler & Nakatsukasa, 2018). The field calls for further studies that incorporate learners' ability to produce learned vocabulary items, as comprehension and production are two distinct skills. Therefore, it is important to investigate which vocabulary items in both production and comprehension that the learners tend to make errors. Teachers can learn from learners' errors and modify their teaching of vocabulary.

Though controversial within the Deaf community, the increasing enrollment of hearing learners in sign language classrooms necessitates further investigation of the effectiveness of voice-on and voice-off instructions for the acquisition of signed vocabulary and development of sign fluency. Researchers should be mindful of Deaf cultural considerations in their investigation regarding whether the use of learners' native spoken languages in the classrooms can facilitate their sign vocabulary acquisition. It would be highly informative to know the learners' attitudes toward voice-on and voice-off instructions in a sign language classroom to further understand their perspectives and expectations.

Regarding sign iconicity, the inconclusive findings in the studies reviewed earlier suggest that future research studies examine the relationships between different learning conditions (iconic and non-iconic sign vocabulary, and topics), groups of learners, and classrooms. In addition, the studies need to examine personal characteristics such as learners' demographic characteristics and hearing status, and linguistic features such as sign complexity and frequency, as possible factors that shape the learners' sign vocabulary learning and acquisition.

Regarding fingerspelling, although it is frequently used in the classroom, the relationship between fingerspelling instruction and the L2 learners' acquisition of sign vocabulary is still underinvestigated. Researchers and educators should investigate how fingerspelling is used in the classroom to facilitate vocabulary learning specifically, and how fingerspelling can be used as an instructional intervention. A collection of such studies will enable the field to establish effective sign language teaching curriculum for future learners.

Future pedagogical practices

Teachers may help enhance learners' learning of sign vocabulary by highlighting the iconicity – as well as non-iconicity – of sign vocabulary. Although there is no consensus about teaching about the iconicity of signs, research suggests that adult learners are better able to retain vocabulary when they are aware of the relationship between an iconic sign form and its connection with meaning that the teachers highlighted. Additionally, incorporating explicit teaching on sign parameters in both iconic and non-iconic lexical signs may help the learners become explicitly aware of how to sign accurately and improve their sign production ability.

It would be helpful for teachers when teaching vocabulary to make decisions regarding the language of instruction depending on the learners. Particularly for L2/*L_n* hearing learners, teachers may choose to provide instruction for vocabulary lists in a spoken language with follow-up instruction and use of vocabulary in the target language. They may suggest opportunities for learners to practice and expand their sign vocabulary knowledge by using sign language outside of classrooms. Learners can attend events within the Deaf community as is appropriate and find videos online to supplement their learning. Teachers can provide instruction to the learners on pragmatic ways to ask questions to Deaf signers during Deaf events. It is important that the

learners be taught to self-advocate and become comfortable asking questions if they miss something, particularly as it relates to fingerspelling.

Finally, compared to spoken languages, there are fewer teaching materials for teaching sign language vocabulary. Much remains unknown about the extent to which the materials, both published and unpublished, in sign language vocabulary are utilized in sign language classrooms. Sign language researchers, SLA researchers, teachers, and teacher trainers need to collaborate and develop effective teaching materials in sign language vocabulary.

Notes

- 1 See Hernandez (1997) for a review of other components important for receptive fingerspelling development.
- 2 Though there are rules for fingerspelling use when describing vocabulary, frequency is often dependent on signer preferences, including perception of audience (Nicodemus et al., 2017).

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Teaching L2/*L_n* sign language grammar

Russell S. Rosen

Introduction

The ability of individuals to have meaningful conversations, clearly express thoughts and feelings, reduce ambiguity, exhibit fluency, and be effective in their intent hinges on their grammatical constructions (Ellis, 2002a). Grammar, or syntax, consists of morpho-syntactic devices and sign (word) order that combine lexical items into phrases and sentences. There are different grammatical constructions that are based on topics, contexts, and relationships. As individuals navigate through different topics, contexts, and relationships, the grammatical constructions they use vary. This is the main consideration in the teaching of grammar.

The teaching of sign language grammar is the imputation of knowledge of linguistic rules, how grammar is used, and situations where grammar is used. It requires the explication of the grammatical features and different grammatical structures for the learners to talk about different topics under different situations and for different social relationships. As grammar varies by topics, contexts, and relationships, there are different aspects in the teaching of grammar. They include lexical parts of grammar, phrase structures, grammatical order structures, and uses of grammar. Sign languages carry certain features that are shaped by its visual and manual modality which are not shared by spoken languages. They are, for instance, non-manual facial and bodily expressions, constructed action, and the type of classifier systems found in many sign languages.

The goal for grammar teaching is for the learners to develop grammatical, communicative, and pragmatic competencies in using sign language for social interaction. In the teaching of sign language grammar, however, Rosen and Woodward in Chapter 10 of this volume, McKee et al. (2014), and Quinto-Pozos (2011) saw that sign language instructors who did not receive specialized training possess little knowledge of the grammatical features of the languages, much less on the application of their knowledge of sign language linguistics to curriculum design and teaching strategies. When sign language instruction was first introduced at the elementary, middle, secondary, and collegiate education institutions in the US, many countries in the European Union (EU), Africa, Asia, and other places in the world in the 1980s and 1990s, there are no teacher training programs (Wilcox & Wilcox, 1997), or national curriculum. Wherever teacher training programs were established in the countries, mostly in the 1990s and 2000s, they were left with insufficient materials, no standard curriculum, and a few studies on second

language instruction and acquisition that were available for sign language teachers (Wilcox & Wilcox, 1997). The teachers developed their teaching of grammar with gut feelings, based on knowledge of Deaf community and culture customs, and were not evidence- or data-based (Wilcox & Wilcox, 1997; Nilsson & Schönström, 2014). There were earlier attempts to introduce some teaching strategies, particularly in the US with Caccamise, Garretson, and Bellugi (1981) and Padden (1986). Their approaches were dependent on the grammatical constructions that were known at that time. Several chapters in Caccamise, Garretson, and Bellugi (1981) and Padden (1986), discussed linguistic rules and provided examples of how to teach them. However, they did not provide evidence to assess its effectiveness.

Consequently, early sign language teachers operated with little knowledge and understanding of L2/Ln teaching, curriculum, assessment, and learning process. They acquire information about teaching from workshops, face-to-face encounters, conferences, and on-the-job (Wilcox & Wilcox, 1997). Teachers often bring their intuitions and perspectives on grammar to classrooms that are not drawn from research studies in pedagogy (Quinto-Pozos, 2011; McKee et al., 2014; Rosen & Woodward, Chapter 10 of this volume). Wilcox and Wilcox (1997) reported that the earliest teaching approach was the teaching of signed spoken language, such as Signed English, Pidgin Sign Language, or codes of manual sign language for spoken languages in the US and signed spoken languages in the other countries.

The teachers ought to have a knowledge, or “metalinguistic awareness” (Andrews, 1999) of grammar and know how to incorporate it in curriculum and instruction. There is a need to provide grammar teachers and practitioners with what researchers know and understand about what constitutes and what works in the teaching of sign language grammar. To this end, this chapter explicates and discusses the main theoretical perspectives and pedagogical practices in the teaching of sign language grammar with second language (L2/Ln) learners.

Theoretical perspectives

Different approaches and strategies have been developed during the history of the teaching of grammar in classrooms with learners who learn sign languages as L2/Ln. The pedagogy of grammar in L2/Ln sign languages is guided by theories of the psychology of learning, linguistics theories, and principles of teaching. The pedagogies in the importation of sign language grammar differ in approaches, which include the selection of topics, types of linguistic structures, and the degree of emphasis on vocabulary and grammar. The language forms and pedagogies carry certain assumptions about linguistics and the psychology of learning, and are often influenced by the prevailing theories and approaches in linguistics, the psychology of learning and teaching, and the values of a society that dictate topics to be taught. In addition, the approaches differ in how learners deal with grammatical issues and how they should be presented to them. The following overview of the different theoretical perspectives and pedagogical approaches in the teaching of grammar is based on a study on the history of sign language curriculum conducted by Rosen (2010).

Linguistic theories

Linguistic theories are one of the drivers of teaching strategy. Linguists develop theories by identifying components of and rules for constructing languages. Language users create language structures, and linguists examine patterns in language structures. Their theories are their discerning of the underlying rules that govern the creation of lexemes, morphemes, and syntax (O’Grady et al., 2004). The linguists looked into lexical items, combinations of lexical items into

phrases, modifications of lexical items for grammatical purposes of connecting between phrases, lexical and functional categories, word order, and meanings of utterances.

Psychology of learning

Psychological theories of learning are another driver of teaching strategy. Psychologists study the learning process and the acquisition of language (Gleitman, Reisberg, & Cross, 2007), and generally find that psychological processes shape learning. Variations in learning success are attributable to the substantial individual differences in how they discover the patterns (Brooks & Kempe, 2013). Grammar instruction would need to be made more explicit for the learners to discover patterns (Brooks & Kempe, 2013).

Teaching approaches

Models of L2/*L_n* sign language teaching tend to follow models of L2/*L_n* spoken language teaching. Teaching a language entails teaching the linguistic rules for creating utterances in the language (Brown 2006). Language teaching is shaped by the linguistic theories and the psychological theories of language acquisition. Developments in teaching approaches follow developments in linguistics and psychology of learning. Studies in learning drive psychological theories of learning, and new studies generate not only new theories of learning but also new linguistic theories. The resultant changes in linguistic theories change teaching approaches in second language. Later studies in learning generate changes in learning theories, which then change linguistic theories and teaching approaches, and the cycle is repeated (cf. Richards & Swan, 2001). In addition, ASL curricular material may model that of existing spoken-language curricula, or it may be designed straight from the theories and approaches they employ. Different teaching approaches employ various combinations of linguistic rules, uses of language, and the characteristics of a community and are often shaped by certain theoretical, empirical, and pedagogical assumptions.

*Approaches in teaching L2/*L_n* grammar*

The following review is drawn from Rosen (2010) and is divided into sections that contextualize different ASL teaching methods according to different theories and approaches in linguistics, learning, and teaching that were prevalent at the time of their development. The spoken language instructional approaches are identified for each teaching approach, and the reader is referred to Rosen (2010) for further description of the identified approaches.

Behaviorism

One of the oldest theories in the teaching and learning of languages is based on the assumption that learners came to classroom with a “tabula rasa.” Teachers would need to condition them to learn languages. The behaviorists such as Watson (1930) and Skinner (1957) proposed that individuals do not act freely but in response to outside stimuli in a programmed way. They suggested that languages are best learned through modeling, drills, and rote memorization. Linguists such as Bloomfield and Harris believed in fixed, predetermined, immutable, and irreproducible types of language structures as “word classes” (Bloomfield, 1933), which are parts of speech defined in terms of their grammatical features. Sentences that are formally alike may be mapped, or transformed, into another that preserves the linear combinations (Harris, 1951). Languages can be learned by memorizing strings of word chunks, substituting words within strings, and arranging different word strings into a word order. In spoken language instruction, the grammar

translation method (Titone, 1968), direct method (Titone, 1968), situational language teaching (Palmer, 1917), and the audiovisual method (Brooks, 1964; Fries, 1945) followed the percepts of behaviorism.

Several studies have pointed out the limitations of the behaviorist approach. The issue with the behaviorist teaching approach is that it does not make grammar explicit to the learners. Brooks and Kempe (2013) found that learners are made aware of the grammatical structures in a language if the structures are explicitly shown, described, and explained to the learners. Without this, the learners are left with their own devices to learn the grammatical structures, including asking teachers about the grammatical principles, while other learners do not and instead use their beliefs about language, communication, and grammar (Loewen, 2015). Studies showed that the learners frequently expressed sentences not in the target language but translated from the L2/*L_n* into the L1, suggesting that L1 transfer plays a role in the learning of L2/*L_n* vocabulary and grammatical constructions (Gorsuch, 1998; Shih, 1999). Other studies showed that the learners made minimal gains in L2/*L_n* communication skills (Gorsuch, 1998; Swain, 1985; Anderson, 1993; Fotos, 2001; Shih, 1999). The learners are active agents of learning, which informed a new theory in linguistics.

Rationalism

Instead of agreeing that people learn languages by imitation and rote memorization, Chomsky (1965), and supported by Radford (1997), argued for innatism, or an innate human ability to create languages. A Language Acquisition Device (LAD) is proposed as a mentalistic, internalized linguistic system for language that appears in actual utterances through the process of generative rules, which are compounded when language is exhibited on the surface. Rationalism emphasizes top-down thinking skills and posits that languages are learned by analyzing linguistic rules. The learners bring their linguistic knowledge to learn how to create meaningful sentences in L2/*L_n* languages. The approaches in spoken language instruction that follow the percepts of rationalism are Total Physical Response (Asher, 1969), the Silent way (Gattegno 1972), and the Whole Language Approach (Rigg, 1991).

Empirical studies of rationalism showed that grammar instruction improves learners' meta-linguistic knowledge of the structure and rules of L2/*L_n* languages but not their actual use of the languages (Alderson, Clapham, & Steel, 1997; Norris & Ortega, 2001; Ellis, 2002a, b). Those who learn an L2/*L_n* by negotiating meanings of utterances during conversation fare better than those who focus on language generation drills (Savignon, 1997; Pica, Young, & Dougherty, 1987; Harley, 1989; Day & Shapson, 1991; Lyster, 1994; Murunoi, 2001). While learners are active agents of learning, they need to use the language in order to know it. This reasoning led to the development of the Communicative Language Teaching (CLT) approach (Canale & Swain, 1980), that is predicated on the learners going through natural stages of acquisition of L2/*L_n* languages that are centered on communicative success (Andrews, 1999).

Communication

The communicative language teaching is built on the works of Hymes (1971) and Halliday (1978) that led to a communication theory of language in society. The theory proposes that individuals learn languages best through socialization and not by rote memorization of linguistic rules. Given a social context, individuals learn how to construct utterances to generate meaning through communication. In order to use a language correctly, as Hymes (1971) argued, one needs to learn not only its vocabulary and grammar but also the context in which words are used, and construct utterances that reflect the topic and context, including message form and content, setting, addressor, addressee and audience, and purposes. People are motivated to learn

languages, according to Halliday (1978), when it serves their purposes and construct utterances that may be instrumental, representational, regulatory, heuristic, interactional, personal, and imaginative to satisfy their physical, emotional, and social needs. The above theories suggest that language learning consists of learning how to create utterances by interacting with others in various communication situations. Cooperative Language Learning (Johnson et al., 1994; Kagan, 1992, Rodgers, 1988) is an example of the approach used in spoken language instruction that followed the percepts of communication.

Several studies showed limitations of the communicative approach. There are no clear tasks for which the learners can generate communication, and that communication by itself does not reflect the repertoire of linguistic rules or grammatical forms of a language. Several studies found that high levels of language proficiency were achieved by L2/*L_n* learners who focused on specific tasks and topics acquired vocabulary, constructed and used grammar, and had dialogues through communication about tasks and topics better than L2/*L_n* learners who do not (Pica & Dougherty, 1985; Genessee, 1987; Duff, 1986; Long, 1996; Swain, 1985; Platt & Brooks, 2002). While the communicative approach meets the need for function in language, there is a need to focus on form. While learners may have clear intent or function to communicate, they often do not produce proper grammatical forms. Proper form in grammar is generated when feedback and re-castings of grammatical inaccuracies aided acquisition (Nobuyoshi & Ellis, 1993; Ellis & Takashima, 1999; Dougherty & Varela, 1998; Nicholas, Lightbrown, & Spada, 2001; Lyster & Ranta, 1997; Izumi, 2002). The above studies suggest a need to develop content-based instruction in combination with task-based instruction to introduce grammar forms and enhance L2/*L_n* learners' mastery of linguistic structures.

Conversationalism

Conversationalism is a teaching approach that is comprised of Content-Based Instruction (CBI) and Task-Based Language Teaching (TBLT). CBI sees language as a means of acquiring information and that language learning is organized around content, not just linguistic rules or principles (Brinton, Snow, & Wesche, 1989; Stryker & Leaver, 1993, 1997). Content refers to topics that people talk about, which may be about current events, science, math, social studies, and the arts. CBI builds on the precepts that people learn a language best when it draws on their prior knowledge and experience, addresses their needs, and is purposeful (i.e., giving and obtaining information). TBLT sees language learning as learning how to create meanings of things and activities under different types of real-world tasks, such as drawing diagrams and asking for information (Ellis, 2003; Skehan, 1996; Willis, 1996). TBLT posits that learners learn languages best when they are engaged in activities that involve real communication and use the languages to complete meaningful tasks.

Cognitive linguistics

An approach that is gaining support among sign language linguistic and teachers is cognitive linguistics. Cognitive linguistics builds on mental and visual imagery and the cognitive organization of images of real entities, actions, and states (Langacker, 1987). Grammar is seen as a mental conceptualization of objects and their movements across time and space, and an interpretation of meaning of real entities, actions, locations, and attributes. Meaning, or function, determines the formal organizing principles of phonology and grammar. Changes in concepts of entities and its attributes, movements and locations, either actual or metaphorical, generate changes in phonological and semantic representations and in grammatical structures. Teachers who follow the cognitive linguistic approach use and modify arrangements of pictures and images for learners to

generate lexicon and grammars. While generative linguistics is form driven, cognitive linguistics is meaning driven.

Translanguaging

Particularly in Europe, one aspect of sign language teaching is the role different languages and modalities play in the teaching of grammar. There is a shift in European countries where sign language teaching is influenced by the neighboring language(s) in classes. As Holmström and Schönström (2018) found, there are distinctive bimodal parameters of adult learning of sign language as an additional language. Translanguaging is proposed as a model for the multilingual (use of different languages) and multimodal (use of different modality, e.g., the oral-aura modality of spoken languages and visual-gestural modality of sign languages) teaching approach. Under the translanguaging approach, the sign language teachers developed multimodal resources and languages in the teaching of grammar (Holmström & Schönström, 2018; Nilsson & Schönström, 2014).

Pedagogical practices

Current pedagogical approaches

As explained in the above, the pedagogical approaches that are currently used are shaped by developments in linguistic theory and the psychology of learning. Examples of sign language pedagogical approaches are provided. They are largely drawn from the ASL curricular materials that are commercially available on market in the US and Canada.

Teaching grammar through translations, drills, and rote memorization

One teaching strategy is informed by the precepts of behaviorism. Teachers teach grammar by having learners be drilled, translate, and rote memorize fixed phonological, morphemic, and syntactic constructions.

Topics that are covered under behaviorism tend to consist of linguistic categories and contain lessons organized by linguistic principles, with vocabulary and sentences. They include personal pronouns and possessives; basic sentence structures with nouns; adjectives; verbs in present, past, and future tense; classifiers; numbers; quantifiers and plurals; wh- questions and rhetorical questions; modals; locational relationships; negation; time measurements; conjunctions; inflections; topicalization; and conditional sentences. Dialogues are arranged by conversational activities such as telling, requesting, giving information, describing, and giving directions, as well as by topics such as personal information, family, home, school, travel, work, activities, and future plans.

In each lesson, teachers begin with a description of a topic. Learners are first given sign vocabulary and sample sentences to study and memorize. They are next given similar sentences with questions. The teachers write language grammar on board and ask the learners to sign each word literally, without modifications of the lexical items to mark for time, person, and number. They explain linguistic structures with examples and illustrations. Teachers then ask learners to memorize and recite them when responding to questions asked by the teachers. Learners answer questions based on the information in the sentences. New phrases are then given. With these phrases, the learners are asked to create sentences using the structures they have learned. In substitution drills, learners replace a sign for another sign in a given sentence. Teachers may develop additional exercises and activities. There is no opportunity for the learners to generate their own sentences.

Examples of this teaching strategy are found in the Basic Course in American Sign Language (Humphries, Padden, & O'Rourke, 1994) and *The American Sign Language Phrase Book* (Fant, 1983). The learners complete memorization and substitution exercises and question-response drills. The topics and lessons largely consist of linguistic rules. Dialogues are printed in English, and the learners are asked to sign in ASL, memorize the phrases, and are given drills in which they repeat their sign production until they are proficient. In essence, learners are asked to translate English utterances into ASL grammar. There are no opportunities for the learners to create their own phrasal structures.

Teaching grammar by analyzing linguistic rules

Another teaching strategy is based on the principles of rationalism, which posits that languages are learned by analyzing linguistic rules. Teachers teach grammar by giving learners sentences and having them analyze its linguistic constructions.

The topics that are covered under rationalism tend to include linguistic rules for sign language grammar, rules for social conversation, and a few social situations. The linguistic rules include sign formations for lexical and functional categories such as nouns, verbs, adjectives, prepositions, pronouns, phrases, classifiers, sentences, tenses, aspect, time, number, and quantities. The rules for social conversation include introductions, politeness, ensuring comprehension through interlocutor feedback, asking for help or information, giving descriptions, directions, instructions, making or declining offers, suggestions, giving advice, expressing attitudes and opinions, describing a sequence of activities, describing how things are done and stating what you need, explaining what was wrong, and commenting on someone's competence or expertise. The topics on social situations and contexts are personal information, school, people, physical appearance, clothing, personalities, character, feelings, opinions, preferences, family, friends, time of day, food and food shopping, death and dying, personal experiences, activities, future plans, occupations, professions, recreational activities, travel and places and experiences, body, health, emergencies, current events, natural catastrophes, and measurements.

In each lesson, teachers begin with a vocabulary list and rules for creating linguistic constructions. Following this the teachers show a synopsis of a story written in dialogue form in printed English gloss, and illustrated it in ASL. A text analysis with grammatical explanations based on ASL rules is given for signs and sentences in the dialogue. In the exercises following the lesson, learners are given sentences with interchangeable phrases. They are then asked to create sentences by substituting phrases with other phrases. Teaching consists of teachers' demonstrating and explaining the linguistic rules for sentential constructions and learners' reciting those constructions and incorporating the linguistic rules. While examples of ASL constructions are provided, learners are not given opportunities to create their own sentences. Instead, they are asked to analyze the constructions in order to discern the linguistic rules.

Examples of the rationalist approach are found in the American Sign Language curriculum (Cokely & Baker-Shenk, 1980a, b), also known as the Green Books, *The Learning American Sign Language (Levels I and II)* (Humphries & Padden, 2004), and *Master ASL!* (Zinza, 2006). The learners analyze, learn, and memorize linguistic constructions. Dialogues are encouraged, but the learners recite signs and dialogues with each other.

Teaching grammar through communication

Still another strategy of teaching grammar is guided by the principles of communication language teaching approach, which holds that people learn languages through conversations.

The topics that are covered under the communication approach tend to include personal information, surroundings, residences, family, school and subjects, meals, activities, directions,

describing others, making requests, occupations, qualities, and routines, objects around the house; complaints, suggestions, and requests; life events; and descriptions and identification of objects. Other topics are conversations about the weekend, health and accidents, shopping, and story-telling techniques.

In each lesson teachers introduce vocabulary and sentences. They perform dialogues and tell the grammatical rules to be used in interactions. As grammatical structures are determined by the function that is covered in a unit, the teachers perform language functions such as asking for and giving information; complaining and commanding; and ways to describe, explain, express, narrate, tell, correct, evaluate, affirm, and decline. They showed different grammatical structures such as topicalization, aspect, numeral incorporation, classifiers, negation, role shifting, verb agreement, pronominalization, and nonmanual features. Then the teacher gives sentences with alternate phrases and asks the learners to substitute phrases in sentences. The teachers and learners role-play in different social activities in context. The role-play situations are constructed as daily encounters that occur under different contexts and that give meaning to the functions (Lentz, Mikos, & Smith, 1988).

Examples of the communication approach are found in the Bravo ASL! (Cassell, 1997) curriculum and the three-level Vista American Sign Language Series: Signing Naturally curriculum (Lentz, Mikos, & Smith, 1988; Smith, Lentz, & Mikos, 1989; Mikos, Smith, & Lentz, 2001). The learners learn communicative structures and interact with other learners to develop sign fluency.

Emerging pedagogical approaches

There are several emergent teaching approaches that are influenced by recent studies in language learning. However, they are not used worldwide and are not commercially available. It is possible that sign language teachers worldwide will adopt the following emergent approaches in the future.

Teaching grammar using content and task

A recent strategy for teaching sign language grammar builds on the CBI and TBLT notions whereby learners learn language if they have a topical content and a task to talk about. Teachers teach grammar by giving the learners a task with topical contents for them to learn how to have conversation. In each lesson, teachers begin by introducing a topic. They ask learners to brainstorm concepts and vocabulary. The teachers ask and show the learners the sign vocabulary. They followed by asking the learners to hypothesize about the grammatical structures for narrations and dialogues. Teachers showed the accepted grammatical constructions for conversation in monologues and dialogues, partner dialogues and solo monologues. Lessons end with the learners having paired dialogues with each other or giving monologues to class. The learners may as a group present the topics using the concepts and conversation structures learned. At present, there is no commercially published sign language pedagogy that is modeled after the current CBI and TBLT approaches. Future teaching strategy in the grammar of sign language as a second language should be based on the CBI and TBLT models.

Teaching grammar as translanguaging

Translanguaging is a strategy for teaching grammar that is developed by teachers of European sign languages. Teachers teach grammar by using a repertoire of communication tools to carry intentions and meanings. Translanguaging in the teaching of grammar is largely employed by teachers using different techniques such as gesturing, pointing, and pictures to cross-over, move-alongside, and weave-through the different languages and its grammatical features (Holmström &

Schönström, 2018). They also use different variations of a sign-supported spoken language to teach grammar (see Nilsson & Schönström, 2014). The learners talk about concepts, phrases, or sentences in the national language, and borrow words from other languages, including sign languages. However, there is no developed curriculum currently available for the teaching of grammar using the principles of translanguaging. In addition, there are variations among teachers in their knowledge of and skills in employing two or more languages to teach grammar. As Holmström and Schönström (2018) recognized, there are no evidence-based teaching practices that subscribe to the percepts of translanguaging. Sign language teachers who employ the translanguaging approach tend to follow their insights and intuitions (Holmström & Schönström, 2018). How the instructors use translanguaging to teach grammar using different languages, particularly when the different languages have different grammatical constructions, facial and bodily expressions, constructed actions, and classifier constructions, is an unresolved issue that needs further work.

Teaching grammar using corpus

A recent development that may impact on sign language teaching is the creation of a corpus of grammatical constructions in a sign language (see Leeson et al., in Chapter 24 of this volume). Conrad (2005) and Cresdee and Johnston (2014) suggest that corpus is an useful resource in teaching grammar. The use of corpus in teaching will aid L2/Ln learners learn the rules and patterns of use of linguistic units under different contexts and situations. For studies and suggestions on using sign language corpus to teach grammar, the reader is referred to Leeson et al. in Chapter 24 of this volume.

Considerations in the L2/Ln teaching of sign language grammar

There are two areas that teachers of sign languages need to consider in the teaching of grammar. They are the role of gestures and written language in teaching, and L2/Ln learners' acquisition of syntax.

Consideration in the use of gestures

Many sign language instructors use gestures in their teaching. Liddell (2003) argued that iconicity plays a role in learning the complexities of visual-spatial languages such as classifier constructions, verb inflections, and grammatical and lexical facial expressions. Gestures may aid in learners' cognitive understanding of language, particularly the identification of, and relationships between entities and actions. Recent studies looked at how iconicity in sign languages contributes to the learning of sign language grammars. However, the studies on iconicity looked into the perception and processing in sign language vocabularies (Rosen et al., 2015; Ortega & Morgan, 2015). There is no formal study on the role of gestures in L2/Ln sign language instruction. One teaching strategy that incorporates gestures is visual-gestural communication (VGC), which was created in the 1990s and used with both L1 and L2/Ln learners of ASL (Carvey & Kemp, 1995). Gestures are taught and used to identify objects and describe actions. The teacher shows the learners how to lexicalize and grammaticalize the gestural constructions into lexical and syntactic forms. Carvey and Kemp (1995) claim that their experience shows the success of VGC, although they provide no empirical evidence. However, there is no commercially available VGC curriculum for review here.

Considerations in the use of written language

Teaching sign language grammar requires transparency overheads, LED powerpoints, and a board, white board, or blackboard to write down. What is written is in a spoken language and it

can be written using the syntax of the spoken language or in glosses that are frequently written in capital letters and using the syntax of the sign language, drawn with lines and markers to indicate non-manual features such as found in the SignGram Blueprint developed by Quer and colleagues (Quer et al., 2017). Studies showed that glosses aid L2/Ln hearing learners (Kaul, Griebel, & Kaufmann, 2014) and deaf education majors (Buisson, 2007) in comprehending and remembering sign language grammar. Sign language teaching with L2/Ln/M2 hearing learners may need to use a multimodal approach and make grammar more transparent to the learners to prepare them for encounters with different individuals, contexts, and topics. However, teachers would need to be cautious in relying on glosses, lest the order of glosses may correspond with the spoken language word order rather than the order of signs in sign language, and that an impression may be given to the learners that vocabulary learning is emphasized at the expense of grammar learning (e.g., McKee & McKee, 1992).

L2/Ln acquisition of syntax

Teachers need to be mindful of the learning process of their learners when they teach grammar (Quinto-Pozos, 2011). Learners go through certain processes in order to master the syntactical structures of sign languages. Studies in spoken languages found that learners go through certain steps in their acquisition of syntax (Hawkins, 2001). Recent studies by Rosen (n.d.) on L2/Ln grammatical production by non-native learners showed certain steps in the mastery of sign language grammar. The learners produce utterances with bare signs, that is, without modifications. In the next step they link a few lexical items together to make a phrase, also without modifications of the lexemes to mark for person, time, number and gender. In the third stage, the learners produce lexical items with inflections to mark for time, gender, number, and referents. In the last stage, the learners produce utterances with not only the inflected lexical forms but also the incorporation of construction action, nonmanual features, and complex verb constructions to mark for referents. Learners vary in the rate and progress in their learning process.

In addition, L2/Ln sign language learners bring their knowledge of prior languages and their constructions of grammar to sign language classrooms. In learning sign language grammar, the learners may rely on their prior languages to guide the learning of inflected forms for lexical items, phrasal structures, and word order. Regarding L2/Ln sign language learners, in the early stages of their acquisition they may rely on the linguistic constructions of prior languages to guide their sign language constructions. They go through an interlanguage stage where they incorporate features from their prior languages and sign language into an interlanguage grammar. At the end, they are able to use and incorporate sign language principles and drop the linguistic features of prior languages in their sign language grammars.

In order for the L2/Ln learners to be able to move from their interlanguage stage to the final stage, teachers would need to ensure that the learners are exposed to the syntactical constructions in sign language, and to make grammatical principles explicit for the learners. There is the issue of explicit grammar instruction and implicit grammar instruction. If syntax is not made explicit to the learners, the learners would tend to rely on the constructions of the prior languages they are familiar with. If the language instruction is made explicit, the learners are given the opportunity to master it and rely less on their knowledge of prior languages that they learned and mastered.

Future trends

Sign language teaching and research will continue to benefit from new studies and technological advancements for efficient pedagogies in sign language grammar.

Future research studies

Three issues require future investigation. They are the grammatical structures that are taught in L2/Ln classrooms, the multimodal approach in teaching sign language grammar, and the use of gestures to teach sign language grammar.

The first issue pertains to research studies in sign language grammar. Research is ongoing in the areas of not only syntax but also the place of certain features that are parts of the visual and gestural modality in the linguistics of sign language, in particular, gestures, constructed actions, bodily and facial expressions, classifier constructions, and the use of space. New research findings in sign language grammatical structures do affect the teaching of sign language grammar. Teachers should keep themselves up to date on new findings regarding sign language grammar, so they can be better informed about what grammatical structures to teach their learners.

The second issue is the multimodality in sign language teaching scenarios. Particularly when deaf and hearing instructors work with L2/Ln/M2 hearing learners, there may be an over reliance of one language such as a spoken language, as a template to teach another language such as a sign language. This may work for some learners because of their perceptual processing of sign language (Rosen, 2015). Teachers who utilize the learners' L1/M1 as a resource may need to introduce the spatial-visual aspects of sign language in teaching. Research is needed to study the characteristics, process, and triggers for transitioning from L1 spoken language to L2/Ln sign language for the L2/Ln/M2 hearing learners. Multimodal approaches in sign language teaching may need to be assessed and developed.

The third issue is the use of gestures in the teaching of grammar. Liddell (2016) argued that gestures play a role in learning the complexities of visual-spatial languages such as classifier constructions, verb inflections, and grammatical and lexical facial expressions. In some teaching approaches, such as total physical response (Asher 1969), teachers need to role-play and gesture different concepts, actions, entities, and locations for the learners to see how they are expressed lexically and grammatically. Iconicity, as an aspect of gestures, has been studied in L2/Ln sign language literature. However, the studies looked at sign phonologies and vocabularies, not grammar (e.g., Rosen et al., 2015; Ortega & Morgan, 2015). There is a need to investigate whether and how gestures aid learners in their learning of sign language grammars.

Future pedagogical practices

Future pedagogical practices include techniques that tap on learners' cognitive understanding of language using the principles of cognitive linguistics. Recall that cognitive linguistics holds that language is mental representation of events, including persons, entities, settings, and actions that can be visualized in a "real space." They are visualized into entities, attributes, location, and movement. Teachers should demonstrate ways to convert "real space" to "language space," whereby these mental representations are translated into lexicon and grammar. Teaching strategy should be able to convert entity to nouns, attribute to adjectives, movement to verbs, location to propositions, and demonstrate that grammar refers to the relationship between entity (noun) and its attribute (adjective), as well as the relationship between entity and its movement (verb), and to its location (proposition) (cf. Langacker, 2008; Tyler, 2008).

There should be an increased use of technologies that allow teachers to teach and assess, and L2/Ln learners to learn sign language grammar and receive assessment. Kose and Uluer in Chapter 23 of this volume describe different software programs with video capabilities that provide opportunities for teachers to teach sign language and give feedback to learners. In addition, teachers may want to create online teaching and learning platforms for the teaching of grammar. An example of such learning platform is eLCA, where teachers install learning units on an aspect of grammar, which is constructed action, for the learners to review lessons they learned

in class (Fischer & Miller, 2014). Teachers may also want to use platforms that allow them to provide feedback to learners' signed productions outside of classrooms. An example of a software program where learners sign on and upload videos and teachers give synchronized feedbacks is GoReact in the US (<https://get.goreact.com>). While these technologies do not substitute for classroom teaching, they can be used to allow the learners to review and retain their knowledge and comprehension, and be corrected in their production, of sign language grammar.

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Teaching sign language literature in L2/Ln classrooms

Rachel Sutton-Spence

Introduction

Sign language literature in its various forms is increasingly recognized as a cultural language phenomenon, both within deaf communities and within the academy. Research on the topic is developing and this research is feeding into the classroom at all levels to support teaching deaf people's literature in a range of academic subject areas. As Ryan, an eminent American Sign Language storyteller, argued, storytelling in sign language "provides the audience with listening skills ... and ... practice in visualization, creativity and imagination skills ... and exposes [them] to cultural values and value systems" (Ryan, 1993: 145). Informally, teachers report using signed narratives as a tool in the L2/Ln language classroom but there has been little published research on any pedagogical use of sign language literature. For instance, Arenson and Kretschmer (2010) in their study on deaf children's responses to ASL poetry found no past studies that are related to teaching sign language poetry. Where it has been acknowledged, we lack evaluation of the effectiveness of the pedagogical approaches. However, research that has been reported in the area suggests that it has the potential to be a highly effective pedagogical tool to teach language, culture, linguistics, and literature within the sign language field. Most of the existent published works are in northern European languages.

The existing research shows a clear role for using literature (including stories and poems) in teaching any language, whether as L1 or as foreign, second, or new languages (referred to here as L2/Ln), which is the focus of this chapter. Although teachers should introduce learners to as wide a range of genres and registers of sign language as possible, the literary genre is especially useful as a rich "authentic source of language" (Paran, 2008: 10). Some language pedagogy theorists such as Edmondson (1997, cited in Paran, 2008), have warned that literature is intrinsically no better than other resources, and we should not use it as a language learning tool without careful consideration, a point that is echoed by Humphries in Sutton-Spence and Ramsey (2010). Paran (2008) notes, however:

If we take as our starting point an understanding of the role of literature in daily life, the way in which narratives function in learning, the role of literature and narratives in education,

and the language–literature link – all these are important in understanding that literature may have a place in L2 teaching.

ibid.: 14

Research on teaching sign language literature that has been published in English has focused predominantly on American Sign Language (ASL). The findings can be extended to other sign languages, but readers should note that not all studies are necessarily applicable to every country’s cultural and educational practices.

Theoretical perspectives

To appreciate theoretical perspectives in this area, it is first necessary to explore what is understood by the term “sign language literature,” including what it encompasses in terms of form, content, and function, and how it relates to concepts such as deaf culture and deaf folklore. Following from this, in view of the scarcity of available existing publications on the pedagogy of sign language literature in L2/*L_n* classrooms, this chapter will consider research studies on teaching and learning written literature in other L2 classrooms, and studies on the pedagogy of using written literature in L2 languages, extending these to sign languages.

Theoretical perspectives on sign language literature

The term “sign language literature” encompasses sign language works that deaf communities view as having cultural and artistic merit. Linguistically, sign language literature frequently prioritizes the visual image, playing with sign language and exploring its aesthetic and creative potential. Culturally, it shows deaf people’s views of their place in the world. Importantly, and especially relevant for its role in pedagogy, sign language literature is usually highly enjoyable (Ryan, 1993; Nathan Lerner & Feigel, 2009; Sutton-Spence & Shepherd, 2010). With its roots firmly in Deaf folklore, sign language literature has traditionally been a social, face-to-face activity, but increasingly is recorded, enabling L2/*L_n* learners to study it.

Rose (1992) described sign language literature as “a union of language and gesture that results in linguistically organized aesthetic movement” (*ibid.*: 157). It is a “literature of the body” and a “literature of performance” (Rose 2006). Thus, while sign language literature may be an important artifact of deaf culture, we can understand it also as an active process. It is a social exchange, in which performers and audiences *do* sign language literature as they participate in it. Teachers of sign language as L2/*L_n* will find literature is most useful as a resource when learners actively participate in it as audiences and performers.

One definition of the word “literature” in the *Oxford English Dictionary* is that it is work that is considered of superior or lasting artistic merit. However, judgment of any artistic merit is a complex process, and Robertson (2017) notes that judging literary merit is “both personal and social – a distillation of such factors as experience, education, intuition, ideology, sensitivity, intellect and feeling” (*ibid.*: 5). Deaf community members and especially sign language teachers bring all these factors to their appreciation of sign language literature and, ideally, language learners will also learn to understand them. Judgments about the merit of pieces of sign language literature change as deaf cultural and community norms change. This creates an extra challenge to teachers and learners in L2/*L_n* classrooms, who need to understand how a literary piece is currently viewed. For example, some signed literary pieces that were highly valued in the 1980s now appear dated, especially if they adhere closely to the linguistic or poetic structures of spoken languages (Sutton-Spence, 2005).

There are many genres and types of sign language literature, depending on the aims and structure of the works, and each one may have a different use in sign language teaching. *Signing the Body Poetic* (Bauman, Nelson, & Rose, 2006) is an important edited collection of written essays focusing on American Sign Language literature that covers a broad range of genres, and may guide teachers using literature with L2/*Ln* learners. Nathan Lerner and Feigel's (2009) video documentary *The Heart of the Hydrogen Jukebox* comprehensively reviews the history of American Sign Language poetry, and includes widely diverse poems with interviews and commentary in sign language, that should be of great assistance in planning teaching. Additionally, Peters (2000), Bahan (2006), and Sutton-Spence and Kaneko (2016) review and summarize some categories or types of sign language literature, all acknowledging that the categories are not watertight. Ryan (1993) warned simply that "Deaf storytellers often cross over into other forms" (ibid.: 145). The strong theatrical element in sign language literature, either in its dramatic elements during storytelling, or its production by more than one performer in plays and skits, can show learners the potential for language and performance structures and encourage L2/*Ln* learners to produce creative language in a less formal learning environment.

While a great deal of sign language literature is fiction (or near-fiction), signed nonfiction literature includes signed speeches, political pieces, historical or religious productions, and autobiography or narratives of personal experience. Such nonfiction pieces, especially narratives of personal experience, use culturally valued forms of sign language, even if they are not considered artistic. They are frequently less influenced by linguistic structures of the surrounding spoken language, and sign language teachers report using them because of this.

Other rich language models of artistic merit, so useful for L2/*Ln* learners, can be seen in sign language folklore, which includes traditional narratives, jokes, skits and language games (or a mixture of all of them) and in original works by known authors that are rooted in folklore. Sign language poetry is a highly polished and original signed performance art that presents new ideas in creative forms of language. Additionally, literature in sign language encompasses signed translations and retellings of other cultural works, including translations of children's stories, fables and religious texts (see for example, Karnopp, 2010; Sutton-Spence & Kaneko, 2016). Visual and performative sign language literature is often multi-textual (Kincheloe, 2015), and we see that original works and translations draw on film, photographic and painted images and other visual sources such as video games and comic books.

In summary, a rich sign language resource that may be called "literature" exists in the culture of many sign languages, ideal for teaching to learners learning those sign languages as L2/*Ln*, although the availability of this resource in a format suitable for teaching (such as video recordings of culturally valorized pieces) varies in different countries. Students can watch examples of sign language literature simply for enjoyment, and study it as a culturally rich linguistic art-form to develop an awareness and love of their new language and its culture, and an understanding of the language form.

Theoretical perspectives on teaching sign language literature

Theoretical perspectives and conceptual approaches to teaching sign language literature in L2/*Ln* contexts are rarely articulated in the published research, which is usually descriptive rather than theoretical. The study by Arenson and Kretschmer (2010), which evaluated the impact of introducing ASL poetry to deaf adolescents as part of teaching English-language poetry, is theory-neutral and deliberately descriptive, as they emphasize the lack of existing theory and previously published research in their study. Newell's (1995) survey of American Sign Language teachers' practices and perceptions showed that, while teachers rated the ability to tell stories as

very important, they rated theories of second language teaching/learning as only “moderately important,” and knowledge of philosophies of education as of “little importance.”

Although some publications on the use of sign language literature for language learners (whether L1 or L2/*Ln*) relate their research to conceptual frameworks, there is currently no clear over-arching theoretical perspective of pedagogy used to understand or explain it, or to predict outcomes of its use. As one sign language teacher reported while describing his work with stories in the classroom, “Nobody taught me the right rules. I just know and feel” (Sutton-Spence & Ramsey, 2010: 150). Acknowledging the cultural importance of statements such as this, research on sign language literature in language teaching (whether L1 or L2/*Ln*) has been set within frameworks of deaf folk knowledge (for example, Sutton-Spence & Ramsey, 2010) and deaf culture (Lane, Hoffmeister, & Bahan, 1996; Andrews, 2006; Karnopp, 2010). It has also been described as one part of multi-textuality and developing multiple literacies (Kincheloe, 2015; Kuntze, Golos, & Enns, 2014).

L2/*Ln* studies on teaching literature in non-sign-languages have used a range of theories, including discourse analysis and reader response theory to understand how learners use their target language to interact with literary texts and with each other when discussing these texts. Communicative language teaching approaches, such as the theory of input, interaction, and output (Gass & Mackey, 2007), and reader response theory (Kim, 2004) both highlight the need for learners of L2/*Ln* to discuss the literature they read in their target language to develop their comprehension and production skills. We can extend these theoretical perspectives to using literature in the sign language classroom.

As philologists have long known, there is a tight inter-relationship between literature, language, language learning, and the language learner. Paran’s (2008) comprehensive review of the effectiveness of literature in foreign language teaching and learning shows how literature may be studied in classes with focus on learning the language, and on learning the literature of that foreign language. It can play a vital part in motivating the learning experience of any learner, encompassing the human element of the new language, moving beyond mere measured competence in production of the L2/*Ln*. Paran notes that “language is learned by human beings, and the interest and love of literature for its various qualities is a human characteristic” (2008: 14). A focus on language while studying sign language literature can result in increased and more enjoyable language learning. With a more literary focus, the themes and meaning contained within the signed pieces can also help learners understand deaf culture in more depth, including the very concept of sign language literacy, as it compares to literacy in written languages. Paran outlines the intersection of literature and language teaching (recreated here as Table 16.1), noting that the division is simplified and does not include culture, which is widely understood to be an essential part of sign language teaching.

Table 16.1 The intersection of literature and language teaching

	<i>Language learning focus</i>	<i>No language learning focus</i>
Literary focus	(1) Literary knowledge and skills are focused on, but there is also a conscious focus on the lexis, grammar etc.	(3) Literature is discussed only as literature; any focus on language is on its literary effects
No literary focus	(2) Literature is used just as a text with no focus on literary values, literary knowledge, or literary skills	(4) Extensive reading

Source: recreated from Paran (2008).

Paran highlights the importance of the roles of the teacher, the text, and the reader in any teaching situation, as he reports on the effect of different techniques and pedagogies, interactions between teachers and learners, and the effect of engaging with literature on learner output. The studies mentioned that they provide a useful survey of existing theoretical perspectives on the role of literature in learning English as L2/*L_n*, which researchers and practitioners can extend (with caution) to sign languages.

Pedagogical practices

Sutton-Spence and Kaneko (2016) set out the topics that can be used for study within courses on sign language literature. The list is not exhaustive, but provides a starting point, perhaps, for discussion of a sign language literature curriculum. Depending on the level of study, learners may also be encouraged to read chapters, articles or other research publications on the following topics.

1. Notions of “literature,” sign language literature, and spoken language literature.
2. Sign language literature in its cultural role and social context.
3. Characteristics of oral literature and performance.
4. Characteristics of folklore and “deaflore.”
5. Story types: narratives of deaf experience, traditional deaf stories, cinematic stories, constraint stories, deaf humor, and sign language humor.
6. Storytelling techniques in “tell it, show it, become it” stories. Includes techniques for creating anthropomorphism, metaphors, neologisms, and ambiguity.
7. Techniques in signing stories. Includes aesthetic and symbolic uses of handshapes, use of signing space, and nonmanual features. Also includes repetition and rhythm of various sign parameters, particularly in poetry.
8. Story structure, including beginnings, endings, plots, protagonists, subjects, and themes. Also includes thematic, temporal, and spatial balance and symmetry.
9. Distinguishing prose and poetry in length, lines, purpose, function, flexibility, vocabulary, plot, and rules.
10. Style in signed art form, and differences in artists’ performances that may arise from their age, education and linguistic background and individual outlook.
11. What sign language literature may look like in the future.

For each topic, the lesson can be divided into instruction and activities to ensure learners develop their knowledge and understanding of the topic. The lesson may begin with exposition by the teacher to present the necessary knowledge. Videos showing relevant pieces by sign language artists can be used to contextualize the topics and provide examples used in sign language literature. Teachers skilled in sign language storytelling or poetry can provide their own topics and examples, or draw them from other sign language artists. This may be followed by participation by the learners in activities where they apply what they learned to describe and analyze pieces of sign literature. They also include activities where learners create and produce their own piece of sign language literature. While the learners generally can apply their understanding in the activities, teachers would need to ensure that their production tasks are appropriate to their language production skills. Examples of lessons in sign language literature teaching and learning in L1 classrooms that are given by Rosen in Chapter 7 in this volume may be used in the L2/*L_n* classrooms.

In the different pedagogical contexts outlined above, the way that sign language literature is used varies according to the learning objectives. Whether teachers use literature primarily for

focus on the language form, its cultural content, its linguistic structure or its literary features, we see that it can be applied to different aspects of L2/*Ln* learners' learning at different levels. It enables learners to see high-quality, culturally approved language, often in informal and relaxed contexts. It encourages learner discussion, debate, and language production, increasing learners' receptive and expressive sign language skills and encouraging analytical approaches to sign language. Teaching sign language literature to L2/*Ln* learners shows them the beauty of sign language, allowing them to enjoy the best models of language available. It helps learners look at the language in a new way, beyond something that is merely for daily communication or as a means of access to information. It shows learners the potential of sign language, both for their potential future abilities and for what other signers are capable of. Sign language literature's role in the classroom goes well beyond teaching language, culture, and linguistics. It teaches respect for sign language and shows the almost limitless possibilities of expression in visual spatial language.

The following are descriptions of five main contexts where sign language literature is used as part of pedagogical practice, with different emphasis for L2/*Ln* learners depending on whether the teaching is more language-focused or more literary-focused and depending on the aim of the teaching, whether it is teaching sign language, teaching Deaf culture, teaching sign language linguistics, interpreter training, and teaching sign language literature. Although the practices are not explicitly related to specific pedagogical theories, this review covers some of the principal published work, and makes suggestions how they could be used, based on personal experience of over 25 years as a sign language researcher and teacher of sign language literature and linguistics to a range of learners, including sign language learners, sign language teachers, and interpreters.

It is fully understood that L2/*Ln* learners need to be competent in basic communication and should have clear control of the commonly used forms of their new language. Teachers are responsible for introducing their learners to a range of socially determined sign language registers and culturally determined sign language genres. Signed narratives, and how they are used to teach and what they teach, form a part of cultural deaf learning environments. Sutton-Spence and Ramsey (2010) quote a deaf teacher saying, "you just can't teach without stories" (*ibid.*: 175).

Many sign language curricula include sign language literature for the L2/*Ln* learners in spite of the lack of formal research on methods and a lack of comprehensive evaluation of its use in educational institutions. Rosa (2018) documented its inclusion in the curricula at 12 federal universities in Brazil. An internet search conducted by the author found that sign language literature included in many colleges and universities in Europe and North America. One key document, *Standards for Learning American Sign Language* (Ashton et al., 2012), devised by the American Sign Language Teachers Association (ASLTA), included standards for teaching and learning American Sign Language (ASL) poems, plays, jokes, and narratives, in which learners learn how to communicate in ASL and learn about Deaf culture and communities in comparison to other cultures and communities. The ASLTA also recommend its inclusion as a subject matter in K-16 ASL classrooms.

A few countries have widespread sign language teaching programs in schools and universities (Sweden, the USA and Brazil are some positive examples of countries where this is more widespread and established than in many others). Even in those countries that do offer it, institutions with fewer resources may focus purely on teaching more communicative forms of sign language, so that literature is less likely to be taught to L2/*Ln* learners. College teachers are often left to devise their own curricula and teaching materials. The inclusion of literature in the classrooms depends on the availability of resources and the teachers' personal interests, experience, and professional networks. Mann and colleagues (2014) reported on the lack of training for sign language teachers around the world, observing that:

Frequently, signed language instructors design teaching methods based on their own experience as a language user and member of the community. This is, in part, due to lack of any formal training in teaching language since the vast majority of instructors have not completed academic preparation in language instruction.

ibid., 2014: 2

With respect to teaching Auslan, for example, Willoughby et al. (2015) noted that, “Teachers are ... constrained by the curricula and resources available to them, which in the Australian context often focus on the teaching of word lists and basic grammatical structures relevant to a theme” (*ibid.*: 330). It is this focus on the teaching of word lists in many places that Mann et al. (2014: 3) claimed “may result in neglecting to highlight important features that represent the complexities of visual-spatial languages such as classifier constructions, verbs that use the signing space for inflection, and grammatical and lexical facial expressions,” a point that is also shared by Quinto-Pozos (2011).

Sign language literature and L2/Ln language instruction

When teachers use literature to focus on the language used, they focus primarily on the features identified in the second quadrant of Table 16.1 (“Literature is used just as a text with no focus on literary values, literary knowledge, or literary skills”), as learners develop language skills. The *form* of creative sign language can be seen at every linguistic level, drawing attention to the rules of non-literary sign language by bending or breaking those rules. Stephen Ryan (1993) noted that good sign language storytelling (which we may extend to any good signed literature, including poetry) may include signs with repeated handshapes, locations, movements, or spatial arrangements of symmetry, creative classifier signs, role shift (or characterization), specific use of space, eye-gaze, facial expression, and other non-manual features, repetition, rhythm, and timing. Personification is very common, as are other creative uses of metaphor and metonyms. Sign language literary artists make new signs, use new and unexpected handshapes, leave the standard signing space, and produce signs that are too fast or too slow for normal signing. All of this is essential for L2/Ln learners to understand, and can be presented in interesting, fun ways.

Repetition is a crucial part of L2/Ln learning and sign language literature’s aesthetic dimensions rewards repeated viewing. Additionally, within many stories and poems, specific linguistic features or individual signs are repeated. Although L2/Ln learners may see short signed narratives in their study, these simple vignettes do not have the repetition of elements seen in “high art forms.” Sutton-Spence and Shepherd (2010) report a learner comment in relation to *Brazilian Flag*, a poem in Brazilian Sign Language by Nelson Pimenta that they had studied. The learner noted that information was not repeated in the narratives they were given as teaching materials so, “if you missed it, you missed it, whereas in *Brazilian Flag* the stars folded up again and again, and he repeated it. So – aesthetically pleasing, yes, but also you had the opportunity to see it more than once” (*ibid.*: 54).

Sign language literature and cultural elements of L2/Ln learning

When teachers focus on both the literary and the language elements of texts, their activities are more in keeping with those in the first quadrant of Table 16.1 (“Literary knowledge and skills are focused on, but there is also a conscious focus on the lexis, grammar, etc.”), as teachers also consider themes and meaning as they teach. In this case, teachers use the *content* of sign language literature to discuss the culture, experiences, and language art forms of deaf communities with

their learners. Deaf literature can celebrate what is good about deaf life, such as the joys of sign language, deaf success, and feelings of belonging within the deaf community (Sutton-Spence & Quadros, 2005). Many pieces have thematic threads of Deaf community resistance to oppression and Deaf liberation, in topics such as Deaf education and the struggles to use sign language (Christie & Wilkins, 2007; Bahan, 2006). Davidson (2017) has drawn attention to narratives that show “the typical experiences of a Deaf person as they function in the mainstream world that is oriented by sound” (ibid.: 4), as the events and experiences would not happen to a hearing person. However, Deaf literature also encompasses broad themes such as identity and the self, mortality, nationality, religion, nature, and love, as well as topics on familiar daily matters such as the family cat, a fish in a tank, jam, or watching laundry in the washing machine. All the content, shown from a Deaf, visual perspective and through sign language, provides an additional learning level for all L2/*Ln* learners when it is explicitly taught to them.

Sign language teachers may naturally turn to the use of sign language literature to teach culture to hearing L2/*Ln* learners, because they see it as a device already used among the Deaf community (Carter, Scott, & Sutton-Spence, 2013). Quinto-Pozos (2011) and Mann et al. (2014) observe that sign language teachers often teach about deaf culture and community life in their language classes. As Sutton-Spence and Ramsey (2010) reported, deaf educators valued the teaching of literature for their learners, such as Scott who said that “storytelling is always deaf culture. Always. I am always telling stories,” and Weiniger asked rhetorically, “How do you explain anything without a story? Straight, boring: ‘Here’s the list. The end,’ No, you can’t do it” (ibid.: 155).

As long ago as 1998, Sharon Allen noted that literature was usually not taught until later years of ASL study (we have seen that this is still often the case), but in this early study, she outlined the benefits of introducing beginning language learners to ASL literature, even though it might contain language at a level currently beyond their comprehension. She argued that early exposure to the literature could be achieved through translations or descriptions and explanations in their L1 where necessary. With support from their ASL teachers the literary exposure would make learners familiar with different ASL genres and improve their cultural knowledge.

Sign language literature and linguistics classes

Sign language literature can be used to teach *about* the language in sign linguistics classes. The focus here can fall into Paran’s first and second quadrants in Table 16 .1, as language is always the key focus. Linguistics is a science that aims to observe, describe and explain the structure of languages. In its applied form, it can help second language learners understand their new language more clearly by explicitly talking about it. Haug, Leeson, & Monikowski (2017) found that most sign language training organizations use sign language linguistics as part of their language and interpreting curricula. Thus, it is worth thinking how sign language literature can play a part in L2/*Ln* learning by considering its role in the pedagogy of sign linguistics (another area that has received little attention from pedagogical researchers, despite its extensive use in sign language teaching). Spoken language stories are increasingly used in corpus-based linguistic studies, having been chosen to support a theoretical point. Linguistic constructions in sign language literature have currently not been annotated together into a corpus.

The need to observe, describe, and explain the language and meaning in literary analysis is similar to that for linguistic analysis (Kincheloe, 2015). A learner analyzing a sign language poem or narrative in the linguistics classroom will focus intently on the language used (Wolter, 2006). Clearly, literary language is an unusual, marked form of the language, but breaking language rules

gives a clearer idea of those rules to challenge linguistic theory. Additionally, the grammatical or structural rules are only broken as far as audiences will accept it, so sign language literature can explore the *potential* for sign languages as well as their more daily use as may be seen in other non-literary elicited pieces.

Learning is more effective when learners find it *enjoyable* (Bork & Gunnarsdottir, 2001; Paran, 2008) and the aesthetic language used signed poems, jokes, and stories that are analyzed in linguistics courses may relax some learners who are initially challenged by, and resistant to, the more abstract, scientific elements of linguistics.

Many L2/*L_n* sign language linguistics learners could learn about sign language literature. Over 25 years of the author's personal experience of teaching sign language linguistics to undergraduate and postgraduate learners learning sign language (in Britain, the USA, and Brazil) and to professionals who work with sign language has led to insights into ways to draw upon signed literature to illustrate concepts such as phonology, morphology (derivational and inflectional), syntax, non-manual features, and pragmatic and discourse features such as use of space, classifiers, and constructed action. For example, when linguistics classes introduce ideas of phonetics, phonology and sign parameters, with a focus on hand configuration, location, movement, and orientation, a teacher can use signed poems that have deliberate rhyme schemes with strong repetition of sub-sign elements. They are perfect vehicles for demonstrating and problematizing the concept of the essential building blocks of a language, being entertaining as well as practical and imaginative.

Derivational morphology, where linguistics would address creating new signs, is important in practical applied linguistics because learners need to understand how classifier signs and constructed action are used in sign language (Johnston & Schembri, 2007; Smith & Cormier, 2014). As these productive signs are created ad hoc, L2/*L_n* learners cannot learn them by rote and need to learn how to create them. Creative sign language uses productive signs extensively, and some stories, particularly those told as “visual vernacular” pieces (Nathan Lerner & Feigel, 2009), use almost no conventional vocabulary at all, giving learners the opportunity to study and understand the process behind these signs, as they reproduce the novel and highly pleasurable signs, before creating their own.

Non-manual elements can be differently described from different linguistic theoretical frameworks, even though their linguistic status is unclear (Dachkovsky & Sandler, 2009; de Vos, van der Kooij, & Crasborn, 2009). Non-manual features are often foregrounded in stories or poems that include personified inanimate objects that communicate their feelings and desires entirely via the torso, face, head, mouth, and eyes (because the inanimate objects do not have hands). By studying such pieces, learners can focus on ways the non-manual features contribute to the message. Wolter (2006) observed that teaching ASL literature encouraged her learners to analyze their productions and discern rules for sign order and the role of eye gaze in creating topic-comment structures that determined the order of components in their work.

Sign language literature and interpreter training classes

Sign language literature is essential for training interpreters to work within the specialist field of literary translation and interpretation, as interpreters need to be familiar with a large range of works and to know and understand deaf literary norms before they can successfully translate between deaf and hearing literary norms. Cohn (1986: 276) wrote, “interpreters need knowledge and skill, and the performance-art interpreter of poetry must also be a translator; i.e. have knowledge of poetry itself, style, traditions, voice ...” The demand for interpreters and translators of sign language literature is still relatively small but it is growing, and there are

increasing opportunities for interpreters and translators working in performance fields such as theater and concert interpreting, working from spoken languages into sign languages. As Barros (2015) found, an in-depth knowledge and understanding of the structure of signed literature is essential for translating written literature into sign language.

Additionally, personal experience of teaching sign language literature to qualified interpreters who are not specifically planning to work as literary translators has shown that it still benefits them greatly, for a range of reasons. Many interpreters' daily contact with deaf signers does not include highly articulate, creatively fluent sign masters of either gender who could bring fresh language ideas to their work. Studying the highly visual imagery produced in sign language literature using techniques beyond mere vocabulary, especially in the use of non-manual expression, use of space and constructed action, can help interpreters devise new strategies for their work. They also genuinely relish the opportunity to delight in studying the language and discussing it with their peers, without needing to interpret it.

Sign language literature as a separate academic subject

Teaching sign language literature with a literary focus falls within the third quadrant of Table 16.1 of Paran's division of literary and language focus of teaching. It follows that "literature is discussed only as literature; any focus on language is on its literary effects." Nevertheless, it can have a marked effect on the language skills of learners. Paran noted that explicit teaching of language may not be necessary by the stage learners study literature in this way, but incidental language learning occurs for L2/*Ln* learners when exposed to sign language literature even without discussion of the language. As learners learn about deaf literary norms and develop skills in analyzing sign language literature, few can avoid learning about language structure and deaf culture, and the creative potential of both.

Increasingly at university level, sign language literature is taught as a separate subject, rather than as a component of language learning. For example, a survey by Rosa (2018) found that of the 12 Brazilian Federal universities that teach Letras-Libras (Libras Letters, or Brazilian Sign Language Studies) all have at least one module on literature, named variously Deaf Literature, Sign Language Literature or Visual Literature, often including a practical component for learners training to be teachers that include teaching sign language literature to L1 and L2/*Ln* learners. Although the focus of this chapter is teaching literature in the L2/*Ln* classroom, teaching sign language literature as a separate academic subject to L1 learners is crucial if they are training to be sign language teachers who will go on to use it in their classes. Teachers need to have the skills to provide analytical and systematic descriptions of a wide range of sign language literature and folklore, including its content, form and origins, and the linguistic, social, and literary ways to approach the subject.

Paran (2008) conducted a survey of studies on literature and L2 learning and reported that learners viewed literary and semi-literary texts as the most enjoyable. This reaction of enjoyment by L2/*Ln* learners can affect their *confidence*. Confidence is a crucial element in language learning and one that frequently suffers among hearing learners after a period of learning sign language. Quinto-Pozos (2011) reports that many hearing learners embark upon ASL courses with unrealistic expectations of how much they will be able to learn in the time available and notes other related difficulties that may hamper such L2/*Ln* learners. Sutton-Spence and Shepherd's (2010) interviews with L2/*Ln* British Sign Language learners in higher education found that active engagement with creative BSL had a positive impact on their confidence and BSL skills and increased their enjoyment of the language and understanding of other areas of Deaf Studies.

They quote a learner who approached the end of her degree course with considerable lack of confidence in her signing skills and low motivation to continue, until she was introduced to sign language literature:

It was like the light had been switched back on. I remembered what had originally brought me to BSL and my hunger for knowledge grew again. I found because I was enjoying it once more, my confidence grew and my overall signing began to improve.

ibid.:52

Because sign language literature in this context is not to be *learned* but to be learned *from*, learners who lack confidence in their sign production skills feel less anxious while watching it. The learners know that they are seeing an art form that they are not expected to be able to produce, so they can relax and delight in it, simply working to understand how the artists create the effect.

It is increasingly understood that language learning requires learners to produce language. Studying literature is a way to stimulate learners to talk (or in the case of sign languages, to sign). Gass and Mackey (2007) emphasize the benefits of input, interaction, and output for L2 learning, and Kim (2004), in a study based on Reader Response Theory, found that learners who were guided to discuss literature using their L2 interacted more easily with each other, were stimulated to discuss issues that arose from the literature and showed increased emotional engagement with the texts, the L2 language and each other.

For less advanced learners, literature may be discussed in the learners' L1. This may not always occur in the context of deaf studies classrooms, where mixed classes of deaf and hearing learners, or language policies of the institution mean that the subject is taught in sign language. However, whatever language the subject is taught in, learners are inspired by the language forms they see, and this increases their love for sign language, and can incidentally improve their learning of the L2/*Ln*. Sutton-Spence and Shepherd noted responses from learners, such as: "I think [the class on sign language literature is] the only lecture I have managed to get my confidence to actually sign something, as you say, a question or answer or something" and "Lit and poetry have helped me to enjoy the language again and widen my experience" (*ibid.*: 52).

Future trends

As the argument for sign language literature in the L2/*Ln* classroom is so strong, we need to act to increase its use. Most sign language teachers are simply not trained to teach using literature, which is a common problem for language teachers of non-signed languages as well (Paran, 2008). Providing training in sign language literature for teachers requires courses and publications that explain it in ways that teachers can understand. Additionally, teaching anthologies of good, easily available, wide-ranging literature resources need to be provided because it is not currently easy for sign language teachers to find examples of sign language literature for their learners. However, if teachers use sign language literature that is recognized within their Deaf communities as a language art-form, the learners will be learning from the language forms that are valued in the communities.

Future research topics

We have reached a stage in teaching sign language literature to L2/*Ln* learners where we are starting to know what we need to know. We know that sign language teachers use literature

and that learners appear to respond well to it. Research on teaching literature to learners learning sign languages as L1, most of whom are deaf children, needs to be extended to learners of L2/*Ln*. Research findings that indicate good practice in L2/*Ln* pedagogy in non-sign-languages need to be tested in sign language classrooms. Future research should focus on evaluation tests and procedures that will ascertain the effectiveness of the teaching of literature to L2/*Ln* learners. They would need to account for the unique learning process of L2/*Ln* learners, who are largely hearing. Although literature does not lend itself easily to quantitative study, controlled interventions need to be conducted to present evidence for (or against) its use as a tool in language teaching. This research could be usefully undertaken by teacher-researchers (Rosen et al., 2015) who are in an ideal position to test and modify teaching plans in their professional activities. The development of good quality, accessible, and age appropriate literary teaching anthologies in different national sign languages is also essential so that teachers can draw on the resources with confidence (Sutton-Spence & Machado, 2018). These anthologies should also include new and minority group sign language literature.

Future pedagogical practices

The studies reviewed above indicate that good pedagogical practices by L2/*Ln* teachers will use a broad range of sign language literary materials, encouraging learners to understand the language and cultural context in which they are used. Time must be provided in class for literature if it is not on a curriculum. Teachers must always have a clear objective in using the literature and build on the characteristics of the fourth quadrant in Table 16.1, that of merely “Extensive reading,” according to Paran’s (2008) suggestions. The objective should include increasing the learners’ comprehension skills, production skills, and desire to independently explore the language and literature. For this reason, it is imperative that sign language teachers have the knowledge of the specific literary norms in their languages and cultures.

There is no consensus on the content of a sign language literature course, but the structure suggested in Sutton-Spence and Kaneko (2016), and outlined above, gives an indication of the potential topics that can be covered, all of which can contribute to a greater understanding and appreciation of sign languages. Teachers can show examples of signed stories, poems, and jokes from their own sign languages, appropriate to their learner groups, illustrate the key points, and encourage learners to explore further and experiment. Perhaps most importantly, we need to promote sign language literature as an integral tool in the teaching of L2/*Ln* sign languages.

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L2/Ln sign language tests and assessment procedures

David H. Smith, Jeffrey E. Davis, and Dan Hoffman

Introduction

The number of L2 learners in secondary and postsecondary education has grown exponentially over the past two decades (e.g., Wilcox, 2018; Rosen 2015 for the US; Leeson et al., 2018 for the EU countries). There is growth of the use of sign languages by professionals either to teach, communicate directly with deaf individuals, or for interpreting. Given the widespread popularity of learning sign languages (sign language) as a second and additional language (L2/Ln), and the growth in the use of sign language by the professionals, it has become more necessary to evaluate the sign language competency of L2/Ln learners. These evaluation approaches range from informal observations conducted by L2/Ln classroom instructors to rigorous formal examinations. Some of the L2/Ln sign language tests and assessments are developed for linguistic research purposes. Other L2/Ln sign language tests and assessments are developed for qualifying and credentialing individuals with graduating diplomas and professional certifications. This chapter focuses on the latter group of L2/Ln sign language tests and assessments. We cover the assessment tests that are informal and formal, receptive and expressive, and formative and summative. More specifically, we look at the issues of validity and reliability. A few of the tests that are developed for the purpose of assessing L2/Ln sign language learners can also be used with L1 native users. For references on L1 instruments, the reader is referred to the Haug et al. chapter in this volume.

Theoretical perspectives

As noted by Norris and Ortega (2012), the choice of testing and assessment protocols in L2/Ln should be guided by four concerns. They are (a) the target population, or *who* gets assessed in terms of the clearly specified learners; (b) the purpose(s) of assessment, or *why* we investigate these populations; (c) the domain(s) of assessments, or *what* gets assessed in terms of the knowledge constructs we want to know about; and (d) the format, measures, and psychometrics, or *how* to assess including the ways of acquiring and examining data related to the constructs. We use the Norris and Ortega's approach to examine the L2/Ln sign language tests and assessments.

Who we assess: the target population

There are L2/*L_n* groups that are regularly evaluated for their skills and knowledge of sign languages. They are educational learners, sign language teachers, teachers of the deaf, and sign language interpreters. The assessments that test the knowledge and skills in sign language and sign language pedagogy are governed by the standards for sign language knowledge and skills that are developed by different governmental and professional entities. For instance, the standards for L2/*L_n* learners are developed in the US by the American Sign Language Teacher Association (ASLTA) based on the standards developed by the American Council of the Teaching of Foreign Languages (ACTFL) (Ashton et al., 2014) for ASL, and the ProSign project based on the Common European Framework of References for Languages (CEFR) for the different sign languages of the European Union (EU) countries (Leeson et al., 2016). Individuals who aspire to become sign language teachers, whether for L1 or L2/*L_n* learners, are subject to the same standards for teacher licensure in sign language that are developed by governmental certifying entities for all content areas. Aside from the pedagogical skills they are expected to learn, beginning teachers are also required to take teaching assessments to demonstrate their knowledge and skills demanded by their profession. Regarding teachers of the deaf, we see a trend towards bilingual education and the use of natural sign languages in classrooms. There are a growing number of teacher training programs that require teacher candidates to show proficiency before graduation, although few programs have any minimum sign language requirements prior to admission (Beal-Alvarez & Sheetz, 2015). Sign language interpreters, given their critical roles as facilitators between sign language and spoken language users, are an obvious group in need of assessment. There are standard assessments and formal certification or licensure requirements in place in several countries (Napier, 2004), and *The World Association of Sign Language Interpreters (WASLI) Country Reports* (2015) reported that a growing number of other countries have interpreting associations that grant certifications and licensures. There are currently no standards in sign language knowledge and skills for other practitioners that work with the deaf, such as mental health and rehabilitation professionals, although sign language knowledge and skills are essential for these professionals to have effective communication with signing deaf clientele.

Why we assess: reasons for assessment

Sign language assessments are crucial. Without sign language assessments, the consequences of having teachers who are L2 learners with less than optimal sign language skills could result in language deprivation and/or gaps in learner knowledge. Likewise, interpreters whose lack of or poorly demonstrated knowledge and skills in sign languages may have grave consequences for signing deaf people particularly in a criminal court hearing or in an emergency room (Holcomb & Smith, 2018). Given the possible negative outcomes, it is appropriate that the assessments being given are high stakes for the L2/*L_n* learners taking them. The reasons for sign language assessments differ for each constituencies of sign language pedagogy. The assessments are given to ensure that learners have skills in communication using sign languages, teachers have the knowledge and skills to teach and assess L2/*L_n* sign languages, and interpreters have the knowledge and skills to interpret sign languages. Sign language assessment also aid in the diagnosis, planning, feedback, and ascertaining qualifications for degrees, certifications, and licensures (Napier & Leeson, 2016).

What we assess: domains of assessment

The “what” of assessment addresses the domain areas. The domain areas covered in sign language assessments are distinct for the different constituencies of sign language pedagogy. The sign language assessments for the learners, some of whom become teachers and interpreters, test their expressive, receptive, and discourse skills in sign languages. The domains of language include linguistic forms such as phonology, morphology, morphosyntax, syntax, semantics, discourse, and pragmatics, and functions such as the use of language in an appropriate manner depending on the different situations and contexts that shape form. Form entails specific grammatical features, and function entails judgments of the overall ability to deliver a message with an appropriate meaning, depending on the audience and context (Harris, 2017). The assessments for teachers test their knowledge and skills in the areas of sign language pedagogy, including preparing curriculum, lesson plans, instructional strategies, instructional materials, and evaluation of learner progress. Teachers and teaching programs should follow the cycle of reflective practice of planning, implementation, evaluation, reflection, and revision process (e.g., Farrell, 2014), and the feedback that they obtain from the direct assessment of L2 learners is a significant part of this process and may aid in modifying different areas in sign language pedagogy. For interpreters, the sign language assessments test their ability to translate from a sign language to a spoken language, and vice versa, and to follow professional code of ethics.

How we assess: assessment protocols

For our purposes here, the “how” of assessment is the protocols in the format, data solicitation, times, and scoring of the tests. They pertain to the standardization of test items, the means of transmittal of stimuli and responses, the timeline to administer the tests, and the issue of neutrality in scoring.

Test format: informal and formal

Assessments may be either formal or informal. They differ in the standardization of test items and scoring systems. Formal assessment tests are standardized measures that are either normative or criterial. Norm-referenced measures are based on a collection of scores from a large sample population, and a subject’s scores are compared against the scores from the sample population. Criterion-referenced measures are based on the objectives of a curriculum and whether or not a learner met the objectives by the end of a course. Formal assessments include quizzes, assignments, or projects that are evaluated and documented as evidence of increased or lack of skills. They are the instruments that focus on a specific parameter such as vocabulary production or comprehension, or sentence comprehension or reproduction. Informal assessment tests are not standardized measures but refer to the spontaneous on-the-spot evaluation given by assessors, who may include instructors, as they observe the learners using the language. An example is proficiency interviews, through which grammar, vocabulary, accent/production, fluency, and/or comprehension can be assessed.

Test data solicitation: receptive and expressive

Assessment tests differ in how data is solicited from the subjects. Some tests assess only receptive skills, and other tests assess only expressive skills. Receptive tests assess subjects’ language comprehension, and expressive tests assess their language production. Receptive tests typically entail a subject watching a fluent speaker signing a phrase, sentence, or a story, and responding either by

writing, choosing from a list of possible answers, or signing what they observed. These protocols tend to provide more *objective* measures since the set of expected responses is usually narrow. In expressive tests the subjects are asked to respond to a given question of which stimuli may consist of either signed utterances on videos, or pictures and images of people, things, places, and activities. The latter type is more *subjective* due to variations in the coherence of signed responses, which require a judgment call from raters.

Times of test: formative and summative

There are different assessment tests that are given to subjects at certain points in their learning of sign languages. They are formative and summative tests. Formative assessment tests are measures of learner progress and given periodically over time. Informal assessment tests are usually formative evaluations of learners' mastery that are given at different temporal points. They are usually given for the purpose of obtaining information and feedback for pedagogical purposes, and determining if test results have a positive effect or "washback" on instruction (Smith & Davis, 2014). Formative assessment of learners requires that a valid and reliable relationship has been verified between a skill and overall knowledge (concurrent validity). Summative assessment tests are measures of learners' mastery of the domain areas that are covered in the tests and are given once. While formal assessment tests are usually summative evaluations of language knowledge and proficiency, summative tests can be either informal or formal.

Test scoring: issue of neutrality

Assessment tests vary in protocols for the scoring of subject responses. Subject responses in some assessment tests are objective, and the responses in other tests are subjective. The assessment tests that are objective tests require an either right or wrong response, such as multiple choice or matching questions. No room for interpretation is given. The assessment tests that are subjective usually contain open-ended questions and rely on broader responses to the questions. Such responses are subject to a judgment call from raters that may or may not be based on a rubric, but largely based on raters' perceptions and experiences.

Considerations for the selection of assessment tests and procedures

Considerations in the selection of sign language assessment include its psychometrics and feasibility. The psychometric properties of assessments are *validity* and *reliability*. A test is considered valid if it accurately measures the domain areas that the tests are assessing. A test is reliable if it provides consistently accurate results within and between subjects and at one and different times. We will not go into detail here on validity and reliability; Haug and colleagues in this volume discuss these two factors in depth. The *feasibility* of an instrument is its practicality in implementation. This is usually described in terms of ease or difficulty of implementation and the amount of time required to compile the results. If an assessment is deemed valid and reliable, but is complicated in delivery and requires much time to evaluate or score the results, then one would need to decide if it is worthwhile to use. An instructor with a large course load is unlikely to see the value in a test that is overly time-consuming. On the other hand, a linguistic researcher might be willing to disregard the time factor in favor of an accurate measure of a construct. One of the primary reasons it has taken so long for the development of available assessments is due to the time, effort and number of developers, raters, and participants needed to establish the validity, reliability, and feasibility of instruments.

Pedagogical applications

The above aspects of assessment tests and procedures provide the framework from which we review the different L2/Ln sign language assessment instruments and procedures. In the following, we identify the target population, the format of the test, who does the assessment and how they do it, and psychometric information that is available for the instrument.

Assessments for L2/Ln sign language learners

The rise in L2/Ln sign language learning at schools, colleges, and universities creates the need to test learners for foreign or world language credits, which may be applied to meet the requirements for admission and/or graduation. There are informal and formal assessments of the learners and they are examined below.

Informal assessments

Classroom-based assessments

Instructor-used assessments in classrooms cover a range of topics that are being taught and there are different assessment tests and procedures that are used for this purpose (Napier & Leeson, 2016). The classroom-based assessments include formative measures such as having learners create short vlogs or stories in response to a prompt with embedded scoring rubrics and video or written feedback. The assessments can be expressive and/or receptive. In expressive and receptive tests, learners observe sign language narratives and either respond by signing or choosing an answer to multiple-choice questions. The assessments also include summative evaluation of material taught at the end of the course. If an assessment accomplishes what it is intended to do, that is, it is valid and reliable, instructors and programs should be able to accurately determine the level of knowledge and proficiency of L2/Ln users of sign languages.

Technology for the recording and evaluation of signed utterances on video is increasingly used in the assessment process. Holistic evaluations of sign language are time-consuming, and there are programs and software that streamline the process. There are learning management programs and software currently available (e.g., Blackboard, Moodle, Canvas, D2L, GoReact) with embedded video capability and ability to load learner prompts and rubrics within assessments. Technology-based assessments can either be formal or informal, formative or summative, and objective or subjective. The learners in classrooms are able to take assessments in their classrooms and other spaces such as the library and homes, and can be monitored remotely. Instructors open the videos and score directly within the program, and their learners get their results as soon as they are assessed. This protocol makes technology-based testing more efficient and feasible, but may not necessarily improve the validity and reliability of the assessment test. Instructor-developed formal measures are often haphazard without regard to validity or reliability (Mertler, 1999). Rubrics as well as rater and technology training may affect the quality of the in-classroom assessments.

Formal assessments

Expressive L2 sign language assessments

The most widely used expressive assessments of L2 sign language learners are based on the Oral Proficiency Interview (OPI) developed in the 1950s by the Foreign Service Institute of the US Department of State (Liskin-Gasparro, 2003). The OPI has been adapted to many world languages (ACTFL, 2019), including sign languages.

Sign Language Proficiency Interview: American Sign Language (SLPI: ASL)

In the early 1980s, in consultation with the Educational Testing Service in the US, Caccamise and Newell at the National Technical Institute for the Deaf (NTID) developed a Sign Language Proficiency Interview for American Sign Language (SLPI: ASL) (Caccamise & Newell, 2007). It is used in over 50 academic and vocational rehabilitation programs across the US and in Canada, Kenya, and Ghana (Cagle, 2009), and South Africa (National Technical Institute for the Deaf, 2019).

Target population - the SLPI: ASL was originally developed to assess sign language skills of faculty teaching at NTID. It was later adopted by a number of US schools for the deaf and rehabilitation agencies to assess the skills of teachers, counselors, and other professionals.

Target measures - the SLPI: ASL ratings are based on a 11-step rating scale, ranging from *No Functional Skills* to *Superior*, based on the sign language proficiency of highly skilled native signers. Table 17.1 shows the SLPI: ASL rating scale. Raters assess the *function* or overall ability to receive and convey messages appropriately according to the levels previously mentioned. *Form* is also assessed and includes: vocabulary knowledge, production and fluency, and use of a range of ASL grammatical features, including linguistic parameters, word order, and classifiers (or depicting signs). Receptive comprehension is also evaluated.

Format of the test - the SLPI: ASL is conducted as a 20-minute conversation between a native or native-like sign language user and the test subject. Questions center on these topic areas: what the subject does in their daily lives such as work or school, family life, and personal interests and hobbies. This conversation is video-recorded for later viewing by the raters.

How measures are assessed - raters work together in teams of two or three and follow a rater worksheet. They do an independent rating of initial overall assessment of the subjects' functional skills. If the raters agree within two levels of each other on the functional skills, then they proceed to independently assess the sign language forms. Raters are expected to come to a unanimous agreement on the same level of proficiency after discussion, or to independently reassess. If no agreement is reached, a third rater is used. Any subsequent lack of further agreement invalidates the interview.

Psychometrics - as a subjective measure, the SLPI: ASL has questionable validity and reliability. Bochner, Garrison, & Doherty (2015) reported that the SLPI: ASL contains no independent objectives; that is, valid and reliable measures for comparison. Subjects' responses are shaped by interviewers, scored on a qualitative rubric, and are susceptible to rater bias, which is a major issue of SLPI: ASL's validity (Bochner, Garrison, & Doherty, 2015). One psychometric study has been published, and it found good inter-rater reliability and limited evidence of construct validity (Caccamise & Samar, 2009). Test results can be affected by the diversity in background and experience of raters and interviewers, as well as the fidelity in using the SLPI: ASL due to regional variations in its implementation among different test sites. Nonetheless, Bochner, Garrison, & Doherty (2015) argued that the SLPI: ASL is still considered an important heuristic assessment tool for progress and can provide feedback for the purpose of improving the ASL skills of L2 learners.

American Sign Language Proficiency Interview (ASLPI)

The American Sign Language Proficiency Interview (ASLPI) was developed by Mel Carter in the 1980s based on Oral Proficiency Interview (OPI), and conferred to Gallaudet University in 2008, which currently is its sole administrator (Gallaudet University, 2019a; Caccamise & Newell, 2007).

Target population - the ASLPI is utilized by agencies, schools, universities, programs, and employers to evaluate L2 and some L1 learners to assess the skills of those desiring to work professionally with deaf individuals, including teachers, interpreters, and counselors. This assessment is also used by the Educational Testing Services (ETS), a private nonprofit educational testing and assessment organization in the US, as an ASL teaching licensure examination in some US states.

Target measures – the ASLPI measures expressive and receptive skills in ASL, including evaluating the accuracy, consistency, complexity, and flexibility of the signer’s language forms and functions, to determine ASL proficiency.

Format of test – the assessment contains a 20-minute face-to-face conversational interview that is video-recorded in-person or through a live video feed.

How measures are assessed – this is a subjective, criterion- and rater-based assessment. It contains five domain areas, which are vocabulary, grammar, accent/production, fluency, and comprehension. Ratings are numerical that ranges from 0 (no functional skills) to 5 (fully proficient). Like the SLPI: ASL, in the ASLPI three raters evaluate the criterion noted above and need to come to a unanimous agreement on the proficiency level, otherwise different raters would need to re-evaluate the video (Gallaudet University, 2019b).

Psychometrics – the ASLPI is subject to similar validity and reliability issues that have been expressed for the SLPI: ASL. That is, subjective measures of language proficiency based on a single interview and the test results from raters have raised questions of validity, reliability, and interpretation (Chalhoub-Deville & Fulcher, 2003). Gallaudet University addressed these issues in 2013 by mandating and prioritizing validity and reliability research on the ASLPI using an independent outside organization. Their research studies investigate and document validity and reliability; identify best-practices and standards for language assessments that can be applied to the ASLPI; identify the gap between current and desired states, including recommendations to improve the ASLPI process and psychometrics; and (re)training raters to ensure high agreement that approaches 90 percent for initial ratings (Gallaudet University, 2019b).

NGT (Nederlandse Gebarentaal) Functional Assessment (NFA)

The NFA was developed based on the SLPI: ASL beginning in 2011 for use with Dutch Sign Language (NGT) by Eveline Boers-Visker and Beppie van den Bogaerde in consultation with Geoff Poor, NTID’s SLPI: ASL Coordinator (see Boers-Visker et al., 2015; van den Broek-Laven et al., 2014; Poor, 2011).

Target population – the initial subjects were learners in the Interpreter and Teacher Training Program at Utrecht University of Applied Sciences, one of the largest educational institutions in the Netherlands.

Target measures – in 2010 the Utrecht program developed NFA to align with the new curriculum that is drawn from CEFR, which requires an assessment of functional communication skills, and also aligned with the CEFR proficiency levels. The rater forms were adapted based on NGT grammar (Boers-Visker, Poor, & van den Bogaerde, 2015).

Format of test – the NFA uses the same 20-minute interview procedure as the SLPI: ASL. Both interviews cover the same topical areas that center on work, courses of study, family and background, as well as leisure activities and hobbies.

How measures are assessed – the NFA rating process employs two raters working together and using the same indicators as the SLPI: ASL to establish the initial rating based on language function and the final rating based on language form, though some changes in the rating form are made regarding examples of the grammar specific to NGT. The NFA rating procedure also requires the same process of reaching unanimous decisions between raters as the SLPI: ASL. The NFA proficiency levels align with the CEFR proficiency levels that ranges from A1 for beginning to C2 for fluent, and is used in the Utrecht program. See Table 17.1 below for the NFA and SLPI: ASL proficiency levels.

Psychometrics – the NFA has the same psychometric properties as SLPI: ASL and ASLPI. It also has extensive rating procedures and requires unanimous rating decisions. As with many other

Table 17.1 SLPI: ASL and NFA Proficiency Levels

<i>SLPI: ASL Proficiency Levels</i>	<i>NFA Proficiency Levels (Aligned with CEFR Standards)</i>
Superior plus	C2
Superior	C1
Advanced plus	
Advanced	B2
Intermediate plus	
Intermediate	B1
Survival plus	
Survival	A2
Novice plus	
Novice	A1
No functional skills	No functional skills

Source: adapted from Caccamise & Newell, 2007, for ASL; van den Broek-Laven, Boers-Visker, & van den Bogaerde, 2014, for NFA.

formal assessments of language, evaluators need to be extensively (re)trained to ensure that their ratings maintain its initial calibration and reliability.

51U American Sign Language Phonological Fluency Task (51U)

The 51U test is a derivation of the Controlled Oral Word Association test that uses the spoken letters F, A, and S (Patterson, 2011) and modified by Morere, Witkin, & Murphy (2012) using the handshapes 5, 1, and U in ASL (Beal-Alvarez & Figueroa, 2017; Morere, Witkin, & Murphy, 2012). The handshapes are selected based on the order of frequency of use in ASL (Morere, Witkin, & Murphy, 2012; Morford & MacFarlane, 2003). The 5-handshape is a high-frequency handshape, the 1-(index) handshape is less frequently used, and the U-handshape is the least used of the three (Morere, Witkin, & Murphy, 2012). The 51U can be used as either a formative or a summative assessment test.

Target population - the 51U test assesses phonological skills in ASL by L1 deaf (Morere, Witkin, & Murphy, 2012) and L2 hearing ASL learners (Beal & Faniel, 2018).

Target measure - the test assesses expressive phonological fluency based on the ASL handshapes of 5, 1, and U. It can be used as a formative measure of progress over time, similar to curriculum-based measurements since it only requires 3 minutes to administer (Beal & Faniel 2018; Smith & Davis, 2014).

Format of test - the subjects are given ASL handshapes for 5, 1 (index), and U, one at a time, and asked to generate as many possible ASL signs that use each handshape within a one-minute time period for each handshape.

How measures are assessed - test results are rated by two fluent ASL users and expressed as the number of correct productions of signs.

Psychometrics - the ratings are subjective. Morere, Witkin, & Murphy (2012) reported a significant correlation between the scores from 51U and the *American Sign Language - Sentence Reproduction Test* (ASL-SRT), described below, among deaf subjects enrolled at Gallaudet University, which indicated the concurrent validity of 51U with ASL-SRT. Beal and Faniel (2018) reported that the number of years of sign use and instructional approaches were significantly associated with their hearing subjects' performance. If the test is used as a formative

assessment, it should be noted that its validity and reliability may be affected by the washback effect on instruction (see Smith & Davis, 2014).

Receptive L2 assessments

The following tests measure receptive skills by providing a prompt or stimulus and asking subjects to either select a multiple-choice answer or replicate the stimulus as closely as possible. These are more objective than the expressive proficiency tests reviewed above.

American Sign Language Discrimination Test (ASL-DT)

Developed by Bochner and colleagues at NTID, the ASL-DT is based on the NTID Speech Recognition Test (Bochner, Garrison, & Doherty, 2015), a measure of sensitivity to phonological contrasts. They consider this phonological contrast sensitivity skill as a basic part of language competence and reflects a learner's comprehension and overall language proficiency.

Target population - the ASL-DT is an objective test intended to measure proficiency in phonological contrasts in ASL L2 adult learners.

Target measures - the ASL-DT contains a paired-comparison discrimination task to measure subjects' ability to recognize phonological and morphophonological contrasts in ASL. Each test item consists of two pairs of ASL utterances, each of which contains a standard sentence followed by a comparison sentence that may either be the same or have one element that is different. The number of lexical signs in each pair of sentences contains a range of three to nine signs. The test stimuli feature sentence pairs with certain signs that are similar or distinct in form or meaning, and with "minimal pairs," that is, signs that are similar or contrasted in at least one linguistic parameter such as movement, handshape, palm orientation, location, and complex morphology. An illustrative example is given below with glosses of the sign language utterances (Bochner, 2015):

Trial 1

YOUR APPOINTMENT NEED CHANGE. (standard sentence)

YOUR HABIT NEED CHANGE. (comparison sentence)

Trial 2

YOUR APPOINTMENT NEED CHANGE. (standard sentence)

YOUR APPOINTMENT NEED CHANGE. (comparison sentence)

In the above example, the signs for APPOINTMENT and HABIT in ASL are similar except for one parameter, which is movement. Test subjects view a video of native ASL users and tell if the sentences are the same or different. An item is scored as correct only if responses to both pairs of tasks is correct. This is to reduce the possibility of chance-level performance (Bochner et al., 2016).

Format of the test - initially developed as a paper test, the ASL-DT is now computer-based. A session consists of 35 prompts, each with two pairs of ASL sentences that are drawn randomly out of a test bank of 350 items, and requires approximately 10 minutes to administer.

How measures are assessed - the ASL-DT is an objective criterion-based assessment in five domain categories of sign language phonology which are handshape, palm-orientation, location, and movement, and complex morphology.

Psychometrics – Bochner et al. (2016) found that ASL-DT was able to differentiate learners into beginning, intermediate, and advanced levels of ASL skill. The test data highly fit the Rasch model of person measurement. They also added that while ASL-DT reflected subjects' sign language knowledge better than SLPI: ASL, the two assessments can complement each other as objective and subjective measures of subjects' knowledge and skills in ASL.

American Sign Language-Sentence Reproduction Test (ASL-SRT)

The ASL-SRT was developed by Hauser et al. (2008). It determines subjects' ability to reproduce sentences and measures their complexity level of sentences. The test does not require a skilled interviewer, labor-intensive training, or highly trained raters.

Target population – the ASL-SRT is given to native and non-native sign language learners, including children and adults.

Target measures – the test is an adaptation of the TOAL-3 *Speaking Grammar Subtest* of the *Test of Adolescent and Adult Language – Third Edition* (Hammill et al., 1994). Subjects listen and repeat back recorded sentences. The prompts consist of sentences with grammatical features that gradually increase in length and complexity.

Format of the test – the ASL version presents pre-recorded videos of a native signer signing 20 test sentences. These sentences increase in length and syntactic, thematic and morphemic complexity. The lexical items that were used for the test do not show regional variation, do not vary across generations, and are not a variation of a sign system. Sentence complexity increases with more fingerspelling, numerical incorporation affixes, and polymorphemic signs, and signs with a low frequency of occurrence. The time for test administration is between 10 to 15 minutes.

How measures are assessed – two native deaf ASL signers rate the participants' responses with narrowly acceptable deviations. Exact reiterations are scored as "1" while repetitions with replacements or errors are given a score of "0."

Psychometrics – according to Hauser and colleagues (Hauser, et al., 2008), ASL-SRT has a high inter-rater reliability ($R = .83$) and internal consistency ($\alpha = .875$). They also found that deaf native signers performed better than non-native signers ($p < .001$) and deaf adults performed better than deaf children ($p < .05$). Hauser et al. (2008) added that the ability to repeat sentences correlates with language competence, and that sentence complexity does not increase with increasing sentence length.

German Sign Language Sentence Reproduction Test (DGS-SRT)

The DGS-SRT was developed by Kubus and colleagues and is an adaptation of the ASL-SRT test (Kubus, et al. 2015).

Target population – like the ASL-SRT test, the DGS-SRT is given to native and non-native sign language learners, adults and children, and deaf and hearing individuals.

Target measures – just as in the ASL-SRT test, subjects view and repeat back prerecorded utterances in DGS.

Format of test – participants are shown 30 DGS stimulus sentences one at a time and asked to repeat exactly what they viewed immediately after seeing them. Stimulus sentences gradually increase in complexity as the test progresses.

How measures are assessed – two native deaf DGS signers rate the participants' responses. A limited number of deviations is allowed. Exact reiterations are scored as "1" while repetitions with replacements or errors are given a score of "0."

Psychometrics – the only published source we could find on the use of DGS-SRT is in a study of adult bilingual German and DGS users by Kubus et al. (2015). They reported that the DGS-SRT reliability is high (Cronbach $\alpha = 0.959$).

British Sign Language Sentence Reproduction Test (BSL-SRT)

The BSL-SRT was developed at the Deafness Cognition and Language Research Centre (DCAL) by Cormier and colleagues (2012).

Target population - the BSL-SRT is given to L1 and L2 sign language adult learners, both hearing and deaf.

Target measures - as in the SRTs described above, in BSL-SRT the subjects watch and repeat prerecorded utterances in BSL.

Format of test - in contrast to other SRTs, in BSL-SRT the subjects observe and sign 40 BSL sentences of increasing length and complexity.

How measures are assessed - the rating protocol is the same as in the other SRTs.

Psychometrics - as with the ASL-SRT and DGS-SRT, Cormier, et al. (2012) found that native signers significantly performed better in repeating observed BSL sentences than non-native signers.

American Sign Language Comprehension Test (ASL-CT)

Developed by Hauser et al. (2015), the ASL-CT is a receptive ASL test. Raters are not needed for the test. Scores showing ASL proficiency levels are provided immediately upon test completion.

Target population - the ASL-CT is given to L1 and L2 adult learners, both deaf and hearing.

Target measures - the ASL-CT measures receptive skills in grammatical aspects of ASL such as phonology, vocabulary, role shifting, and depicting verbs constructions including classifiers.

Format of test - this test is web-based and consists of 30 test items. Three practice items are presented with feedback. All test items are presented randomly. Half of the items consist of line drawings and event videos as prompts and four response choices of sign description in ASL. The subjects match sign description with the prompted drawings and event videos. The other half provides sign descriptions as prompts and four choices of line drawings or event videos. The subjects match drawings and videos with sign descriptions.

How measures are assessed - the ASL-CT is a computer scored objective test with one correct choice and three incorrect foils.

Psychometrics - the test has good internal reliability ($\alpha = 0.834$). It has high concurrent validity with ASL-SRT ($r = .715$). Hauser et al. (2015) reported that deaf native signers performed significantly better than deaf non-native signers and hearing native signers, and that hearing ASL learners' level of ASL courses they were taking correlated with their test results ($r = .726$).

Assessments of L2 sign language teachers and interpreters

Assessments that involve the use of sign languages are not only given to learners but also L2 sign language teachers and sign language interpreters. While the learner assessments cover the domain areas of sign languages, L2 sign language teachers and interpreter assessments include not only the domain areas, but also other domain areas that pertain to the field of knowledge and skills in these respective disciplines. Since this chapter focuses on assessment of sign language knowledge and skills, a broad discussion of teacher and interpreter assessments is limited by space to teacher and interpreter certifying entities and their assessment systems and domain areas in the following.

Assessment of L2 sign language teachers

The ever-growing numbers of L2 classrooms (e.g., for the US, see Rosen, 2008; Wilcox, 2018) necessitate that teachers who teach L2 sign languages need to demonstrate knowledge and skills in not only sign languages, but also the aspects of pedagogy including instruction strategies and materials; the development of course design as curriculum such as a course, a unit, and a lesson;

learning process and acquisition; and learners' assessment forms and protocols. In many countries they need to be qualified for teacher certification. Teacher assessments cover sign language skills, the pedagogy of language, the linguistics of sign language, and deaf people, community, culture, and history. Certification examinations typically rely on the standards for learning and teaching that are created by government education entities and professional organizations of practitioners and researchers (see Rosen, Chapter 2 in this volume). For example, in the US teacher certification examinations given by various states typically follow the language learning standards developed by ACTFL, and in the EU by the *Common European Framework for Reference – Languages* (CEFR). These have been adapted for the evaluation of sign language proficiency respectively by ASLTA and ProSign Project, which is developed by a consortium of colleges and universities in the EU. Countries and provinces within countries vary on whether they use standardized assessments or develop their own assessments of sign language skills, as well as the requirements and assessments they provide, including test forms, domains, administration, and scoring criteria.

Assessment of sign language interpreters

There is also an increased enrollment of signing deaf learners in general education schools, colleges and universities, which creates a need for sign language interpreters. Sign language interpreters are expected to have the knowledge and skills in sign languages and interpretation, which can be demonstrated through assessment. In the countries where interpreting is recognized as a profession, individuals who want to become professional sign language interpreters need to complete a higher education degree program in interpretation, pass interpreting assessments, and obtain interpreting licensure and certifications. As previously noted, the international, national, and provincial bodies of certifying organizations, either statutory or interpreter associations, have different requirements and assessments they provide (for ASL: Liu, 2015; Cokely, 2012; National Association of the Deaf, 2016; for AUSLAN: Napier, 2004). Different countries develop their own assessment tests and procedures, such as in Australia with the National Accreditation Authority for Translators and Interpreters (NAATI), in the US with the National Interpreter Certification (NIC) and Educational Interpreter Performance Assessment (EIPA), in the United Kingdom with the Council for the Advancement of Communication with Deaf People (CACDP) Signature Level 6 NVQ (National Vocational Qualification) Certificate, and in Canada with the Canadian Evaluations System's Certification of Interpretation (COI). While they have different requirements and assessments, the domain areas of interpreter assessments are similar. Their interpreter assessments typically include knowledge, performance, and interview domains. The knowledge domains typically include interpreting issues, theory, and models; sign language linguistics; the interpreting code of ethics and professional conduct; cultural, linguistic, and social issues within the Deaf community; and the business of interpreting. The performance examination typically assesses interpreters' ability to mediate through sign languages and spoken languages between deaf and hearing consumers. The interpreter assessments vary in test formats. The NAATI, NIC, EIPA, and TOI are scored assessments and the Signature Level 6 NVQ is a portfolio assessment.

Future trends

Due to inconsistencies in the format, domain areas, data solicitation, and scoring in the assessments noted above that the profession should continue to seek ways to improve in measuring the language skills and knowledge of sign language learners as they develop, including the ongoing development of both formative and summative tests, and to increase efforts to standardize domain areas and scoring across L2 sign language assessments.

Future research studies

Many tests measure only a small range of linguistic structures, and are either formal or informal, and expressive or receptive. The overall evaluation of an L2/Ln individual's skills should be comprehensive rather than relying on only one or a few assessments. We have indeed come a long way from the subjective and often arbitrary evaluations of the past. There is also the need for continuing sign language linguistic research to inform the development of new domain areas in future tests. Future research should also focus on developing comprehensive assessments that include expressive and receptive tests, formal and informal tests, objective, not subjective, evaluation protocols, and standardization in scoring, including norms. High construct validity across different tests needs to be attained by grounding on the same body of linguistic research and communication studies. In addition, future research should address the need to increase inter-test reliability across different sign language assessment tests. There are recent efforts towards more objective and standardized tests that do not rely on raters.

Future pedagogical applications

The sign language assessment tests that are informal such as the proficiency tests reviewed here are quite well entrenched as a standard method and can give us some reasonable confidence in the results. This presumes that rigorous training and oversight of the raters is maintained, and that scores are objectively determined. However, there is a high reliance on subjective ratings by evaluators assessing global levels of proficiency. The reliance on trained raters has been the core of the problem. It inhibits the distribution and availability of tests developed in the labs of sign language researchers (Hauser et al., 2015). It is critical that raters receive periodic and intensive trainings to ensure that at least the reliability and inter-rater agreement remains adequate for a fair assessment. In addition, many assessment tests that were developed are not commercially available. They were initially developed for research purposes. Those tests need to be made available for the assessment and evaluation public for use with the L2/Ln learners. As sign languages are increasingly accepted in many countries, there are countries that do not have L2/Ln assessments in their sign languages. Existing sign language assessments may need to be adapted for their sign languages.

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The politics of L2/*L_n* sign language pedagogy

Timothy Reagan

Introduction

There is a worldwide proliferation of classes and programs in sign language as second and additional languages (L2/*L_n*) in education institutions today compared to at least a century ago. This is made possible by the countries' recognition of sign languages as a second, foreign, or world language where learners take for academic credit at schools. However, sign languages sit uncomfortably in general discussions of language, politics, and ideology. Their status with respect to such issues as nationality and nationalism, ethnicity, culture, and identity is problematic, with political implications for the teaching of sign languages as L2/*L_n* to largely hearing learners who do not have direct connection with the DEAF-WORLD.

This chapter looks at the politics of L2/*L_n* sign language pedagogy. The politics of L2/*L_n* sign language pedagogy hinge on the politics of national language policy and planning as these relate to minority languages in general and sign languages in particular, including the unique nature of language rights for those whose dominant language is a sign language. The history of sign language as L2/*L_n* is closely tied to the history of deaf education. The motivations for learning L2/*L_n* sign languages and teaching strategies in sign language, including motivations and teaching strategies, by hearing people is examined. Following this are suggestions for future legitimacy in the teaching of sign languages and research and pedagogical practices in L2/*L_n* sign language pedagogy.

Theoretical perspectives

Language policy and planning

Countries develop language policy and planning (LPP) to determine the creation, selection, status, recognition, codification, distribution, allocation, and elimination of languages, including majority and minority languages, for its inhabitants within its politico-geographical boundaries. Writing about language policy, Tollefson has observed that,

Language policy is a form of disciplinary power. Its success depends in part upon the ability of the state to structure into the institutions of society the differentiation of individuals into

“insiders” and “outsiders” ... To a large degree, this occurs through the close association between language and nationalism. By making language a mechanism for the expression of nationalism, the state can manipulate feelings of security and belonging ... the state uses language policy to discipline and control its workers by establishing language-based limitations on education, employment, and political participation.

1991: 207–8

According to Tollefson (1991), LPP, in particular the selection and use of languages, is a function of nationalism that is grounded on the ethnicity and cultural identity of its people, with effects on the recognition, scope, and implementation of majority and minority languages within the countries, and on the education, employment, and political participation of its inhabitants.

Formal education efforts entailing LPP became increasingly common as new countries chose official languages, developed indigenous languages, prepared educational materials to provide children with schooling in their mother tongue(s), and invested in different kinds of media to promote national languages (see Cooper, 1989; Kaplan & Baldauf, 1997). LPP also includes foreign and world languages other than the mother languages. Countries construct LPPs to determine which languages other than their mother languages to offer to their inhabitants based on their value system, purposes, and aims in relation to the language communities within and other countries.

For people whose vernacular language is a sign language, the situation for LPP is even more complicated than this might suggest. Deaf people,¹ those most likely to use and depend on a sign language, are both “insiders” and “outsiders” in the cultural and linguistic societies which surround them at the same time, in a way that is arguably unique among cultural and linguistic groups. This is so because of the nature of the deaf community, and the ways in which its norms and language transmit across generations.

Sign languages and deaf communities

Minority communities of signing deaf people have coexisted with larger, dominant communities of hearing and speaking individuals throughout human history. The fact that the vast majority of deaf individuals have hearing parents, and that the parents will also have hearing children, is an important and extremely unusual aspect of both cultural deafness and sign language. Unlike other cultural and linguistic groups, the transmission of both deaf culture² and sign language most often takes place *transgenerationally*, that is, it occurs *within* a generation from child to child, rather than intergenerationally, from parents to children (Holcomb, 2013; Leigh, Andrews, & Harris, 2018). Yet, sign language is used by signing deaf communities and is closely tied with deaf identity. This is an important point, which becomes pronounced when sign language is officially recognized as a language in a country, and this creates increased pride by signing deaf communities for the acceptance of their language and social identities. A case in point is American Sign Language (ASL) when it was recognized as a language not only through linguistic and scholarly research but also by members of the American Deaf community. As Padden and Humphries have explained,

The recognition of sign language, not by linguists or scholars, *but by Deaf people themselves*, was a pivotal moment. While Deaf people had been aware that their sign language met their needs and provided them with an aesthetic pleasure that only languages can provide, the realization that sign languages were equal to yet uniquely interesting among human languages brought to Deaf people a sense of vindication and pride,

2005: 157, *my emphasis*

The issues of LPP, the majority populace's use of spoken languages in society, the coexistence of signing deaf people communities with hearing communities, and the transgenerational nature of sign language and Deaf culture transmission provide the context for the LPP regarding sign language as a L2/*Ln* and L2/*Ln* sign language pedagogy to learners who are largely hearing and do not have direct connection with the DEAF-WORLD.

LPP for sign languages

In the past two decades, a growing number of scholars have focused on issues concerned with LPP issues related specifically to sign languages (see Reagan, 2010). Although for the most part grounded in the traditional work on LPP, this scholarship has identified a number of ways in which LPP for sign languages is unusual or even unique in comparison to that of spoken languages (see Eichmann, 2009; Rayman, 2009; Reagan, 2010; Turner, 2009). The difference between LPP studies for spoken languages and for sign languages is not due solely to the different modalities employed by the two kinds of languages, nor is the fact that sign languages are virtually never written languages particularly relevant. Rather, the difference with respect to LPP for sign languages is reflected in popular (albeit erroneous) views about the nature of sign languages and to deficit views of both sign languages and deaf people.

Much of the LPP focus on sign languages around the world has been concerned with gaining some sort of official or semi-official status for the sign languages of different national deaf communities. Such status planning efforts have been quite successful, and an increasing number of countries have granted just such recognition either constitutionally or legislatively. The nature of official recognition of sign languages varies from one country to another, as does the relative strength of the legislation involved. Some kinds of official recognition are much stronger in terms of their potential impact on the deaf community than are others. Most commonly, official status for a sign language serves three purposes: (1) a symbolic (but nevertheless important) recognition of the legitimate status of sign language as the vernacular language of the deaf community; (2) a guarantee of the linguistic rights of sign language users, both in the judicial and legal process and in other social service contexts (e.g., the provision of sign language interpreters); and finally, (3) a commitment to use sign language in the educational domain with deaf children. It is important to note that the second and third purposes are often met *prior to* the official recognition of a sign language, as a result of more disability-oriented legislation. Thus, we can see that the recognition of a sign language as an official language, although intended by its advocates to promote a positive view of sign language and deaf people, may also involve the continuation of elements drawn from a medical or pathological perspective of deafness (see Corker, 2000; Reagan, 2011).

Many of the countries of the European Union (EU) have been at the forefront of moves to recognize national sign languages (see Timmermans, 2005). Finland was the first country to recognize its sign language, and there are a number of countries in the EU that have constitutional recognition of their national sign languages, including Austria, the Czech Republic, Portugal, and Slovakia. In most other EU countries, recognition of sign language, while not constitutional, is nevertheless largely in place through other kinds of enabling legislation. In addition, the European Parliament passed a *Resolution on Sign Languages* in June 1988, which recognized the legitimacy and importance of sign languages, and specifically asked member states to remove obstacles to the use of sign language. In Europe outside of the EU, comparable legislation exists in a number of other countries. Elsewhere, constitutional recognition of national sign languages has been achieved in Ecuador, New Zealand, Uganda, and in Venezuela. In a host of other countries, such as Australia, Brazil, Canada, China, Columbia, Cuba, Iran,

Ireland, Mauritius, Mozambique, South Africa, Sri Lanka, Thailand, Turkey and Zimbabwe, sign languages are recognized in non-constitutional ways.

Although discussions and debates about the official status of sign languages are for the most part positive developments, not only are they based on deficit views of both sign language and deaf people, but they are not without other risks as well. Just as dominant national languages are virtually never the only languages spoken in a country, so too there are generally a variety of different sign languages in a country. At the national level, only one such sign language is likely to be recognized; we find only *British Sign Language*, *German Sign Language*, *Russian Sign Language*, *Israeli Sign Language*, and so on, but no mention of the fact that there is considerable variety in sign language use in each of these national settings. Perhaps the clearest case of this phenomenon is that found in the Arabic-speaking world, where local, regional and national sign languages have been the target of efforts to create a common, standardized “Arabic Sign Language” in recent years (Abdel-Fattah, 2005). Thus, linguistic hegemony and imperialism takes place in the world of sign languages just as they do in the world of spoken languages. The success of a national sign language all too often means a threat to the survival of local and community sign languages (Skutnabb-Kangas, 2000).

As in most other national settings, what we find is less than a full commitment to the recognition of sign language and the linguistic human rights of its users. As Krausneker notes,

The key issue within [the] demands [of deaf people] has been the request for linguistic rights, which one might even call linguistic human rights Participation in public life, the media, politics, and so on is therefore rather difficult. It is not that deaf people cannot participate because they have an auditory problem; rather, it is because the majority are unfamiliar with the language that deaf people use and interpreters are rarely provided. In the field of social and political work, deafness-related issues are generally dealt with in the confined area of “disabilities,” which ignores the important linguistic question of the status and rights of sign languages.

2000: 142

There is substantial literature that is devoted to issues of language rights and linguistic human rights, and questions about such rights play an increasingly significant role in discussions related to LPP. In the case of sign languages, there is also an extensive and well-documented concern with the linguistic rights of deaf people (see Batterbury, Ladd, & Gulliver, 2007; Murray, 2015).

The primary way in which issues of language rights differ from the norm in the case of deaf-signing people has to do with the issue of meaningful access to the dominant language in society. Tollefson has commented that,

The policy of requiring everyone to learn a single dominant language is widely seen as a common-sense solution to the communication problems of multilingual societies. The appeal of this assumption is such that monolingualism is seen as a solution to linguistic inequality. If linguistic minorities learn the dominant languages, so the argument goes, then they will not suffer economic and social inequality. The assumption is an example of an ideology which refers to normally unconscious assumptions that come to be seen as common sense ... such assumptions justify exclusionary policies and sustain inequality.

1991: 10

Although the idea of a single, shared dominant language as a “common-sense solution” to linguistic diversity is problematic under the best of circumstances, when applied to the case of

deaf-signing people, it is not simply problematic, but absurd. Access to spoken language is profoundly difficult to acquire for most deaf people, and distinguishes the deaf population from other minority language populations in a key, and highly relevant, way.

The challenge here is that in the political framework language rights in the context of sign languages may be based *either* on the more common disability-rights model of deafness (the more common model), *or* on a civil rights-oriented model of deafness. Although fundamentally the two paradigms of deafness are incompatible on a variety of philosophical and ideological levels (see Hoffmeister, 2008; Ladd, 2005), in the real world of politics and practice, and given the dominance of the hearing world and its commitment to the pathological conception of deafness, it is the disability-oriented perspective that predominates:

Although the disability label seems inappropriate for the Deaf-World, its members have not aggressively promoted government understanding of its ethnicity and of the poor fit of the disability label. As a result, the majority's accommodation of the Deaf has come under a disability label and Deaf people must in effect subscribe to that label in order to gain their rights in access to information, in education, and other areas. This is the Deaf dilemma: retain some important rights as members of their society at the expense of being mischaracterized by that society and government, or surrender some of those rights in the hope of gradually undermining that misconception.

Lane, 2005, quoted in Komesaroff, 2008: 111

In other words, what takes place is that for the purposes of accessing education and resources, the deaf community sometimes find itself foregoing, to some extent, its claim to linguistic human rights for rights grounded in a disabilities paradigm in order to ensure that the needs of deaf people are met. This is hardly surprising, of course, given the relative status of the deaf community vis-à-vis the hearing world, a fact that creates further confusion with respect to discussions about language rights.

Pedagogical practices

The political framework pertaining to LPP for sign languages in education is its recognition, status, and distribution as an academic subject. Countries, LPP on indigenous, non-mother languages has effects on L2/Ln pedagogy. The countries' LPP for sign languages shape its locations in educational institutions, acceptance as foreign or world languages where learners take for academic credit at the pre-collegiate and collegiate institutions, and pedagogical practices, including the configurations of classroom settings; types of courses; purposes, curriculum, and teaching in the courses; learner population; and teachers and teacher qualifications. In addition, changes in a country's LPPs for foreign and world languages also generate changes in L2/Ln pedagogical practices.

One of the interesting aspects of an examination of L2/Ln teaching with respect to sign languages is that the literature in the field is overwhelmingly concerned with the teaching of English to deaf learners, rather than with the teaching of sign language to hearing learners (Pichler & Koulidobrova, 2016). The focus in this chapter is precisely on the teaching of sign languages to hearing individuals, an area about which there is some (albeit limited) scholarly work in the field (see, for example, Jacobs, 1996; Kemp, 1998; McKee & McKee, 1992; Quinto-Pozos, 2011; Rosen, 2015; Wilcox & Wilcox, 1997). As Quinto-Pozos (2011) has observed, while there are many similarities between teaching spoken languages and teaching sign languages, there are also some significant differences. Many of these differences remain in need of study, which are "the possible role of the socio-political history of the Deaf community in which ASL teaching

is situated, linguistic differences between signed and spoken languages, and the use of video and computer-based technologies” (Quinto-Pozos, 2011: 137).

In the following, we use the case of American Sign Language (ASL) in the United States as an example of the effects of a country’s LPP on sign language as a foreign or world language, and how changes in a country’s LPP shape pedagogical practices in L2/Ln languages, although for the most part the situation in other parts of the world were comparable. We examine the history of American LPP and its effects on L2/Ln pedagogy of American Sign Language.

LPP in the US and L2/Ln ASL pedagogy

The status planning for ASL in the United States is a complex case. The legal and constitutional status of ASL at the federal level in the US is unimpressive when placed in a broader international context. The US Constitution is silent on the matter of an official language (though English is obviously the *de facto* official language of the country), but a growing number of states do recognize English as their official language. In terms of sign language in the US, there is no constitutional recognition of ASL at the federal level, but at the state level legislation differs significantly, falling into a number of different categories. Among the different kinds of legislation currently in place, the three most common are those that simply recognize ASL *as a language*, those that recognize ASL *as a foreign language*, and those that recognize ASL *exclusively for educational purposes*. Although such legislation may well be important in increasing the opportunities for hearing learners to study ASL as a foreign language, it also sends a powerful message about the need to establish, by legislative fiat, the recognition of the legitimacy of ASL *as a language*.

What is seen here is a basic confusion between general educational rights and fundamental language rights, and this confusion is grounded in a lack of understanding of sign languages and the communities that use them. This confusion does not mean that there have not been cogent and articulate calls for the recognition and manifestation of language rights for signing people. In the US, one of the most powerful examples of such calls has been that provided by Siegel, who argues that:

The right to communication and language requires the protection of the US *Constitution* ... the First and Fourteenth Amendments to our *Constitution* mandate that ... deaf and hard of hearing children have that which virtually every other American child takes for granted – the right to exchange ideas and information in school ... a right to access and develop communication and language.

2008: xiii–xiv

The role of sign language in America has been, and remains, profoundly political and ideological in nature.

There are different “eras” in the American LPP for ASL as L2/Ln. Each “era” is marked by a certain constellation of attitudes and views on deaf people, community, culture, and sign language that can be explained by the LPP model. The nature, purposes, and practices of the teaching of sign languages as L2/Ln in the United States has, since the nineteenth century, also been closely tied to the pedagogical practices and competing philosophies found in the history of deaf education. Almost since the inception of formal, institutionalized schooling of deaf children in the nineteenth century, there were deep divisions about goals, methods, and “medium of instruction” (see Moores, 1987; Nomeland & Nomeland, 2012; Reagan, 1989; van Cleve, 1993; Winefield, 1987). The field is largely bifurcated between those who advocate the use of signing in the education of deaf children (historically known as “manualists”), and those who reject the

use of signing and advocate instead intensive training in speech and lip-reading (commonly known as “oralists”) (see Lane, 1984; Moores, 1987; Paul & Quigley, 1990; Baynton, 1997).

In spite of the competing philosophies, however, since the establishment of the earliest schools for the deaf in the early nineteenth century, hearing teachers of the deaf were taught to sign. Early teachers of the deaf were largely hearing who have had no prior connection with deaf individuals. They used ASL with the deaf children at earliest schools for the deaf. Parents and siblings, members of religious institutions (i.e., churches and seminaries), and others who worked in close contact with deaf people also learned ASL. Typically, the instruction in ASL received by hearing learners was provided by either deaf people themselves or by CODAs,³ although neither group was in any meaningful sense trained or prepared to teach a language, let alone a specific sign language. The curriculum, such as it was, often consisted of the manual alphabet, numbers, a limited sign vocabulary, and (though less commonly) certain grammatical features (though of contact sign or the equivalent of a manual sign code rather than of ASL itself). However, the teaching of ASL was not typically seen as “true” L2/Ln teaching or learning. In short, the teaching of ASL in this period was *laissez-faire* in nature, varied from place to place and individual to individual, and based on a disability model; hearing people learn ASL to “help” deaf individuals communicate and receive education for largely religious purposes (Lane, 1984).

This *laissez-faire* approach to the teaching of ASL as an L2/Ln continued well into the twentieth century. Community education programs, often taught in schools for the deaf as well as to some extent in colleges and universities, began to appear, targeting learners who had some special interest in acquiring ASL such as parents and other relatives, friends, future teachers of the deaf, and social workers, counselors, and psychologists employed in settings in which some of their clients would be deaf. Such courses were generally non-credit in nature, and continued to use individuals as instructors who could sign but who were largely not trained as language educators. Curricula varied extensively, yet they cover manual sign codes and sign vocabularies, and none existed that would constitute a real equivalent to a more typical foreign language curriculum. The teaching of ASL reflected the general, and widespread, view that although it might be a useful communicative tool in some situations, it certainly did not constitute a “real” language in a strong sense (see Reagan, 2016, 2019), and that its teaching did not require serious thought or consideration, let alone formal training, policies, and practices. In addition, attempts to create ASL classes for credit at pre-collegiate and collegiate institutions were met with derision by education authorities, who viewed ASL as not a language but a manual representation of English, that the Deaf community does not represent a foreign country, and that there is no written tradition in Deaf culture and hence unworthy of study (Rosen, 2015).

Current pedagogical practices

This predominantly *laissez-faire* approach to the teaching and learning of ASL as an L2/Ln that was based on a disability model began changing in the last decades of the twentieth century towards a *language-rights* approach based on a civil-rights model. Since the late twentieth century ASL is offered not only at schools for the deaf but also general education schools, colleges, and universities for academic credit. The disability model has evolved to the current civil rights model, and ASL is offered at the schools in a language rights approach with a view that language is culture, that deaf people are a part of the world’s peoples and cultures, and that sign language is a legal right for deaf people.

Arguably, the single most important factor in these changes was the publication of Stokoe’s monograph, *Sign Language Structure*, in 1960 [1993]. Stokoe argued that ASL was not an inferior *alternative* to spoken language, as was widely believed, but rather a full and vibrant human language in its own right. In the past half century, a growing body of linguistic evidence, not

only on ASL, but also on a host of other sign languages as well, has more than proven most of Stokoe's fundamental insights true (see Brentari, 2010; Valli et al., 2011). By the late 1970s, scholarly work began to appear that suggested that signed languages are not only full and complete human languages, but contain unique features that could further inform linguistic research on a host of topics – not the least of which were universal grammar (Lillo-Martin, 1991; Sandler & Lillo-Martin, 2006), comparative and historical linguistics (Shaw & Delaporte, 2015; Supalla & Clark, 2015; Wittmann, 1991), sociolinguistics (e.g., Lucas, 1989; Schembri & Lucas, 2015), the diglossia that are found in virtually all the signing communities (Brennan & Colville, 1979; Lee, 1982; Lucas & Valli, 1990), lexicography (McKee & McKee, 2014; Zwitserlood, 2010), psycholinguistics and neurolinguistics (Corina & McBurney, 2001; Hickok, Love-Geffen, & Klima, 2002; McGuire et al., 1997), and language policy and language planning (Eichman, 2009; Hult & Compton, 2012; Quer & Quadros, 2015; Reagan, 2010, 2011). Much of this linguistic work had direct and important implications for the teaching of ASL and other sign languages as L2s.

In addition, public education laws in the US such as the Individuals with Disabilities Education Act mandated that deaf children be mainstreamed into public general education schools and to encourage them to learn how to speak and hear so they can be integrated in the general society. As Rosen (2015) reported that in time, such efforts did not meet the goal, and the increased presence of signing deaf children had resulted in the interest by high school learners to learn ASL so they can communicate with deaf peers, and in taking ASL for foreign language credit. ASL scholars and the Deaf community met with education authorities, which resulted in the recognition of ASL as a language to be used with deaf children in deaf education classrooms and offered in general education classrooms where hearing learners can take to meet world or foreign or world language requirements for degrees and diplomas.

Consequently, in the past decades, there has been increasing interest at both the Pre-K-12 and university settings in studying ASL (Rosen, 2015). By mid-twentieth century, ASL teaching as L2 occurred in community education programs at colleges and universities, mostly for no credit, to learners who were interested in learning ASL so they can communicate with their families and individuals who are deaf at work, and as a part of requirements for teacher trainers, social workers, vocational rehabilitation, with people who work with the deaf. Since late twentieth century, L2 ASL teaching and learning are offered at colleges and secondary and middle schools where ASL is offered for foreign language credit. As Quinto-Pozos has noted,

American Sign Language (ASL) has become a very popular language in high schools, colleges, and universities throughout the U.S., due, in part, to the growing number of schools that allow learners to take the language in order to fulfill a foreign or general language requirement ... The number of learners enrolled in ASL classes has increased dramatically, and there are ... more instructors of ASL at the present time than ever before.

2011: 137

As reported in *The Standards for Learning American Sign Language*, a part of the American Council on Foreign Languages' Task Force is to develop national foreign language standards, and there is an exponential increase in the number of K-12 schools that offer ASL (ASLTA, 2019). In addition, the Modern Language Association (2010) reported that in post-secondary institutions witnessed 600% growth in enrollment in ASL courses between 1998 and 2006, and 16% from 2006 to 2009. Public school enrollments have increased by close to 43% between 2004 and 2008.

With respect to the actual teaching of ASL as an L2/Ln, the contemporary situation is far better than it has ever been. As is true of virtually all other commonly taught languages (and many less commonly taught languages) in the United States, there are national ASL

standards which were developed by the American Council on the Teaching of Foreign Languages (ACTFL) in partnership with the American Sign Language Teachers Association (ASLTA) (see National Standards Collaborative Board, 2015). These national standards are reflected either formally or informally in many of the textbooks available for the teaching and learning of ASL (e.g., Cassell, 1996; Newell et al., 2010; Zinza, 2006). L2/Ln ASL curricula follow developments in spoken languages and theories of linguistics, learning, and teaching (Rosen, 2010). The curricula moved from the collections of images and signs, to grammar and dialogues. The curricula began in the 1960s with translations and correspondences between ASL and English sentences such as *ABC Phrase Book* (Fant, 1983) and *A Basic Course* (Humphries & O'Rourke, 1994), which have evolved into the linguistic approach in the 1980s with the "Green Books" series (e.g., Baker-Shenk & Cokely, 1980; Cokely & Baker-Shenk, 1980), and now the communicative approach with the "Signing Naturally" series (e.g., Lentz, Smith, & Mikos 1988). The field of L2/Ln ASL pedagogy have become professionalized with the establishment of a national organization, ASLTA, which is "dedicated to the improvement and expansion of the teaching of ASL and Deaf Studies at all levels of instruction" (ASLTA, 2019), and holds annual conferences as well as offering four levels of certification for teachers of ASL (Provisional, Qualified, Certified, and Master levels). In addition, different states have different certification requirements for ASL teachers. Some states accept ASLTA certification, some require ASLTA certification, and others offer their own certifications. Typically, states also require either a bachelors or a masters degree, and the completion of an accredited teacher education program. The teaching of ASL as a L2/Ln has currently become a professionalized endeavor and is fully comparable to the teaching of other foreign or world languages.

Current issues in L2 ASL pedagogy

Although the growth in interest and enrollments in ASL is impressive, and is certainly a positive development, there are remaining political issues in L2/Ln sign language pedagogy. First, the percentages of growth with respect to the number of learners actually studying the language can be somewhat misleading: the *National K-12 Foreign Language Enrollment Survey Report* in 2017 indicated that only 1% (roughly 150,000 learners) of all learners enrolled in foreign language classes in the US were studying ASL. Further, the growth in ASL enrollments has also led to a predictable backlash, especially among some foreign language educators, often for reasons that go beyond mere "turf" (see Reagan, 2016). Indeed, the resistance to ASL in public education at all levels has often been grounded in ignorance and misunderstandings about its status as a "real" language (see Reagan, 2016) and the state legislation related to ASL in the US has, at the very least, helped to address such problems.

Second, lest one think that learners studying ASL are taking an "easy out" and avoiding the difficulties of learning a foreign language, recent research suggests that acquiring ASL may actually be somewhat more difficult than learning a foreign spoken (see Jacobs, 1996; McKee & McKee, 1992). Kemp has emphasized that:

Like all languages, [ASL] is not mastered easily beyond a basic level. Mastery requires extensive exposure and practice. Presently, there is no consensus on where ASL might fall on a learnability continuum for native English speakers. Nonetheless, ... learning ASL should be approached with respect and with the knowledge that mastery only occurs over a substantial period of time.

1998: 255

Indeed, as Jacobs (1996) has pointedly suggested, learning ASL is a case of learning “a truly foreign language.”

Third, as more hearing people have begun to learn ASL, complications have started to arise with respect to issues of access to ASL. The role of ASL in the construction of deaf identity, then, is quite complex. It is clearly a *necessary* condition for deaf cultural identity, but (as is demonstrated in the cases of hearing individuals who use it fluently) not a *sufficient* condition for group membership. Indeed, for non-group members, use of ASL can somewhat paradoxically present significant challenges to one’s credibility and status as a sympathetic outsider, and it is far from uncommon to find deaf people who seek to “protectively withhold from hearing people information about the DEAF-WORLD’s language and culture” (Lane, Hoffmeister & Bahan, 1996: 71). As one leader in the deaf community reports,

I have asked a number of Deaf individuals how they feel about hearing people signing like a native user of ASL. The responses are mixed. Some say that it is acceptable for hearing people to use ASL like a Deaf person on one condition. The condition is that this hearing person must make sure that the Deaf person knows that s/he is not Deaf. Some people resent the idea of seeing hearing people signing like a native ASL user. Those who are resentful may feel sociolinguistic territorial invasion by those hearing people.

Quoted in Schein & Stewart, 1995; 155

Although there may be different attitudes in the DEAF-WORLD about hearing people learning ASL, it is important to note here that there is really no debate in the community about what might be called the “ownership” of ASL. It is clearly a possession of deaf people. In short, the only question about which there may be some ambiguity is whether hearing people should be encouraged to learn ASL, versus some other kind of “contact signing” (see Levesque, 2001).

Future trends

Predicting the future is notoriously difficult and risky. There are, in fact, a fair number of quite famous predictions are remembered today precisely because they proved to be so terribly, and embarrassingly, wrong. Watson, the chairman of IBM, famously predicted that, “I think there is a world market for maybe five computers,” while someone writing an internal memo at Western Union dismissed the future of the telephone in 1876 by noting that it “has too many shortcomings to be seriously considered as a means of communication.” In 1929, Fisher, Professor of Economics at Yale University, suggested that “stocks have reached what looks like a permanently high plateau.” Trying to predict the future of the politics of L2/*L_n* sign language pedagogy could just as easily prove to be a trap, but certain things do seem to be likely.

Future research studies

It is likely that as the study of the linguistics of sign languages continue to evolve and develop, the study of sign languages as L2/*L_n* will continue to be of interest to learners, and probably to a greater degree than it is now. There is a need to study the impact of linguistic research on the political views of sign language and deaf people, community and culture. As suggested earlier, this should be paralleled with another area that remains in need for further research, which is the socio-political history of sign language status and mechanisms for its recognition, implementation, and dissemination within the general education system, from pre-K to collegiate institutions.

Future pedagogical practices

It is also likely that individuals involved in pedagogical practices continue to improve the political situation with sign language as L2/*L_n* and create future opportunities for L2/*L_n* pedagogy of sign languages. There is a need to increase the distribution of the language in education institutions. This requires upgrading the respect of sign language among schools and change countries' view of sign language as disability to sign language as culture. Deaf people should maintain control over ASL but at the same time create opportunities for hearing people to use among themselves in certain contexts and situations (cf. Rosen, 2014). They need to get hearing people to learn sign language to use it, involve themselves in deaf community, and create positive political, educational, and employment opportunities for signing deaf people at workplaces.

In spite of the above developments in L2/*L_n* sign language pedagogy, at the same time, regardless of what is found in linguistics, developments in the medical sciences, driven by a pathological and deficit view of deafness, will continue to seek “cures” for deafness and reduce the size of the deaf and signing population. One hopes that there is no future for eugenics, although it is not completely unimaginable, and a future in which deafness is recognized simply as another sort of human diversity – a world in which, as Martha's Vineyard once was, there is a place where “everyone here spoke sign language” (Groce, 1985).

Notes

- 1 Beginning in the 1960s and 1970s, it became common in the literature dealing with deaf people, Deaf Studies and sign languages to distinguish between “deaf” and “Deaf”: the former referring to deafness as an audiological condition, while the latter to Deafness as a linguistic and cultural condition. Although this is a valuable distinction, it oversimplifies and dichotomizes deafness. One way of addressing this bifurcation is to use a term such as *d/Deaf* and *d/Deafness*, but even this seems to overly simplify the complexities of deaf identity. Given these identities, I have chosen to use simply “deaf” and “deafness” in this chapter. When directly quoting other authors, I have used the forms that they have chosen.
- 2 There are a number of different terms and phrases that are commonly used to refer to the deaf cultural community, many of which are used synonymously in this chapter: deaf culture, deaf community, Deafhood (a British term that I do not typically use), and DEAF-WORLD (representing the ASL sign for the concept).
- 3 CODAs are the hearing “Children of Deaf Adults,” for whom ASL (or some other sign language) is their first and native language. These individuals play a crucial bridging role between the DEAF-WORLD and the hearing world (see Leigh, Andrews & Harris, 2018: 10).

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Part IV

Learner characteristics



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Typical and atypical sign language learners

Jenny L. Singleton, David Quinto-Pozos, and David Martinez

Introduction

Instructors of foreign languages in secondary and higher education often encounter diversity in learning abilities among their learners. Setting aside motivation and other academic factors, what makes one learner better at L1 or L2/ L_n learning over another? Might some learners have a stronger aptitude for a signed language over a spoken language? And, how do we know how an atypical L1 or L2/ L_n learner will fare in the classroom? These are interesting issues for the L1 and L2/ L_n instructors as they consider adapting their instruction or activities for the range of skills and capacities within their class.

In this chapter, we focus on adolescent and adult learners of signed language, exploring situations of learner diversity or atypicality and how those differences impact signed language learning in both the L1 and L2/ L_n contexts. We begin by considering a number of case studies of signed language-exposed youth who present learning difficulties, exploring how their language and cognitive deficits affect primary signed language development. We then explore language aptitude; that is, how different cognitive factors, like phonological memory, may create language learning variation among spoken and signed language learners. Further learning diversity among L2/ L_n learners is considered, including those who possess language and learning disabilities. This review of current research will hopefully provide insights to learner learning differences, especially for instructors of signed languages. We conclude with a general discussion of pedagogical and intervention approaches with these diverse learners, but leave specific sign teaching strategies, assessment, and therapeutic intervention to the other chapters in this volume.

Theoretical perspectives

L1 and L2/ L_n sign language learning considering typicality and atypicality

Given that all child learners produce some errors in the process of language acquisition, we must be careful to define patterns of language that are atypical, taking care to consider multiple sources of evidence. For any language user, atypicality might be defined as performance or behaviors that lie more than 1.25 standard deviations (SD) away from a group/expected mean

(Leonard, 1998). However, such a calculation is not always possible (e.g., if norms for a given task are unavailable, or the population itself is small); in such cases, comprehensive analyses of various types of data may be the best approach to characterize an individual's atypicality. Before discussing atypicality, and because the field of signed language disorders is relatively new, we first provide some background on typical signed language acquisition.

Typicality in L1

Signed languages are acquired by native-signing Deaf children following a timeline that largely parallels the acquisition of spoken language by hearing children (Newport & Meier, 1985). For example, at the age when children are engaged in vocal babbling, sign-exposed children engage in manual babbling – the reduplication of hand or arm movements (Cheek et al., 2001; Petitto & Marentette, 1991), and there is evidence that these manual babbles lead to the children's first signs. Other early milestones (e.g., first signs and first two-word combinations) are similar for the acquisition of a signed or a spoken language (Newport & Meier, 1985), although there are elements of acquisition that exhibit protracted development. For example, some classifier structures and referential shift acquisition are not mastered until after age 7 (Emmorey & Reilly, 1998; Kantor, 1980).

Children acquiring a signed language also experience typical production errors just like hearing children who are acquiring a spoken language. Some of the errors involve an incorrect value for one or more of the phonological parameters of manual sign formation (e.g., handshape, place of articulation, movement, orientation). For instance, a young child may substitute a relatively easier handshape for one that is more difficult to articulate. Studies have reported that handshape errors are the most common in the early signed productions of children with native exposure to American Sign Language (ASL), whereas place of articulation is the most robust parameter, containing the fewest errors of production (Cheek et al., 2001). Additionally, early pronoun reversal errors can occur (Petitto, 1987), and some non-manual signals that are part of signed language grammar are not comprehended and produced until the semantically relevant lexical sign is mastered (Reilly, McIntire, & Bellugi, 1990).

Atypicality in L1

The vast majority of children throughout the world acquire the language(s) to which they are exposed through infancy and early childhood with ease, but that is not true for all children. In some cases, they do not progress as expected on milestones of vocabulary, grammar, and discourse/narrative ability. Many children with Developmental Language Disorder (DLD) can make progress with early therapeutic intervention. Unfortunately, there are few examples of research-based interventions for children with signed language difficulties as the vast literature on L1 intervention approaches is based on spoken language.

The study of atypicality with respect to L1 acquisition of a signed language includes a host of questions, including the following: What may be causing the purported language disorder? Is the deficit specific to language or are other cognitive abilities also affected? Does the language disorder surface in multiple modalities (e.g., signing, writing, speaking) and/or languages? By studying atypical L1 acquisition of a signed language we can examine the extent to which language disorders are influenced by modality and whether or not they are independent of other cognitive processes in the developing child. These findings spur some initial suggestions for interventions, discussed below.

Several studies have confirmed that developmental signed language disorders exist, and they are not necessarily the product of delayed or impoverished exposure to language. The first studies of signed language disorders were conducted in the United Kingdom, and a team of researchers showed that children who were exposed to British Sign Language (BSL) throughout childhood could be candidates for a signed language disorder diagnosis (Marshall, Denmark, & Morgan, 2006; Marshall et al., 2015; Mason et al., 2010; Morgan, Herman, & Woll, 2007). Results across myriad studies – including group studies and analyses of individual cases – suggest that atypicality in the signed modality is remarkably similar to various deficits that have been described for hearing children. In particular, those researchers suggested that deaf children with DLD struggle with complex morphology, their lexical processing is less efficient than that of their typically developing peers, their narratives are shorter and exhibit less structure than those from typically developing peers, and they are less able to accurately repeat all parts of a sentence repetition task. In general, the BSL-signing children in these studies did not exhibit impaired cognitive abilities, which provides evidence that signed language impairment can occur even in the absence of deficits in general intelligence and cognition.

Research on deaf children acquiring ASL in the US has also confirmed that native-signing Deaf children can exhibit language deficits, although aspects of the modality may influence the form that the developmental language disorder takes. In one case study, a native-signing Deaf adolescent was shown to exhibit a deficit in visual-spatial processing (in particular, perspective taking), and that deficit affected aspects of her ASL processing and production abilities (Quinto-Pozos et al., 2013). The adolescent's struggles with the processing of visual images from different perspectives were hypothesized to be closely tied to her atypical comprehension and production of classifiers and the use of topographical space. The comprehension and use of grammatical space was not impaired for this individual, but her abilities with classifiers (and, to some extent, the production of role-shifting) were not commensurate with that of her age-matched native-signing peers. In another case study, Quinto-Pozos, Singleton, and Hauser (2017) suggested that a native ASL-signing adolescent male was shown to be a good candidate for a DLD diagnosis. His deficits were particularly evident when considering the processing of sequentially ordered linguistic segments (especially fingerspelling). Like the studies from the UK, the ASL-signing adolescents in these case studies did not exhibit an impairment of general cognitive abilities (e.g., intelligence, problem solving, etc.), although they struggled with very specific types of processing (e.g., visual-spatial, sequential working memory), and those challenges likely affected their signed language development.

In addition to studies of signed language impairment with otherwise typically developing children, there exists a growing literature on language development that co-occurs with some type of cognitive or intellectual deficit, such as Autism Spectrum Disorder (ASD) or one of various syndromic conditions that sometimes accompany deafness in a child (e.g., Down syndrome, Williams syndrome). Work on these populations highlights the close ties between language and general cognition with respect to development.

Several case studies have shown that Deaf children who have been diagnosed with ASD often reverse palm orientation on certain signs (e.g., face their palm inward toward themselves rather than outward toward the interlocutor, such as during fingerspelling production; Shield & Meier, 2012), avoid pronoun use (Shield, Meier, & Tager-Flusberg, 2015), and have difficulty processing emotion facial expression used during signed narratives (Denmark et al., 2014). Further, researchers have shown that lifelong exposure to a signed language from birth does not help a Deaf autistic child overcome such struggles (Shield et al., 2016). In other words, the social and

cognitive impairments that often surface in autistic children, whether hearing or deaf, provide challenges for language acquisition, whether signed or spoken.

Various syndromic conditions can co-occur with deafness, and one may wonder about language acquisition for such children. One approach is to consider the cognitive characteristics of different syndromes that co-occur with deafness (e.g., Down, Usher, Pierre Robin, Treacher Collins, and C.H.A.R.G.E; see Picard, 2004) and whether features of those syndromes notably influence the acquisition and use of a signed language. In some cases, the syndromes are characterized by cognitive deficits (e.g., intellectual impairment in the case of Down and Pierre Robin) or other sensory deficits (e.g., blindness in Usher) that could also have an effect on signed language acquisition.

Woll and Morgan (2012) provide an account of the English and British Sign Language (BSL) skills and selected aspects of the cognitive abilities of several hearing English-BSL users, among them twin females with Down syndrome (exposed to BSL by their Deaf parents) and a hearing child with Landau-Kleffner syndrome (LKS) who was exposed to BSL at age 13. In the case of the child with LKS, which is a disorder of sound processing (auditory agnosia) in which no sounds can be recognized early on, English abilities were determined to be impaired, whereas signed language abilities were spared. In this case, a syndromic condition that affects auditory processing had an effect on a bimodal bilingual's spoken language development, but not their signed language acquisition. Researchers from the UK have also reported the case of a deaf adult with Williams syndrome (WS) (Woll & Morgan, 2012). As expected of a hearing patient with WS, this deaf signer fared poorly with respect to her performance on tests of visual-spatial skills. Similarly, and notably, her processing and use of the grammatical and topographical signing space in BSL was also affected.

In addition to ASD and various syndromic conditions, deaf and hard of hearing children are diagnosed with a disability other than deafness (sometimes referred to as “deaf plus”) at notable rates, with estimates ranging as high as 40% (Guardino, 2008; Knoors & Vervloed, 2003). Gallaudet Research Institute (GRI) data from 2010–2011 report nearly 34,000 deaf and hard of hearing learners in pre-K through 12th grade in the United States during that academic year, and of that number, approximately 5.3% were reported as having a developmental delay, 8.0% as exhibiting a learning disability, and 5.4% as being diagnosed with attention deficit disorder (ADD)/attention deficit hyperactivity disorder (ADHD). Several of the diagnosed disabilities could presumably have an impact on the acquisition and development of a signed language. There is some research on executive functioning and signed language (Hauser, Lukomski, & Hilman, 2008; Jones, Jones, & Ewing, 2006); nevertheless, with the high prevalence of “deaf plus,” this is an area in great need of further research.

Typicality in L2/Ln

Language aptitude

We now turn to the question of L2/Ln signed language learning and the normal variation that might be observed among hearing typical learners. Are certain people just naturally worse (or better) at signed language learning? Are there any predictors of sign learning supported by research? We shall examine how language aptitude and cognitive factors play a role in a typical learner's success.¹ We first discuss what is generally known regarding aptitude in L2/Ln spoken language learning, then turn to L2/Ln signed language learning.

Language aptitude is typically defined as a cognitive construct representing one's ability to master “any foreign [or second] language that the individual might choose to study” (Carroll, 1973: 2). Historically, research on language aptitude has been concerned with the

prediction of L2/*L_n* proficiency during the early stages of learning, typically operationalized as final course grades or standardized test scores. In this regard, research efforts have proven very successful, with language aptitude measures, such as the Modern Language Aptitude Test (MLAT; Carroll & Sapon, 1959), exhibiting strong predictive validity (Li, 2016). This is not to say that an individual deemed to have *low* language aptitude cannot master a foreign language, but that such an individual is unlikely to develop proficiency at the same *rate* as others, all other things (e.g., motivation, instructional interventions) being equal (Carroll, 1973; Dörnyei & Skehan, 2003).

Although the term *language aptitude* implies a single ability and, in fact, is typically operationalized as a single test score, research indicates that it is composed of a number of relatively independent factors (Grigorenko, Sternberg, & Ehrman, 2000; Pimsleur, Stockwell, & Comrey, 1962). The most parsimonious and influential account of the construct of language aptitude is Carroll's componential theory (Carroll, 1964). According to the componential theory, language aptitude consists of four factors: phonetic coding ability (or sound-symbol association); rote-memory; grammatical sensitivity ("the ability to recognize the grammatical function of words in sentences," *ibid.*: 95); and inductive language learning ability ("the ability to infer the forms, rules, and patterns of a given language," *ibid.*: 130). More recently, grammatical sensitivity and inductive language ability - which both require language analysis and, in practice, are difficult to differentiate - have been combined into a *language analytic* factor (Skehan, 1998).

Despite being proposed over half a century ago, the componential theory continues to dominate the language aptitude field (Li, 2016; Wen, Biedron, & Skehan, 2017). Still, some have argued that the componential theory of language aptitude could benefit by incorporating other components. In particular, there is an abundance of research implicating phonological short-term memory and working memory in L2/*L_n* language learning.

Phonological short-term memory and working memory

Phonological short-term memory (PSTM) is short-term memory *specifically* for phonological (i.e. lexical and sub-lexical) information. It is typically measured by *simple span* tasks (e.g., digit span) or nonword repetition tasks in which one reproduces a nonword immediately after presentation. Working memory, on the other hand, is theorized as a domain-general cognitive system that allows individuals to maintain a limited amount of information in an accessible form, even in the face of interference (Engle, 2002; Shipstead, Harrison, & Engle, 2016). Given this definition of working memory, working memory capacity (WMC) is often measured using *complex span* tasks consisting of a primary memory task interleaved with a brief secondary processing task (Conway et al., 2005).

There is good reason to believe that language aptitude theories would be well served by incorporating PSTM and WMC. While PSTM and WMC are both predictive of L2 learning (Linck et al., 2014), these variables appear to play different roles in language learning. Specifically, PSTM seems to be especially predictive of vocabulary development (Baddeley, Gathercole, & Papagno, 1998; Hummel & French, 2016; Martin & Ellis, 2012) while WMC is more strongly predictive of grammar learning (Martin & Ellis, 2012; Verhagen & Leseman, 2016). This last observation implies that WMC and PSTM are assessing distinct processes that, when incorporated into a language aptitude battery, can improve its diagnostic and predictive utility.

Language aptitude for signed languages

Learning a signed language presumably involves many of the same factors involved in learning a spoken language (e.g., the language analytic factor), however, given that spoken and signed

languages rely on different perceptual and motor processes, one should expect some differences. In general, the small but growing body of research supports these intuitions.

In a small exploratory longitudinal study, Stone (2017) investigated the validity of the (spoken language-based) Modern Language Aptitude Test (MLAT) as a predictor of L2 signed language learning. The sample consisted of 22 BSL interpreting learners with varying degrees of BSL experience. The results of a correlational analysis showed that MLAT total score was a significant predictor of performance on an exam of first semester BSL learning, achieving a correlation coefficient of 0.492 – on par with what is observed in spoken language research.

As in spoken language research, PSTM also appears to be important to signed language learning and specifically to vocabulary development (Mann et al., 2010; Mason et al., 2010). Importantly, however, the relationship between PSTM and initial sign learning appears to be driven by similarities in perceptual and motor processing not linguistic processing (Martinez & Singleton, 2018; Williams, 2017). Consider the following: Williams, Darcy, and Newman (2017) observed that in hearing individuals learning ASL as an L2, digit span was unrelated to ASL vocabulary growth, while tasks assessing STM for movements and visual patterns and sequences have been found to be moderately to strongly predictive of sign learning (Martinez & Singleton, 2018). These results suggest that perceptual and motor processes are significantly involved in lexical learning. Therefore, one who wishes to use PSTM tasks to aid in predicting vocabulary acquisition should use measures appropriate for the language modality.

To our knowledge, no study has investigated working memory capacity as a predictor of signed language learning; however, we speculate that WMC is related to sign learning in a qualitatively similar fashion as it is related to spoken language. Recall, the construct of WMC is theorized as domain-general and, in fact, research supports this claim, finding that WMC tasks, whether verbal or non-verbal (i.e. visuospatial), share a substantial proportion of variance (Ackerman, Beier, & Boyle, 2002; Kane et al., 2004). Moreover, evidence indicates that WMC is especially important for the acquisition of grammar (Martin & Ellis, 2012; Verhagen & Leseman, 2016). Given that these demands are not unique to spoken languages and that WMC is a domain-general system, we reason that WMC should also be predictive of grammar learning in signed languages.

Atypicality in L2

We next explore what kind of L2 challenges might we expect from a hearing sign language learner who has a diagnosed language disability or learning disability. So often, learners with language or learning disabilities are given alternate pathways around “foreign language options” (Wight, 2014) such as waivers or cultural studies substitution courses. Rarely are these learners given the option of learning a signed language as a second language in school. Perhaps they would be more successful if given the chance?

Sparks (2016) summarizes some of the myths about foreign language learning for individuals with learning disabilities (note this research is all based on spoken L2). He argues that there is no empirical evidence to support the claim that having a learning disability (e.g., ADD) necessarily predicts L2 learning difficulty. Using many different measures of cognitive and language ability, including the MLAT measure by Carroll (1958), Sparks could not find any difference on FLL (foreign language learning) performance measures between those learners with a diagnosed learning disability and those learners who were non-LD, but low-achieving. Poor performing FLL learners (LD and non-LD) look very similar on many learner characteristics, including poor performance on native language measures. Sparks argues that just knowing a learner has a learning disability does not warrant waivers and substitutions for foreign language study, and that

FL educators continue to perpetuate this myth of expecting failure from LD learners without any prior failure evidence. He offers some suggestions for handling FL issues for low-achieving and LD learners who are struggling in their FL studies.

In contrast to learners with non-linguistic learning disorders, it is reasonable to assume that learners who have a native language disability, such as Developmental Language Disorder (DLD) (see Bishop, 2017, for a discussion of the use of this term instead of Specific Language Impairment), may also have second language processing differences and may be at greater risk for struggling in the FLL classroom. Sparks, Ganschow, and Pohlman (1989) proposed the *Linguistic Coding Differences Hypothesis*, suggesting that both native and FL learning depend on intact basic language skills (phonology, orthography, grammar) and that having problems with one will negatively influence both native and FL learning. Their literature review suggests that the majority of FLL strugglers have challenges with phonological and orthographic coding. They also suggest that motivation issues are a *result* of difficulties with language, rather than a cause of FL learning problems. Their instructional approach aims to support all struggling FLLs, not just those who have a formal disability accommodation. The Orton-Gillingham Approach used to develop native language reading skills has been adapted for L2 instruction. This approach focuses on phonology/orthography and includes multi-sensory instruction (hear, see, write). They also suggest that a “whole language approach” may not be as effective with FLL-strugglers who need more explicit instruction with sound-symbol mapping.

The prior research has focused on contexts where the L2 learner is learning a spoken second language. Quinto-Pozos (2011) has suggested that some of these atypical learners may be drawn to L2 ASL study because they have struggled mightily with trying to learn a second spoken language. Still, he argues that because ASL is considered a “Category 4” language (similar to Chinese or Japanese in level of difficulty), we should not expect ASL to be any easier to learn, than say Spanish or French.

Two of the present authors have begun to investigate what L2 signed language learning looks like for hearing learners with identified first language or learning impairments (Singleton & Martinez, 2015). We next describe some preliminary findings from this interview study with such learners. The study was conducted at a private school that serves hearing learners with language and learning disabilities in small class settings. The high schoolers take either Spanish (n=25) or American Sign Language (n=12) to meet their foreign language requirement. We interviewed the learners individually, asking them about their second language learning experience, including a “difficulty rating” (easy-to-hard). The learners had a wide variety of language and learning disabilities in their native spoken language, some had dual diagnosis (e.g., language impairment plus ADD), and some had borderline IQs (Standardized IQ within 70–84 range). We found that learners in L2 Spanish, on average, provided higher difficulty ratings as compared to the learners in L2 ASL. We also found that for both Spanish and ASL, difficulty ratings were quite high by the learners with borderline IQ. Difficulty ratings were fairly similar comparing learners with ADD to non-ADD learners, for both languages. Interestingly, some learners with ADD reported feeling that learning ASL was beneficial to them, a sort of “cognitive training” (improving visual focus) or a “built-in fidget” to occupy their normally fidgeting hands.

With these preliminary findings, we may have some supporting evidence of Sparks and Ganschow’s suggestion that there is no “special L2 disability” or that +ADD necessarily causes FLL difficulty. We did not find a trend that +ADD learners found ASL learning more difficult than –ADD, suggesting that they should be given the chance to learn ASL. Thus, it appears that ASL may be a viable L2/*L_n* option for hearing learners with diagnosed language or learning disabilities. It remains for further research to discover what L1 language impairments may be

sidestepped if the L2/ L_n is in a different modality, clearly it will depend on the nature of the impairment.

Pedagogical practices

L1 signed language learners: intervention

Recent searches within high-impact journals of the American Speech and Hearing Association (*Journal of Speech, Language and Hearing Research; Language, Speech, and Hearing Services in Schools*) yield little research on the topic of signed language and related interventions. This is true in spite of various researchers' comments about the need for more writings and strategies for deaf education and language intervention with L1 learners with signed language deficits (Mason et al., 2010; Quinto-Pozos, Forber-Pratt, & Singleton, 2011; Woll & Morgan, 2012).

One study of professionals at bilingual-bicultural schools for the deaf reported that they experienced challenges with both diagnosis and intervention for developmental signed language disorders (Quinto-Pozos et al., 2011). Currently, there are limited instruments for assessing signed language comprehension and production (see v12.gallaudet.edu/resources/asl-assessment-toolkits; Haug, 2005; Haug & Mann, 2007; Haug et al., 2016; Singleton & Supalla, 2011, for some resources and discussion), although not all instruments are necessarily available to speech and language therapists (SLTs) who work in educational settings. We note the publication of national ASL Content Standards for Kindergarten-Grade 12 (2018), which may also serve as a resource for monitoring learner progress with ASL learning. Nevertheless, professionals at schools for the deaf might still develop their own methods for assessing children's developing signed language. In addition, assessment instruments are generally not designed to diagnose developmental signed language disorders, but learner scores can serve as one measure, among various, to assist with diagnosis. One method for diagnosis that has been employed for research purposes involved collecting and analyzing various types of data (e.g., interviews with adults who interact with the child, language assessments, neurocognitive assessments, etc.) over a longitudinal period in order to triangulate on the source of the problem (Quinto-Pozos et al., 2013, 2017). This approach, of course, requires much time, effort, and resources, but it provides outcomes that are detailed and potentially useful to language therapists.

In terms of language intervention, some language therapists are adapting spoken language methods that seem appropriate for deaf children and signed language (Quinto-Pozos et al., 2011). Professionals at two bilingual-bicultural schools for the deaf report using various strategies for working with learners who have been identified as exhibiting signed language comprehension or production problems. Among those strategies are the following: video recording a learner in their language production and then showing them the video and assisting them with an analysis of their own signing, manually manipulating a learner's hand(s) when they produce incorrect phonological values for a sign, and language modeling by adult fluent signers. Other language therapists report having a learner practice certain sentence types, such as *wh*-questions or playing games with the learner that allow them to practice use of the signing space. These are strategies devised by language therapists in the absence of empirically supported techniques. However, such strategies represent the current state of language intervention for L1 developmental signed language disorders.

Since there exists little that has been written with respect to accommodations made for atypical L1 signers in the classroom, there may exist instructional modifications that could be successful for such learners. For example, instructors might consider slower paced instruction with much repetition and practice (and perhaps allowing learners to work on language

features over an extended period of time), while also maintaining a naturalistic approach (e.g., highlighting how a topic connects with learners' lives). In addition, instructors might tap into multiple learning strategies by taking advantage of multimodal learning approaches (e.g., visual, kinesthetic, etc.) and online language exchange to facilitate practice opportunities. Game-based learning could be particularly useful, since it may also serve to maintain learners' interest and motivation during a lesson (see Connolly et al., 2012, for a general review of empirical evidence for computer and "serious games" for educational purposes).

L2/Ln signed language learners: aptitude

As a cognitive variable, aptitude is thought to be a fixed trait that, at present, cannot be improved; however, the role that aptitude plays in one's acquisition of a language can be manipulated (Carroll, 1973). That is, given enough time, optimal instruction, and high motivation, the vast majority of individuals can learn an L2/Ln. What differs is the *rate* at which learners will learn. Thus, the purpose of assessing language aptitude is not to prohibit or excuse individuals from learning an L2/Ln but to facilitate the designing of programs of study that will allow learners to achieve their goals (Snow, 1986).

In general, individuals who score low on cognitive measures of language aptitude will likely need support beyond that which is offered in the general education classroom. Schools and instructors could follow a *response to intervention* model in which increasing levels of support are offered to learners who exhibit learning difficulties (Mellard, 2008). For example, a learner who scores below average on a language aptitude test such as the MLAT (Carroll & Sapon, 1959) can be given small group instruction that focuses on specific skills.

Information from language aptitude tests and other measures (assessing such things as visuo-spatial or movement STM) can be used to tailor instruction for learners' particular strengths and weaknesses. For example, although research shows that explicit instruction is generally superior to more implicit-oriented instruction (Norris & Ortega, 2000), learners who show above average language analytic ability and/or WMC will likely do well in an implicit-oriented language program in which inferring meaning from context is prioritized (Erlam, 2005; Ranta, 2002). Students who perform below average on language analytic ability, WMC, or PSTM, on the other hand, will likely struggle to "keep up" in such classrooms and should therefore receive more explicit instruction.

Hearing L2 sign learners with language or learning disabilities

It is estimated that some 7% of learners have learning disabilities (Tomblin et al., 1997). Sparks (2016) disagrees with the common response of waiving L2 courses of study for such learners. Based on his research, Sparks maintains that educators should give each learner with a diagnosed L1 language or learning disability a more detailed assessment of their capabilities. Knowing more detail about strengths and weaknesses of an individual learner, at least consider the opportunity of teaching them a signed language, even if the learning conditions, such as pace or scope of instruction, would need to be adapted or modified. Rosen et al. (2015) report on an action research study conducted by ASL instructor DeLouise with learners with learning disabilities. DeLouise found that learners who had difficulty with visual processing of signs had improved learning outcomes when instruction was adapted to include "voice-on" support for ASL vocabulary instruction. The benefits that second language study confers on a learner warrant giving them a chance to succeed by studying a signed language, even if instructional adaptations are necessary. If given the chance, such learners may in fact get farther in an L2/Ln signed language than

an L2/Ln spoken language. With more and more schools offering ASL as an L2/Ln, opportunities to take ASL are increasing (Rosen, 2008, 2015).

Future trends

Future considerations for teaching and language support for L1 learners with signed language disorders

There are at least two main areas that could be addressed in future work on L1 developmental signed language disorders. The first concerns so-called signed language therapy and the latter involves proposed instructional modifications for L1 learners with specific needs.

There is a growing need for a framework for signed language therapy that could be employed by language therapists who work with signing deaf and hard of hearing children. Such a framework would necessitate professional therapists to be fluent in the signed language of the ambient community or else they would need to work closely with interpreters who could relay detailed information about language form in addition to semantic value. Such a therapy might have features in common with language intervention in cases of language deprivation (e.g., see Humphries et al., 2014), although it may also take on a drastically different form, depending on the learner and her/his linguistic challenges. A framework for signed language therapy would need to take into account the needs of each language learner, based on linguistic, cognitive, and social factors that influence language development. As noted in Quinto-Pozos et al. (2011), some therapists are, indeed, engaged in designing learner-tailored strategies that focus on the improvement of signed language skills. Unfortunately, little is known – from an empirical viewpoint – about the efficacy of such personalized intervention, and future research studies could investigate strategies that are employed with and by learners who present with different types of deficits.

There are also gaps in the research on classroom-based instructional modifications used with learners who present with some type(s) of deficit in their L1 comprehension or production skills. It could be very useful to educators to know, empirically, if certain types of modifications (e.g., frequent repetition, slower-paced lessons, multimodal approaches, and the use of certain types of games) are successful with linguistically compromised learners. Such research could benefit both classroom instruction and the provision of language therapy outside of the classroom.

Future considerations for teaching and language support for learners of L2/Ln sign language

With regard to L2/Ln pedagogy for learners who are challenged either because of a language or learning disability, or who lack aptitude or motivation to learn, we suggest several key considerations for future research:

There is something to be gained by exploring the L2/Ln option of ASL for learners who have historically struggled with L2 spoken language learning. This will require educators and disability-support specialists to do further assessment and research on where ASL learning opportunities exist in their communities. For example, ASL may not be an option at the local high school, but a learner could co-enroll in an ASL course at a community college to fulfill their L2/Ln language study requirement in high school. Future research is also needed on how certain language impairments, e.g., dyslexia, interface with signed language learning and fingerspelling (expanding the scale of Singleton & Martinez's work reported here). Another

example for future research is stuttering. There is anecdotal reporting in the literature about signed language stuttering (Whitebread, 2014), but we are not aware of any systematic research with deaf or hearing individuals with stuttering behavior in their signed language.

For learners who seem to be underperforming in their L2/*L_n* ASL courses, appearing to lack in motivation, instructors can have a significant impact. They may be able to uncover some learner characteristics, such as difficulties with language processing, phonological memory or working memory that is the real cause of their motivational problems. Sparks (2016) suggests that those L2/*L_n* difficulties are likely going to be observed in their L1 as well. If instructors can understand more about the learners' general language processing, their memory, and their motivation (or lack of), they can better help the struggling L2/*L_n* learner and tailor instructional strategies that will enhance or incentivize the learner's L2/*L_n* learning. In situations where the learner characteristics are slowing down the learner's pace of L2/*L_n* learning compared to other learners in the class, then individualized learning objectives may need to be established, rather than standardized criteria associated with language learning "units."

Note

- 1 It is important to note that motivation is clearly an important factor in second language learning. While there is some research on motivation for L2 sign learning among hearing learners (see Lang et al., 1996a, 1996b; Rosen, 2015), we are not aware of L2/*L_n* motivation research among atypical learners. For that reason, we will not discuss motivation for L2/*L_n* learning in this chapter, and keep our focus on cognitive aspects of language learning.

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L2/*L_n* parent sign language education

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Introduction

Teaching sign language as a second (L2) or additional (*L_n*) language to hearing parents, who are not native users of sign languages, of deaf children is an underexplored area of research. A number of projects internationally have been initiated that are aimed at supporting the parents' acquisition of sign language. However, in many contexts there has often been a shortage of formal, sustained programs and curricula that are targeted at parents of deaf children and a lack of a body of evidence to document the success and outcomes of parents' sign language learning. However, over 90% of deaf children are born to hearing parents who may have little or no knowledge of sign language (Mitchell & Karchmer, 2004), and the stated focus of neonatal hearing screening and early intervention services for deaf children is supporting language development (Speech-Language & Audiology Canada, 2014; U.S. Department of Health and Human Services, 2013). Moreover, the benefits of sign language for deaf children's linguistic, cognitive, and social and emotional development are well documented (e.g., Kushalnagar et al., 2010). The lack of comprehensive public support for parents' learning of sign language in many contexts is here argued to be a main factor behind the failure of many parents to learn sign language to better communicate with their deaf child. Most sign language classes for second or additional language learners do not address parents' specialized learning needs. These needs include developing elaborated parent-child communication, supporting deaf children's social and emotional development, and fulfilling parenting roles via sign language. The development of specialized parent sign language classes and curricula in turn relies on enhanced support for sign language teacher training and teaching materials development.

This chapter provides an overview of theoretical and ideological perspectives on teaching sign language as a L2/*L_n* to hearing parents of deaf children, including parent advocacy for bilingual education, home visiting frameworks, and parent learning goals and motivation. A historical survey of international initiatives is presented from Australia, the US, the Netherlands, and Scandinavian countries that aimed at supporting parents' sign language learning. The outcomes of these initiatives are evaluated, and future directions are suggested for research and practice in parent sign language education.

Theoretical perspectives

This section discusses theoretical perspectives in parent sign language education in relation to bilingual education for deaf children, home visiting services to deaf children and their families, teacher goals and learner motivation, and plurilingualism. Parent sign language education is linked to advocacy for and provision of bilingual education for deaf children, which privileges the teaching of native sign languages and written (and sometimes spoken) national languages and the cultural norms of deaf and hearing communities (Czubek & Snoddon, 2016). However, in other contexts teaching sign language to parents of deaf children takes place within a home visiting services framework that may limit parents' learning opportunities. Both teacher goals and learner motivation in parent education revolve around the need to support communication between parents and deaf children. A theoretical framework of plurilingualism takes an action-oriented and learner-centered approach to parent sign language education. These topics, theories, and concepts are further exemplified below.

Policy context and parent advocacy in Scandinavia

Several Scandinavian countries where bilingual education for deaf children historically enjoyed widespread support have implemented intensive sign language instruction for parents of deaf children. Parents of deaf children, along with national associations of deaf and hard of hearing people and university researchers in sign language linguistics, were a driving force behind Sweden's becoming one of the first countries in the world to recognize sign language in legislation (Nilsson & Schönström, 2014; Svartholm, 2010). In Denmark, the Bonaventura Parents' Organization issued a memorandum outlining the following "basic attitudes" or principles for parents of deaf children that emphasize a bilingual approach and inform education and other services to be provided to parents of deaf children:

- Deaf children are children;
- Deaf children's language is sign language;
- Deaf children are not ill;
- Deaf children become deaf adults;
- Deaf children should be together with deaf people;
- Deaf children should be together with hearing people;
- Parents of deaf children need each other;
- The impact of a deaf child is on the family (see Mahshie, 1995: 235–8).

These principles subsequently became a foundation for early sign language intervention in other countries, including Finland (Takala, Kuusela, & Takala, 2000).

Parents' ability to access adequate support for sign language learning is directly linked to their increased advocacy for deaf children's bilingual education. In turn, bilingual education for deaf children is linked to better sign language teacher preparation and curriculum development. Figure 20.1 shows the cycle of L2/Ln parent sign language teaching and advocacy.

Currently, Swedish law requires sign language instruction to be provided for "persons who require sign language," including parents of deaf children (Svartholm, 2014: 44). However, today in Sweden and many other countries in the Global North, most deaf children receive cochlear implants, and as a consequence an increasing number of parents do not feel sign language is needed, at least in early childhood (Nilsson & Schönström, 2014). This presents a risk to these children's healthy development since language deprivation may result (Humphries et al., 2012).

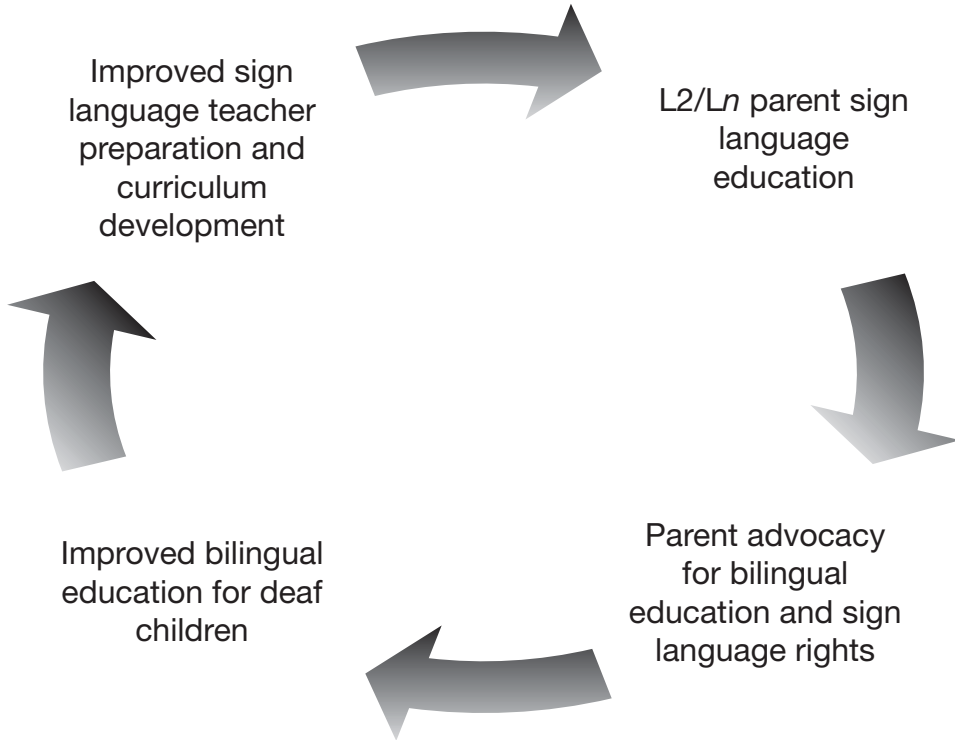


Figure 20.1 The cycle of L2/Ln parent sign language teaching and advocacy

Home visiting frameworks

In other contexts in the Global North, approaches to supporting parents' sign language learning tend to be relatively informal and unstructured, especially compared to learning opportunities for preservice sign language interpreters and other second or additional language learners studying at postsecondary institutions. Often, these approaches focus on home visiting services by deaf mentors or consultants who support deaf children's language development through play and informal teaching (e.g., Watkins, Pittman, & Walden, 1998). In the United States and Canada, many state and provincial schools for the deaf and their associated regulatory bodies provide home visiting and outreach services to preschool-age deaf children and their families (e.g., Roberts, 1998). The Colorado Home Intervention Program is a notable example of a home visiting program that provides a range of intervention services to parents of deaf children that focus on sharing information about "resources, strategies, development, and methods of communication" (Yoshinaga-Itano, 2003: 13). Most early intervention providers for this program are licensed teachers of the deaf or special educators, speech-language pathologists, audiologists, social workers, and/or psychologists with graduate degrees, and there are also a number of service providers who teach sign language to parents (Yoshinaga-Itano, 2003). Within the early intervention services framework, these sessions take place once weekly for one to one-and-a-half hours (Yoshinaga-Itano, 2003).

Home visiting services to families with deaf children exist within a longstanding early intervention framework that revolves around family-centered principles and family health (Nicholson

et al., 2016). However, the centering of parent sign language teaching within a health services framework constructed by infant hearing screening programs also shows how a medical model of disability is enacted within the lives of parents and deaf children, where “funding is linked to diagnostic labels, and education may be seen as ‘treatment’” (Komesaroff & McLean, 2006: 89). A health services framework may also have inhibited the development of innovative, theoretically grounded and research-based models of second and additional language teaching and learning of sign languages for parents of deaf children. This is reflected in the shortage of curricular and teaching materials directed at parents and the comparatively limited services available to this population. For example, the Ontario Infant Hearing Program’s model of providing up to 48 hours of American Sign Language (ASL) instruction per year until the child reaches the age of six, and half of this number of hours for families who choose a dual spoken and signed language approach, has resulted in parents’ reported communication difficulties and frustration (Snoddon, 2014a). In 2018, the Infant Hearing Program stated the consultants providing ASL and Langue des Signes Québécoise (LSQ) support and development services under the program “do not teach ASL/LSQ to families” (Ontario Ministry of Children and Youth Services, 2018: 16). In addition, it was announced that the dual signed and spoken language approach is no longer offered and that parents must choose either spoken or signed language services since “IHP services are not designed to support development of a child’s bilingualism in spoken and signed language” (ibid.: 7). This raises further questions as to how parents of deaf children in Ontario can receive research-based ASL learning support that meets their needs and fosters deaf children’s bilingual development.

Teaching goals and learner motivation in parent sign language teaching

Improved communication with deaf children is therefore a key factor in parents’ motivation as second or additional language learners of sign language. To this point, Young (1999) has addressed the impact of a cultural-linguistic model of deafness on parents’ adjustment to having a deaf child. In this model, parents and children’s sign language use and cultural identity are centered, and parents and children’s access to learning sign language and participating in the deaf community are paramount. However, the competing frameworks employed by deaf and hearing service providers have resulted in opposing views regarding parents’ attainment of sign language proficiency (Young, 1997). Young argued that a “linguistic proficiency” framework held by many hearing professionals, based in modernist conceptions of bilingualism as requiring balanced, native-like proficiency in standard languages, regards parents’ second or additional language learning of sign language as unrealistic and therefore to be discouraged (ibid.). This view continues to be held today by several researchers in deaf education (e.g., Knoors & Marschark, 2012; Mayer & Leigh, 2010). Young (1997) contrasted this framework with the “communicative competence” framework held by deaf professionals in her study who privileged parents’ communicative abilities over notions of formal linguistic proficiency. Nevertheless, Young (1997) found that parents of deaf children in her study expressed a desire to both become fluent in sign language and achieve communicative competence. This goal was reported by parents to not be well supported by the home visiting services they received (Young, 1997).

A plurilingual framework

Snoddon (2014a) proposed a learning framework of plurilingualism, or multilingualism at the level of the individual (Coste, Moore, & Zarate, 2009) for parents’ L2/Ln learning of sign language. This was “a response to certain academic and professional perceptions of parents’ learning

of sign language as a second language as being unrealistic, unimportant, or contentious” (Snoddon, 2014a: 175). Plurilingualism

defended the (sociolinguistic) notion that because plurilingual individuals used two or more languages – separately or together – for different purposes, in different domains of life, with different people, and because their needs and uses of several languages in everyday life could be very different, plurilingual speakers were rarely equally or entirely fluent in their languages.

Coste, Moore, & Zarate, 2009: v

This defense of partial competence in a sign language was in part intended to counter negative perceptions of parents’ ASL abilities that were evident in parents’ own comments during interviews such as the following remark from a parent participant in Snoddon’s (2014a) study who had been receiving ASL home visiting services for over two years. As the participant stated of her young deaf child, “My concern is that I don’t know ASL, myself. She sees broken ASL, and she can’t hear enough English. So I feel she gets both broken English and broken ASL” (Snoddon, 2014a: 185).

Like Young’s (1997) findings, Snoddon (2014a) found a paradox in the need to simultaneously endorse parents’ emergent sign language competences while developing more rigorous, classroom-based models of sign language teaching to support better learning. While a home visiting model of parent sign language teaching remains predominant in many contexts that provide early intervention services, other models have been provided in the form of immersion programs that will be further discussed in the next section. More recently, work has taken place in the Netherlands and Canada to begin developing parent sign language curricula that are aligned with the Common European Framework of Reference for Languages (CEFR) as a framework for second language learning, teaching, and assessment (Oyserman & de Geus, 2013; Snoddon, 2015). The next section further discusses historical and current pedagogical practices and programs in parent sign language teaching, and research studies in their effectiveness.

Pedagogical practices

This section discusses how theories in parent sign language education are translated into practice in relation to the establishment of immersion programs for parents, the development of a specialized parent curriculum, deaf mentor home visiting services, and a deaf mentor curriculum. These pedagogical practices and concepts are further exemplified below.

Immersion programs in Scandinavia

In Scandinavian contexts, policy and practical changes for supporting bilingual education occurred in tandem with recognition of the importance of peer support for hearing parents of deaf children and interaction with other deaf children and adults (Mahshie, 1995). Summer courses in Swedish Sign Language for families with deaf children, dating from the 1970s, combine sign language instruction by deaf tutors for parents with summer camp activities for deaf children and hearing siblings (Nilsson & Schönström, 2014). These courses were organized by the Swedish National Association of the Deaf at its folk high school in Leksand (Nilsson & Schönström, 2014).

Mahshie (1995) similarly reported that both Sweden and Denmark implemented intensive parent courses taking place over either one week, two weeks, or on weekends. Historically,

such intensive courses typically involved teaching sign language, storytelling, and gestural communication, and discussing child language (Ulfspärre, 1977). The courses were created to give support to the parents in communicating with their deaf children at home. This immersion-type program structure allowed the parents to concentrate on learning sign language in a setting away from home, and socialize with other parent learners while their children participated in a playgroup (Mahshie, 1995). The courses were organized in partnership between deaf schools, deaf clubs, parent organizations, and universities with support from community funding for individual parents, and were taught by teams of deaf teachers in Sweden and deaf and hearing teachers in Denmark (Mahshie, 1995). The Swedish and Danish Sign Language lessons focused on building receptive skills to help parents better understand their children and on supporting parents' sense of communicative competence (Mahshie, 1995). In the 1990s, a national curriculum was launched for teaching Swedish Sign Language to parents of deaf children that totaled 240 hours (Nilsson & Schönström, 2014). These courses were offered in multiple ways, including an evening class format as well as the previously described weekend, weeklong, and summer camp settings. The Swedish National Association of the Deaf also worked with local deaf clubs to organize parent association meetings, parent courses, and social activities for families with deaf children (Mahshie, 1995).

Mahshie (1995) reported anecdotal findings regarding the impact of parent sign language instruction on parents' attitudes toward sign language as well as parents' second or additional language proficiency. As she wrote, "according to the preschool and first grade teachers I interviewed, a high percentage of parents in these countries DO learn enough of the language of the Deaf community to communicate high-level concepts to their children well before their children enter first grade" (Mahshie, 1995: 139, emphasis in original). As one parent reported in an interview, "Almost all parents of deaf children today in Sweden sign" (Mahshie, 1995: 141).

In Finland, Takala, Kuusela, and Takala (2000) described a five-year intervention project where deaf preschool-age children and hearing family members received sign language education. In this project, parents and deaf children received informal sign language lessons during home visits in addition to intensive weekend workshops taking place four times a year for parents, siblings, and relatives of deaf children (Takala, Kuusela, & Takala, 2000). Families with deaf children could in total receive up to one hundred hours of sign language lessons each year. The authors administered a questionnaire to parents that focused on children's sign language competence in addition to parents' learning experiences and the perceived benefits of sign language instruction. While the "parents generally reported experiencing a high level of benefit" and "were both satisfied with and eager to continue with the project" (Takala, Kuusela, & Takala, 2000: 369), with more benefits reported by parents who were more actively involved with learning, they "did not generally have a high opinion of their own ability to sign" (ibid.: 371). However, the authors reported: "Every one of the respondents learned to sign during the project" (ibid.: 371). Between the first and last years of the project, parents' reported ability to have rich discussions with their deaf child increased, and parents stated that family communication became easier as they learned sign language, met other families with deaf children, and learned about deaf community and culture.

Similarly, in Norway parents of deaf and hard of hearing children are eligible to participate in a module-based program totaling 40 weeks during the child's first 16 years (Peterson, 2007). This program teaches 900 hours of Norwegian Sign Language and 100 hours of topics related to parenting a deaf child (Peterson, 2007). Sign language instruction, room, and board are provided at no cost to parents at government resource centers (Peterson, 2007). Peterson (2007) reports an earlier study where he administered a survey to 723 parents of deaf children enrolled in this program, where 88% of parents reported better communication at home, 76% reported

improved quality of family life, and 85% reported that they never considered quitting the course. However, Peterson (2007) reported that many parents, almost all of whom have children with cochlear implants, desired more instruction focusing on the simultaneous use of speech and sign. This finding suggests that the parents lack an understanding of the role of sign language in supporting spoken language development in deaf children with cochlear implants (Humphries et al., 2014).

An Auslan curriculum for families

Napier, Leigh, and Nann (2007) described an action research project for designing a new Australian Sign Language (Auslan) curriculum for hearing parents of deaf children. The authors reported that parents in their study had attended other Auslan classes for second- or additional-language learners that did not meet parents' needs for communicating with deaf children. In addition to a specialized curriculum, the authors identified the need for parent sign language teaching to include information about raising a deaf child, reading books with deaf children through sign language, and learning deaf cultural norms such as visual and tactile behaviors to get a deaf person's attention (Napier, Leigh, & Nann, 2007). Prior to developing their pilot Auslan for the Family curriculum, Napier, Leigh, and Nann (2007) undertook extensive consultation with parents and professionals where parents presented a range of issues, including the need for extended support for learning sign language beyond the early intervention period and information about sign language linguistics.

The Auslan for the Family curriculum was based on an existing Auslan teaching curriculum (ACTRAC, 1996) but included thematic modules deemed suitable for families and children because they focused on daily family activities and routines (Napier, Leigh, & Nann, 2007). The curriculum consisted of two levels to be completed in two years via a blended distance and in-person teaching approach via family home visits (Napier, Leigh, & Nann, 2007). The first level of the curriculum focused on vocabulary learning, with six modules about greetings and introductions, the home environment, everyday activities and routines, and deaf culture and community (Napier, Leigh, & Nann, 2007). The second module focused on supporting conversational skills, with six additional modules about meeting people, a school day, holidays, excursions, and deaf studies (Napier, Leigh, & Nann, 2007). An immersion component was included in both levels where family members attended social gatherings with other parents and deaf children, as well as other members of the deaf community. The final module featured a one-day workshop about communication, play, and reading with deaf children. This included information about attention-getting strategies and visual communication. Parents also received a video resource package that featured deaf adults signing with children while reading books.

Perhaps owing to the curriculum's focus on home visits and distance learning, a chief finding of Napier, Leigh, & Nann's (2007) project appears to be a continuing need for additional video resources to support families' learning of Auslan, specifically Auslan translations of children's books. No data is provided regarding parents' sign language learning outcomes following the new curriculum, however, which is reported to have "had only limited implementation" (Napier, Leigh, & Nann, 2007: 97).

American Sign Language initiatives

Similar to the Australian context, in the United States ASL teaching for parents has largely taken place within a home visiting early intervention framework. Watkins et al. (1988) conducted a

groundbreaking study of the Deaf Mentor Experimental Project from the SKI-HI Institute (2017) at Utah State University that since 1972 has provided training and services related to home intervention for young children with sensory impairments. The authors reviewed literature and principles regarding bilingual education for deaf children and the higher English literacy achievements of deaf children of signing deaf parents (e.g., Strong & Prinz, 1997) prior to reporting findings from “exploratory research to obtain introductory data on the efficacy of that model” (Watkins et al., 1998: 30).

Watkins et al. compared the learning outcomes from a group of 18 children and their parents in Utah who received deaf mentor home visiting services, and another group of 18 children and their parents in Tennessee who received only spoken or signed English services from a parent adviser. The deaf mentors provided the Utah group with ASL instruction, information about deaf culture, and introductions to the local deaf community as well as ASL-based interactions with deaf children in the home setting. At the start of the study, children in both groups ranged from 27.2 to 28.6 months of age (Watkins et al., 1998). Both groups received hour-long weekly home visits for approximately 18 months. It was reported that children receiving deaf mentor services had significantly greater expressive and receptive language gains, and vocabularies that were more than twice as large as children in the Tennessee group. Moreover, the Utah children scored 2.5 times higher on a test of English grammar than the children in Tennessee. Parents in the Utah group receiving ASL instruction from a deaf mentor reported less frustration when communicating with their children and used more than six times as many signs as parents in Tennessee.

The SKI-HI Deaf Mentor Curriculum (HOPE, 2017) for teaching ASL and deaf culture and supporting young deaf children’s language development through play-based activities continues to be used across the United States and Canada. This curriculum includes 37 ASL lessons aimed at teaching families ASL grammar and communication skills, 18 lessons about early visual communication, and lessons about deaf history and culture (Crace et al., 2016). The ASL lessons focus on teaching elements of ASL grammar and syntax, including facial expression, declarative statements, question types, directional verbs, pronouns, and word order (Crace et al., 2016). Each lesson includes a description of the ASL rule or concept being covered, vocabulary, practice sentences and dialogue, suggested games and activities, and references and resources (Crace et al., 2016). The early visual communication lessons include information about communicating with and responding to young deaf children in ASL. Each Deaf Mentor Home Visit Plan includes a section for interacting with deaf children in ASL, a section for helping families learn ASL, and a section for helping families learn about deaf culture.

As seen in the above, pedagogical practices and programs for supporting parents’ sign language learning are often combined with programs for supporting young deaf children’s language and literacy development (see Snoddon, 2014b for a review of literature related to children’s book sharing with sign language). This is also evident in previous research regarding ASL and early literacy programs for parents and young children, including an action research study of an ASL Parent-Child Mother Goose Program for teaching ASL rhymes and stories to parents (Snoddon, 2012). Similarly, Snoddon (2014b) reported findings from a 10-month study of deaf instructors teaching hearing parents how to read books with their children through ASL. A main finding of both studies was a perceived lack of adequate support for parents’ ASL learning via home visiting instruction that was extraneous to the research studies, and the communication difficulties and frustrations that resulted from this. As Napier et al. (2007) reported, for parents of deaf children there is a pervasive need for extended support for learning sign language beyond the early intervention period when home visiting instruction typically ends.

Current pedagogical practices

This section discusses how theories in parent sign language education are currently translated into practice in relation to the use of the Common European Framework of Reference for Languages (CEFR) to teach sign language to parents of deaf children. These pedagogical practices and concepts are further exemplified below.

Using CEFR to teach sign language to parents of deaf children

Related to the plurilingual framework discussed above, in the Netherlands there has been groundbreaking research and pedagogical development in terms of developing a classroom-based parent sign language curriculum aligned with the CEFR for second language learning, teaching, and assessment. The CEFR proclaims plurilingualism as a fundamental principle (Coste, Moore, & Zarate, 2009). The CEFR employs proficiency descriptors, or “I can” statements for assessing learners’ receptive, productive, interactive, and mediation skills. See Figure 20.2 to illustrate the list of learner goals for one parent class in the author’s study.

These skills are aligned with scales A1–C2, which involve six levels to describe learners’ language proficiency from basic user (A1–A2) to independent user (B1–B2) to proficient user (C1–C2) (Council of Europe, 2001). In Europe, the development of sign language teaching approaches following the CEFR has focused mainly on interpreter training programs (Sadlier, van den Bogaerde, & Oyserman, 2012). Prosign, or Sign Language for Professional Purposes, is a project sponsored by the European Centre for Modern Languages of the Council of Europe that works to specify CEFR proficiency levels for sign languages in the context of interpreter training (Council of Europe, 2017).

In September 2012, Oyserman and de Geus (2013) began implementation of a CEFR-aligned parent course in Nederlandse Gebarentaal (NGT), or Sign Language of the Netherlands. The first researcher was previously involved in adapting CEFR descriptors to NGT (Sadlier et al., 2012). Oyserman and de Geus’ (2013) pioneering curriculum was rooted in the recognition of systemic deficiencies of the NGT teaching then offered to parents, with a mere

Production	<ol style="list-style-type: none"> 1. I can produce simple mainly isolated phrases about people and possessions. 2. I can sign simple phrases and sentences about myself. 3. I can ask questions about people (direct). 4. I can answer questions about myself.
Understanding	<ol style="list-style-type: none"> 1. I can understand everyday expressions when delivered to me clearly, slowly and repeatedly. 2. I can understand questions about myself or other people I know.
Interaction	<ol style="list-style-type: none"> 1. I can interact in a simple way. 2. I can use basic greetings. 3. I can answer simple questions. 4. I can make an introduction by myself. 5. I can use nonmanual markers to indicate that I did follow what has been expressed. 6. I can use nonmanual markers to indicate that I did not follow what has been expressed.

Figure 20.2 Student goals: A1 can-do statements (class 2, module 1)

Source: Snoddon (2018).

52 hours of NGT instruction provided since 1994 to families with deaf children via a main service agency. Oyserman and de Geus' (2013) first parent course combined communicative NGT teaching with child-focused pedagogical content and aimed at incorporating 100 hours of learning time through 14 weeks of classroom instruction, homework, and other learning and assessment activities (Snoddon, 2015). Two more courses were subsequently developed following the same format to bring parents to more advanced CEFR proficiency levels (Oyserman & de Geus, 2015), and a fourth course was recently developed.

These courses follow CEFR descriptive categories for selecting themes for individual lesson plans and modules for each course or group of learners. The CEFR divides domains, or "spheres of action or areas of concern" where language is used into the personal, public, occupational, and educational (Council of Europe, 2001: 45). For each of these domains, there are individual themes listed under the descriptive categories of locations, institutions, persons, objects, events, operations, and texts (Council of Europe, 2001). This consideration of domains and descriptive categories in the external context of language use allows sign language teachers to develop curricula that meet parent learners' needs. For example, lesson plans can be developed in accordance with the "personal" domain and category of "persons" to introduce linguistic goals and vocabulary related to family members and personal acquaintances. In the category of "institutions," family trees and relationships can be further explored. The CEFR proficiency descriptors enable teachers to set learning goals and develop activities for each lesson and module so parents can practice communicating in sign language and apply what they learn in communicating with their deaf children at home and in other settings.

In 2012, ten parent participants enrolled in the first pilot NGT course. All of these parents had deaf children with cochlear implants aged between 7 and 13. Eight of these parents remained enrolled in the third course (Oyserman & de Geus, 2015). For parents enrolled in the first two pilot NGT courses, Oyserman and de Geus (2013) reported significantly longer sentence utterances, with a mean sentence utterance length increase from 3.76 to 4.61 as parents progressed from the first to the second course. Parents produced significantly fewer lexical errors, with an average decrease from 9.25 to 3.43, and fewer fluency interrupts, with an average decrease from 35.25 to 16.38, representing a 46.5% reduction in fluency breaks, hesitations, and self-corrections (*ibid.*). Parent participants reported improved communication with their children, fewer experiences of frustration, and better knowledge of sign language following the second parent NGT course (*ibid.*). Before the first course and during and after each course, parents were assessed following CEFR proficiency descriptors for NGT. From before the first course to the end of the third course, parents progressed from a beginner (A1-A2) to an advanced intermediate (B2) proficiency level (Oyserman & de Geus, 2015). This body of work provides compelling empirical evidence regarding the success of rigorous classroom models of parent sign language teaching following current second or additional language learning theory. Parent NGT courses aligned with the CEFR currently take place across the Netherlands, with funding from insurance companies so classes are offered free of charge to parents (de Geus, M., personal communication, April 4, 2017).

The above pedagogical practices have in common the aim of supporting parents of deaf children's unique sign language learning needs. However, there is a contrast between practices that support the congregation of parents as a distinct group of learners, as in immersion programs and specialized parent classes, and practices that focus on teaching individual families in the home via deaf mentor services or distance learning. Moreover, programs for supporting parents' learning are often combined with initiatives for supporting deaf children's language and literacy development that may reduce the amount of direct sign language instruction provided to parents themselves.

Future trends

This section identifies gaps in current theory regarding how teaching sign language to parents supports deaf children's development, and the implications for sign language teaching and learning across the lifespan. This section also addresses gaps in practices in terms of developing formal curricula, teaching, teaching materials, research, and school and community collaborations to meet parents' learning needs. These key areas for future research are outlined below.

Future research studies

There is a body of evidence that suggests that deaf and hard of hearing children need to acquire sign language and engage in elaborated communication with their families and caregivers. As children grow older, their sign language communication needs become increasingly complex. To date, preliminary evidence suggests that best pedagogical practices in parent education include an action-oriented, learner-centered approach in parent sign language teaching with classes and teaching materials that are designed to meet parents' unique needs in communicating with and raising deaf children, and that are provided on an ongoing basis throughout a deaf childhood until parents reach an advanced level of sign language proficiency. Future parent educators are invited to follow this approach and practices as much as possible, and as much as they are relevant and adaptable across parents' sign language learning contexts. Sign language teachers need opportunities to engage with L2/Ln learning theories, frameworks, and research that will in turn inform new curricular approaches that meet the needs of the parents.

In Canada, preliminary work has taken place in terms of adapting the Dutch CEFR-aligned parent sign language teaching model to an ASL context (Snoddon, 2015, 2018). This project involved the provision of training workshops facilitated by Dutch collaborators for a small group of Canadian ASL instructors, and the hosting of two pilot parent ASL courses in Toronto and one course in Ottawa (Snoddon, in press). However, challenges have been identified in terms of the need to improve training for Canadian ASL teachers in order to successfully implement a CEFR framework (Snoddon, 2018). These challenges include moving beyond the *Signing Naturally* curriculum and its communication approach (Smith, Lentz, & Mikos, 2008) that is dominant in many ASL instructional contexts. Moving beyond this approach is needed in order for ASL instructors to learn a new, dynamic theoretical framework for L2/Ln teaching and learning that is flexible and adaptable to diverse learner needs, such as those of parents of deaf children (Snoddon, 2018). These ASL instructor training needs extend to sign language teachers in other contexts around the world who will also benefit from support in theory, curriculum, and teaching materials development. Indeed, the CEFR is in the process of being taken up by sign language teachers across Europe and other international contexts mentioned in this chapter (Council of Europe, 2017). Current and future research initiated by the author includes investigating the alignment of the CEFR-based parent ASL curriculum with the American Council on the Teaching of Foreign Languages (ACTFL) proficiency guidelines to merge with the framework employed by ASL teachers in the USA and further promote and expand the parent curriculum.

Future pedagogical practices

The importance of teaching sign language to parents of deaf children has regained prominence in deaf education, along with the need for formal curricula and theoretically grounded,

evidence-based practices in teaching parents sign language. However, this area underscores the need for educators of the deaf to collaborate with L2/*Ln* teachers of sign languages, and for the expansion of training and resources provided to all sign language teachers. Where parents of deaf children are concerned, sign language teachers need information about how to develop and adapt curricular content and lesson plans to meet family communication needs in addition to supporting parents' achievement of advanced levels of sign language proficiency. Courses developed for parents require sustainable funding to meet communication needs throughout childhood.

As described in this chapter, supporting parents' sign language learning needs fuels increased advocacy for both bilingual models of education for deaf children and deaf children's sign language rights. Providing parents with high-quality sign language education requires collaboration between schools, deaf organizations, sign language teacher associations, early intervention service providers, and parents themselves. What deaf communities and sign language teachers can do today is take responsibility to ensure all parents of deaf children have access to learning sign language on a par with other L2/*Ln* sign language learners.

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Using sign language to teach sign language interpreters

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Introduction

The role of language learning in interpreter education is not unique to the education of signed language interpreters. This issue has been at the forefront of questions about spoken language interpreter education since before signed language interpreting education programs were formally established. As early as 1959, and in many works since, the International Association of Conference Interpreters (AIIC) has held an underlying presumption that the prerequisite for spoken language interpreters to be properly educated in the work of interpreting (including translation, consecutive, and simultaneous interpreting work) is for a learner to first be linguistically (and culturally) fluent within the languages of the communities in which they will work¹ (Mackintosh, 1999).

This notion holds true for the education of signed language interpreters as well (Carter, 2015; Monikowski & Winston, 2011). Signed language interpreter education in the US, for instance, has become academic. Concerns are raised about the interpreters who are not native signed language users and do not become bilinguals or multilinguals, and worse, the lack of a clear path to language fluency before they take interpreting courses and are able to focus on the development of the cognitive and professional skills needed to become effective interpreters (Aborn, 2010; Metzger, Cagle, & Hunt, 2019; Winston & Monikowski, 2011).

Understanding the evolution of signed language interpreter education provides the context for considering current practices and future trends. Heretoforth in this chapter, examples from the US are used to illustrate the history and trends in interpreter education worldwide. Historically, interpreter education in the US originated with roots in the civil rights movements of the 1960s, and as such, an immediate need for interpreters led to the proliferation of interpreter education programs (Ball, 2013) without ample time to consider questions of the timing or methodology of language instruction, or even of the education or qualifications of language teachers or interpreter educators.

In recent decades, American educators of signed language interpreters have increasingly expressed concern over an interpreting learner “readiness-to-work gap.” That is, graduates of interpreter education programs (IEPs) are quite frequently not sufficiently prepared upon graduation to meet the needs of deaf, hard of hearing, and hearing consumers in the workplace

(Maroney & Smith, 2010; Monikowski & Winston, 2011; Patrie, 1994). This chapter makes the case that the larger field of interpreter education, including spoken and signed language interpreter education, considers L2/*L_n* language learning a prerequisite to developing cognitive and professional interpreting skills for non-native users training to work as interpreters. This consideration, as well as theoretical and pedagogical considerations, implications for research, and possible future trends regarding the use of L2/*L_n* signed language in the education of signed language interpreters, will be addressed in this chapter.

Theoretical perspectives

The development of signed language interpreter education in the US has essentially been need-driven, rather than theory-driven. Nonetheless, theoretical issues underlie every aspect of interpreter education, and more practically, theory provides answers when empirical research sheds light on the outcomes of need-based interpreter educational programming.

Spoken language interpreter education for many years followed the “master-apprentice” tradition (Pöschhacker, 2010). The following is based on signed language interpreter education in the United States, and is an example of signed language interpreter education in other countries. Signed language interpreter education programs in the US were initially created as vocational programs, with the idea that two years would be a sufficient time to prepare learners (Ball, 2013). The 2012 changes by the Registry of Interpreters for the Deaf (RID), an American professional sign language interpreter organization that developed and grants interpreter certifications, in the requirements of becoming an interpreter include the expectation that interpreters should hold a four-year degree in order to sit for professional certification. These considerations have contributed to the development of a variety of approaches to revise interpreter education to leverage two-year education programs to four-year programs. RID’s call for standards for pedagogy and curriculum for learner interpreters has led to the advent of interpreter education program standards, review, and accreditation. The development of standards has focused on the aim of preparing interpreting learners to graduate ready to enter the interpreting field. However, one clear challenge stems from backward design (Wiggins & McTighe, 1998), suggesting that curricula should begin by starting with the end goal in mind. The desired outcome is for learners to be credentialed professional interpreters. The curricula in interpreter education should provide the learners with the knowledge and skills in becoming interpreters.

Interpreter education is shaped by theoretical and need-driven developments. In the US, legislation provided the primary impetus driving the establishment of signed language interpreter education. A number of legislative acts over a period of approximately 50 years were instrumental in the need-driven development of signed language interpreter education. Some legislation focused on the rights and needs of the American Deaf community, including the provision of interpreters. Other legislation focused on the secondarily arising need for preparing qualified interpreters, hence, for the establishment of interpreter training programs.

According to Ball (2013), legislation reflected a gap and, initially, attempted to fill a need, federally, for people with disabilities (not caused by military service). The first program, the Civilian Vocational Rehabilitation Act (or Smith-Fess Act) of 1920, provided matching funds to state rehabilitation agencies for counseling, vocational training, and job placement service for people with physical disabilities. Decades later, in 1954, and based on experience resulting from the 1920 Vocational Rehabilitation Act, an amendment, the Vocational Rehabilitation Act Amendment (P.L. 83–565), was created. This amendment recognized people working in vocational rehabilitation (VR) as professional counselors and provided money for training them. As a result of this act, federal funding was set aside to engage in research and demonstration projects,

education of counselors, and construction of rehabilitation facilities. This is especially pertinent because it mandated that interpreting services be provided, without providing funding to educate interpreters or to prepare interpreter educators. This legislation also prompted the federal government to begin to consider services for deaf people, according to Ball (2013). The VR had not previously considered the need for language access of the people they served, but as the number of deaf people participating in VR workshops and training opportunities increased, the need for signed language interpreters increased as well.

In the years following the VR amendment, additional legislation attempted to address the need that was driven by providing more equitable opportunities for members of the American Deaf community. The Vocational Rehabilitation Act of 1965 (Section 9) P.L. 89–833 made provisions for signed language interpreting services for deaf clients regardless of economic need. The Higher Education Act of 1968 made provisions for special services in higher education, including the provision of interpreters. Ball (2013) suggests that the Babbage Report on the Educational Needs of the Deaf was a critical piece of legislation that led to initial development of interpreter education opportunities in the 1960s. Similarly, the need for interpreters increased significantly when the Vocational Rehabilitation Act of 1973 (P.L. 93–112) and 1974 Amendments to the Vocational Rehabilitation Act of 1973 (P.L. 93–516) contained initiatives that any deaf person attending a federally funded program had the right to an interpreter.

As the right to a “free and appropriate public education” was legislated in 1975, the Education for All Handicapped Children Act (P.L. 94–142) increased the demand for interpreters in school systems serving deaf youth in K–12 schools. Finally, in 1978, the Comprehensive Rehabilitation Services Amendments Act (CRSA) provided funding for interpreter education programs to serve all the states and territories in the US.

Ball (2013) draws a clear picture of the increasing demand for interpreters in a variety of settings that led to the eventual financial support to establish programs to help prepare practitioners to meet the demand. Moreover, legislation such as the Americans with Disabilities Act (ADA) of 1990 further expanded the rights of deaf people to have interpreters to provide access in a multitude of settings, including the charge to the Federal Communications Commission (FCC) to provide telephone services via video technology (Brunson, 2010). In the case of video relay interpreting, the ruling required it be established within a short time period, thus increasing the need for a large number of interpreters nationwide to provide videophone accessibility that is now provided around the clock. Clearly, legislation that recognized the accessibility rights of deaf people created a need that became the driving force behind the development of interpreter education programs.

Due at least in part to the fact that interpreter education programs (IEPs) were developed in response to a legislated, time sensitive need, most IEPs in the US were originally developed in two-year community colleges in part to prepare practitioners in a relatively short time frame, by focusing primarily on signing and voicing skills. These signing and voicing skills were in conjunction with the vocational preparation yields a different outcome than one incorporating general studies requirements and even theoretical and empirical education in interpreting and translation studies. As a result of this history, today over 100 two-to-three year interpreter education programs exist around the US. After decades of focus on interpreter education at the community college level, the Registry of Interpreters for the Deaf (RID) had a distinct impact on interpreter education curricula with their landmark decision to require hearing candidates for national certification hold a four-year degree in any major prior to national testing by July 2012. This was noteworthy because an interpreter association made a determination to shift the direction of interpreter education from a vocational focus to an academic one. The interpreting learners were given general education requirements that bolstered the world knowledge requisite to the comprehension tasks of interpreting, and the theoretical and empirical tools to develop

an academic understanding of their work. Despite the fact that the content of the degree was not designated (that is, an applicant for certification could hold a four-year degree in any subject matter), two-year AA level IEPs clearly felt the need had arisen to shift to four-year degree curricula, or at least were faced with the reality, in recruiting learners to their IEPs, that graduates of the AA program would no longer be qualified to sit for national certification.

The benefits of a university education on the quality of interpretation have been examined in some scholarly studies, and there is support regarding benefits for the requirement of a four-year academic degree on the part of interpreters in the literature (cf. Napier, 2002; Sawyer, 2004). Nonetheless, this professional requirement created a unique challenge for interpreter education programs in the US, and under the National Consortium of Interpreter Education Centers (NCIEC), a federally funded working group was created to study and recommend options for how to shift from two-year educational curricula to four-year programs. In the resulting report, the options for how to proceed included: maintaining two-year programs (and allowing learners themselves to individually address the need for a BA-level degree post-IEP and prior to being certified), developing partnerships between two-year and four-year programs (to collaborate in support and preparation of learners for professional certification), and even to evaluate the relative role of two-year lower division courses and programs with upper-division courses in four-year educational curricula to develop best practices for preparing interpreters to enter the field in keeping with RID's four-year degree requirement (Aborn, 2010).

More specifically, Aborn (2010) recommended developing or redesigning two-year IEP curricula to focus on foundational skills for interpreting learners, so that subsequent articulation with four-year programs could focus on developing a secondary set of interpreting skills with this clear foundation established. In keeping with previous recommendations and claims in the spoken and signed language interpreting literature, Aborn's recommendation was that the foundation skills focus on developing language fluency and communicative competence prior to the secondary development of cognitive and professional-practice related interpreting skills. It is worth noting that Aborn's recommendation maintains a vocational approach to interpreter education, but still finds sequencing of content to be paramount.

At the same time that the recommendation to focus on L2/*L_n* signed language learning first for signed language interpreting learners was proliferating, research focusing on the IEP graduates' readiness-to-credential gap found that while surveyed IEP four-year program graduates were generally able to attain state-level interpreting credentials, one or two years' post-graduation were required for national credentials (Godfrey, 2010). Significantly, two-year program graduates surveyed reported needing two years to attain state level credentials, and more than two years to attain national ones. Godfrey suggested one reason for this is that two-year IEP programs have insufficient educational time with learners, and therefore rush them through language development and theoretical foundations (cf. Carter, 2015; Witter-Merithew & Johnson, 2005).

In the absence of widespread theory-driven curricula, and given the time-sensitive, need-driven evolution of interpreter education, how has L2/*L_n* signed language teaching been practiced within US IEPs? The teaching of signed languages to L2/*L_n* learners is the focus of the next section.

Pedagogical practices

Spurred by the rapid development of interpreter education programs resulting from civil rights legislation (Ball, 2013), and fed by the increase in linguistic analyses of signed language structure

inspired by Stokoe (1960), pedagogical practices in the teaching of American Sign Language (ASL) as L2/*Ln* in the US have evolved over the past four decades to incorporate various second language teaching methodologies, ranging from grammar translation to L2/*Ln* immersion in visual language-only classrooms. This section will address some of the pedagogical practices used for L2/*Ln* signed language teaching in US interpreter education programs. The notion of ASL as an instructional language in secondary interpretation classes will also be addressed.

In the United States, linguistic research on signed languages in the 1960s and 1970s paved the way for recognition of the American Deaf community's language as a legitimate language that is distinctive from spoken language's grammar and syntax, and further, to name American Sign Language (ASL) as the signed language used by Deaf community members in the United States and Canada. This led to many states giving recognition to ASL as the official language of the American Deaf community, and to provide ASL classes for credit in academic settings, beginning with the colleges and universities and then in the K-12 schools (Wilcox, 1992). The Modern Language Association reported that the number of learners taking ASL classes has increased 15.5% from 2006 to 2009 and 19% from 2009 to 2013, and that ASL is the third most common foreign language in America (Goldberg et al., 2015). Many learners who complete ASL classes may pursue a degree in interpreter education programs.

Teaching methods in ASL classes

Teaching ASL is a relatively new phenomenon compared to the teaching of other foreign or modern languages. Prior to the 1960s, the idea that sign language was based on the spoken language used in their home community was prevalent. At that time, sign language was taught strictly in parallel with the words from the spoken language. Many sign language classes were provided on a voluntary basis through Deaf community organizations and churches for the deaf (Newell & Cagle, 1997, 2008). Prior to the 1980s, classes often were taught by children of deaf adults (Codas) who were hearing heritage signers, hearing interpreters, and hearing teachers of deaf learners (Cagle, 2016; Newell & Cagle, 1997, 2008). During this era, teachers relied heavily on using spoken English to teach new signs, and on vocabulary drills without much attention to grammatical structure or communicative behaviors (Cagle, 2008). Beginning in the 1980s, signed language instruction changed to being offered as formal ASL courses taken for credit in an academic setting with signed language teachers using ASL to introduce lexical signs, grammar, and Deaf culture (Cagle, 2008).

With limited knowledge about teaching foreign language as L2/*Ln* in the 1960s and 1970s, many ASL teachers used methods known as the Vocabulary Method and Audiolingual Method (also known as the Army method). In keeping with this L2/*Ln* teaching methodology, signed language instructors often provided lists of vocabulary and sign dictionaries to the learners, and then taught the signs correlating to the English words from the lists. The learners relied on memorizing the signs through drills where lists of sentences in English were provided for the learners to copy and practice. The learners used the signs following their spoken language's grammar rather than ASL grammar (Cagle, 2008).

While the work of the American Sign Language Teacher's Association (ASLTA) has made great strides in setting standards for ASL teaching through their ASL teacher certification process, ASL teaching still occurs with relatively little oversight to ensure standard practices are in place. There are numerous methods and approaches available for teaching L2/*Ln* languages. Today, most ASL teachers are using an eclectic approach in which they select and use several tactics and methods to fit their teaching styles and learners' learning styles. Most draw from the following methods and approaches in their ASL classes: direct method, functional notation approach, grammar translation method, total physical response, interactive learning, and learner-centered instruction (see Cagle, 2008, 2016).

L2/*L_n* teaching methods have evolved over time, and the changes in approach can often be traced to the goal of language teaching (Richards & Rodgers, 2014). For example, depending on whether the teaching an L2/*L_n* is focused on the literacy skills of reading and writing or on conversational skills for interaction, the teaching method is likely to shift, since language knowledge for reading, writing, and interaction are distinct linguistic skills. One well-known and early method of language teaching, the Grammar Translation (GT) Method, originated in the 18th and 19th centuries in Europe with the goal of teaching Latin (then a “dead” language, so the aim was to teach reading and writing skills, not interactive conversational skills). At that time, learners were given lessons around grammatical features of the language, with lists of vocabulary to memorize, and sentences to translate, while learners were taught in their L1. According to Richards and Rogers (2014), the Grammar Translation Method is still in wide use today, largely due to the fact that it enables the instructor to maintain some measure of control within the teaching and learning process. The grammar translation method, if used in ASL classes, may be a language teaching-learning method that is a precursor to translation as a professional activity (such as translation of ASL-English on video or in print). The role of this method could be quite different if ASL is taught as an L2/*L_n* teaching occurs prior to interpreter education, or concurrently with it.

The Direct Method is a natural language teaching method that treats language learners as one might treat a child learning a new language, exposing them to language use without detailed study of grammar or translation, and aiming for a more natural acquisition of language (Bhatti & Mukhtar, 2017). According to Bhatti and Mukhtar (2017), grammar translation is one of the most popular, widely used methods of language teaching despite many decades of reform in the language teaching field. In their study of the effectiveness of GT vs. the Direct Method, Bhatti and Mukhtar suggest that a combination of both methods is the most effective language teaching approach. Because the Direct Method has language use as its goal (forbidding translation, in fact, see Larson-Freeman, 2000), the focus of the Direct Method is for the teacher to generate lessons around topics that provide an opportunity for natural interaction. The Direct Method may incorporate the use of reading, geography, study of cultural attitudes, the use of pictures or objects and demonstration rather than explanation, with immersion in the L2/*L_n* language of study (Larson-Freeman, 2000).

In keeping with this description of the Direct Method, in recent years, many ASL programs and teachers have established a policy of no voicing in ASL classes to strengthen learners’ receptive skills and natural acquisition of ASL as a visual language. In these classes, different teaching techniques are used: identifying and labeling, substituting, contrasting, setting a scenario or acting out, and defining to introduce new ASL signs without relying much on written or spoken English (Cagle, 2016). At the same time, many ASL teachers (and materials) also incorporate intentional study of grammatical aspects of ASL, helping learners to learn appropriate use of sign order and non-manual aspects of the signed language. Thus, this section shows that elements of various L2/*L_n* approaches have been incorporated into ASL as L2/*L_n* teaching in the US.

ASL as major instructional tool in interpretation classes

While multiple and mixed L2/*L_n* language teaching methods have been found to be used in the US for teaching ASL as L2/*L_n* to hearing, second language signers, the question remains regarding how signed language is taught to learners who have applied to and been accepted as learners preparing to work as professional signed language interpreters. In keeping with the 1959 AIIC description of interpreter education content, signed language interpreting learners

are required to take a variety of interpretation courses focusing on cognitive processing for interpretation and including translation, consecutive, and simultaneous interpreting skill development, as well as professional interpreting skills such as ethical decision making and business practices. When interpretation classes focus on the transfer of meaning between ASL and English, the grammar-translation method may be employed regardless of whether the interpreter educator has formal training in the method, when discussions are led that compare and discuss the two languages' lexical equivalences, semantics, and grammatical similarities and differences. IEP instructor preparation regarding the use of the grammar translation method for language teaching, and the teaching of translation as a cognitive process for interpreters as two distinct instructor skill sets, are other important considerations to be addressed.

According to a recent survey of 138 interpreter education programs in the US, interpreter educators in many interpreter education programs across the country report using spoken English as a major instructional tool in interpreting courses, as well as using spoken English for classroom discussion (Hunt, Cagle, & Metzger, 2017). Conversely, some educators report the use of ASL as the language of instruction for interpretation classes. The use of L2/*L_n* signed language as the language of instruction in interpretation classes is theoretically supportable based on the concepts underlying the Direct Method, with language use as central, and immersion as a pedagogical practice. It is helpful to know the role of language teaching and learning currently in place in American signed language interpreter education programs.

A survey of signed language teaching in US undergraduate and graduate interpreter education

As mentioned earlier, legislation has had a direct impact on the establishment of formal signed language interpreter education in the US. However, despite a relatively long history of 50 years or so, very little formal education exists to prepare faculty to teach interpreting learners. In 1988, the first graduate-level ASL-English interpreter education program in the US was established at Gallaudet University, but the program was dedicated to preparing interpreters to enter the field as practitioners, not to prepare educators. When the Department of Interpretation and Translation at Gallaudet opened an interpreter education program at the BA level in 2005, the question of how curricular content should be tailored to learners entering the field at the BA level, rather than the MA level at Gallaudet, was carefully considered (cf Shaw, Collins, & Metzger, 2006). In 2010, the Department of Interpretation and Translation at Gallaudet University opened a doctoral level program in interpretation designed to prepare interpreter educators and scholars. As a result, an unanticipated, but perhaps not surprising, outcome of this new program raised the question of curricular distinction by academic level yet again.

The unexpected outcome results from the fact that, while the US hosts over 130 interpreter education programs, over 100 at the AA/AAS level, over 30 at the BA level, and at least five at the MA level at the time of this writing, Gallaudet University is the only university that provides degrees in signed language interpretation at all three academic levels: BA, MA, and PhD. This fact has created a cycle that both feeds into and is impacted by the content of IEP curriculum and language teaching in programs across the US. Most pertinently, these learners arrive at Gallaudet with a range of language abilities in ASL as their L2/*L_n*. The doctoral learners who graduated work in faculty positions in AA, BA, or MA level sign language interpreting programs. This cycle brings the question of academic level and curricular content to the center of pedagogy in all three programs at Gallaudet.

The authors of this chapter, all engaged in program administration at the time of the study, conducted a survey of IEPs at the AA, BA, and MA levels in the US to gather information about curricular content. The survey was sent to 138 interpreter education programs around the US, yielding 37 responses, or 27% response rate, from AA, BA, MA, and Certificate programs. For the purpose of this study, Gallaudet University was not included in the survey, and certificate programs were not examined. The results of this survey as they pertain to teaching L2/*L_n* signed language to interpreting learners are reported here. As can be seen below, the results showed variation in L2/*L_n* signed language entry and exit requirements and curriculum, suggesting a lack of differentiation and standardization across IEPs and academic levels.

Survey results

Of the 37 IEPs in the US, 15 were from AA/AAS programs, 13 from BA programs, and three from MA programs. This distribution reflects the prevalence of degree levels offered by the IEPs, where the greatest number of programs exist at the AA level.

Language Requirements for Program Entry. Fifteen IEPs have language entry requirements. Seven programs require either an American Sign Language Proficiency Interview (ASLPI) or Sign Language Proficiency Interview: American Sign Language (SLPI:ASL),² and eight IEPs use some other measure, such as an in-house evaluation or a mock interpreting assignment for language evaluation. Some IEPs have an open enrollment policy with no language entry requirement.

Breakdown by Degree Level. Two-thirds of the IEPs that responded to the survey have an open enrollment policy, with no entry language skills requirement, and 7% of the IEPs require standardized reading and writing tests that are not related to ASL fluency. Of the 15 AA-degree level programs, eight programs require minimal language ability, with 13% of those indicating the use of language screenings measures such as the ASLPI or SLPI:ASL, while seven programs use other forms of language screening. Of the 13 BA-level IEPs, 30% require an ASL screening, though only 15% said that they require minimal language ability. Of the BA-level IEPs, 31% indicate an open enrollment policy, with one program indicating an ASLPI requirement at the end of the sophomore year. Of the three MA program respondents, one program indicated an open enrollment policy, and two programs indicated a minimal language fluency requirement demonstrated experientially, such as via certification or other criteria establishing that they have experience with the languages they work between and interpreting.

For the 30% of the AA- and BA-level IEPs that have an open enrollment language policy, three clear questions arise: What are the language requirements for taking the IEP courses if some learners enter with signed language ability and others do not? Are these courses sequenced so that learners learn signed language prior to learning interpreting skills, as recommended by AIIC and others? For the learners who graduate from the AA-level IEPs and enter in the BA-level IEPs, how does the BA curricula meet the needs of just-graduated AA-level interpreting learners? Further research would be needed to better understand how language teaching and learning is occurring in AA-level as opposed to BA-level IEPs.

ASL classes. Ninety-seven percent of the 34 IEPs that responded to this item indicate that they require ASL classes as a part of their IEP degree requirements. The results indicate that nearly all IEP respondents are offering ASL at the same time that they are teaching the cognitive and professional skills of interpretation. This is in contrast to AIIC's recommendation for learner interpreters to demonstrate bilingual fluency *prior* to learning the cognitive and professional skills of interpretation. Given the variation in entry-level signed language requirements, and given the centrality of language abilities in the task of interpretation, the result is heartening.

Instruction in ASL. In the 37 IEPs where ASL courses are a part of degree requirements, 35 IEPs offer self-contained L2/*L_n* language courses. Twenty-three IEPs incorporate L2/*L_n* ASL

instruction within other program courses. Twenty-four IEPs provide feedback³ to learners on their L2/Ln learning progress in addition to their performance in interpretation assignments in the program courses. Results suggest that IEPs vary in assessment procedures in ASL as L2/Ln.

ASL instruction also varies by the degree level of the IEPs. All AA- and BA-level IEPs offer ASL instruction in L2/Ln language courses and interpreting courses. One AA-level program offers a sequence of ASL 7–12 courses. Two-thirds of the AA-level IEPs integrate ASL instruction in many courses, and 73% provide signed language feedbacks to learners. Although two-year AA-level programs might appear to have no option to sequence language learning prior to interpreter education, there are a few AA-level programs that require ASL as an entry requirement, or even require ASL courses or an ASL certificate as prerequisite to the two-year IEP. Thus, this finding is significant to the question of the timing of L2/Ln teaching in interpreter education. Eight BA-level IEPs integrate ASL instruction in several courses, and nine IEPs provide feedback in ASL learning progress. Two MA-level IEPs offer ASL instruction in program courses, with one providing feedback in ASL learning progress in addition to performance in course content. One AA-level and one MA-level program volunteered that deaf instructors teach ASL I, II, III, and IV, fingerspelling, ASL Lab, and Fingerspelling Lab, and professional interpreters teach interpreting courses.

In keeping with the need-driven development of US IEPs, these results suggest that AA and BA programs are both teaching language and interpreting skills. Because of the call for interpreter education to be sequenced with language learning as the first scaffold, further research is needed to identify programs that do follow a language-first curriculum to see if any AA-to-BA curricula collaborate in the sequencing of curriculum, and if so, how they compare in efficacy with programs that do not.

Language immersion. Twenty-six IEPs offer opportunities for signed language immersion for interpreting learners outside of classrooms. There is a variety of immersion experiences for their learners across the IEPs, including communicating within signing-only environments within departments, regular attendance at Deaf community events, signed language immersion weekends, and in non-interpreting classes where signed languages are used. At Gallaudet, for instance, signed language immersion for its interpreting learners occurs where ASL is used by deaf learners in non-interpreting courses, dormitories, and social activities due to the bilingual mission of the university. IEPs in hearing-centric campuses that have signing faculty provide signed language immersion experience by teaching signed languages in program courses.

Language requirements for graduation. Twenty-four IEPs reported exit level graduation requirement related to signed language skills. IEPs reported a variety of evaluation options for the signed language exit requirement. Eleven IEPs reported that the RID National written certification exam is its signed language exit requirement. One IEP reported that the RID National performance certification exam is its signed language exit requirement. Six IEPs reported that state-level exams that assess knowledge of signed languages are their exit requirements, and three IEPs indicated that state-level exams that assess performance in signed languages are their exit requirements. Three IEPs indicated that the Educational Interpreter Performance Assessment (EIPA) is their exit requirement. Four IEPs reported that minimal language ability⁴ or other skills evaluations stand as exit requirements at the program level.

There are variations in signed language exit requirement by program degree level. Of the 15 AA-level IEPs, more than half indicated a signed language exit requirement prior to graduation. Two programs use ASLPI or SLPI:ASL as its exit requirement. Two other programs require a state-wide or national interpreting performance test prior to graduation. Still another two IEPs use a program-developed language assessment as its exit requirement. Of the 13 BA-level IEPs, 23% have a minimum exit language assessment requirement as measured by the ASLPI or SLPI:ASL. One program requires a state-level performance exam and another

program requires the EIPA performance exam. Eight IEPs use program-developed signed language requirements prior to graduation. None of the three MA-level IEPs requires an exit signed language assessment.

This survey showed a higher percentage of BA-level IEPs (62%) than AA-level IEPs (50%) require exit signed language assessment. A small percentage of IEPs require bilingual fluency in interpreting learners prior to graduation, and use both English language and ASL assessments as their exit language requirements. These programs also require bilingual fluency as the prerequisite prior to enrollment in interpreter education.⁵ The possibility that entry-level requirements may correlate to exit language requirements is an area worth exploring.

The above survey results provided a snapshot of the situation of signed language teaching in the IEPs in the US. There are variations across IEPs in entry and exit language requirements, and the courses where signed language instruction is offered. It is now worth considering the preparation of and what formal education and professional development opportunities exist for signed language interpreter educators.

Formal training and professional development of interpreter educators

In recent decades, researchers have called for the need for systematic research and preparation of interpreter educators (see Godfrey, 2010). Since these calls began, formal training and professional development have been expanded, including the opening of graduate degree programs focusing on interpreter educator preparation, and doctoral degree programs to increase research and develop scholars and faculty for IEPs. Cagle (2016) proposes that formal training and professional development of sign language and interpreter educators include coursework and practicum in teaching; interpretation theory and history; methodology; assessment; curriculum development; research designs; signed languages; comparative linguistics of signed and spoken languages; Deaf people, history, community, and culture including signed language and Deaf literature; and professional practice and ethics.

There are professional development opportunities available for signed language and interpretation teachers worldwide through numerous workshops and conferences, such as the American Sign Language Teachers Association (ASLTA), Sign Language Instructors of Canada (SLIC), the Registry of Interpreters for the Deaf (RID), and the Association of Visual Language Interpreters of Canada (AVLIC). Graduate-level training in teaching signed languages and a Masters degree in Interpretation are granted through colleges and universities.

The methods and timing of language teaching and learning in translation and interpreter education are critical. A deeper understanding of the relevance and applications of various L2/Ln teaching methods, such as grammar translation for language learning discussed earlier, is critical in the L2/Ln signed language teaching within interpretation courses. The significance of building interpreter education on theories of interpretation, communication, and cognitive processing are central to success in IEPs that are theory-driven rather than need-driven.

Future trends

What can be seen in this chapter by unpacking the evolution of signed language interpreter education in the US is that, to date, there appears to be two separate lines of research and pedagogy that are symbiotic in the development of interpreters who might graduate ready-to-work. They are signed language pedagogy and interpreting pedagogy. The juxtaposition of these two seems

to be the center of interpreter education, and certainly a driver of future trends in L2/*L_n* signed language teaching in interpreter education.

Future research studies

Research in the past decade shows that IEP learners are not gaining the skills required to enter the field or pass national certification by graduation (Godfrey, 2010). Hence, the most pressing future trend will likely be a shift from the need-driven curricula of the past, to a future pedagogy that is research-driven and evidence-based. As graduate programs increase worldwide, so too does the quantity and quality of empirical research about interpretation, interpreting pedagogy, and the teaching of as L2/*L_n* to interpreters. The topics that are likely to be addressed in future research studies include translation and sign language learning processes. These research studies should be guided by solid theoretical backgrounds that can inform the education of sign language teachers and interpreter educators. Some studies may explore language teaching methods that provide best practices for preparing bilingual and multilinguals toward success as future interpreters. Other studies may examine the impact of various language teaching methodologies in the teaching of visual languages.

Future pedagogical practices

The considerations that are likely to be addressed in future pedagogical practice concern program and teacher development and teaching approaches. There is a need to increase the number of programs that focus on preparing deaf translators, interpreters, and instructors in interpreting and language teaching programs. There is a need for an increase in programs that require L1 and L2/*L_n* language fluency and proficiency prior to commencing interpreter education. The programs should increase the diversity of interpreter educators and learners, including people of color, heritage signers, and trilingual interpreters. There should be collaboration among the programs regarding content and sequencing of language learning and interpreter education. One possibility is team teaching to pair native L1 signers with L2 signers. Interpreting courses need to be offered in the signed language of the countries where training is being provided.

As Monikowski and Winston (2011) suggested, educators of signed language interpreters recognize the lack of consistency in two- and four-year degree interpreter education programs, a lack of consistent entry and exit requirements, coupled with a very widespread approach that combines language teaching and interpreter education simultaneously. The need for additional research is clear, to determine realistic outcomes for language learners prior to interpreter education courses, effective sequencing by degree level for learners, and, as well, to examine best practices in signed language teaching and assessment.

Of the trends that can be expected in coming years, two seem likely to have the greatest impact on the teaching of L2/*L_n* sign language to interpreters. One trend is the change in the timing of language teaching versus cognitive and professional interpreting skills. A growing body of research and literature calls for an established language base before interpreter education commences. Interpreter education curricula will shift to accommodate the need for language learning semesters (and successful language acquisition) prior to the beginning of interpretation courses (see Cagle, Metzger, & Hunt, 2016). Another trend is the increased use of L2/*L_n* sign language as the language of instruction in interpreting courses in both cognitive and professional skills in interpreter education programs, for interpreting learners' language immersion, and for increasing the number of deaf interpreting educators.

Notes

- 1 Spoken language interpreters work in language pairs, and must be fluent in both languages. Some are fluent in more than two languages. Similarly, signed language interpreters work in language-pairs, often one signed and one spoken language, but also a signed language-to-signed language, and or multiple signed or spoken languages. However, at the time of this writing, the majority of learners in US interpreter education programs are neither Deaf nor hearing heritage signers, but hearing L1 speakers of English. For the purposes of this chapter, we focus on this latter group.
- 2 The ASLPI and SLP:ASL are standardized assessments of ASL skill/fluency, similar in structure to the spoken language proficiency interviews used in assessing language fluency in spoken languages by organizations such as the US State Department.
- 3 Language feedback on ASL would mean feedback focusing on learner L2 language abilities. Language feedback “in” ASL would mean feedback given in ASL (presumably in person or via technology such as GoReact) and could focus on language or interpretation abilities, the latter relating to questions of how the learner is comprehending, reformulating, and producing a target interpretation, and whether it is equivalent in meaning, or affect, and so on.
- 4 Minimum language ability has no standard definition, however measures such as the ASLPI provide a relative assessment/report (such as ASLPI 2.5 or 3.0) that reflects beginner to native or near-native language abilities. Further research is needed to determine how much variation exists in each program’s determination of what their “minimum language” requirements are.
- 5 English language entry and exit requirements, as well as other language or language variation requirements (such as tactile ASL, ProTactile, Spanish, LSQ, etc.) is an area outside the scope of this study, and one that warrants further research.

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The uses of technology in L1 and L2/*L_n* sign language pedagogy

Hatice Kose and Pinar Uluer

Introduction

Technology plays a crucial role in teaching as an assistive tool. With the recent development in smart mobile-internet based applications, e-learning platforms, and robotics, several applications of these technologies were made for deaf, hard of hearing, and hearing learners. This chapter mainly focuses on the use of technology in sign language teaching. It does not focus on the use of technology to teach spoken languages through sign languages, or translate across spoken and signed languages. It will cover key concepts in technology in L1 and L2/*L_n* teaching (including tutoring) and learning, and review research studies on technology in L1 and L2/*L_n* classrooms for teaching and learning, and some case studies based on the cutting-edge technology in use in sign language tutoring. The technological concepts are widely used in L2/*L_n* teaching, and a few sample uses in L1 teaching are also summarized in the following subsections.

Theoretical perspectives

A sign language teaching technology system is generally based on several modules including sign-gesture recognition, sign generation-presentation, and a translation module. These systems involve several channels, such as computer/web platforms, mobile applications and even humanoid robots.

Sign recognition systems

One set of technologies is the sign recognition system. The sign recognition system is able to track and recognize hand, arm, head movements, and facial expressions of the human signer. The technology that recognizes learners' signs or gestures has the capacity to contain built-in mechanism to provide feedback to the learners. A survey conducted by Parton (2005) summarizes different studies in the recognition, generation, and translation of sign language, mainly American Sign Language (ASL). Several researchers have studied the gesture recognition for various sign languages by using different methods (Haberdar & Albayrak, 2005; Keskin & Akarun, 2009; Aran & Akarun, 2010).

Glove

One of the mostly preferred assistive tools in sign recognition studies is a glove. It is either a data glove embedded with sensors or colored glove combined with an RGB camera setup to track and capture the various movements of the hand. A data glove is a glove that is mounted with different types of sensors such as pressure, tactile or bend sensors, accelerometer, gyroscope, and potentiometer. They are mostly used as an input device in human-computer interaction studies. The gloves used in the studies are either manufactured by companies (Fifth Dimension Technologies, n.d.; CyberGlove Systems, n.d.), or specially designed by researchers for academic purposes such as the early example of a lightweight glove connected to a computer that was designed by Zimmerman et al. (1987) for fingerspelling interpretation to provide an interface to a visual programming language. Even though some systems had to incorporate only one-handed signs (Figure 22.1), the results of the studies are promising in terms of the use of a computer-based system in such a learning scheme (Ritchings, Khadragi, & Saeb, 2012). The trainees taking part in the study report that the system is easy to use, stable, and preferable to the traditional classroom approach for sign language tutoring (Ritchings, Khadragi, & Saeb, 2012).

Researchers also use colored gloves, which contain distinctive colors for the different parts of the hands and fingers for recognition, combined with a camera that tracks and segments the hand motions by color detection, and interacts with the computer through a vision recognition system (Lee et al., 2005). In a similar setup, some researchers also proposed vision-based approach without any wearable sensors. In a recent study, Solis, Martinez, & Espinoza (2016) also use a vision-based approach using an Artificial Neural Network (ANN) to classify and recognize fingerspelling in Mexican Sign Language (MSL). In another study, Camgoz et al. (2017) propose a deep-learning-based methodology to provide continuous sign language recognition with only an RGB camera feed.

Kinect and body sensors

Kinect is a 3D depth camera designed initially for games, and enables users to interact with games using their bodily actions (Figure 22.2a). With the release of Kinect SDK in 2011, the use of depth data captured by the sensor has become more popular in recognition-based studies. Another depth sensor, Leap Motion controller (Figure 22.2b), is a small-sized depth camera that is specially designed to detect and track hands and fingers in close proximity and has ability to report discrete position and motion.

Inspired by the idea that practice improves language learning when there is appropriate feedback and validation, Aran et al. (2009) propose an interactive system for sign language tutoring named SignTutor, which evaluates the users' signing, provides visual feedback, and validates their performance. It is composed of a sign recognition module analyzing the hand-motion and handshape as well as a head-motion tracker to recognize signs including both head and hand movements using two different-colored gloves. The system classifies the signs based on a Hidden Markov Model (HMM) approach and gives feedback on the correctness of the hand or head gestures. The conducted user study with six participants shows that the system is user-friendly, and the visual feedbacks are helpful, yet the feedbacks could be more constructive about what is wrong or what should be corrected.

A brief summary of the sign recognition studies in assistive tools such as gloves, and RGB and RGB-D (depth) cameras is given in Table 22.1.

Several machine learning techniques are involved in the recognition phase of the systems. Deep learning-based methods were introduced in recent years. Different tools have various advantages and disadvantages. Wearable devices are easy to track but hard to obtain for every

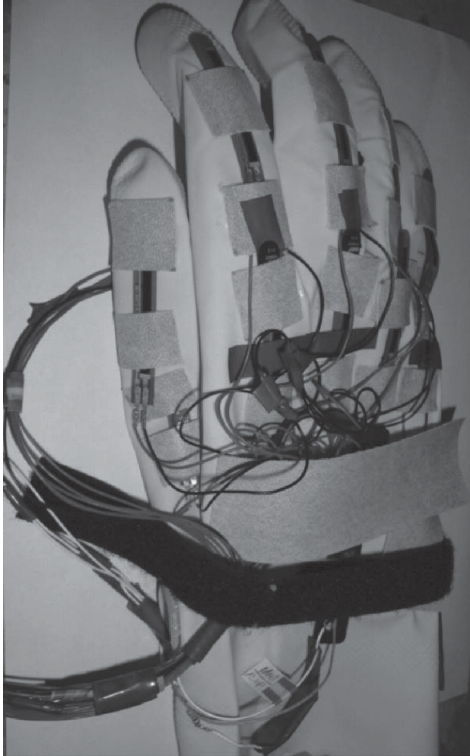


Figure 22.1 A data glove and colored glove used in sign recognition studies

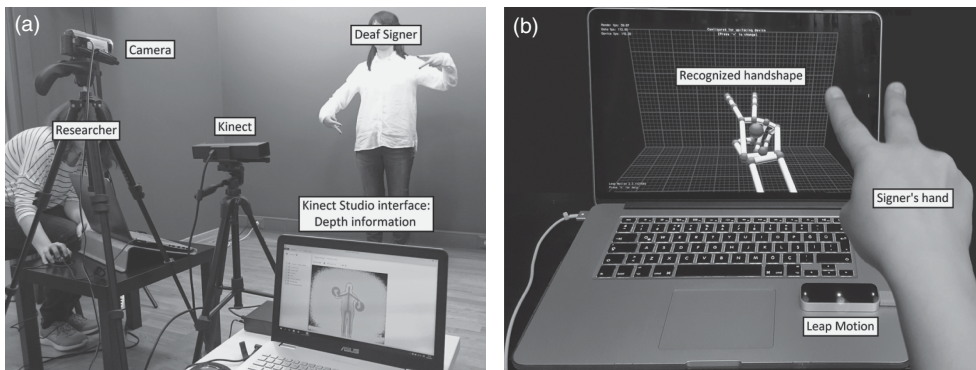


Figure 22.2 Data capture setups with Kinect and Leap Motion sensors

individual in the classrooms, sometimes even for the second hand of the user. RGB systems are cheaper since they do not require any additional wearable device. Unfortunately, the color of the users' clothing, and background color can be problematic for a successful tracking system. If the hands come over each other or the face, the clash of skin color also avoids the tracking of the hand. Depth cameras overcome some of these problems, but the user needs to stand in

Table 22.1 A summary of studies on sign recognition

<i>Reference study</i>	<i>Sign Language</i>	<i>Motivation</i>	<i>Methods</i>	<i>Test setup</i>	<i>System evaluation (Recognition rate or verification rate)</i>
<i>Glove-based studies</i>					
Starnier & Pentland (1997)	ASL	A real-time ASL sentence recognition system	Vision-based approach with colored data gloves and skin tracking	40-word lexicon	99% with gloves 92% without gloves
Liang & Ouhyoung (1998)	Taiwanese Sign Language (TWL)	A large vocabulary sign language interpreter with real-time continuous gesture recognition using a DataGlove	HMM-based classification	A lexicon of 250 vocabularies	80.40%
Lee et al. (2005)	ASL	A system to facilitate language development in deaf children via a computer game using colored gloves	An ASL interpreter to recognize the signs & Wizard of Oz (WOZ) method	8 sentences	Subjectively evaluated
Aran & Akarun (2007)	TID ASL	An interactive sign language game	A pair of colored gloves with HMM-based classification	7 signs (TID) 19 signs (ASL)	95% 76%
Ritchings et al. (2012)	ArSL	A computer-based system for sign language tutoring using a low-cost data glove and a software application	Pattern matching	65 signs	93.80%
Praveen et al. (2014)	ASL	ASL alphabet recognition using a portable smart glove	Analog to digital voltage conversion using the sensors on the smart glove	10 letters	Subjectively evaluated
Tubaiz et al. (2015)	ArSL	A glove-based Arabic sign language recognition system	A modified kNN classifier with 2 data glove	40 sentences using a 80-word lexicon	98.90%

Depth sensor-based studies

Zafrulla et al. (2011)	ASL	An interactive game to improve the language and memory abilities of deaf signing children in order to assist in the language learning of deaf children using Kinect	HMM-based classification	1,000 phrases	74%
Memis & Albayrak (2013)	TID	A sign language recognition system using RGB camera and depth sensor	DCT combined kNN classifier	Sign database containing 1,002 isolated dynamic signs from 111 signs	80%–90% for different test conditions
Mohandes et al. (2014)	ArSL	Sign language alphabet recognition with Leap Motion controller	Naive Bayes Classifier vs. Multilayer Perceptron	28 Arabic alphabet signs	98.3% (NBC) 99.1% (MLP)
Gameiro et al. (2014)	Portuguese SL	Sign language alphabet tutoring via a serious game for children using Kinect	Template matching approach	Prototype testing	Subjectively evaluated
Yauri Vidalon & De Martino (2016)	Libras	A sign language recognition system based on continuous depth data stream	DCT combined with DTW with a kNN classifier	107 medical signs from common dialogues in healthcare centers	98.69%
Demircioglu et al. (2016)	TID	Hand shapes primitive recognition with Leap Motion	Rule-based heuristic approach vs. Machine learning (Random Forest)	18 primitives	99.03% (Heuristic) 93.59% (Random Forest)
RGB camera-based studies					
Solis et al. (2016)	Mexican SL	A vision-based system for the automatic recognition of fingerspelling alphabet	Vision-based approach with ANN	21 letters	93.00%
Camgoz et al. (2017)	DGS	Continuous sign language recognition with RGB camera feed	Deep learning (SubUNets) approach trained on camera feed	One-Million Hands dataset (Koller et al., 2016)	Out-performing previous techniques by more than 30%

a particular position to be within the limits of the camera, and be tracked, and the data can be noisy due to other people or material in the scene/background, or lighting conditions. These limitations also cause problems when the user aims to use only one depth camera to track both the upper torso, hands, and face, all at the same time.

There are fewer studies in sign generation than sign recognition, except for video-based studies. Sign generation is a time-consuming process since it requires two human-like hands and an upper body to capture both manual (hand configuration, orientation, placement, or movement) and non-manual (posture of upper torso, head orientation, facial expression, and gaze direction) components (Gibet, 2011). The studies generally focus on different media, videos of human signers, virtual agents (avatars), and robots.

E-learning

E-learning is also a highly popular medium preferred in sign language studies where the videos of human signers are used in L2/Ln sign language teaching scenarios. It provides easy access to information for the users. The drawback of these systems lies in the production of new material and the continuity of the systems. The teaching material is static. It cannot be generated or modified like in the computer-based systems. Expert human signers should produce all the teaching materials. When another signer is used in the future videos, there are possible continuity problems due to the differences in the style and accent of the signers. The setup in the video production phase, the color of the signer's clothing, the background color, and the mood of the signer that affects the facial expressions play important roles in the utility of the systems.

Robotics-based systems

Since sign language teaching and learning requires repetitive practice, sign generation with robots has been another popular research field since late 1970s. A robotic hand with the aim of spelling finger alphabet from ASL was developed in 1977 (Laenger & Peel, 1978), and the study has been carried out with different versions up to 1994 (Jaffe, 1994; Hersh & Johnson, 2003). "Dexter" was an upgraded model with additional capability of wrist actions (Gilden & Jaffe, 1988). In 1992, the TTY model was implemented. The latest model "Ralph" (Robotic ALPHabet) was a 4th generation computer-controlled electro-mechanic hand that is capable of spelling ASL finger alphabet (Jaffe, 1994; Hersh & Johnson, 2003). There are several studies for generating sign language by developing robotic hands (Salisbury & Roth, 1983; Sugiuchi, Morino, & Terauchi, 2002); one of them is the ongoing ASLAN Project (n.d.). The project is based on the 3D printed robotics, therefore it aims to print a low-cost and accessible robotic hand that can fingerspell or generate signs from any input sign languages. However, there can be only one set of mechanical hands, which is not enough to express and generate signs that require the simultaneous use of both manual and non-manual components.

Inspired by the idea that a humanoid robot would be more credible, another robotic study focuses on the translation of the signs from vision to speech using HUBO humanoid robot from KAIST where the robot generates a selected set of words from Korean Sign Language through fingers and hands (Park et al., 2008). In order to express a sign with all its components, child-sized humanoid robots with high DOF in arms and fingers are used in sign language-based interaction games (Kose & Yorganci, 2011; Kose et al., 2012; Akalin, Uluer, & Kose, 2013; Uluer, Akalin, & Köse, 2015; Uluer, 2017).

Creating digital learning environments with educational purposes is an attractive area for research. Vogt et al. (2017) proposed design features of a second language tutoring system that

includes a child-friendly social robot tutor and a tablet where the features of the robot are listed as acting like a peer adaptability, establishing joint attention, using meaningful gestures, providing effective feedback, and monitoring children's learning progress.

Virtual reality (VR) and avatar-based systems

Virtual reality technology can help users by combining abstract and concrete data through involvement, interaction, and 3D visualization. Avatars that offer the possibility to imitate the human signs incorporating both manual and non-manual markers have become popular in the sign language related studies.

WebSign is an avatar-based platform that is created by Jemni, Elghoul, & Makhoulf (2007) to teach sign language to deaf learners in order to help them improve their communication ability and social skills based on sign language acquisition. It provides a web application platform with an integrated avatar generating a video output given an input text in a written language. Although it is a web-based tool to create online courses, the application may also be used as an online or offline course platform with different user interfaces designed for various user profiles.

Another project, SignMOTION relies on depth sensors to create a 3D facial expression and body posture to record the animation of intended sign to a virtual signer system (Boulares & Jemni, 2014). In another study, Brega et al. (2014) present a system to assist the teaching and learning process of Brazilian Sign Language (Libras) by converting text into sign language of 3D virtual reality avatar.

There are other avatar-based systems. In several case studies, an avatar generates ASL words, not only performing hand motions but also head motions combined with facial expressions. It can be used as a translation system where written English text is translated into ASL. The comprehensibility and understanding level of signs in the avatar are comparable with a human signer and can be used as sign language tutoring system (Kipp, Heloir, & Nguyen, 2011; Kacorri & Huenerfauth, 2015).

Dictionaries

Electronic dictionaries may be helpful for the learning and self-study of sign vocabulary (Langer, 2012). Some of the aforementioned studies incorporate a vast database of dictionaries for self-taught language learners. There are several online design dictionaries that teachers and learners can use to teach and learn sign language vocabularies and grammar. Examples are for ASL, and they are the ASLPro, ASL App, and SignASL.

There are studies based on translation of a sign language into a foreign sign language. Parton (2014) studied the level of knowledge and interest in foreign sign language among deaf teenagers and the approach in the creation of a learning platform to teach a foreign sign language as an additional language. Mobile-Assisted Language Learning (MALL) offers an important technological tool for foreign language learning. As a case study in MALL, a mobile app featuring 25 words and clausings for four different sign languages is presented. Although Parton does not present a user study to validate the effectiveness of the presented system, the design and procedure are based on the instructions and comments of deaf teenagers, and seem promising for future applications.

Eryigit et al. (2016) propose an interactive e-dictionary platform which enables both academicians and signers to upload and label sign videos to construct a machine-readable sign corpus for TID. Another study is the Spreadthesign (n.d.) corpora that is a web-based teaching and translating aid designed to make an international dictionary of the following national sign languages accessible: Swedish, English, American, German, French, Spanish, Portuguese, Russian, Estonian, Lithuanian, Icelandic, Latvian, Polish, Czech, Japanese, and Turkish.

Pedagogical applications

In the previous section, we introduced several uses of technology such as sign recognition with cameras and gloves, generation systems with avatar and robot displays, and virtual reality and avatar-based (AR/VR) systems to teach sign language. Text-to-sign systems and teaching platforms such as web and mobile platforms that are based on these systems usually target L2/L n learning. The instructions are usually for adult users and cannot be used by deaf early age learners (L1). Sign recognition systems can be used in both L1 and L2/L n settings as an automatic feedback mechanism. The systems should be trained for the children; the systems are trained with adult data (RGB or depth information of adult signers) and might not perform well with children. In addition, some technologies require the wearing of gloves and certain gadgets, which might be difficult to use in classrooms for each individual children and for the teacher. For example, in her study Nasereddin (2017) found that the users should wear black gloves, and use a green background and certain type of operating system that is compatible with this system for use in classrooms.

Virtual reality and avatar-based systems

Likewise, virtual reality (VR) and avatar-based (AR) systems can be used in both L1 and L2/L n settings. Passig (2000) showed that the use of VR 3D and regular 2D Tetris game over a period of three months helped enhance language, reasoning, and inductive abilities of deaf and hard of hearing children to the level of normal hearing children. Yet, the educational material used for L1 should be chosen carefully and VR goggles might not be convenient for the early age group. These accessories might be too heavy to carry for the early age group, and might cause dizziness if used for long time.

Computer assisted systems

Mertzani (2008) examined the effect of the computer-mediated communication (CMC) on sign language teaching and learning in British Sign Language classes. She developed a networked video interaction program with a deaf tutor and three hearing learners within a digital sign language laboratory, SignLab, at the University of Bristol. Each tutoring session comprised an instructional video clip showing and a task to complete, which were either an opinion-exchange task or a jigsaw task. The results show that the learners were able to note and correct their errors and video outputs before installing them to the system for their tutor's evaluation. When they received the tutor's feedback, they modified their video outputs. The learners also reported that individualized feedback was helpful, which is not common within traditional classes, and the fact that they can repetitively watch the instructional videos. The study demonstrated that interactions occur within an asynchronous video-based CMC environment for sign language learning.

Parton et al. (2009) studied an RFID-based system that is used to support the early language acquisition of young children. It is a tangible computing system that combines physical interaction with audiovisual feedback. Although the system is designed for early language education of deaf children born to hearing parents, young L2/L n learners can use it to learn sign language. The proposed system is composed of an RFID reader, a set of toys with embedded RFID tags, an audiovisual display that shows the video of a human interpreter signing words for toys, several images showing different forms of a toy, written English translation, and an audio file of the English translations. Parton et al. (2009) conducted a user study with a

preschool class for 3- and 4-year-olds, and reported that the results showed that the RFID-based system significantly helped enhance vocabulary growth in the children than without the system.

Berrett (2012) conducted an experiment with two classes of hearing people at an American public university in the use of the Computer-Assisted Language Learning (CALL) platforms as resources in the teaching of ASL. In the experimental class, Berrett uploaded CALL-based materials consisting of videos embedded with the side and frontal view of signers performing different signs, still photography capturing the handshapes of each letter, and an asynchronous communication Q and A module for the use of learners taking the ASL class. The experimental class received CALL-based instruction and the control class received traditional instruction without the use of the CALL platforms. Berrett (2012) studied the effect of CALL as an instructional tool for the L2/Ln ASL learners. Results showed that there is no statistically significant difference between the experimental and control classes in linguistic knowledge and skills. More experiments are needed to ascertain if CALL is a useful resource for sign language teaching and learning.

Sign assessment systems

There are technologies that are designed to assess learners' sign language knowledge and skills. One example is the scalable multimodal sign language technology for automated sign language learning and assessment system that was developed for Swiss German Sign Language (DSGS) (SMILE Project, n.d.). The system uses machine-learning algorithms for automatic sign language recognition. The automatic sign assessment system is installed with DSGS sign language resources and tasks; sign language recognition and verification capabilities; vocabulary tests; and protocols for recording, assessing, and giving feedback on learners' sign language. Studies to assess the efficacy of the sign automation systems have not been conducted.

Messenger systems

There are web-based technologies available that enable learners to learn sign languages. Ohene-Djan et al. (2004) described a real-time messenger and "finger-chat" communication platform with pictorial representations of fingerspelling for teaching sign writing to deaf and hearing learners. Ohene-Djan & Naqvi (2005) described a web-based platform, Kids Sign Online (KSO), which contains instructional materials including digital videos of deaf children teaching British Sign Language to deaf learners. There are no studies on efficacy of the web-based platforms systems.

Computer software programs

One of the activities in sign language teaching includes teachers giving feedback to learners. There are sign language feedback software programs available. The programs have the capability to recognize and provide feedback on the signs and gestures that are performed by the learners (Aran, Keskin, & Akarun, 2005; Brashear et al., 2010; Davydov et al., 2013). Davydov et al. (2013) described a Ukrainian Sign Language tutoring software system that captures and records from a web camera the learners' sign productions and verifies them with a feedback mechanism. The software program includes data processing protocols for background modeling, machine learning of signs, and image segmentation. It includes 85 signs and has 91.7% success rate for sign recognition.

Robotics

There are robotic systems that can be used for language teaching. Some of the robotic systems are more convenient and useful for L1 learners. The choice of a robot should be made according to the needs of the target age group. Avatars, a robotic system, can be used for both L1 and L2/*L_n* teaching. The appearance and features of the avatar should be designed according to the needs and likes of the different age groups. The instructions in the avatar robotic systems are largely visual and iconic, and should be easier to follow by the learners. As discussed in Jaballah and Jemni (2013), avatar-based systems need to contain a sign vocabulary database that are scalable, with signs that are clear, understandable, and natural; easy user interfaces; and are extensible to different computer systems. If the system is hard to use, changes, or is confusing, the course lessons will be adversely affected; teachers may have difficulty teaching, and the learners may have difficulty learning (Jaballah & Jemni, 2013).

Robotic Sign Language Tutor Project

The authors conducted a case study of deaf and hard of hearing children with humanoid robots and virtual avatars. The children did not wear cochlear implant and were not fluent in reading and writing. They have communication difficulties. The study used a humanoid robot as a teacher and peer in order to improve the children's interaction ability and to encourage them to transfer what they have learnt from interaction with the robot to their interaction with other individuals. The humanoid robotic assisted interactive sign language teaching platform was employed to teach Turkish Sign Language.

The Robotic Sign Language Tutor Project is a robot-assisted interactive Turkish Sign Language (TID) tutoring system. The robots can recognize and express signs in TID. They include games and a human-robot interaction system. Interaction based turn-taking games are specially designed to be played by the robot and the children as assistive resources in children's TID tutoring. The platform is based on intelligent teaching platforms and can be adapted to other sign languages. The study assesses the efficacy of the assistive humanoid robots in TID tutoring.

A Nao H25 humanoid robot with three dependent fingers and 25 DOF, a Robovie R3 humanoid robot with five independent fingers to sign in TID, an integrated RGB-D camera on the chest, and 29 DOF were designed, modified, and used in the games. These robots capture learners' feedback with emotional and action states, signs and gestures, and sound from the colored cameras in the eyes (visual clues/colored flashcards), RGB-D cameras (human motion data), the tactile sensors on its head, a speech recognition software, a face detection software, and LEDs on learners' faces. An HMM-based sign recognition algorithm is created with the learners' sign data that are gathered by the RGB-D cameras (Kinect). Figure 22.3 shows the arrangement of the robotic system. The proposed system architecture is detailed in Kose et al. (2014).

In the interactive turn-taking games, learners observe the TID words signed by the robot using its upper torso (head, arms, hands and fingers), imitate the robot simultaneously, guess the sign given by the robot, and provide the robot a visual or motion-based feedback. The success rate of the recognition module with the learners' data is 98% with offline data and 63% during the real-time interaction game (Kose, 2015; Uluer et al., 2017). The fingers that form the signs were successfully recognizable using a Leapmotion-based machine learning system (Demircioglu, Bulbul, & Kose, 2016). The modules and the interaction games within the project are tested both with deaf and hard of hearing children and hearing children at several phases. The tests were modeled on the Wizard of Oz method that was created by Salber and Coutaz (1993), in which the robot was controlled via its remote controller but the learners were not aware of



Figure 22.3 Robovie R3 robot

the fact that it was being prompted to perform the appropriate actions. When necessary, the robot is employed alongside the vision module of the robot. As observed from the experiment results and the surveys, the deaf and hard of hearing learners perceived the robot very positively, and were very motivated during the games. They commented that playing with an agent that can “communicate in their language” is very interesting and motivating, and they accepted the robot positively as an assistive teaching system and playmate.

The project is evaluated as successful based on the robots’ ability to produce and recognize signs, learners’ verbal and written feedback, and performances within the games. The novelty of the project lies in the use of humanoid robots in Figure 22.3 in both producing and recognizing gestures within interaction games for sign language tutoring. The humanoid robot gets relevant information from the human through different modalities such as gesture and sign recognition, and flashcard or speech recognition for individuals who have partial hearing and/or who are able to express themselves vocally. With the information, the humanoid robots are able to select appropriate feedback to the human player and can be made to vary by games. The above robotic system can be adapted for other sign languages. Future projects will utilize statistical approaches to assess the algorithms on the human action data gathered from deaf TID teachers/signers by RGB-D cameras.

A technology that has the capacity to translate printed text to sign language is currently under development. A project by Istanbul Technical University and Bogazici University is currently developing a machine translation and avatar display system that can translate written



Aşağıdaki resimlerde çocukların hangileri okul ve sınıf kurallarına uyuyorlar?

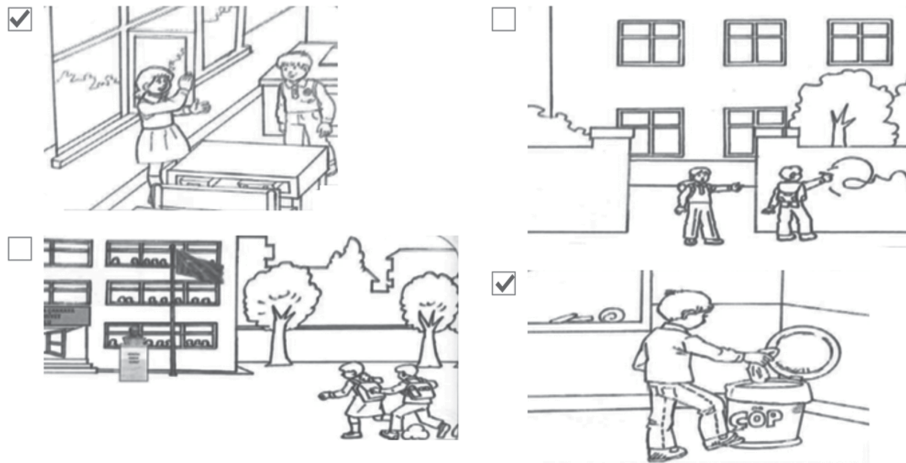


Figure 22.4 Avatar signing the question “which children behave according to the school and classroom rules in the pictures below?” The children should choose and tick the appropriate boxes

Turkish educational material to Turkish Sign Language (TID). The project seeks to support the education of Turkish deaf primary school learners and reduce the gap with hearing peers (Eryigit et al., 2016). There are three project activities. They are the (1) development of a method to represent written TID “sign gloss” for the purposes of computer-processing and computer-generation of TID; (2) development of an automatic translation system from written Turkish to written TID; and (3) transfer of the written TID that is generated by the system to the animation medium. Deaf signers and children of deaf adults (CODA) produce and implant signed stories onto avatars. A corpus and a sign dictionary are developed. Figure 22.4 shows the arrangement.

Preliminary results show that the deaf primary school learners understood and were able to correctly answer test questions when the written text is accompanied with a signing avatar. However, further discussion of this topic in translation from print to sign for deaf children to comprehend written texts is beyond the scope of this chapter.

Future trends

The VR and AR, e-learning platforms, and robotic technologies have made it easier to install teaching materials in different modalities, develop and implant vocabularies onto avatars, produce and recognize sign and gestures, assess and give feedback to learners, and translate from texts to signs. Teachers and learners can use the technologies to learn, tutor, record, and test. Touch screens and smart interfaces make the sign lectures in the classrooms more efficient. The emerging and evolving technologies enable the growth in the number and variety of sign language studies. However, there are remaining issues pertaining to uses of technology in sign language teaching that require attention. They are future technology design and research studies, and their effects on pedagogical applications.

Future research studies

Sign languages are spatio-visual languages. Future research work in the development of technologies should take into account not only the hand-based gestures and movements, but also non-dexterity-based markers such as facial expressions, head, and upper-torso motions. Sign languages compose of a sequence of gestures, and the computational systems have difficulty detecting when each sign-gesture starts and ends. The systems should incorporate the capacity to detect facial expressions and other non-manual markers. The limitations of each system enforce researchers to use various sensors or additional components in the design of the technological assistive systems. The additional components may create usability and portability problems. Future work on new technologies should take into account its reliability with sensors and luminosity, obstruction, and power constraints. In addition, a few studies were conducted to assess the efficiency and reliability of the proposed idea, and more efficacy studies are needed. It is continually necessary to find pervasive and reliable solutions with devices that are user-friendly to improve user acceptance and experience.

Future pedagogical applications

Communication is vital for the learners' cognitive, social, and neurological development. Sign language teaching plays a very important role in the communication skill development of learners. Unfortunately, most technological applications and teaching platforms are designed for adult learners. New sign language teaching platforms for young learners should be developed with the pedagogical guidance of experts, teachers, parents, caretakers, and therapists. In addition, bidirectional communication plays an important role in tutoring and teaching scenarios. However, most of the technologies contain video clips of human signers, avatars or robots in the design of assistive systems. The technologies should enable bidirectional communication between learners and humanoid tutors, avatars, and robots. The learners would benefit from not only watching sign language videos, but also learning, interacting, practicing, and getting individualized feedbacks with the humanoid tutors, avatars, and robots. Individualized feedback (the children can be evaluated by the tutor, and can notice their errors) and repetitive teaching material (i.e., the children can watch instructional videos as many times, themselves) are helpful in terms of the learning process (Mertzani, 2008). The systems should also be adaptive according to the learners' skill. Xu et al. (2007) proposed such a system (DeSIGN) that adapts the questions according to learners' performance by estimating learner knowledge with a knowledge tracing technique which models

skill acquisition over time. Such a system should be developed for and used in sign language teaching and learning.

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The uses of corpora in L1 and L2/*L_n* sign language pedagogy

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Introduction

Leech and Candlin (1986) remarked that in this current world of information there is a need for “classroom access to language databases, lexicographic, and grammatical corpora” that can be used by language “learners (not only lexicographers and grammarians) [who] can understand” (ibid.: xvi). In this vein, sign language corpora offer the opportunity for the teaching of sign languages in both L1 and L2/*L_n* classes. The establishment and development of annotated sign language corpora has served as a lynchpin for usage-based descriptions of many sign languages, leading to significant insights into aspects of language form, function, and variation, and, as a result, revisions of many assumptions about aspects of sign language structure (e.g., Börstell, Mesch, & Wallin, 2014; Cormier et al., 2012; de Beuzeville, Johnston, & Schembri, 2009; Fenlon et al., 2015; Fenlon, Schembri, & Cormier, 2018; Fitzgerald, 2014; Johnston et al., 2015; Leeson & Saeed, 2012; Mesch & Wallin, 2012; Mohr, 2014). While these L1 corpora offer unrivaled sources for pedagogical practice, very little has been written about their application in teaching and learning with a small number of exceptions (Cresdee & Johnston, 2014; Leeson, 2008; Mesch & Wallin, 2008).

At the same time, recent decades have seen increased reflection on the application of corpora to spoken language teaching and learning which have yet to be applied to sign language teaching and learning (Aijmer, 2009; Aston, 2001; Campoy, Belles-Fortuo, & Gea-Valor, 2012; Lavid, Hita, & Zamorano-Mansilla, 2012). While L2 corpora are also important sources for exploration of the process of L2 (and indeed, *L_n*) sign language learning, these corpora have emerged relatively recently (e.g., Mesch & Schönström, 2018; Schönström et al., 2015; Schönström & Mesch, 2014; Sheridan, 2016). The focus of this chapter is primarily concerned with the leveraging of existing sign language corpora in sign language teaching and learning.

Theoretical perspectives

Defining a “corpus”

A linguistic corpus is a collection of texts that is representative, is in machine-readable form, consists of authentic texts, and acts as a standard reference (McEnery and Hardie 2012). For example, the British National Corpus (BNC), a 100 million-word corpus, meets these criteria. It is representative; a broad range of texts from written and spoken sources was sampled

for inclusion in the corpus (i.e., portions of these texts were selected and ordered according to explicit linguistic criteria). It is machine-readable; computer-run searches within the corpus determine the frequency and distribution of specific constructions (see BNCweb: <http://corpora.lancs.ac.uk/BNCweb/>). The BNC contains authentic texts, spoken or written, which serve a communicative purpose (e.g., a newspaper article is written to inform people of news of importance). Finally, the BNC can act as a standard reference; because the corpus is sampled and representative, findings from this corpus can be generalized to the language variety used in the United Kingdom during the early 1990s, when it was established.

Although corpus linguistics methodologies can be traced back to the late nineteenth century, the use of corpora in language research in the twentieth century has not always been popular (see McEnery & Hardie, 2012). Corpus linguistics was criticized for being a poor model of language competence and, particularly before significant technological advances, a labor-intensive industry. Instead, obtaining judgments on language via introspection and elicitation was often considered a more efficient practice. However, corpus linguistics has gradually grown in favor partly due to technological advances in computer software. Today, corpora can be created quickly and annotations can be enriched (e.g., lemmas can be tagged for grammatical category). Linguists can now use corpora to extract information on the frequency of linguistic elements (e.g., how often grammatical patterns occur) as well as the frequency of co-occurrence of these elements (e.g., what words frequently occur together). Such information, which is much more difficult to obtain via introspection, has important implications for different domains of linguistics (e.g., in understanding grammaticalization or language acquisition).

Many contemporary corpus linguists advocate a combination of introspective and corpus-based procedures as best practice in linguistics. Note, however, that most corpora based on spoken languages consist of written texts since they are easy to convert to a machine-readable format quickly. In contrast, spoken corpora are much more time-consuming to produce and therefore not as widely available. For example, in the case of the BNC, spoken language data accounts for just 10% of the entire corpus (www.natcorp.ox.ac.uk/corpus/index.xml) while written data accounts for the remaining 90%. Multimodal corpora are rare, as the technology available to annotate them has only recently been made available. Similarly, work on sign language corpora is very much in its infancy.

Why sign language corpora?

Writing about the rationale for establishing sign language corpora, Johnston (2016) notes that a core objective of sign language corpus linguistics “is to empirically ground SL description in usage in order to validate previous research and generate new observations” (ibid.: 5–6). This is particularly important, as research involving sign languages has often been based on elicited datasets from a small number of signers. This approach is difficult to justify when one considers that sign language use is extremely variable. This variation can be partly attributed to the fact that sign languages are young minority languages with few native signers and an interrupted pattern of intergenerational transmission. Therefore, it is often difficult for users (even native signers) to say with a degree of certainty what is and isn’t an acceptable construction in their language. Johnston goes on to note that the documentation of sign languages, via corpus creation, assists in language maintenance and serves to function as a cultural artifact in its own right. Further, and more immediately, he notes that corpora serve “to create teaching and learning materials for SL-using communities because it is often difficult for learners to

get adequate exposure to the language” (Johnston, 2016: 5–6; see also Van Herreweghe & Vermeerbergen, 2012).

There has been an increase in the number of sign language corpora worldwide in the last decade. Prior to this, few sign language datasets could be subjected to linguistic annotation (e.g., tagged for parts of speech) on a large scale. Although sign language datasets could be converted to written glosses, this approach is problematic since there is no widely agreed-upon writing system for any sign language and the association with the primary data is lost in the conversion process (see Fenlon et al., 2015 for an overview). The development of time-aligned video annotation software, such as ELAN (Wittenburg et al., 2006), together with increased computer capacity for the storage of digital data addressed this major shortcoming and allowed sign language corpora to flourish. Using ELAN, annotations such as sign glosses could be directly associated with a specific interval within a media file. Additional annotations, either offering different levels of linguistic analysis (e.g., phonological or syntactic) or associated with a different articulator (e.g., the brows), could also be associated with the same interval on corresponding tiers. The use of such software and overlapping annotations means that it is possible to search for and quantify the frequency of occurrence of a large range of constructions across multiple files to gain a more accurate picture of sign language use (e.g., the frequency of eyebrow raises with WH-questions by different signers). Note, however (as described below), that the type of searches possible is reliant on the type and amount of annotations that have been carried out to date. In Figure 23.1, a screenshot of ELAN from the Signs of Ireland Corpus is provided.

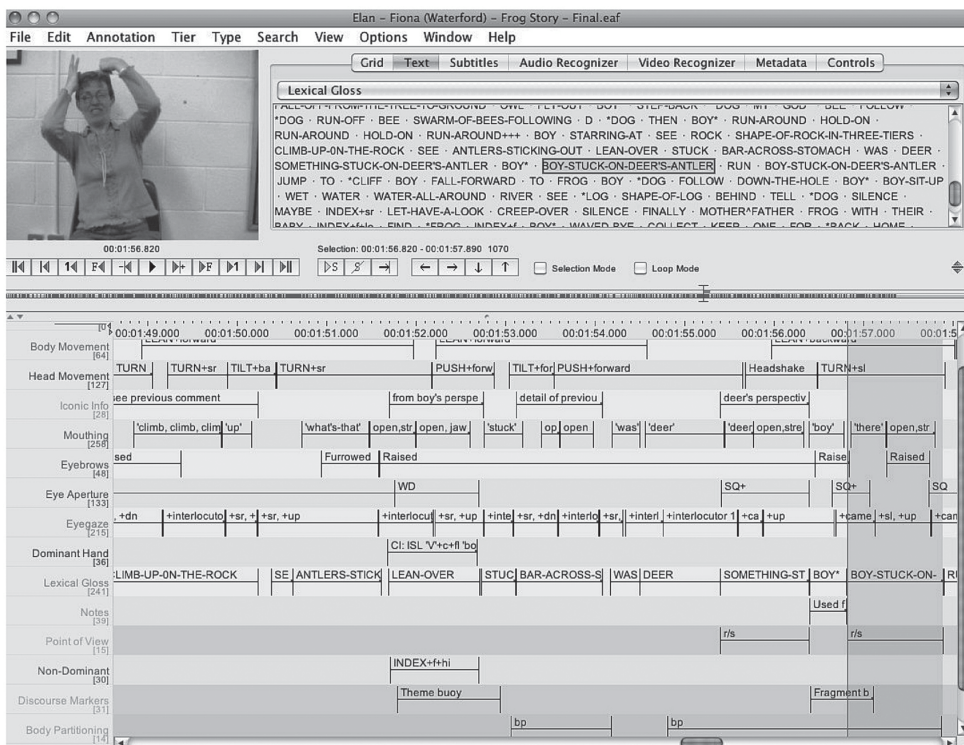


Figure 23.1 Signs of Ireland Corpus. Fiona (36) Frog Story (Waterford)

Corpora in language teaching and learning

Corpora have a well-defined role to play in linguistic research, but they are also valuable in the classroom environment (Johansson, 2009). The use of textual corpora for language teaching purposes is a relatively recent phenomenon (Sinclair, 2004). Sinclair (2004) reports that corpora were not warmly welcomed by either the research community or language teachers. Instead, he says, corpus-driven approaches have only recently received any serious attention from applied linguists, claiming that, “[f]or a quarter of a century, corpus evidence was ignored, spurned and talked out of relevance, until its importance became just too obvious for it to be kept out in the cold” (ibid.: 1). While there has been some shift in this regard, significant gaps remain regarding how corpora can be effectively leveraged in teaching and learning of both spoken and sign languages.

Today, teachers and learners of spoken languages are increasingly likely to make use of corpus-based educational materials including dictionaries and grammars. At the same time,

few teachers are clear about the nature of corpora, or their significance for language teaching, and fewer still have ever made direct use of a corpus. The questions most frequently asked by teachers are: What is a corpus? How are corpora relevant to language teaching? How can they be used?

Gabrielatos, 2005: un-numbered

Part of the challenge relates to the question of how useful corpora might be, a question that has been raised from a number of perspectives in the literature. Gabrielatos (2005) notes that those skeptical of corpora have expressed reservations about their potential to adequately capture language use (e.g., Widdowson, 1991). Others have challenged the usefulness of native-speaker (L1) corpora in providing a model for teaching (Prodromou, 1997); indeed, some have argued that L1 corpora can intimidate learners (Gabbrielli, 1998), or disempower teachers (Dellar, 2003).

Cresdee and Johnston (2014) report that traditionally, information related to language features that appear in textbooks or curriculum guides has frequently been based on writers’ intuition, anecdotal evidence, and traditions (O’Keefe, McCarthy, & Carter, 2007; Reppen, 2010). However, the rise of corpus-based analyses has led to the beginnings of empirically driven descriptions of language use, which facilitate the identification of frequency patterns and allow us to better understand how register-specific discourse shape language use. These, in turn, can either support or challenge assumptions that have been held about the nature of language structure. As a result, frequency studies based on actual language use can lead to pedagogical changes that are beneficial for learners.

At the same time, leveraging corpora in the classroom requires preparation and intervention from language teachers. Teachers have a responsibility to filter corpus data for learners, seeing corpora as offering significant potential for material development rather than being used in their raw form. Teachers can also take advantage of corpora by, for example, exploring frequency information in the target language, by using data sets to compare across registers, and for exploring associations between grammatical structures and words (lexico-grammar). As described below, one of the challenges with applying such principles to sign language teaching and learning contexts is the fact that many corpora are small, not fully annotated, and decisions around labeling phenomena (e.g., grammatical classes) have the potential to influence the way in which phenomena are categorized (Pizzutto & Pietandrea, 2001).

Corpora and sign languages in L1 and L2/Ln

The analysis of a sign language requires video-recorded data as a starting point and a mechanism for annotating and leveraging the dataset. In both sign language research and gesture research communities, ELAN is a tool that has revolutionized the capacity for handling large bodies of data expressed in the visual-gestural modality. It facilitated the development of significant corpora for British Sign Language,¹ Australian Sign Language,² Sign Language of the Netherlands,³ German Sign Language,⁴ Swedish Sign Language,⁵ Irish Sign Language, French Sign Language, and French-Belgian Sign Language,⁶ among others. These corpora consist of lexical items and grammatical constructions that are produced by L1 users of sign languages. While these corpora have been used as a resource for research, they have not been widely leveraged in teaching and learning (Leeson, 2008). Most existing corpora have been annotated only with respect to what a given research project is focused on (e.g., verb type, point of view predication, etc.), which inevitably limits the scope of the searchability function for learner-led corpus engagement. At the same time, Crasborn (2015) suggests that complete phonetic annotation of sign languages is simply not possible. Despite limitations associated with partially annotated corpora for teaching purposes, the wealth of data that emerges from a sign language corpus offers virtual access to a community of signers hitherto impossible to introduce in a classroom setting.

Cresdee and Johnston (2014) discuss how the Auslan corpus can be leveraged in sign language teaching and learning, advising that the first step in corpus-based teaching entails ensuring that information conveyed to instructors and included in curricula is correct. They point out that in both spoken and sign language teaching and learning contexts, decisions that influence curriculum development are influenced by theoretical, empirical and pedagogical assumptions about the nature of language and language teaching and learning. Additionally, native speaker/signer intuitions are not wholly reliable. Cresdee and Johnston (2014) report that native speaker intuitions about typical language choices are often wrong and frequently skewed. They suggest that use of the Auslan corpus (in their context) can assist in identifying authentic patterns of use that can inform teaching. They note that without such data, learners have problems identifying which language features to use in which contexts because intuitions are vague and/or inaccurate. They exemplify this at various levels of the lexico-grammar in Auslan, including: phonology (e.g., handshape or handedness), lexis (e.g., dialect variation or the differences between closely related signs), and grammar (e.g., the grammatical class of some signs). Critically, they argue that Auslan teachers might overgeneralize or oversimplify observations regarding sign language use because their training has not been able to benefit from the findings from naturalistic corpora.

It is critical that individuals who work with sign language curricula ensure that existing claims regarding their use are compatible with findings from these corpora. Furthermore, Cresdee and Johnston (2014) note that the fact that teachers lack the training to search and analyze corpus data in order to supplement their teaching materials only serves to exacerbate the problem. This, then, brings us to consider the pedagogical basis for using corpora in applied ways.

Pedagogical practices

Drawing on corpora offers an opportunity to embed sociotechnical theory into teaching and learning practice. Sociotechnical theory refers to the inter-relatedness of both social and technical

aspects in organizations and processes (Trist & Bambford, 1951). Applying this to language teaching, Scharer (2010) reports that the key principles inherent to the theory are: “responsible autonomy, referring to internal group leadership and supervision; whole task responsibility, referring to a minimum of instructions to achieve defined goals; and meaningfulness, as a source of inspiration and motivation” (ibid.: 328). Such principles should be embedded into approaches to using corpora in the sign language classroom. The use of corpora encourages learners to discover patterns and make generalizations about sign language form and use based on observation of usage data, particularly in L2/*L_n* classrooms (Cresdee & Johnston, 2014; Leeson, 2008).

Inductive approaches, which promote effective learning by discovery and inquiry learning (Felder & Henriques, 1995), are also principles that underlie learner autonomy (Ridley, Ushioda, & Little, 2003). Inductive learning forms part of “data-driven learning” (Johns, 1991, 2002). It is an approach that exploits machine-readable linguistic corpora and creates opportunities for learners to generate generalizations about the target language. Cresdee and Johnston (2014) report that this can be supported in L2 classrooms by introducing structured, focused corpus search activities designed by the teacher, for example, as outlined by Leeson (2008) for Irish Sign Language (ISL). Typically, search results are displayed and manipulated, facilitating the identification of authentic examples of language in use. As Cresdee and Johnston (ibid.: 100) point out, “In this way, both learning and teaching are strongly rooted in authentic language data.”

An overview of current research and (evolving) practice for sign language teaching classrooms is given in the remainder of this section. Note, however, that there is currently very little published data that discusses applied sign linguistics in general (Napier & Leeson, 2016), and the application of sign language corpora in teaching and learning specifically.

Cresdee and Johnston (2014) report four major steps that are required when planning to apply corpus findings in teaching and learning environments. They are:

- (1) *Foundational work*: i.e., consideration of instructors’ knowledge of linguistic and grammatical concepts that underpin the subject matter that is taught.
- (2) *Intuition versus data checking*: awareness of potential mismatch between intuitions and data.
- (3) *Implementation process*: strategies for using the corpus to inform the design of learning activities.
- (4) *Integration of corpus material into teaching resources*: i.e., use of clips of actual usage of the target sign or grammatical construction from the corpus rather than overreliance or exclusive reliance on modeled or invented examples.

Naturally, there are several challenges arising from these recommendations, some inextricably linked to the current status of sign languages. For example, few sign language teachers have a robust understanding of linguistics and are appropriately skilled to leverage corpora. Only two European higher education institutions (Ireland and the Netherlands) offer a pathway to a degree in sign language teaching. In other countries where formal training for sign language teacher training was previously offered (e.g., United Kingdom), it is no longer available. This means that sign language teachers in many countries lack access to formal training as language teachers. Although some opportunities may be available via generic teacher training (see Danielson & Leeson, 2017), the chance for sign language teachers to formally learn about pedagogy, assessment, and corpus linguistics are extremely limited in many countries. This impacts on the rate and quality at which useful tools like corpora are applied in sign language teaching and learning environments, especially outside of higher education institutes pursuing sign language corpus projects themselves.

As Napier and Leeson (2016) point out, approaches to the teaching and learning of sign languages are often under-informed by empirical evidence in the field of applied linguistics generally, and, specifically, do not harness recent findings from sign linguistics. This is partially explained by the lack of formal educational pathways to sign language teacher education in most countries. The problem is that this extends the gap between theory and practice, in this case, sign language teaching practice. However, some work is underway to try to address this gap. These include the European Commission funded project, Sign Teach (see: www.signteach.eu), and the Council of Europe's European Centre for Modern Languages (ECML) three-year Promoting Excellence in Sign Language Instruction⁷ project.

Further, since the use of sign language corpora requires proficiency in ELAN, it takes time to develop skill in using this annotation software. Teachers must be comfortable with the software and be able to teach learners how to annotate, if this will form part of their teaching and learning repertoire. This also requires access to adequate computer equipment and the corpus itself. It may be necessary to set aside a period of time each week for learner self-access and/or computer laboratory-based work on corpus issues, and this assumes that local timetabling challenges can be overcome. While timetabling may seem an inconsequential issue, it can be the downfall of many best laid plans given ever increasing demand on limited teaching space and the limited number of qualified personnel working in the field.

With competence using ELAN, and a strong foundation in the linguistics of sign languages, the potential to explore how a corpus can facilitate data checking of intuitions about a given sign language can emerge. Teachers can lead classes in quests to evaluate assumptions about, for example, the distribution of aspectual markers (see Cresdee & Johnston, 2014).

In terms of implementation, there are some excellent examples of good practice that can be highlighted. For example, corpora can be used in a number of ways that promote active learning. These include use of exercises that are developed to explore concordancing patterns, culturally specific discourse elements (sociolinguistic variables that map to gender or age, for example), and exercises used in translation and interpreter educational settings. In the following section, examples from Sweden and Ireland are described.

Using Swedish Sign Language corpus data in classroom

At Stockholm University, Swedish Sign Language (STS) corpus building has been ongoing since 2003 (ECHO project 2003–4; and the Swedish Sign Language Corpus project 2009–11). As of 2018, the STS corpus contains approximately 90,000 sign tokens which are available to learners and teachers. Each of these 90,000 tokens in the STS corpus has also been tagged for parts of speech; additional annotations indicating larger constituents is also available for 10% of the STS corpus. The STS corpora was first developed by the faculty, and then used for teaching purposes. The learners and faculty use ELAN as a tool for searching, analyzing, discussing, and annotating STS not only for research, but also for teaching and learning purposes.

Students take an initial STS course to develop skills in transcribing manual and non-manual forms in accordance with established conventions, including annotations that account for morpho-phonological, syntactical, and textual entries. Students then learn how to use ELAN for searching, analyzing, and annotating entries. A manual containing conventions of corpus notation is given to them. Access to the corpus is through the university website, which is an important consideration for supporting autonomous engagement with the material and independent work with the data outside of the classroom.

To support learners working with the corpus, teachers direct learners towards certain components of the corpus. For example, learners are given a specific sign language phenomenon

to search for and/or annotate. A good exercise for beginners working with ELAN is to explore where a sign begins and ends, and whether the signer's two hands are acting together or separately. Students are also required to look at phonological aspects of a sign (e.g., handshape) and then annotate a small part of the corpus data drawing on established annotation conventions with assistance from the STS dictionary. Students are also asked to select the appropriate gloss for each sign and then justify their decisions in class; this allows for consideration of unique identifiers (ID-glosses) and variants (Johnston, 2010).

In other exercises, learners can be asked to explore the corpus while considering a range of questions (e.g., use of fingerspelling, compounds, depicting signs and the usage, form, and function of signs articulated with one or two hands). Ensuring that teachers do not demand performance that is out of reach of learners is important. For example, beginners may struggle if asked to annotate tiers for non-manual features (e.g., eyebrow, eye gaze, and eye aperture). Instead, learners can be introduced to some pre-annotated files that demonstrate how such features are annotated. For beginners taking STS, for example, conversation analysis forms part of the curriculum, and learners are asked to identify topics, topic changes, instances of turn taking, overlap and back-channeling with reference to the annotated corpus.

Learners who worked with the STS corpus data reported that they gained a deeper understanding of how signed languages differ from spoken languages. They learned about “old signs” and “new signs,” in which they otherwise would not encounter in the classroom. They found that conversational turns for sign languages, and for deafblind signers, are different from conversational turns in spoken languages. Indeed, one learner reported that in group discussions, the corpus showed patterns of overlaps in discourse that were different from what she assumed would hold for sign languages. Learners also reported that they enjoyed the technical challenge of working with ELAN and the annotation system.

Using Irish Sign Language corpus data in classroom

The Signs of Ireland (SOI) corpus is a highly annotated corpus containing some 46,499 tokens (Leeson & Saeed 2012), with tiers marked up for a range of lexical and non-manual information including: eyebrows, eye aperture, lexical gloss, dominant hand, non-dominant hand, mouthing, body movement, head movement, iconic information, point of view. A subset of data set is marked up for discourse markers. Work is currently underway to mark up some of the data for grammatical class.

Leeson (2008) reports on how the corpus is used in the teaching and learning of ISL and associated courses at Trinity College Dublin, Ireland (e.g., sign linguistics, translation, and interpreting modules, ISL modules). ISL courses at Trinity College Dublin are mapped to the Common European Framework of Reference for Languages (CEFR) (Council of Europe, 2001; Leeson & Byrne-Dunne, 2009; Leeson et al., 2016). The SOI corpus is leveraged when delivering aspects of the curriculum that link with specific thematic domains identified in CEFR, such as life experience, travel, education, and employment. The corpus is also a resource for illustrating use of specific grammatical features to learners in similar ways to those described for STS learners above.

If a corpus is not fully annotated, it may still have the information from which to draw on for examples to illustrate particular features. Corpus data can also be used for sign language receptive skills tests, mapped to CEFR (or similar frameworks), and in evaluation of learner capacity to identify patterns that occur in the sign language of study. Leeson (2008) reports how learners taking an introductory course in sign language linguistics and sociolinguistics were required to identify patterns of occurrence, explore the distribution and frequency of specific sociolinguistic features (e.g., lexical variation), and to draw on the corpus in preparing end of year essays. She

describes a range of other ways in which the SOI corpus is used, for example, asking learners to look closely at collocational norms for ISL, and consider the distribution of discourse features and features such as metaphor and idiomatic expression. Students then connect their findings to their reading of the literature and/or to their own or peers' class presentations. Students are supported in their development as autonomous learners as they work through corpus-search-driven tasks. Leeson reports that this has proven to be an effective mechanism for increasing learner awareness of the range of variability in ISL (lexical items, use of mouthing, size of signing space, etc.), but also in terms of the grammatical features that hold across the language. She also reports that through working with the SOI corpus, learners come to appreciate how change occurs over time in ISL. For instance, they found that older women use mouthings to a greater extent than older men, and young men and women do more mouthing than fingerspelling when compared to older men (Fitzgerald, 2014; Leeson & Saeed, 2012; Mohr, 2014).

Autonomous reflective practice supports learner identification of strengths, weaknesses, and recurring habits (Patrie, 2000; Ridley, Ushioda, & Little, 2003). Thus, learners also have non-class-based opportunities to work with the SOI corpus. Undergraduates are required to take a mandatory research methods module as a component of the Bachelor in Deaf Studies. Students with intermediate skill in ISL (B2- CEFR) worked with Smith (a PhD candidate) to code a subset of the SOI corpus, comprising constructed action (CA) and grammatical class. A task-list was established using Basecamp (Basecamp.com), an online project management tool, and learners received a step-by-step exercise list that included learning how to use ELAN; understanding CA, and grammatical classes; understanding the annotation methodology and tier structure in the corpus; and completing annotate-check-record with changes processes for quality assurance. The learners received face-to-face support from Smith and the Centre for Deaf Studies faculty (deaf and hearing). They prepared a report, which served as their assessment for the module. The learners reported that the project "has not only deepened our knowledge ... of the grammatical structures of ISL but ... [represents] a unique experience of collaborative work" (Coburn Gray et al., 2018: 2).

Practical considerations in using corpus in pedagogy

Some practical issues arise when considering how to leverage sign language corpora within the sign language classroom. Teachers must set aside time to plan how they will implement corpus-driven activities into their practice and the level of competence of learners must be taken into consideration from the beginning. A teacher must consider the advantage/s of adopting corpus-driven approaches for a particular cohort and consider how they will enhance learners' attainment of articulated learning outcomes for a course. Once a corpus-driven approach is determined to be useful, exercises that focus on annotation, or linguistic analysis can prove helpful in prompting learner engagement with sign language data in a meaningful way. This also allows for flipped classroom approaches where learners work in their own time and bring their work product to class for discussion and engagement (Barrett, 2012) and Problem-based Learning approaches, where learners are provided with a realistic problem that they solve as part of a structured group process, with teachers serving as coaches and facilitators (Darling-Hammond et al., 2008; Thomas, 2010).

Further, in classes that are teacher-led, groups can engage in corpus searches for examples of particular structures (as described above). The process of mapping a corpus to CEFR (Council of Europe, 2001) or the Standards for Learning American Sign Language (American Sign Language Teachers Association, 2014), or other parallel framework of description is a time-consuming, but worthwhile enterprise as it facilitates subsequent ease in identifying what body of authentic

corpus data is ideally targeted at learners at a particular stage of development (e.g., beginner (A-level), intermediate (B-level), advanced (C-level)). Due to a lack of training opportunities, teachers require support in working confidently with ELAN. Corpus project teams for specific sign languages should consider developing a short manual (available in text and sign language) to support sign language teachers (e.g., Mesch, 2011). Furthermore, teachers need to be notified about updates that have arisen regarding changes in annotation conventions applied by a corpus team.

While it is true that sign language corpora are generally still too small to allow for generalizations regarding sign language use, they provide a very good complement to traditional language teaching approaches. For learners of a sign language, working with a corpus allows the opportunity to hypothesize about their target language and test theories via a process of discussion with their peers, and with their teacher/s who can evaluate their progress and function as the learners' cultural and linguistic guide and local point of reference. The potential learning that arises from peer learning opportunities should not be underestimated (Boud, Cohen, & Sampson, 1999), which, in the case of a sign language learner, typically occur in the target (sign) language.

Future trends

Future research studies

Research findings based on sign language corpora have been published in linguistic journals, and it is crucial that these results are implemented in curriculum design and revision for their respective sign languages. They look at a wide range of linguistic phenomena such as phonological (Fenlon et al., 2013), lexical (Stamp et al., 2014) and morphosyntactic variation (Cormier, Fenlon, & Schembri, 2015; Fenlon, Schembri, & Cormier, 2018). Some provide evidence that may run contrary to popular opinion/expectation. For example, Cormier, Fenlon, & Schembri (2015) illustrate how indicating verbs in BSL (i.e., verbs that move in space to indicate arguments) rarely move from left to right in neutral space to indicate two third person arguments. Instead, signers in the corpus frequently prefer to use constructed action (i.e., they embody an argument of the verb). There may be an overwhelming focus on constructions in some teaching curricula which are rare in sign language discourse. Prioritizing frequent constructions when teaching is not only beneficial to the learner but also ensures that they will understand a wide range of sign language discourse quickly. Going forward, it is therefore important that current research is relayed quickly and clearly to sign language practitioners, and that they can embed that in their practice.

Information on lexical frequency has yet to be leveraged effectively in teaching curricula. Lexical frequency lists are available for Auslan (Johnston, 2012), BSL (Fenlon et al., 2014), and STS (Börstell et al., 2016), and can be used by the teachers to teach the most frequent signs earlier to learners. As with spoken languages, these sign language frequency studies have demonstrated that a small number of signs can account for a large proportion of the text. For example, in BSL, the top 100 signs in the BSL corpus account for 56.6% of the overall dataset. Therefore, prioritizing these 100 signs ensures that a learner can access at least half of the annotated content in the BSL corpus. The lexical frequency list can also be exploited further in the creation of simple, artificial sentences to be taught to learners. Restricting the lexical items used in these sentences to the most frequent items ensures accessibility and further training for the learners (i.e., repeated usage means that these items will become entrenched in a learner's mental lexicon).

While this chapter has addressed how corpora can be leveraged in teaching and learning settings, an area that is slowly gaining attention from researchers is "Learner Corpora," a branch

of research that is concerned with the language development of L2/Ln learners. Hummel (2013) states that when testing existing theories on second language acquisition and/or creating new hypotheses, researchers are frequently creating and analyzing L2/Ln repositories to legitimize their findings. Therefore, methodologies associated with the development and optimization of learner corpora are garnering increased attention and can assist researchers who are embarking on this journey (Mackey & Gass, 2011).

Future pedagogical applications

We hope to see multi-disciplinary teams comprising corpus linguists, computer scientists, SLA specialists and teaching practitioners collaborating to harmonize corpus building activities and application of the same in teaching and learning settings, with maximum efficacy, ensuring that sign language teachers are a critical part of the process of engaging with, interpreting and mediating linguistic research in teaching and learning environments. This will be crucial in ensuring usability of corpus software by end users (i.e., sign language teachers) and the immediate transferability and impact of research findings on teaching design and practices. There is also a need to examine how learners respond to learning that entails working with sign language corpora.

As outlined above, work with sign language corpora is a promising area for teaching and learning. There are many ways that a corpus can be successfully leveraged pedagogically, though some “translation” of research to practice is required. Importantly, as stated repeatedly in this chapter, how sign language corpora are integrated into sign language teaching depend ultimately on the type and amount of annotations available to learners. Few sign language corpora can be described as fully annotated at the lexical level. Additional annotations (e.g., showing grammatical information for a specific sign or how signs can be grouped together into larger constituents) are also rare. The extent and availability of these annotations determines the kind of activities teachers can set within the sign language classroom. A sign language corpus in its earlier stages with limited annotations available will provide a useful basis for investigating language use as it varies from person to person. In contrast, a sign language corpus that has been annotated extensively will enable more global searches that the learner can base their observations upon. Therefore, improved availability of the type and amount of annotations to learners will subsequently enhance and extend the usefulness of sign language corpora in the classroom and the activities available to them. Note that non-annotated components of sign language corpora can be leveraged effectively in class with careful planning, such as leveraging existing work to guide annotations of a non-annotated component.

Looking forward, we assume that sign language teacher training will be embedded in higher education, with appropriate recognition of sign languages in place in the political and educational sphere. With this as a backdrop, teacher education would entail training in how to leverage sign language corpora effectively in their teaching practice. This would necessarily involve guiding teachers in exercises that have them map the level of competence required by a learner to understand the content of individual movie files, and the threshold competencies required for a learner to be deemed to have moved (or be transitioning) from one level of competence to another. They would also engage in developing corpus-driven activities for learners to conduct searches for use of particular lexical and grammatical categories.

Notes

- 1 www.bsllcorpusproject.org
- 2 www.auslan.org.au/about/corpus/

- 3 www.ru.nl/corpusngtuk/
- 4 www.sign-lang.uni-hamburg.de/dgs-korpus
- 5 www.ling.su.se/english/research/research-projects/sign-language/swedish-sign-language-corpus-project-1.59270?cache=1
- 6 www.corpus-lsfb.be
- 7 www.ecml.at/News3/TabId/643/ArtMID/2666/ArticleID/274/Promoting-Excellence-in-Sign-Language-Instruction.aspx

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Note on terminology: the index reflects the terminological variation between chapters, especially concerning the terms Deaf/deaf and sign/signed languages. See the editor's comments on terminology on pages 13–14 for details.

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