Codeswitching Techniques: Evidence-Based Instructional Practices for the ASL/English Bilingual Classroom

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American Annals of the Deaf, Volume 155, Number 4, Fall 2010, pp. 407-424 (Article)

Published by Gallaudet University Press

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CODESCLUDING TECHNIQUES: EVIDENCE-BASED INSTRUCTIONAL PRACTICES FOR THE ASL/ENGLISH BILINGUAL CLASSROOM

THE AUTHORS present a perspective on emerging bilingual deaf students who are exposed to, learning, and developing two languages—American Sign Language (ASL) and English (spoken English, manually coded English, and English reading and writing). The authors suggest that though deaf children may lack proficiency or fluency in either language during early language-learning development, they still engage in codeswitching activities, in which they go back and forth between signing and English to communicate. The authors then provide a second meaning of codeswitching—as a purpose-driven instructional technique in which the teacher strategically changes from ASL to English print for purposes of vocabulary and reading comprehension. The results of four studies are examined that suggest that certain codeswitching strategies support English vocabulary learning and reading comprehension. These instructional strategies are couched in a five-pronged approach to furthering the development of bilingual education for deaf students.

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As the field of bilingual education for deaf students matures, the literature is departing from dependence on anecdotal and descriptive accounts and moving toward definitions of deaf bilingualism that include scientific, empirically based studies (see Rusher, 2010, for reviews). In the present study, we describe one aspect of deaf bilingualism research, that is, developing evidence-based classroom instructional strategies. We present the instructional strategy we term codeswitching, define it, then describe the evaluation of this strategy. Prior to our presentation of the data, we provide definitions of terms. Finally, we suggest that if bilingual education for deaf students is to mature as a scholarly discipline, further work is needed in evaluation in five areas: (a) evaluations of program effectiveness, (b) correlational studies, (c) additional student achievement outcome studies, (d) preprofessional and professional development, including consideration of the role of deaf professionals, and (e) additional classroom instructional strategies using bilingual techniques.

The Young Emerging Deaf Bilingual

Understanding of the bilingual language development of the young deaf
Codeswitching Techniques

A student has been obstructed because of a variety of factors. First, myths about bilingualism in general and deaf bilingualism in particular abound (Grosjean, 2008, 2010; Nover & Andrews, 1998). Such myths prevent parents and professionals from even considering bilingualism for their deaf child. Second, it is not fully understood, nor has it been adequately described, how deaf students use the two languages—American Sign Language (ASL) and English—in their everyday lives. Third, conventional linguistic and literacy terminology applied to hearing individuals who are bilingual does not adequately describe the language and literacy learning situation of the deaf child (Nover & Andrews, 1998); this has made it difficult for researchers to agree on and articulate how to describe the language and literacy development of the emerging bilingual child. Fourth, adequate assessment measurements have not been developed, nor levels of functioning of deaf bilinguals been identified, and this has hampered understanding of the language-learning process in such individuals. In the present article, we address each obstacle in turn.

Myths About Bilingualism

Bilingualism is not a unique phenomenon; in fact, more than half of the world’s population uses two or more languages regularly (Grosjean, 2008, 2010). Further, being bilingual does not mean that someone is fluent or equally proficient in two languages. In reality, most bilingual individuals’ proficiency in their two languages is not balanced, but varies across a continuum depending on numerous factors such as their purpose in communicating, the context, the person they are communicating with, and their language background and history (Grosjean, 2008, 2010).

Because of blockage of the auditory pathway, for deaf children and adults bilingualism is viewed by Grosjean (2008) as a necessity, not a choice. Preventing deaf people from learning two languages can result in negative outcomes such as cognitive, linguistic, and social deprivation (Andrews, Leigh, & Weiner, 2004; Grosjean, 2010).

Because English is not fully accessible to deaf children in its auditory form, it does not always function as the “mother tongue” of deaf children even though 90% of deaf children come from hearing families (Andrews et al., 2004). Deaf children will develop a visual sign language as their “first fully accessible” language and learn English as a second language, even though they may be exposed to spoken English or even a signed English code from birth (Mounty, 1986).

Developing two languages at a young age is not uncommon among hearing bilingual children (Grosjean, 2008, 2010). And like the young deaf person who is bilingual, hearing individuals who are bilingual do not achieve proficient bilingualism until a later age. In a similar vein, there are many young deaf bilinguals who are exposed to a signing English code or contact signing at home, but English does not become their dominant language. When they go to school, they are exposed to ASL, spoken English, signing codes of English, fingerspelling, and written language, and often they must learn both languages at the same time. Rarely, then, do young deaf students experience balanced bilingualism; nor are they fluent in both their languages even though they use both languages regularly.

In Taiwan, there are deaf children who must learn to speak, read, and write Mandarin Chinese and English at school, learn signed Chinese, and learn the sign language of the Deaf community—Taiwanese Sign Language (Andrews, 2010). But many of these deaf children come from Taiwanese homes where other languages are spoken such as Southern Min or Hakka. Thus, they are exposed to multiple languages and dialects such as Mandarin Chinese, English, Signed Chinese, and their home Taiwanese dialect. Indeed for deaf and hearing children alike, bilingualism is a reality (Grosjean, 2010), and it is up to the schools to encourage its development in children if they are to succeed academically.

There is a widespread myth in the English-using world that sign language will impede the acquisition of English, when the opposite is true (Grosjean, 2010; Wilbur, 2000). Early intervention studies have found that signing helps deaf children learn spoken English even at a young age, as they learn to “piggyback” their speech skills onto their sign skills (Yoshinaga-Itano, 2006). For more discussion of myths about bilingualism in general as well as deaf bilingualism, see Grosjean (2010).

How Deaf Bilingual Students Use Their Languages

In addition to the persistence of myths, another factor that impedes understanding of deaf bilingualism is related to a lack of understanding of how deaf children and adults use their two languages. The young deaf child is seen as an emerging bimodal-bilingual individual who is developing and using these two languages, their language codes, and their language varieties regularly: ASL, a signed manually coded English or contact signing mode, spoken English, mouthing English (with and without signing), and English reading and writing. This does not mean that emerging bimodal-bilingual young persons are fluent in both languages. Grosjean (2010, p. 148) refers to “special bilinguals,” who have many bilingual char-
acteristics but are not as fluent as "balanced bilinguals," who are equally fluent in both languages, a situation that rarely occurs. Young deaf children are not fluent in the same sense as deaf adult bilinguals who have the dual language skills to attend universities and obtain graduate degrees using sign language interpreters and written English. Another instance of fluent deaf bilingualism occurs among deaf children of deaf parents who are exposed to ASL from birth and are also highly fluent in English reading and writing (Andrews et al., 2004). There are also certified deaf interpreters, who have had formal training in linguistics and interpreter education, who have high levels of fluency in both ASL and English. Furthermore, there are teachers both hearing and deaf who learned ASL in their adult lives and now make their living teaching ASL as a second language to deaf students. In contrast, the young deaf bimodal-bilingual child is acquiring both languages slowly and will develop each of the languages depending on his or her language-learning aptitude and home and school environments. Our emphasis in the present article is on how much and how often young deaf bilinguals use both languages for everyday purposes.

Our view of the deaf bimodal-bilingual child is based on our work as reading teachers and researchers in K–12 programs as we observed young deaf children acquiring ASL and different modes of English, including speech, manually coded English, and English literacy. It is also based on our work observing and working with proficient bilingual deaf adults who are graduate students or who are our colleagues at our university deaf education program.

Since 1988, we have prepared and graduated 150 Texas state-certified teachers and 15 doctoral-level leaders who are deaf. These deaf professionals are employed as teachers, principals, and administrators in programs for K–12 deaf children, as well as in universities, community colleges, and deaf service agencies. When these deaf individuals entered graduate school, they were already bilingual, with high levels of both ASL and English (reading and writing) proficiency. In addition, the university has also employed approximately 10 professors who are deaf over a 20-year span. Within such a bicultural environment, we have been able to observe how deaf adults who are proficiently bilingual in both ASL and spoken English interact with us, with administrators and staff, and with their hearing and deaf classmates and colleagues, as well as navigate the two cultures—Deaf and hearing (Andrews, Rusher, & Martin, 2009). To illustrate our point, we use a graphic from interpreter education that shows language variation (see Figure 1).

Deaf adult bilinguals and young deaf emerging bilinguals (whom we discuss later in the present article) use language along a continuum that is shaped by three factors: (a) whom they are communicating with (a deaf or hearing partner), (b) what they are communicating about (social matters, work, or other topics), and (c) their language histories and language education. For example, our signing deaf graduate students and colleagues typically use ASL with their deaf classmates and students. They will codeswitch to English when they are reading real-time captioning in class, reading journals, writing research papers, or communicating with hearing faculty who do not know sign language.

Some deaf colleagues will use spoken English only with some hearing conversational partners or use a code mixing in which they mix ASL and speech during Simultaneous Communication. We have frequently observed deaf colleagues and students codeswitching to spoken English or Simultaneous Communication (sign and speaking) when communicating with hearing colleagues or students. They codeswitch, code-mix, and codeblend frequently in order to accommodate the communication and language needs of their conversational partners.

Even though young deaf children have less developed language skills,

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**Figure 1**

American Sign Language and English on Two Lines Illustrating Differences and Contact Between the Two Languages

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Note. From Deaf History Notes (p. 85, Figure 4.8, "Bilingual/Bimodal Language Contact"), by Brian Cerney, Colorado Springs, CO: Hand and Mind Publishing, 2004. Reprinted with permission.
we have observed these same code-switching, code-mixing, and code-blending language behaviors in our work with young deaf children and youth in K–12 programs as well as in our summer reading camp for signing deaf children with cochlear implants (Andrews & Dionne, 2008).

The Need for New Terminology

The third factor that obstructs understanding and communication about deaf bilingualism is related to terminology. Conventional terminology used in linguistics and bilingual education does not adequately address the situation of the young deaf person who is bilingual (Nover & Andrews, 1998). Take, for instance, several terms used in the present article: code-switching, code mixing, and code blending. These terms are typically used in the sign language interpreter literature and refer to adults with fluent and balanced bilingual skills who are interpreters, or deaf adults who are the children of deaf parents, or hearing children of deaf adults (CODAs) who have high levels of proficiency in ASL and English. While the emerging bilingual young deaf person is nowhere near the skill level of these bilingual deaf adults, that young person is nonetheless moving along a similar track in that, like the bilingual deaf adults, he or she is using the two languages every day.

These terms are also related to the sociolinguistic phenomenon that occurs naturally when the two languages—ASL and English—come in contact with each other and are blended, mixed, or “restructured” (Lucas & Valli, 1992; Sofinski, 2002). Linguists have found that linguistic borrowing occurs when ASL and English come in contact with each other. In addition, lexical initialization (e.g., JB for JOB, NG for NO GOOD) occurs when an ASL morpheme is used to represent an English orthographic word (Lucas & Valli, 1992). Grosjean (2010) differentiates codeswitching from borrowing. He says, “Unlike codeswitching, which is the alternate use of two languages, borrowing is the integration of one language into another,” (p. 58).

Codeswitching is a common practice in bilingual speech (Riehl, 2005). Bilingual speakers often switch back and forth from one language to another. Codeswitching can exist within sentences or across sentences. Sociolinguists now understand that this shifting is not random but is systematic and follows certain pragmatic rules, no matter which languages are being used. Codeswitching and language alternation (the latter termed “translanguaging” by Garcia, 2009) are sociolinguistic phenomena and can express many things such as language proficiency, an attitude, or a person’s linguistic identity (Garcia, 2009; Grosjean, 2010; Riehl, 2005). People who are bilingual will codeswitch to emphasize, substitute, express a concept that has no equivalent in the language being used, reinforce a request, clarify a point, communicate friendship, relate a conversation, make an interjection into a conversation, ease tension and inject humor, indicate a change of attitude, and exclude people. Codeswitching is also used with certain topics (Baker, 2001).

For the deaf bilingual, codeswitching means that the person who is communicating can stop signing and use spoken English in a conversation (Sofinski, 2002). Code-mixing occurs when a person mixes signs and speech in a conversation, as in using Simultaneous Communication with any of the numerous manual codes of English (see Andrews et al., 2004, for a review of these codes).

Within sign language discourse, another sociolinguistic phenomenon called linguistic code blending often occurs. Code blending is a cognitive and linguistic process in which two languages come together and “restructure,” creating a third, blended space, typically during an artistic communication such as the rendition of a story in ASL. For instance in signing a story, the signer uses head tilts, eye gaze, and hand configurations and classifier predicates to enrich the narrative of the story, giving it a cinematic effect (Dudis, 2002). To the naive “listening” person these code blends may look like simple miming and gesturing. But they are actually governed by rules and follow linguistic principles of ASL narratives (Dudis, 2002).

We reiterate here that the codeswitching used by deaf adults and the codeswitching used by young emerging deaf bilinguals attending school are different qualitatively and quantitatively; future research will have to differentiate and specify the codeswitching developmental language levels of deaf toddlers, children, youth, and adults.

We also use the term codeswitching to represent a purpose-driven and planned instructional strategy used by the teacher. In our reading research, we use the term storysigning to mean codeswitching at the story or narrative-discourse level. Storysigning occurs when the teacher freely translates a story written in English to ASL (Nover & Andrews, 2000; Simms, Andrews, & Smith, 2005). Another codeswitching strategy used in the reading classroom is called storyreading. This strategy is used when the teacher provides a sentence-by-sentence translation into ASL of a story written in English in order to make the translation more literal. Gallimore (2000) has coined the term fingerscanning to describe a handy tool for signaling that a codeswitching event is about to happen. According to
Gallimore, when the teacher places his or her finger under the English print, this physical act signals to the deaf student that an ASL translation of the word or sentence is imminent.

These terms represent our attempt to develop a visual paradigm of reading acquisition for signing deaf children. We do not have evidenced-based research on the use of storysigning, storyreading, and fingerscanning; however, case studies and action research studies of deaf bilingual students and their teachers using these strategies are promising (Gallimore, 2000; Simms et al., 2005).

Language Assessment of the Deaf Bilingual
A fourth obstacle to the understanding of deaf bilingualism is the lack of appropriate language assessments for the deaf bilingual student. Deaf children’s spoken language is conventionally measured against hearing monolinguals’ speech standards. Also, deaf children’s sign language skills are often described by means of the yardstick of native deaf signers’ proficiencies. Such “strong monolingual biases” in assessment have restricted understanding of the language functioning of the deaf bilingual child. In reality, according to Grosjean (2010)—and we think this applies to deaf children—bilinguals mix, blend, and restructure their two languages, and assessment should take this into consideration. Grosjean enumerates many other problems with how ineffectively bilinguals have been evaluated in terms of language functioning. He claims that tests that measure speed in identifying words and nonwords and identifying correct grammar are typically tests that the fluent monolingual is good at. This results in what Grosjean (2008, p. 10) has termed a “fractional view of bilingualism.” The “fractional view,” or monolingual view, of bilingualism has negative consequences when teachers only look at the child’s proficiency in each language separately rather than assess the child’s use of both languages when the languages come in contact with each other. Indeed, there is a need for a description of the unique and specific linguistic configuration bilinguals possess when using and developing both languages (Grosjean, 2008).

Despite these four obstacles we have described, and probably more we have not mentioned, we see that focusing on instructional strategies provides one of the best ways to encourage language growth in ASL and English among deaf students. In the following section, we present four studies that focus on instructional strategies.

Defining Codeswitching as a Purposeful Instructional Strategy
To reiterate, as we have outlined above, one definition of codeswitching from a sociolinguistic perspective is the switching or changing from one language to another. Typically, fluent bilinguals are able to codeswitch with ease. It is our contention that emerging bilinguals also engage in codeswitching language behaviors even though they do not have fluency in both languages. For instance, during our summer reading camp we observed young deaf children with limited speech skills and limited ASL skills codeswitch with the deaf ASL storyteller and with their speech therapists and audiologists who did not know sign language. For example, with the deaf ASL storyteller, they would turn off their voice and use sign language that was more spatial. With their hearing audiologists and speech therapists who came into the classroom to do one-on-one speech work and auditory listening, they used some codeswitching when they employed spoken language only (typically for names, social words, and yes and no); they would also frequently use code mixing simultaneously with signing and speaking (Andrews & Dionne, 2008). Of course, their signing and spoken-English levels were very low and could not be compared to our ASL storyteller’s bilingual proficiency in ASL and in written English (he was a graduate student majoring in deaf education), or compared to the skills of the sign language interpreter who accompanied the storyteller to his research and statistics classes with a hearing professor who could not sign.

Our second definition of codeswitching is that of a purposeful instructional strategy. We illustrate how codeswitching is used strategically in the classroom in the vignette below, which is followed by four studies that describe how codeswitching is used in other classrooms.

In the vignette, a deaf teacher is working with seven emerging deaf bilingual-bimodal students who are functioning at very low levels of ASL, spoken English, and written English proficiency. Despite their generally low skill levels, they use ASL and English every day; thus, they fit our definition of the emerging deaf bilingual-bimodal. They are not equally proficient in both languages. We still consider them to be bimodal and bilingual because they use both languages regularly. We view bimodal-bilingualism for deaf children as existing on a continuum of least skilled to most skilled, and these seven children fall in the bottom range of least skilled. We use this vignette because these children are representative of the many signing deaf children in public schools who are struggling with low levels of signing...
skill and low-level English reading, writing, and speaking skills:

Ms. Jones works in a metropolitan area at a public magnet program that educates approximately 150 elementary students who are deaf or hard of hearing. In the early morning before her students arrive, she lays out her reading materials and flips on the LCD projector as she mentally plans how integrate both ASL and English into the day’s reading class. She considers the linguistic skills of the seven multiethnic sixth graders who will soon file into the classroom and sit in a semicircle around her. She has been challenged this year with educating a group of deaf children with limited home sign language exposure and delayed reading achievement. While her students are fluent in neither ASL nor English, she considers them to be emerging bilinguals. She has been teaching her language arts class the Deb Piper novel Jake’s the Name, Sixth Grade’s the Game, a book intended for sixth-grade students but written at a more accessible reading level. The student were excited to learn that the main character, Jake, is deaf and attends public school just like they do.

As today’s lesson unfolds, Ms. Jones distributes copies of the novel to each student. Next, the students discuss (in ASL) what they remember up to this point to build background knowledge and fill in conceptual gaps. She instructs the class to read a passage independently. Once the students have finished reading, she opens up a PowerPoint presentation that has the same text they just read. She gives the students an opportunity to read the slide and then she makes the screen go blank while she signs the text. The students laugh because the paragraph is funny, especially since Ms. Jones is elaborating on the text during her free translation. When one of her students challenges her translation, she fingerscans the text and provides a literal translation and then explains her creative interpretation, using grammatical comparisons between English and ASL when necessary. For the next several slides, she asks the students to take turns translating in front of the class. She asks the volunteers to read the slide (to themselves in English), then turn around and face the class before providing an ASL rendition. When they get stuck, they ask other students to assist them with their translations. The students enjoy the process as Ms. Jones encourages them to “play” with the language as they translate. She waits for students to point out problematic vocabulary and assists them with identifying “bridges” ([last week]; [down the road], etc.) in order to help them translate the English words into signs that are meaningful to them, thereby making the sign-meaning-print connection explicit. Ms. Jones engages the students in rich dialogue, continually shifting between the two languages and using ASL to mediate the English text.

Applying Codeswitching as A Purposeful Instructional Strategy

The strategies Ms. Jones used were not happenstance; she received extensive training in bilingual instructional strategies during her teacher preparation. Her techniques empowered her students to become “makers of meaning” and “creators of knowledge” (Wells, 1986, p. 101). She modeled codeswitching skills by employing a series of strategies to bridge meanings between ASL and English during the reading lesson (Gallimore, 2000; Simms et al., 2005). Such codeswitching techniques can be used to support language development in students learning to bridge their two languages by creating semantic approximations and negotiating meaning. Contemporary research is replete with references to strategies that embed some type of codeswitching process. For example, Cartwright and Bahleda (2002) and Novotny, Christensen, and Cheng (1998) described the use of fingerspelling, a manual alphabet consisting of 26 different handshapes that correspond to letters of the English alphabet, as a manual codeswitching tool for bridging ASL and English.

It is important to note that codeswitching used in this manner should not be considered equivalent to decoding. Decoding allows the child to break down the written word using letter phonemes in order to “crack the code,” and tie into the relationships between sounds and print. Fingerspelling permits children to engage in visual and tactile orthographic decoding in which they practice to learn visual letter patterns. Conversely, these strategies bypass phonological information obtained auditorily, instead using semantic and pragmatic resources for print comprehension (Ewoldt, 1981). Haptonstall-Nykaza and Schick (2007) presented an intervention using fingerspelling and phonological patterns that resemble those found in lexicalized fingerspelling to teach deaf students unknown English vocabulary. The researchers found that students were better able to recognize and write the printed English word as well as fingerspell it when the training incorporated fingerspelling that was more lexicalized. Haptonstall-Nykaza and Schick concluded that fingerspelling can serve as a visual phonological bridge to aid students in “decoding” English print.

Padden and Ramsey (1998) described a process of chaining and sand-
ASL signs, printed words, finger-spelling, pictures, and dramatic role-play that supports vocabulary in both languages.

Other researchers have also employed more complex processes involved in bilingual education with deaf students. Simms and colleagues (2005) described a multistep process for continually shifting between the two languages to support the reading process. Nover and Andrews (1999, 2000) described the use of storysigning, which utilizes the ASL translation process in reading. Schimmel, Edwards, and Prickett (1999) provided impact outcome data for a reading instructional protocol that incorporates a strategy called bridging, which teaches children to chunk groups of English words and find semantic equivalents in ASL. Livingston (1997) provided descriptions of ASL interpretation and expansion strategies to support the process from frozen text to ASL in classroom instruction and sign language interpretation (although there was no supporting evidence base for effectiveness). Cannon, Frederick, and Easterbrooks (2010) reported on a procedure using books read on DVD in ASL as a tool for improving vocabulary learning. Cannon and colleagues found that preteaching the vocabulary words by showing the participants the sign for a word, giving them an example and a nonexample, and directing their attention to the word in the text was more effective than presenting the DVD stories alone. Only small numbers of children were involved in these studies, and they were not proficient in either language. However, according to the definition we are proposing, we consider them to be young emerging bilingual language learners because they were using signing and English literacy everyday despite their low performance levels.

Additional studies provide support for the use of both languages to maximize academic proficiency and provide additional evidence-based support, but are not described here because of space considerations. These include Andrews, Ferguson, Roberts, and Hodges (1997), Andrews, Wingo and De Ville (1994), Ausbrooks (2007), DeLana (2004), DeLana, Gentry, and Andrews (2007), and Rittenhouse, Jenkins, and Dancer (2002). Each of these studies shows how teachers make the sign-meaning-print connection explicit to deaf children during reading events.

Expanding the Evidence Base: Four Studies

To further support codeswitching techniques as an instructional strategy, we provide results of four additional studies. The first three used experimental designs, and the fourth a rigorous mixed-method design, with the qualitative portion presented in the present article. The data presented here are extrapolated from data presented in the larger, previously published studies.

Study 1: Codeswitching Techniques Effective for Vocabulary Learning

In our university laboratory, we revisited the data used in an experimental study that examined the effectiveness of codeswitching techniques with 45 signing deaf children from three residential schools for the deaf (Andrews, 1983; Andrews & Mason, 1984, 1986). All three schools made extensive use of codeswitching, using fingerspelling and sign language and matching this manual language to print in early reading instruction in kindergarten and first grade (see Figure 2).

The experimental group (n = 23), signing deaf children from one residential school, participated in weekly story-time sessions with storybooks that included weekly ASL storyreading, story reciting, and codeswitching activities involve printed letters and fingerspelled letters, and sign-to-print-to-sign and fingerspelling-to-print-to-sign codeswitching games and activities. The members of the control group (n = 22), who did not...
receive the treatment, were compared on various pre-reading measures assessing the children’s letter, word and story reading, and story-retelling knowledge. The children’s ages ranged from 5 to 8 years. (The participants’ background variables are fully described in Andrews, 1983, and Andrews & Mason, 1986.)

A second experiment was conducted to examine how the amount of exposure to the printed words using codeswitching would increase printed word recognition. It was hypothesized that higher mean scores would occur with words when codeswitching was used with more exposure and practice than when codeswitching was used with less focused drill and practice. It must be noted that the teachers in both groups were hearing, and that they used a combination of speech and signing in word teaching; thus, the deaf children were exposed to visual mouth movements. However, in other assessments done in the larger study, none of the 45 children were using phonological strategies in word identification or word spelling; thus, the use of voice did not impede their use of the codeswitching strategy (Andrews & Mason, 1986).

In this experiment, 150 words were selected, of which 100 appeared in the 20 experimental storybooks. These 100 storybook words were randomly selected and placed in two groups: the DRILLED words (n = 50) and the EXPOSED ONLY words (n = 50). An additional 50 words were selected from a preschool and first-grade reading list that did not appear in the story materials or story-reading sessions. Both groups of children (N = 45) received the pretest, in which they had to identify the printed word with the corresponding manual sign and received 1 point if they could provide the sign that corresponded to the printed word (Andrews & Mason, 1986).

During the school year, the DRILLED words (n = 50) were drilled each week by the teachers for 1 hour. They employed the strategy of codeswitching, using fingerspelling, manual signs, and graphic pictures of manual signs (which appeared on 50 flash cards given to the children at school, with an extra copy to take home to work with their parents). The 50 EXPOSED ONLY words appeared in the 20 storybooks, and codeswitching was used to explain the meanings of the words in the context of the stories, but there was no additional drill and practice; nor were there flash cards that used these words. The 50 other words were ones commonly found in preschool/first-grade reading lists. These words appeared neither in the experimental storybooks nor on flash cards.

When teachers used the codeswitching strategy for the DRILLED words (n = 50), the children in the experimental group learned an average of 29.39 words. When the teachers used codeswitching strategies but without repeated drilling, the children learned an average of 24.39 words. For the new words, the average was 24.84.

The results of two planned orthogonal comparisons support the hypothesis that more drilled words were learned than exposed-only words, t(44) = 4.21, p < .05. Further, less word learning occurred with the new words than with the drilled or exposed words, t(44) = –6.84, p < .05. Thus, the hypothesis that a greater amount of direct exposure increases word learning was affirmed. The results of the pretests for the experimental and control groups were very close, with a slight edge in additional word learning in the control group. However, the gains for the control group were evenly spread across the three word groupings, while the word learning scores of the experimental group with more exposure to direct codeswitching activities were higher (Andrews & Mason, 1986).

**Study 2: Codeswitching Techniques Effective for Comprehension of Fables**

In another study, a form of codeswitching was used by presenting a summary of a story in ASL, then having the deaf students read the fable in English print (Andrews et al., 1994). A retelling task became the comprehension assessment tool comparing the students’ scores with adult readers’ scores as a baseline. Thus, codeswitching from ASL to English was used for two of the stories, while four of the stories were just presented in English print. (See Figures 3, 4, and 5.)

A set of fables were counterbalanced and presented to three groups of students: seven were deaf bilinguals, seven were hearing monolinguals who had higher reading levels, and seven were hearing monolinguals who had low reading levels. The deaf bilinguals were presented with four fables with printed English only (fables 1, 2, 4, and 6); two stories were first presented with a summary in ASL (fables 3 and 5). The students retold the fables, and the data were analyzed by means of pausal units. Five dependent measures were considered: (a) quantity of pausal units retold, (b) quality of pausal units, (c) weighted quantity, (d) weighted quality, and (e) accuracy of the moral lesson. Performance on the measures was compared to that of deaf adult bilinguals and hearing adults.

The means and standard deviation scores for the number of pausal units retold on the four measures were higher for the deaf readers than for the hearing readers, most notably on fables 3 and 5, for which the ASL summary technique was used with the deaf readers. This finding was expected in
that deaf bilingual readers received added information—that is, the summary of the fable in ASL prior to reading it in English—while monolingual readers did not receive any treatment. Furthermore, the data peaked for the deaf readers on fable readings 3 and 5, on which the ASL summary technique was used.

On the measure of quantity of items retold, the scores of the deaf bilinguals were significantly greater on the fables for which they received the ASL summary, $M = 19.43$ and $M = 19.86$, than on the fables for which they did not receive this treatment, $M = 11.57$, $M = 12.57$, $M = 13.71$, $M = 10.85$, $t(4) = 43.27$, $p < .05$ (see Figure 3).

On the measure of weighted quantity of items retold, the scores of the deaf bilinguals were significantly greater on stories for which they received the ASL summary, $M = 55.14$, $M = 56.86$, than on stories for which they did not, $M = 31.71$, $M = 34.71$, $M = 36.57$, $M = 29.14$, $t(4) = 27.67$, $p < .05$.

On the measure of quality of items retold, the scores of the deaf bilinguals were significantly greater on stories for which they received the ASL summary, $M = 11.01$, $M = 12.06$, than on stories for which they did not, $M = 6.08$, $M = 7.09$, $M = 7.27$, $M = 6.66$, $t(4) = 43.27$, $p < .05$ (see Figure 4).

On the measure of weighted quality of items retold, the scores of the deaf bilinguals were significantly greater on stories for which they received the ASL summary, $M = 32.02$, $M = 35.42$, than on stories for which they did not, $M = 17.13$, $M = 19.33$, $M = 18.60$, $t(4) = 18.51$.

The fables provided a stringent test of the deaf bilinguals’ reading comprehension because the moral lesson was not explicitly stated in the text and the reader had to think beyond the story events to infer the author’s message. Compared to the hearing
monolingual readers, the deaf bilinguals scored lower on the measure of weighted quality of items retold (see Figure 5). The data showed that some improvements in scores for retelling (a memory task) and for comprehension of the moral lessons of the fable (an inference task) were achieved by using codeswitching and ASL summary, then moving toward reading of the English print. This gave the young deaf bilingual students the advantage of added information or increased background knowledge compared to hearing monolingual students at the low and high reading levels. In effect, the codeswitching strategy gave the deaf readers conceptual and semantic support through the ASL summaries, which facilitated their comprehension of English.

**Study 3: Codeswitching Techniques Effective for Reading Science Texts**

In another experimental study, Li (2005) measured the effects of employing the Preview-View-Review (PVR) instructional strategy with deaf bilingual students using ASL and English and hearing bilingual Mexican-American students using Spanish and English, in the reading of science texts (see Figures 6, 7, and 8). Six short science texts, written at the third-grade level, were counterbalanced and presented to 12 deaf and 12 hearing third and fourth graders. See Li for a fuller description of the participants, measures, and reading research tool.

Some texts were presented with the PVR method, others with the English read-only method. PVR is a codeswitching instructional strategy that was adapted from Baker (2001). In the preview segment, the teacher provided a short summary of key points of the science passage in ASL or in spoken Spanish. In the view segment, the students simply read the science
The written transcriptions of the readings by the adult deaf and Spanish individuals were compared to the written texts on the score sheet of the young deaf and hearing elementary school readers to see how closely they matched up. The data were analyzed using five mixed-design ANOVA to compare the two groups. Means and standard deviations were computed for the demographic data.

Overall, the retelling scores of both groups were low. Children had difficulty selecting, sequencing, and logically organizing the items in their retellings with both the PVR and the read-only treatments. Even though the retellings in the PVR treatment were higher, the retellings were not extensive. The 12 deaf students had impoverished and deprived language backgrounds in ASL and in reading comprehension of English. Nine of them had 5 or less years of ASL exposure. All except the 1 student with deaf parents had English as their home language, but it was not accessible to them because of their hearing loss. Only 4 deaf participants had had early childhood intervention, and this was most likely auditory-oral, as ASL parent-infant training was not available in their home area. Thus, all 4 lacked early access to ASL as well as access to comprehensible English. In contrast, the 12 hearing Mexican-American students had full access to their home language of Spanish. Five of the deaf students had IQs below 84. Four of the 12 hearing participants had fluent Spanish/English bilingual teachers, and thus they had adult language role models. The 12 hearing Hispanic students had access to English on the playground and from their teachers. The reading levels in Spanish and in English were higher for the hearing students. The deaf students had low English-language reading scores: 10 scores were below the sec-
CODESWITCHING TECHNIQUES

SECOND-GRADE LEVEL, AND 2 WERE BETWEEN SECOND- AND THIRD-GRADE LEVELS. THE HEARING STUDENTS HAD SIGNIFICANTLY MORE LANGUAGE EXPOSURE IN SPANISH AND IN SPoken AND WRITTEN ENGLISH THAN THE DEAF STUDENTS. THE SCIENCE TEXTS WERE TOO DIFFICULT FOR BOTH GROUPS TO READ; INDEED, THE READABILITY FORMULAS SHOWED THAT THE TEXTS WERE WRITTEN BETWEEN THE FIFTH-AND EIGHTH-GRADE READING LEVELS.


F(1, 22) = 21.24, p < .05. THERE WAS NO SIGNIFICANT MAIN EFFECT FOR READERS, AND NO SIGNIFICANT INTERACTION BETWEEN READERS AND SCIENCE PASSAGES.

IT WAS NOTED THAT HEARING AND DEAF READERS SCORED LOW ON THE INFERENTIAL QUESTION TASK. THE PVR TREATMENT DID NOT ASSIST EITHER GROUP ON THIS TASK.

STUDY 4: CODESWITCHING: VARIOUS APPLICATIONS

As specified in research evaluation studies of other teacher development programs (Desimone, 2009), the vignettes as presented here in the teachers’ logs capture aspects of language reform instruction that cannot be captured by other measurement methods. More studies are needed comparing vignette methodology with other measurement methodologies.

**Codeswitching With Language Experience**

During snack time, students are expressing their wants through ASL. After they sign, for example, CRACKER PEANUT BUTTER, the teacher writes in English, cracker, peanut butter, to present an authentic situation in English and in ASL representation that the students understand. (Nover & Andrews, 1999, p. 59). [We use the convention of capital letters to designate a word in ASL and the convention of capital letters with hyphens between them to designate a finger-spelled word.—The Authors]

My class planted radishes this week. When I was handing out seeds to the students to put in the soil, I fingerspelled the word R-A-D-I-S-H, pointed to the print on the packet, . . . Some touched the words on the packet. . . . One student pointed to the R handshape and signed “mine.” Her name began with R. (Nover & Andrews, 1999, p. 59).

**Codeswitching With Drawings and Language Experiences**

PREVIEW: Tell the story of the Rainbow Fish in ASL. VIEW: After the students dictate the story of the Rainbow Fish through their drawings, I write down their expressive part on their drawings in English. REVIEW: I interpret the written part of their expressive part in their primary language (ASL). In addition, I review the story and ask questions (in ASL). (Nover & Andrews, 2000, p. 31)

**Codeswitching Used to Teach Composition**

Writing sample: “How Do I Find Out About the Earth?”

I not know much about Earth. I have no feel about Earth, but I finish learn about Earth. People need care for home. People need respect. People nice to Earth. Animals live long if animals eat healthy food, drink, clean water, and breathe clean air. Each is very pretty because blue water, colors many different. Earth need nicely.

**Codeswitching and Comparing ASL and English Grammar**

Have students develop stories in ASL. They could videotape themselves signing a story that has been developed purely in ASL (with notes for reminders). After that, the students should edit their stories again through ASL. After their “final story” has been developed, they could sit down and attempt to write what they have signed. This would be effective because the hard part, the “thinking-creating” part, has already been done and they can simply concentrate on the English part. (Nover & Andrews, 2000, p. 33)
Codeswitching Techniques

English are different grammatically and this kind of visual comparison can help make this clear to them. I can also use codeswitching while incorporating and explaining English idioms and expressions in my lesson. (Nover & Andrews, 2000, p. 33)

We have only touched the surface of the understanding of how teachers can use both languages in the classroom in order to bridge meanings between ASL and written English. Our studies point to evidence-based practices in using the planned instructional strategy of codeswitching at the word, sentence, and story levels. More research is needed to add to the database on instructional strategies using the two languages.

Discussion

Our study represents an attempt to develop and document evidence-based practices that increase deaf students’ use of two languages—ASL and English. We view the deaf child as an emerging bimodal-bilingual who uses both languages—ASL and English—every day. While they are neither fluent users of the two languages nor “balanced bilinguals,” as are many college-educated deaf adults and formally educated and trained sign language interpreters and ASL linguists, these children are developing emerging language skills in these areas. Future research can look at identifying and specifying levels of bilingual development of the deaf child.

Like hearing bilinguals, deaf bilinguals come from diverse home-language background experiences. Nonetheless, they must learn two languages at school: ASL and English. Some come from homes where only spoken English or spoken Spanish is used. Some parents use ASL or a sign-based English code, or contact signing, or ASL, or a mixture of these languages, or code blends and code mixes.

We reiterate, however, that there are marked differences between the deaf bilingual and the hearing bilingual. The deaf bilingual must become bilingual by necessity; spoken language is not accessible because of the hearing loss (Grosjean, 2010). The deaf bilingual must learn both languages to survive in the Deaf and hearing worlds.

The instructional strategy of codeswitching at the word, phrase, and story levels can be planned and implemented in a classroom where both languages are used to build English reading skills—vocabulary and retelling of story and expository text segments—as these studies demonstrate. Deaf children do not have to be balanced bilinguals to participate in these instructional strategies; nor do the teachers need to be balanced bilinguals to implement them. Granted, it would be more effective if teachers were highly fluent and balanced bilinguals. However, we believe that the strategies can still be used by teachers who know some ASL and English. To the “purist” in bilingual education, saying that a teacher does not have to be fluent in both languages to use codeswitching strategies effectively may be considered heresy. But we must look at the reality of deaf children and their teachers in the schools today. As it is now, many signing deaf children are language deprived and language deficient, and teachers must use meaning-based instructional strategies in order to assist them in learning how to improve their ASL as well as their English. Even those researchers who advocate oral approaches or support visual phonics approaches and Cued Speech approaches often report in their studies that they initially used ASL as a bridging strategy to develop the concept prior to teaching speech production skills, a visual cue tied to a phoneme, or other aspects of phonological and phonemic awareness. Thus, we see that the use of ASL-English bilingual strategies can be found in all forms of deaf education program delivery, from the speech and hearing clinic to the mainstream classroom to the state school for the deaf and even to inclusion settings where deaf children use educational interpreters in a class with hearing students. Of course, in an “ideal” world all teachers would be fluent in both languages to facilitate the teaching of these codeswitching strategies. But educators and researchers must look realistically at the language-learning environments of deaf children if they want to have an impact on these children’s language learning.

Our concept of the emerging deaf bimodal-bilingual child provides us with a paradigm to set up effective classroom instructional strategies that use both languages. We broaden our classification of the emerging deaf bimodal-bilingual child and include signing deaf children who wear hearing aids or cochlear implants who also can benefit from learning two languages. While they are learning spoken language skills, these children continue to develop and use their signing skills. Indeed, both languages can be used to support each other for the child’s overall language proficiency. And for these reasons, and others related to cognitive, academic, and social benefits that accrue to children with more advanced skills in both languages, we still maintain the category of the emerging deaf bilingual.

We see the implementation of instructional strategies in the classroom such as the ones presented in the present article as allowing educators and researchers to support the language learning of deaf children from
early emerging bilingualism to developmental bilingualism. Teachers can become adept at using language-handling techniques that model effective codeswitching or going from one language to another. These applications must undergo rigorous scientific testing, preferably with the use of experimental designs and randomized trials, to measure their efficacy. Once such testing has occurred, the research-to-practice loop must be completed by providing this valuable data to classroom teachers.

A Final Note on Bilingual Education for Deaf Students

Developing instructional strategies, as we have noted in the present article, is only a small part of bilingual education for deaf students. In an editorial, Moores (2008, p. 3) noted that bilingual-bicultural instruction, while it has been around for 20 years in its “present form” and has indeed generated “a great deal of attention and enthusiasm,” still raises questions regarding its “implementation.” Moores was not the first to express concerns about “implementation.” In his provocative and engaging 1982 monograph *How You Gonna Get to Heaven if You Can’t Talk With Jesus?*, sociolinguist James Woodward underscored the sociolinguistic problems in the implementation of bilingual programs for deaf students and the need for professional development and educational resources.

In order for our field to mature, we see development needed in five key areas. One prong, as mentioned by Moores (2008) and Woodward (1982), is program implementation. A second prong of bilingual evidence that is needed relates to the relationship between ASL proficiency and English reading comprehension. For example, there is an accumulating database of correlational studies that show the moderate-to-strong links between ASL and English reading comprehension (see reviews of studies in Chamberlain & Mayberry, 2000, and reviews in Aushrooks, 2007, and Smith, 2006). One weakness of these studies is that results are correlational, and thus reveal that the relationship between ASL proficiency and English reading comprehension is tentative. More definitive studies are needed in which the effects of ASL proficiency on English reading are examined experimentally.

A third prong is preprofessional and professional development. Since 1997, there have been promising efforts in the development of curriculum and professional training in the K–12 range (Nover et al., 2002), at the early childhood (birth through age 5 years) period (Simms & Moers, 2009), at the preschool and in-service levels of master’s degree programs (Humphries & Allen, 2008; Simms & Thumann, 2007), and at the doctoral program level (Andrews et al., 2009). All of these programs emphasized the role of deaf teachers, administrators, and researchers at all levels of bilingual programming. Hiring core members of the Deaf community who understand the language, the language varieties, and the culture of deaf people to work in these programs, as well as to partner in deaf-hearing bilingual teams, is critical if bilingual education is to succeed.

But, as yet, published data are not available on the effectiveness of these preprofessional and professional development programs beyond anecdotes and descriptions relative to their teachers’ impact on deaf students’ achievement. Rigorous evaluation studies of these preprofessional and professional development programs, such as those done in teacher education (Desimone, 2009), are necessary if the field of bilingual deaf education is to advance beyond the descriptive, anecdotal, and testimonial. This is not to detract from those who write position papers and otherwise advocate on behalf of bilingual deaf education; these testimonials are important because they “feel the pulse” of the very community that educational professionals purport to serve. However, the tools of social science are now available, and can be used to quantify advantages and areas needing improvement in bilingual deaf education.

A fourth prong relates to student achievement outcomes. Researchers have looked for relationships between English reading scores and ASL usage and proficiency with programs that have bilingually trained teachers and staff. Keeping in mind that English proficiency represents only one benefit among many others (e.g., creativity, linguistic flexibility, metalinguistic awareness), we did find three program-focused studies that examined the English reading comprehension of students who were instructed by bilingually trained teachers.

In a small-scale descriptive study in a public mainstream school with seven deaf young deaf children (ages 5 to 8 years), researchers reported that ASL/English bilingual teachers were effective in bringing these deaf children up to first-grade level. Test scores on the SAT–9 and Woodcock–Johnson Reading Test over a 3-year period (1993–1996) showed that by using ASL/English bilingual instruction to support the learning of English (reading, writing, and speech) in the classroom, the teachers enabled the children to function on a first-grade level (Andrews et al., 1997).

In another in-service bilingual program, Nover and colleagues (2002) conducted a series of studies to measure the impact of bilingual teachers on the English performance over time.
of 129 students (ages 8 to 18 years) in five schools for the deaf who had ASL/English bilingually trained teachers. A repeated-measures MANCOVA analysis was used to control statistically for the effects of one or more variables (e.g., IQ) when two or more dependent variables (e.g., Stanford-9 scores) were being analyzed. In this study, the dependent variables were the students’ scaled scores on three subtests of the Stanford-9 Achievement Test (English Vocabulary, English Reading Comprehension, and English Language). The independent variables were hearing loss, hearing status of parents, and etiology, with IQ held constant as a covariate. Within a sample of 153 deaf students, all of whom had teachers involved in the ASL/English bilingual project, the children exhibited increases in their English vocabulary, English reading comprehension, and English language subtest scores over 3 consecutive years. These increases were statistically significant for the English Vocabulary and English Language subtests but not for the English Reading Comprehension subtest. Second, the researchers compared the English performance of the ASL/English bilingual children with that of the 1997 Gallaudet Research Institute norming sample (Holt, Traxler, & Allen, 1997; N = 4,810), keeping in mind that these groups were not a perfect match on the background language-learning variable. Data showed that the younger ASL/English bilingual children had higher mean scores. The researchers attributed these increases to a combination of the ASL/English treatment and other factors such as age and maturity. To further examine the age variable, Nover and colleagues (2002) conducted a second analysis and looked at the SAT-9 subtests during the last year of the project (2002) in order to increase the sample size to 181 students. A series of ANOVAs were conducted. Four groups were examined:

1. Group 1 YOUNG: ages 8–12 years, with hearing parents (n = 33)
2. Group 2: YOUNG, ages 8–12 years, with deaf parents (n = 33)
3. Group 3: OLDER, ages 13–18 years, with hearing parents (n = 100)
4. Group 4: OLDER, ages 13–18 years, with deaf parents (n = 23)

The mean differences of the four groups were significant. Scheffe post hoc test contrasts showed that the groups differed significantly from each other. Both YOUNG groups scored the same. But the OLDER group with deaf parents outperformed the YOUNG group with deaf parents, the YOUNG group with hearing parents, and the OLDER group with hearing parents.

In a third study, which examined student achievement, Delana (2004) studied 25 deaf children in a mainstream setting. She found that over a 7-year-period (1997–2004), when taught by teachers trained in bilingual techniques, children improved in English reading and language achievement as measured on the SAT-9. Researchers also found a statistical correlation between years of ASL usage and the 2004 reading comprehension scores on the SAT-9, r(22) = .508, p < .05 (Delana, 2004; Delana et al., 2007). As Delana pointed out in her 2004 study (in an observation that we extrapolate to the two other studies), it is important to note that within three of these impact studies, while researchers found positive results for the use of ASL in the classroom by bilingual teachers, none of the studies assessed the extent or the quality of exposure to ASL. This finding must be examined by future researchers if understanding of ASL/English bilingualism is to progress.

Comparing student achievement across schools is never easy, as it is hard to control all the extraneous variables that affect language learning at home and in the classroom. Further, it should be recognized and acknowledged that even programs that do not label themselves “bilingual” but that use the “combined method” or Total Communication, or that use “what works best for individual deaf children,” may employ teachers who use codeswitching strategies within their own particular paradigm. In fact, the first two studies mentioned above that utilized codeswitching as a teaching technique and obtained gains in vocabulary (Andrews, 1983) and fable retellings (Andrews et al., 1994) were implemented at schools that used Total Communication. But within each study, a deaf teacher was employed to provide the codeswitching instructional strategies. Even though neither of these deaf teachers had had formalized ASL/English training, as those teachers had in the studies by Nover and colleagues (2000), Delana (2004), and Andrews and colleagues (1997), the teachers nonetheless used codeswitching as an explicit teaching technique in the reading classroom. The point is that codeswitching strategies need to be studied with additional teachers across and within program types: oral, Total Communication, and ASL/English bilingual.

At our university reading lab, we will continue to study and develop the fifth prong—that of developing classroom instructional practices such as the codeswitching instructional strategy we have elaborated in the present article. To us, this represents one of the most promising and serious approaches to improving the dual-language functioning of deaf chil-
dren because it immediately places evidence-based practices in the hands of teachers.

References


CODESWITCHING TECHNIQUES


