Evidence-Based Practice in Educating Deaf and Hard-of-Hearing Students

Based on the 2010 book by Pat Spencer & Marc Marschark and the 2001 NASDSE Research Synthesis (pg 32-36). Practices are drawn from an extensive review of deaf education research findings by these authors. For more information on what is cited below, refer to the book page number. Items cited not all-inclusive. Summary statements on teaching practices are in italics.

LANGUAGE DEVELOPMENT

Vocabulary delays characteristic of most students with hearing loss, including those in signing environments, results from a lack of sufficient exposure to the words/signs, not to any inherent cognitive or symbolic limitations. The average functioning of these children, even when early identification and intervention is provided, remains in the "low average" range, somewhat below that of hearing children of the same age (pg 71). Although some children using each of the communication methods succeed in developing age-appropriate language, this is not the norm. Children who are deaf and hard-of-hearing generally continue to fall farther behind the language accomplishments of hearing children as they increase in age.

- **Regardless of language approach used, significant delays in vocabulary acquisition, phonology, the understanding and use of grammatical morphemes, and other aspects of syntax tend to be significantly delayed** (pg 54, 79). Language delays result from lack of a complete language model, regardless of communication modality used by children with mild or greater degrees of hearing loss (pg 78). It is the general level of language development and not the primary communication modality that most strongly affects speech and spoken language acquisition. Expressive use of signs is supportive of, and not detrimental to, children's use of speech when diagnosis and intervention occur early in life. (pg 73). Even students learning via signed English systems develop delays in syntax and morphemes (pg 68). Children with hearing loss have fewer labels for things around them and are less likely to gain such knowledge from reading. The vocabulary delays of children with hearing loss do not converge with those of hearing children with increasing age and experience with language, instead the degree of lag in language development increases throughout the school years. It is unrealistic to assume that students with hearing loss who enter school with identifiable language delays will 'catch up' by exposure in the classroom even with receipt of minimized specialized instruction support. *Special efforts must be made to expand vocabulary through print, sign, and speech. Access to all aspects of spoken language is crucial to language development. Assess students for emerging delays and provide intervention in vocabulary, phonologic, morphemic and syntactic development, using both visual and auditory teaching strategies, tailoring modality of teaching strategies to what is successful for the individual student. Teachers using any form of signed communication to teach English should pay special attention to the more difficult structures, devising special lessons along the lines of those used by teachers of English as a second language* (pg 70).

- **Children with hearing loss are more likely to use concrete nouns and action verbs over more abstract or general words.** Their vocabularies tend to lag about a year behind their other reading subskills. This mismatch may disrupt fluent reading, as access to individual word meanings requires greater cognitive capacity in the absence of full comprehension of the preceding context. *Focused expansion of vocabulary, in general, is necessary for students with hearing loss.*

- **Sign language cannot be an optimal language of instruction if 95% of deaf children enter the classroom lacking age-appropriate fluency** (pg 53). The potential of total communication programming has been compromised by adults using the signing systems inconsistently and often incorrectly, although it is clear that children are capable of synthesizing visual and auditory representations of language (pg 79). *Total communication programs or cases in which classroom interpreters are the primary access to instruction should receive periodic checks regarding the actual completeness of communication provided and the student levels of comprehension. Lack of comprehension of the signed communication provided necessitates instruction in developing sign competency.*

- Preschool-age children who had exposure to cued speech at home and at school were able to understand the idea of rhyme as well as hearing children and were able **to develop phonological concepts** even before reading skills had been acquired (pg 64). *Students with hearing loss do not have full auditory access and are therefore likely to have delays in phonological awareness and pre-literacy development which requires specialized intervention using both auditory and visual strategies.*

- When communication is a struggle, the student must expend energy and attention on communicating that might otherwise be devoted to acquiring information, concepts, and skills (page 50). Children with profound hearing losses in oral programs develop spoken language at only 50% of the rate of hearing children with average delays of up to 5 years at high school age (pg 54). Only 13% of children with cochlear implants were found to be age-appropriate in their understanding of idioms and figurative or non-literal spoken language (pg 56). Cognitive growth will be affected if a student **lacks sufficient language sophistication** to allow "thinking about" learning (metacognition), organizing and coding of information to support memory, inferencing, and the drawing of logical conclusions based on understanding nuance (pg 50). *Language ability significantly different from class peers (i.e., 6-12+ months) cannot be addressed only via pre-teaching and typical means used to 'catch up' with vocabulary. The greater the delay, the greater the need for intensive direct teaching by someone knowledgeable in deaf education practices to integrate language development with critical thinking skills.*

LITERACY SKILL DEVELOPMENT

A large portion of the effort devoted to improving literacy among children who are deaf or hard of hearing has been directed at teaching them the skills and strategies that work for hearing children, even though it is apparent that deaf and hearing children often have very different background knowledge and learning strategies and cannot learn English in the same way. Some students with hearing loss demonstrate excellent literacy skills, but most lag significantly behind their hearing age-mates. In 2000, the median level of reading achievement among 18-year-old children who are deaf and hard of hearing was roughly equivalent to that of 9-year-old hearing students. Literacy lags are found regardless of language approach, communication modality, or hearing devices used (pg 81). The greatest challenges confronting young readers with hearing loss appear to lie at the level of individual words, including phonology and word meanings, rather than English grammar. Young deaf readers tend to focus more on individual words rather than relations among words, however, compared to both age-matched and reading-matched hearing children. This orientation disrupts both grammatical processing and top-down semantic processing, thereby reducing comprehension and retention. We need to *support* learning rather than just *teach* language. Several factors positively influence the acquisition of literacy skills by children who are deaf and hard-of-hearing:

- **Phonological Awareness, Phonics, and Literacy Skills**: Phonological skills may contribute to better grammatical skill and better reading comprehension, because consistent internal speech has been shown to be more efficient than either visual imagery or internal sign language for the ongoing memory demands of reading. Phonemic awareness and phonics are important tools for beginning readers and for older readers with lower levels of literacy skill which need to be supported by specific lessons and should not be expected to develop without structured input (pg 88). Children with hearing loss need to apply considerable phonological knowledge during reading in order to decode and unlock the meaning of words. While this knowledge is best acquired through hearing and speaking, many children who are deaf are able to use representations that are functionally equivalent to phonological codes by integrated information obtained through varying combinations of sign, fingerspelling, orthography, visual-manual representations of graphemes, articulation, speechreading, and limited audition (pg 89). Research indicated that 40% of variance in reading skill in children using visual communication was accounted for by language and phonological awareness (pg 90). While over half of cochlear implant users score within the average range for reading at age 8-9, by age 15-16 reading scores average about 2 years behind grade expectations (pg 91). Although students who are deaf or hard of hearing can improve phonics and reading skills through the use of Visual Phonics, scores on tests of reading skills decline over time as students do not keep up with progress expected, based on their success following initial instruction (pg 95). *Specifically assessing for phonological deficits and teaching using various auditory and visual strategies will be needed in many, if not most, children with hearing loss regardless of communication modality if they are to develop reading skills on par with peers. Continued progress monitoring and timely intervention is needed as students are at high risk to not keep up with increasing reading fluency demands in the upper grades. This phonologic teaching can also support building knowledge of syntax. Teaching phonological awareness primarily through speechreading is not effective, whereas using cued speech or Visual Phonics have been successful (pg 95).*

- **Vocabulary and Literacy Development:** Smaller vocabulary size of students with hearing loss poses a barrier to the benefits that reading and writing would otherwise have in enhancing language development. Vocabulary growth for these children is related to the frequency of their word exposure, visual accessibility of the representation of the word, and the level of the child's interest and focus of attention on using the words (pg 96). When opportunities for generalization and deepening of understanding of a new word's meaning are not provided, the learned meaning is likely to fail to include all of the

features it would typically include (pg 97). Even for children with cochlear implants, the gap between reading performance as compared to norms for hearing children increases with age (pg 98). Presentations of words in more than one modality does not interfere with these students learning the spoken representations of the words (pg 99). Vocabulary instruction needs to occur in meaningful contexts as opposed to simple drill and practice or memorization of definitions. Vocabulary development should be specifically addressed in children with hearing loss as sufficient development cannot be expected without direct instruction (pg 99). *The traditional practice of learning definitions of new words in isolation is a not an effective strategy for children with hearing loss. Instruction should be meaningful and include discussion and schematic representations of aspects of a word's meaning, along with repeated experiences with a word in varied meaningful contexts (pg 97). Providing standard preteaching tutoring as an accommodation will not effectively teach these students new vocabulary. Children who are visual communicators benefit from chaining when learning new words, during which the teacher directly and sequentially demonstrating the word in print, sign, and fingerspelling (pg 97).*

- **Syntactic Knowledge and Reading:** Grammatical structures that put the greatest load on working memory (i.e., pronouns, embedded clauses) appear to be the most difficult for children with hearing loss to master. The result is reduced comprehension and reading speed, as well as a tendency to remember disconnected portions of texts rather than the whole picture, especially when the material is unfamiliar. Middle school students with typical hearing have better use and understanding of grammatical morphemes and word segmentation than college students who are deaf, even when the two groups have similar scores on standardized reading tests (pg 100). Without equivalent syntactic knowledge, reading speed (fluency) will be reduced. Syntactic complexity is also a contributing factor in decreased working memory for what was read. When syntactic competence is low, students cannot take full advantage of their vocabulary knowledge. (pg 100). Considerable audibility of phonemes, and presumably phonological awareness, does not guarantee a student's ability to apply syntactic knowledge in reading comprehension (pg 102). *Students with hearing loss need to have their syntax weaknesses systematically broken down and taught, along with other strategies to aid their understanding and production of print. Preteaching the actual syntax and vocabulary used in content area reading is time consuming but can be effective. Teaching the student to rely on the order of the major words in a complex sentence can be helpful in some cases, especially when the information was included in the student's prior knowledge and not when it was new information (pg 101).*

- **Teaching Approaches and the Development of Reading Comprehension:** An extensive review of the literature (2008) identified the following approaches provided positive outcomes: a) explicit instruction in strategies for comprehension, b) teaching narrative structure or story grammar, c) using modified directed-reading thinking activities in which children read for specific purposes followed by guided questions, d) using approaches to activate and build background information prior to reading activities, e) using reading materials that are high interest, well written, and have not been simplified grammatically or in vocabulary choice, f) providing specific activities to build vocabulary knowledge, g) using connected text instead of sentences in isolation to provide instruction in syntax or grammar, h) encouraging the use of mental imagery while reading, and i) teaching students to look for key words to assist in comprehension of text (pg 108). There is little or no evidence related to the amount of time provided for independent reading or (as yet) using web-based instructional programs that can provide visual support for reading. There is mixed evidence for the effectiveness of teaching phonemic awareness as a path to reading comprehension. Evidence supports the practice of directed reading and shared reading activities. Teaching vocabulary and morphological knowledge through meaningful activities effectively supports reading comprehension (pg 109). Metacognition, or awareness of one's own comprehension and the intentional use of strategies to improve it, is often not spontaneously activated for students with hearing loss. They tend to be less aware when they do not comprehend, rely more on pictures and less on their background knowledge to help them predict and comprehend text. *There is no single teaching strategy that is effective for improving the reading comprehension of students with hearing loss, necessitating the skill and knowledge needed for using various systematic explicit teaching strategies. These strategies should include monitoring characteristics of the text, being aware of their purpose for reading, recognizing their own problems keeping attention focused on the text, monitoring the pace of their reading and deciding when they should reread or read more slowly and carefully (pg 110). Teacher's use of questions to encourage the application of background knowledge by using salient details from the reading as a basis for drawing inferences can increase the student's ability to independently analyze, synthesize, and evaluate what they have read (pg 109).*

- **Writing:** Typical 17-18-year-old students who are deaf write at skill levels like those of 8-10-year-old students with normal hearing. These written products contain shorter and simpler sentences than expected for age, along with use of fewer

adjectives, adverbs, prepositions, and conjunctions. Problems with morphology and grammatical structure are especially prevalent. No current approach for supporting the language development of students with hearing loss has been found to resolve their difficulties with written language (pg 111).

COGNITION, PERCEPTION, AND LEARNING STRATEGIES

There is no evidence that hearing loss diminishes intelligence or cognitive abilities in general, however, individuals who are deaf may not necessarily think, learn, or behave exactly like peers with normal hearing. Hearing loss may lead to different approaches to learning, the organization of knowledge, and to different levels of skill in various domains. Understanding these potential differences in learners with hearing loss is critical for optimal learning support (pg 119).

- Theory of Mind: ToM refers to the ability to take the perspective of others. Children with hearing loss have been found to have challenges in recognizing emotions and being able to identify their underlying causes. Performance on ToM tasks are associated with language skills in that students with greater delays in language, especially syntax and vocabulary issues, are at greater risk for ToM delays. One conclusion is that children with lower language skills have problems reasoning about tasks related to ToM. *Specific teaching to develop recognition of emotional states; participation in rich conversational exchanges, include discussions of perspective and predictions about what/how others are feeling during interventions.*

- Visual Attention: Children with hearing loss have been reported as being more visually distractible than hearing age peers and their sustained selective visual attention has been shown to be worse than that of hearing children. As an illustration of their propensity toward distraction, one student found that students who are hard of hearing visually attend to their teachers less than 50% of the time during teacher-directed lessons (pg 126). Even more important, research indicates that students may not be aware that they have failed to understand. Many students who are deaf or hard of hearing have learned not to expect complete grasp of communication in the classroom (pg 127). *Teachers of deaf/hard of hearing students need to be especially alert to gaps in understanding and learn to respond appropriately, such as teaching critical thinking skills (Did this make sense?), how to identify communication breakdowns, and how to respond appropriately through communication repair and self-advocacy. Having a teacher who understands what these students know and how they learn is very important to improve awareness of communication gaps and improve overall comprehension.*

- Memory: Deaf and hard of hearing students generally show poorer memory for both verbal and nonverbal materials, especially when information is presented sequentially. Maintaining or integrating verbal information over short periods of time in essential for many academic tasks, and for reading and writing in particular. Strategies related to memory, problem-solving and test-taking need to be fostered or taught if we want to optimize academic progress among students with hearing loss. *Specific teaching should be directed at difficulties in sequential memory and in integrating disparate pieces of information, impulsive and non-reflective responses to problem solving, and improving a lack of metacognitive awareness of one's own understanding or misunderstanding of communication* (pg 133).

EDUCATIONAL PLACEMENT

Much of direct teaching provided by itinerant teachers of the deaf/hard of hearing is remedial in nature (pg 155). In contrast with findings for students with cognitive or emotional disabilities (but without hearing loss), for whom achievement has been found to be better in mainstreamed or general education classes than in separate classes, no functionally significant effect has been found for students with hearing loss (pg 156). The shift toward educating more students with hearing loss in general education classrooms requires changes in teacher preparation for both general education teachers and those specializing in deaf education. Performance of students with hearing loss who are in general education classes continues to lag behind that of hearing student peers, generally falling in the "low average" range. One reason for this continuing lag is that students with hearing loss who use spoken language are often assumed to understand and to be processing more information than is actually the case. In a situation where intensive sessions are provided to pre-teach material covered in the general classroom, 1/3 indicated they remained unable to participate during the regular class and a small number reported that they never understood lessons presented in the regular class (pg 163). The need for specialized support by a deaf educator is expected to increase rather than decrease as more students with hearing loss are served in the mainstream, if appropriate education is to be achieved (pg 157). Students continue to report that many general education teachers do not modify lessons, despite the majority of these teachers receiving inservice training on the need to do so (pg 163). Teachers of the deaf/hard of hearing need to be able to serve as advocates for their students and to facilitate the students' becoming advocates for themselves, as well as supporting students' developing positive self-esteem and social-emotional characteristics (pg 158).