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Strategies for Teaching Literacy Skills to Children who use Alternative and Augmentative Communication

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STRATEGIES FOR TEACHING LITERACY SKILLS TO CHILDREN WHO USE ALTERNATIVE AND AUGMENTATIVE COMMUNICATION

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The importance of literacy is beyond describable. Reading and writing enables learning, activates cognitive development, fosters independence, supports social interaction and promotes career advancement. In addition, for children with severe speech impairments who use augmentative and alternative communication (AAC), reading and writing may be their only efficient means of communication. Unfortunately, school-age children who use AAC have less advanced literacy skills when compared to typically developing children. Educators evince that children who require AAC often struggle with literacy due to physical, sensory, perceptual or cognitive limitations. However, it is important to remember that limited or absent verbal communication is not indicative of cognitive function. Research has shown that children with disabilities can learn to read with the appropriate instruction. This may reveal that it is not the child's impairment that contributes to their struggle; recent research has concluded that children with special needs have fewer opportunities to communicate and are deprived the necessary accommodations needed to acquire literacy skills. Adequate reading instruction, from an early age, can lead to the development of functional reading

abilities.

The National Reading Panel recommends instruction in five areas to develop reading: phonemic awareness, phonics, fluency, vocabulary and text comprehension. Of particular importance during early instruction is the development of emergent literacy skills. Emergent literacy skills include written language awareness (phonics) and phonological awareness. Written language awareness is the understanding that letters have meaning and represent sounds. Phonological awareness is the knowledge that spoken words are comprised of words, syllables and individual phonemes. Phonological awareness is an umbrella term that encompasses phonemic awareness; phonemic awareness is a more narrow skill that includes only knowledge of phonemes. Both of these skills, phonics and phonological awareness, are pertinent in the development of literacy and predict later reading abilities in children with and without disabilities.

Children who use AAC, like typically developing children, need to be instructed in emergent literacy skills. Many instructional methods known to improve communication and literacy for children who do not require AAC can be just as effective with additional adaptations for children who do require AAC. It is beyond the scope of this paper to discuss all instructional methods; therefore,

direct instruction and scaffolding will be the focus. Introducing these methods with adaptations such as multi-modal sensory input will aid in the literacy development of AAC users. And of course, providing a child with additional adaptations will fill the void of both too few learning opportunities and lack of accommodations.

The purpose of the present paper is to highlight strategies for teaching emergent literacy skills to children who use AAC. AAC, for the purpose of this paper, is defined as any method that supplements or replaces speech due to severe speech impairment. This includes, but is not limited to, sign language, picture communication system, and voice output devices. Strategies are presented in a broad manner and should be appropriately adapted to specific children. The present paper focuses on children who are at the developmental age to acquire literacy (ages 3-9). This, however, should not limit the use of the strategies to children only. Speech and language pathologists (SLPs), special education teachers, regular education teachers, and reading interventionists may all benefit from the following review of literature on how to instruct children who use AAC in literacy.

Emergent Literacy Skills

According to the National Reading Panel (National Institute of Child Health and Human Development [NICHD],

2000), phonemic awareness and letter awareness are the two strongest predictors of how well children will learn to read in their first two years of instruction. Also, in a review of the literature, NICHD found that instruction including phonemic awareness activities improved reading abilities more than instruction without activities. Phonemic awareness activities include manipulation of phonemes, blending sounds into words, segmenting words into sounds, and identifying words that begin or end with the same sound. Children who use AAC can be instructed in the same skills, phonemic awareness and letter awareness, that have been proven to increase reading abilities in typically developing children. These skills will develop advanced literacy skills such as reading and spelling.

Kleeck and McFadden (1998) studied whether phonological awareness, including phonemic awareness, could be trained in preschoolers with speech and language disorders. The study consisted of 24 children who attended a private school for children with communication impairments. Sixteen of the children who attended preschool and pre-kindergarten classrooms were in the experimental groups. The other eight children were older students and made up a control group. Researchers provided small group training for 15 minutes two times per week. Training was provided at one of three centers in which the children

rotated. During the first semester rhyming activities were targeted. During the second semester phoneme awareness was targeted. The only instruction in these areas that the classroom teacher provided was reading rhyming books to the class. The classroom teacher did not instruct in phoneme awareness. Rhyming instruction consisted of selecting cards that pictured their rhyme mates, making judgments about which words were rhyme mates and playing rhyming games. Phoneme awareness instruction consisted of modeling initial sounds in words, judging correctness of initial sounds, matching sounds, identifying sounds, generating new words from the same sound, blending sounds and analyzing sounds. Pretests were given in the beginning of the year and posttests were given at the end of the year. Results showed that the children made improvements in their rhyming and phoneme awareness skills. The results also show that phoneme awareness skills were better than the control group, indicating that the acquisition of skills was due to the training rather than maturation. On the other hand, there was no evidence to indicate likewise for rhyming. The results from this study support the claim that phonemic awareness skills can be improved with direct training in children with disabilities. However, because reading was not explicitly tested, conclusions cannot be drawn regarding whether phonemic awareness training improves

advanced literacy skills. The study used older children who had attended the same classroom as a control group. This may negatively affect the validity of the study. For the study to have more validity, researchers needed to spend additional time and use a longitudinal type study. Therefore, the curriculum could be controlled and measured rather than relying on testimonials that the curriculum has not changed.

Blischak, Shah, Lombardino & Chiarella (2004) investigated the effects of phonemic awareness and letter awareness instruction on the reading skills of children with severe speech impairments. The study consisted of three pre-reading children with unintelligible speech. All children had one-word receptive vocabulary, were within normal limits for non-verbal intelligence, recognized ten letters and had letter-sound awareness performance of <50%. The study consisted of two phases. Phase One consisted of letter awareness using ten small plastic tiles. Phase Two consisted of phoneme segmentation, manipulation and encoding pseudo-words using target letters from Phase One. Data was obtained by instructing the child to “point to the letter that says [m]” for letter-sound awareness. Participants were also asked to spell the words (pseudo and real) with the tiles that was presented orally. Once the criterion was met (90% accuracy on three consecutive days)

the child moved to Phase Two. In Phase Two, participants were taught to segment ten CVC pseudo-words. Ten black checkers were used to correspond to each sound in the word. The child was required to move the correct amount of checkers on to the paper for each sound. Next, the researcher modeled phonemic blending by slowly sliding her fingers over the checkers as she said the word. Then, the children were taught to replace a letter to form a new word. The researcher instructed “this is [naen], what letter will you change to make it [haen]?” Lastly, the child was to encode CVC pseudo-words. When the researcher said /haen/ the child was required to select the correct tiles. Results showed that during Phase One none of the children demonstrated increases in encoding skills, however in Phase Two, the participants showed a steady increase in the skill. Participants showed generalization to untrained CVC pseudo and real words with 90-100% accuracy. In maintenance sessions, participants also reached criterion level. The results from this study support the claim that children with impairments can learn phonemic awareness and letter awareness. Unlike the previous article, this study suggests that phonemic awareness and letter awareness training develop advanced literacy skills, specifically spelling. Results from this study also showed that letter awareness alone does not develop reading skills. Future

research is warranted to study whether phonemic awareness training alone will develop advanced literacy skills or if both trainings are necessary.

Johnston, Davenport and Kanarowski (2009) examined a three-step intervention strategy to teach sound-letter correspondence and spelling of CVC combinations to children who use AAC. The study consisted of two children, enrolled in special education preschool programs. Both participants used single symbol line drawings, had expressive vocabulary of five words, demonstrated symbolic representation but had not yet demonstrated letter awareness or spelling. All phases of the experiment were conducted during free choice activity in the classroom. A booklet consisting of randomly arranged lowercase letters /m, t, ae/ was used. During the baseline the researcher presented the booklet and used the cue “touch the letter that says [m]” or “spell [maet].” During the intervention phase a 3-step strategies system was used: Step 1: the participant chose a fun activity to play. Step 2: the researcher used the same cue as in the baseline immediately followed by a model of the correct response. After several sessions a five second time delay was implemented before the model. Step 3: the child was given the object to play the game along with verbal reinforcement if a correct response was given. During the generalization phase, a lowercase and uppercase keyboard

was used in place of the booklet to examine whether letter generalization occurred. Also non-trained CVC combinations were tested. Both participants received 0% correct during baseline data. The first participant maintained 100% accuracy post-intervention and the second achieved 93% accuracy. The first participant generalized both the lower and uppercase keyboard and non-trained CVC words with 60% accuracy. The second participant generalized with 21% accuracy, however, the uppercase keyboard did not generalize at all and only half the CVC words generalized. The findings of this investigation suggest that children with speech impairments can learn letter awareness and phonemic awareness, however generalization is not likely. This study refutes the current claim because even though their phonemic awareness skills and letter awareness skills improved, the training did not develop advanced literacy skills such as reading. The external validity of this study is questionable. During the generalization phase, researchers tested generalization to two new contexts, the keyboard and upper case letter. To increase validity, only one context should be tested while the other remains as a control. Future research should replicate the study and test generalization to a single new context.

Strategies

Direct instruction and scaffolding are pertinent in the use

of AAC and the development of literacy in children. While all children require a model to learn, children using AAC require active teacher-student interaction, direct teaching and repetition. This may be because they have limited access to literacy-related classroom activities and hence have under developed skills (Johnston et al., 2009). Direct instruction and scaffolding benefit children by providing additional processing time and support via errorless learning. Individuals who use AAC participate in and attempt interaction more often when provided with this additional support (Kent-Walsh & McNaughton, 2005). These strategies can be used effectively to teach emergent literacy skills to children who use AAC.

Direct Instruction

Fallon, Light, McNaughton, Drager & Hammer (2004) investigated whether direct instruction facilitates single-word decoding skills of students who use AAC, and if so, if the instruction will generalize to novel words and book-reading. The study included five participants who were in self-contained special education classrooms. All students had speech intelligibility of <30% at the single word level. All participants were able to identify letters when named and had established sound-letter awareness. A multiple baseline across subjects design was used. Intervention was implemented across two groups, in order to

reduce time in baseline. Intervention consisted of matching sounds to initial sounds of words, blending sounds into words and reading VC and CVC words. For sound matching, researchers used a display of four pictures per page with the word written below each picture. Researchers labeled each picture, produced a single phoneme, and then labeled pictures again. The participant was asked to select the picture that started with the phoneme /m/. For the blending task, researchers slowly produced sounds that made up a target word. The participant was asked to point to the picture that showed the target word. For the reading single words, researchers used three instructional levels: the first level included a verbal model of the researcher tracking each letter as they read the word; the second level included the participant choosing the corresponding picture with assistance if needed; in the third level the participant tracked the word and pointed to the picture independently. All levels were included in each session. Generalization was measured by using the book and carrier phrase “I spy something…”. The researcher read the phrase and the child was to read the highlighted word and point to the picture. Generalization was also measured by testing novel words containing the target letters. Maintenance probes were conducted post intervention. Results indicated that all five participants reached criterion for reading VC

and CVC words. Three of the five participants showed generalization to novel words, however only one reached the criterion level of 80%. Four out of five participants showed generalization during book reading, however none of them reached the criterion level. All participants maintained the criterion level for all maintenance probes. It is evident that through direct instruction participants developed skills in phonemic awareness. Also, that they have begun to develop advanced literacy skills such as reading. It is possible that their skills did not generalize to book reading because it is a different context. Perhaps if direct instruction were used during book reading, novel words would be generalized and the criterion would be reached. For this reason, the external validity of this study is questionable. These findings support the claim that direct instruction aids in literacy development.

Truxler & O'Keefe (2007) investigated the effects of phonological awareness instruction on word recognition and spelling in children who use AAC. The study consisted of four participants diagnosed with cerebral palsy and cognitive delay, but with adequate language abilities. A multiple baseline across subjects design was used. Two experiments were conducted. The first experiment was designed to explore participants' abilities to learn

phonemic awareness and letter awareness. The second experiment was designed to explore the children's abilities to acquire word recognition with the skills they learned in Experiment One. During baseline, participants were shown three pictures and the pictures were named. The participant was required to touch the picture that was the correct target sound. During the intervention phase, storybook reading was used to teach letter sound correspondence and phonemic awareness. During 30-minute daily sessions, the researchers read a book and tested comprehension after the first reading. They read the book again and instructed the participant to listen for the target letter /s/. The researchers ran their finger under the words as they read them. The research would prompt "I heard the letter [s] at the beginning of this word" and hold up an index card of the word, repeated the word and then told the participant to locate it on the keyboard. After comprehension was demonstrated researchers tested the participant. "Look at theses pictures, which one begins with letter T?" No prompting or feedback was given. Generalization was measured by testing the middle and last sound of words. Generalization probes also tested novel letters. In Experiment Two investigators used index cards with letters written on them to blend words. They pointed to each sound, elongated the sound and pushed the cards together to form a

syllable. The participant then spelled it on their keyboard. To train word recognition, researchers held up two syllables (ad and an) and asked “which one says [ad]?” To test, researchers asked which word says “did” and held up ten written choices. Comparison of pre- and post-intervention scores indicated an increase for only one participant. The other three showed little or no improvement. Results revealed that letter awareness with limited phonemic awareness was not sufficient to acquire decoding skills even with direct instruction. Or, it is possible that intervention activities in Experiment One were not focused enough to develop these skills. These findings refute the claim that direct instruction aids in the development of literacy skills. However, the nature of this complicated investigation may have limited the simplicity that is direct instruction.

Millar, Light & McNaughton (2004) studied effects of direct instruction on letter awareness and phoneme segmentation as demonstrated by the selection of initial letters of words in children who use AAC. The study consisted of three children with a developmental disability and severe speech impairment. All children had adequate sound letter correspondence but lacked phonemic awareness. Participants used voice output devices and gestures for communication. A multiple baselines across subjects design

was used. During baseline, participants were to asked identify the initial letter of words when presented orally. During instruction, participants were pulled out of classrooms two to three times per week for 30-45 minutes. Each session targeted one letter and reviewed the previously learned letter. First sound-letter awareness was targeted; researchers presented the letter orally and the participant selected the appropriate letter from an adaptive keyboard (target letters were highlighted on the keyboard). Next, a word was presented orally and they were asked to identify the first letter. Least-to-most prompting was used: no prompt, partial (elongated and stressed first sound without pause), and full (elongated and stressed first sound with pause). A criterion of 80% accuracy for four out of five trials was set. Next, participants were involved in a writer's workshop activity where they were asked to create stories using words that began with target letters. Maintenance and generalization probes were utilized. Generalization included selecting target letters of novel words when shown a picture without the word presented orally. Results show that 2/3 participants acquired all five target letters. Two participants met the criterion on maintenance probes for two months post intervention. One met criterion on generalization probes and the other did not. The third participant was

discontinued due to lack of progress; he did not move past the first target letter. It appears that one participant benefited immensely from direct instruction in letter awareness and phonemic instruction. The second participant may require more instruction in order for the skills to generalize. The third participant's results make this study inconclusive due to his lack of improvement. In addition, the third participant's results also decrease this study's validity because of experimental mortality. Therefore, evidence from this study is not compelling enough to support nor refute the claim.

Scaffolding

Binger and Light (2007) created a study to determine the effect of direct instruction of multi-symbol messages and, if effective, the effect on generalization and maintenance. The study consisted of five children who had an expressive vocabulary of less than 25 words and most communication attempts were comprised of one-symbol messages. The baseline phase consisted of 15 minutes of playtime in which the researcher gave spoken models of the child's communicative behavior. In the instruction phase the researcher immediately demonstrated two aided models of how to produce multiple symbol messages. During the 15 minutes of playtime the researcher provided models by touching two symbols on the device while labeling them and

giving a spoken model. During the generalization phase, the researcher did not provide models in new play situations. If the participant did not produce multi-symbol messages by the second session, an additional model was provided. The maintenance phase was a replication of the intervention phase, however, unaided multi-symbol combinations produced by the participant were documented. Results showed that two of the three participants who used voice output systems met the criterion during the intervention phase. The same two participants generalized productions to novel play and did not require models in producing the messages. Both participants who used communication boards acquired multi-symbol communication and met criterion. However, only one was able to generalize combinations without models. All four successful participants maintained multi-symbol production for two months post intervention. It is evident that scaffolding may be effective in creating messages. Researchers shaped the child's response by first providing a model as a maximal cue. The responsibility was then transferred to the child. Because communication is the ultimate goal of literacy, these results support the claim that scaffolding aids in literacy development.

Johnston, Buchanan, & Davenport (2009) compared the rate of acquisition of sound-letter awareness in a gradual array condition and a fixed array condition in children who

use AAC. The study consisted of two boys diagnosed of autism and cognitive delay. Both participants had strong representation skills and print awareness skills, but did not demonstrate letter-sound awareness. A binder of fixed array sheets and gradual array sheets was used. The fixed array contained the target and eight other letters in varied positions. In the gradual array, the target letter was shown first in isolation, then with one other letter, then three, five and seven other letters. The target phonemes were /m/ and /t/. A single subject simultaneous treatment design was utilized. For one participant the fixed array target phoneme was /t/ and the gradual array was /m/, and for the other participant, vice versa. During baseline the interventionist presented the eight-letter array and instructed to “point to (target).” In the intervention stage, the interventionist used the previous cue, followed by a model of the correct response. After two consecutive sessions of 80% accuracy, a five second time delay was initiated. The interventionist provided verbal praise for correct responses and a repetition of the task for incorrect responses. Maintenance follow-up sessions were conducted the same as baseline sessions. Both participants reached criterion in the fixed array condition before the gradual array condition. During maintenance, the participants correctly identified both letters above the

criterion level. These results suggest that children learn letter awareness efficiently when provided with a model. Researchers used a scaffolding technique by first giving a model, then time delay and then transferring the responsibility to the participant. This design adds one more layer of instruction, a time delay, when compared to the previous study's design. It is clear that scaffolding may help children learn letter awareness, which leads to literacy. This study also supports the current claim. More researched is recommended to explore the best ways to teach letter awareness.

Light, McNaughton, Weyer & Karg (2008) investigated the effectiveness of specific evidence-based literacy instruction for a student with multiple disabilities who uses AAC. The study consisted of an eight year old female with multiple disabilities including, but not limited to, speech, motor, vision and hearing. Baselines for phonological awareness skills, letter-sound correspondence skills, decoding skills and sight word recognition were <25%. Intervention was held twice a week for 30 minutes. Direct instruction was used and a least-to-most scaffolding hierarchy was implemented. This consisted of a model, then guided practice and lastly independent practice. The instructor used bimodal input, sign and speech. Letters and words were in 80-90 point black font on yellow background

to accommodate her vision impairment. An FM system was also used to accommodate her hearing impairment. Letter awareness was taught with most visual and easily discriminated letters (i.e., bilabials). High-interest sight words were also targeted. Single word decoding was targeted next. The instructor read the word slowly while tracking each sound with her finger. The participant indicated understanding of the word by using signs or pointing to symbols on her device. Lastly, reading activities were targeted. The instructor used the cloze technique when reading to allow the participant to read the target word and sign it. After seven months the participant was able to identify nine letters when presented orally, read approximately 30 words, and read target words during shared book reading at the criterion level. After 16 months, she was able to identify 20 letters, read 60 words, and continued reading target words at criterion level. Results from this study show a remarkably high degree of success. Also, unlike many studies, researchers continued literacy intervention for 16 more months to demonstrate the superb gains that can be made with continued instruction. A combination of direct instruction and scaffolding guided the participant in the development of literacy. Also, many accommodations were made to overcome impairments. Although much remains to be learned about this area, the current

study is evidence that direct instruction, scaffolding and accommodations are all necessities in literacy acquisition.

Conclusions

The discussion of literacy interventions in children with disabilities would be incomplete without mentioning accommodations. In fact, without appropriate accommodations, these children would be at risk for illiteracy. Literacy is important for countless reasons. Higher level education, employment, socialization and independence require literacy. The claim that children who use AAC should be instructed in the same skills should be the general message. In addition, individual instruction is essential in helping children who require AAC to build literacy skills. Classroom teachers, parents, and aides can be taught these strategies to enforce individual attention. By addressing these skills early, later difficulties in school can be averted. Each piece of evidence presented provided supports for the participants during intervention. For example, to develop letter awareness, the teacher can verbally produce the sound and the AAC user can point to or type the corresponding letter. To develop phonemic awareness, the teacher can verbally produce a word and the AAC user can point to the letter with which the word starts. To develop the phonemic awareness skill blending, the teacher can verbally produce the word and the AAC user

can point to the word or picture. Lastly, the role of the clinician, or partner is pertinent to the success of the child. The teacher needs to be aware of basic strategies to use as accommodations when working with children requiring AAC. These strategies include basic eye contact, providing sufficient time for response and responding positively to all communication attempts. Kent-Walsh & McNaughton (2005) noted that the use of these strategies provided evidence of positive change in the communication skills of the AAC user and the partner. Hence, when teaching early literacy to young children, these basic strategies should not be forgotten.

Future Directions

A study regarding phonemic awareness instruction is warranted. The study would be a true pretest-posttest design. The experimental and control group would be the same age and receive the same curriculum. The classes would be taught by the same teacher and the students should have similar pretest scores. The experimental group would receive explicit phonemic awareness instruction, as in the study by Kleeck and McFadden (1998). The control group would not receive the same explicit instruction. The groups' posttest scores could then be compared. Results would be valid because researchers would not need to rely on old test scores. Also, the researcher could document the

curriculum to ensure that both groups receive congruent instruction.

A study replicating the work by Blischak, et al. (2004) is necessary to determine whether phonemic awareness training alone will develop advanced literacy skills. From the previous study's results it is evident that letter awareness training is not enough. This is relevant because if phonemic awareness instruction alone develops these skills, then it is not efficacious to train letter awareness also. The study would instruct in phonemic awareness activities in Phase One and add letter awareness in Phase Two if the participants have not met criterion. The results could be compared to the previous study. If the participants do not develop advanced literacy skills during Phase One, then it will be remarkable to say that both phonemic awareness and letter awareness instruction are required.

Additional research is needed in the area of letter awareness. The previous study by Johnston, et al. (2009) found that generalization to two new contexts is not likely. A study to determine if generalization to one new context will occur is needed. The previous study may be replicated, however generalization expectations should be limited to one context. A study may train target letters on the keyboard and seek generalization to novel words. In

addition, letters may be trained via booklet and seek generalization to the keyboard. Performing the study in this way would show greater external validity and allow use to educators to generalize the information.

Lastly, additional longitudinal research is needed that incorporates both direct instruction and scaffolding. Research by Light et al., (2008) shows that evidence-based practices can be successful. Their research also demonstrated the exceptional progress that can be made with extended periods of instruction. Researchers need to follow children with impairments throughout their literacy developmental period and document evidence-based successes. With this information, the field would advance much more quickly.

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