Towards A Model Of Literacy Learning For Young Augmented Speakers

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Abstract

The study investigates strategies and contexts for supporting the literacy development of young, augmented speakers, whose difficulties in literacy learning are not explained by their levels of cognition alone. Indeed, quantitative and qualitative differences exist in their literacy experiences at home and school. In this study, four primary school students with severe speech and physical impairments (SSPI) who used augmentative and alternative communication (AAC) aids were selected to take part in a four-week program, followed by four visits to the students' schools where effective instructional strategies and contexts for learning were shared with staff. A thematic approach was employed during intervention to cover known areas of communication difficulty among AAC users and to foster skills in conversational control, self-expression and giving and requesting information. Using these themes, opportunities in literacy were designed with the intention of eliciting active involvement in meaningful, productive and expressive tasks. While the students made significant progress when participating in the program, on return to school success was maintained in only two of the students. Characteristics and contexts of the children whose success was maintained are analyzed to help identify components for a model of language and literacy learning and instruction for young, augmented speakers.

lntroduction

Four elementary school students with severe speech and physical impairments (SSPI) who used augmentative and alternative communication (AAC) aids were selected to take part in an intensive, four-week summer program at Oregon Health and Sciences University, Portland, Oregon. The program was designed with the intention of exploring effective strategies and contexts for supporting communication (including oral language, literacy, and computer skills) among young, augmented speakers.

This paper will begin with a summary of inquiry into literacy development among individuals who use AAC, whose low achievement in literacy cannot be attributed simply to intellectual endowment. Although research into literacy learning and teaching has developed over several decades and is still being generated at a substantial rate, research which has included individuals with developmental disabilities is much more limited and until recently, mainly characterized by inquiry into the effects of certain methods on specific populations: persons with autism, persons with cognitive impairments, and those with severe speech and physical impairments. Individuals who use AAC can be found within all of these populations. More recent inquiry has been

informed by research investigating literacy learning among typically developing learners and has therefore discussed literacy learning in its complexity. Such investigations may be broadly divided into two categories: (i) those investigating possible differences in opportunities and experiences among learners who use augmentative communication; and (ii) those studies examining possible differences in learning among augmented speakers and instructional strategies to support their literacy development. The paper continues with a description of the research methodology, data collection and a description of the intervention approaches used to support the language and literacy development of the four young, augmented speakers in the study. The next section proceeds with data analysis and a summary of the results. Since long-term success seemed to be associated with certain characteristics and contexts of students in the study, the latter are analyzed before the conclusion where components are suggested for a model of language and literacy learning and instruction for young, augmented speakers.

Quantitative and qualitative differences exist in the home and school literacy experiences of augmented speakers that may account for the considerable difficulties they encounter in literacy learning.

Individuals with little or no speech, who use AAC experience severe difficulties in literacy learning in the United States. Referring to a survey of "Adult Literacy in America" (Kirsch, et al. 1993), Koppenhaver (1995) estimates that as many as 90% of adult AAC users may perform within Levels 1 and 2 on the survey's five level scale; (i.e., they do not have the literacy skills to cope with moderately demanding jobs) despite the fact that an estimated 50% of this population are of average or above average intelligence. Intellectual endowment therefore, cannot be the sole determinant of success in literacy learning among augmented speakers. A recent but growing body of research indicates that quantitative and qualitative differences exist in the

literacy learning experiences among this population of individuals with severe language disorders.

Some parents and other caregivers assume children with severe speech and physical impairments are incapable of learning to read and write and, therefore, do not expose them to literacy activities (Higgins, et al. 1992). Since language and literacy learning develop from birth (Teale and Sulzby 1986) lack of exposure to early literacy experiences is likely to jeopardize later literacy development among this population. Even when children who use AAC *are* exposed to early experience in literacy, qualitative and quantitative differences exist when compared to their typically developing peers. Light and Kelford Smith (1993) found that parents of typically developing children identify good social relationships and literacy learning as high priorities, while parents of non-speaking, physically disabled children prioritize health, physical development, mobility and self-care. Although literacy materials were available in the homes of both groups, the children using AAC interacted with these materials much less than their non-disabled peers and they seldom had access to writing or drawing materials. Ablebodied children ask or are asked questions during reading activities, but AAC users tend only to look at the pictures rather than engage the text, predict outcomes, contribute to the storyline, or retell the plot (Light, Binger and Kelford Smith 1994). Compounding apparently limited opportunities for verbal interaction during reading are difficulties relating to physical manipulation of printed materials, which may not be possible for some children who use AAC (Pierce and McWilliam 1993). Parents also grapple with issues that hinder the reading process, such as positioning a young child with multiple disabilities in a way that the child can see the book and being able to

read the story in a relaxed and engaging manner. Furthermore, parents encounter difficulties in 'reading' the cues of children with little or no speech (King-Debaun 1995).

Passive involvement in literacy activities by children using AAC may be symptomatic of the asymmetrical communicative interaction between individuals using AAC and individuals who use speech, with natural speakers usually dominating the conversation and the augmented speakers forfeiting most of their communicative opportunities (Calculator and Dollaghan 1982, Harris 1982, Light, Collier and Parnes 1985, Light and Kent Walsh 2003). This one-sidedness is at odds with patterns of communication between rapid language learners and their parents (Wells 1986). As Flood (1977) demonstrated, the total number of words spoken and the number of questions asked and answered by a child during a reading session is a significant indicator of emerging literacy skills. Research shows that young augmented speakers have difficulty initiating communication and taking their turns to speak. When they do take communicative turns it is often in the respondent role, frequently characterized by yes/no or single word responses (Calculator and Dollaghan 1982; Light, Collier and Parnes 1985). Such passivity may also be associated with the interaction patterns of their speaking partners. The latter usually have little knowledge or training in how to encourage active participation by interacting in close proximity to the AAC user, using open-ended questions, modeling language use and pausing (Calculator and Luchko 1983). However, when 'interaction strategy' training is provided to adult speaking partners, the participation of young augmented speakers during literacy activities increases significantly (Light and Kent Walsh 2003). Nevertheless, intervention is also needed by AAC users and should begin by increasing the augmented speakers' social bids and initiations

(Fey 1986). Controlling conversations is a crucial aspect of self-determination and expression as well as a critical factor in providing opportunities to further communication skills.

School-based literacy experiences that individuals who use AAC tend to encounter are also different from those of non-disabled peers. Their limited literacy experiences before schooling are often perceived as reading difficulties or 'disabilities' to be remediated through 'readiness' approaches to reading and word-study, rather than meaningful literacy experiences (Koppenhaver et al. 1991). Children with disabilities spend significantly less time on literacy activities than their non-disabled counterparts, because of non-instructional activities such as therapies, feeding and toileting (Koppenhaver and Yoder 1990), and non-literacy activities during literacy instruction time (Mike 1995). Students also have very few occasions to write, and writing activities are often reduced to copying and spelling (Koppenhaver and Yoder 1993).

In the absence of sufficient verbal and physical interaction with texts, meaningful literacy activities and writing opportunities, it is not surprising that young children with SSPI do not pick up on key literacy lessons. However, given plentiful reading materials, models of literate behavior, opportunities to interact, and parental expectations and support, it is possible for individuals with severe speech and physical impairments to develop advanced literacy skills (Koppenhaver, Evans, and Yoder 1991). Indeed, powerful texts from adult, augmented speakers are starting to be published (Erickson et al. 2002, Fried-Oken and Bersani, 2000)

Differences in learning among augmented speakers and instructional strategies to support their literacy development.

Traditionally, studies investigating instructional strategies to develop the literacy of people with little or no speech have been generated by psychologists, special educators and speech language pathologists, and have employed skills-based approaches limited to decontextualized letter and word study (La Vigna 1977, Brown and Perlmutter 1971, Hoogeveen, Smeets and Van der Houven 1987, Barudin and Hourcade 1990). Such studies do not consider important lessons from long-standing research into emergent literacy: the social, collaborative and cultural aspects of making meaning (Bruner 1984, Vygotsky 1978, Heath 1983, Street 1992); the possible motivational aspects of reading and writing including, communication, self- expression, self-actualization, self-efficacy (Fry 1985, Atwell 1987, Meek 1988, Rosenblatt 1989, LeDoux 2001); the importance of home literacy and partnerships with significant others (Clark 1976, Ferreiro and Teberosky 1982, Purcell-Gates, 1996); the fact that for learning to be generalized, the learner needs to be engaged in meaningful activities across a variety of contexts (Holdaway 1979, Cunningham et al. 1998); the significance of the early development of phonological awareness (Bradley and Bryant 1983, Ehri et al. 2001); the knowledge that word and letter study is only part of what individuals need to know in order to make meaning from and construct meaning using written text (Goodman 1965, Rumelhart 1976); or that learning about words and letters happens more effectively when incorporated into the broader context of literacy learning (Goswami 1988, Goswami and Bryant 1990, Dombey, and Moustafa 1998).

More recent research has assumed a broader and more dynamic conception of literacy learning. Such research has examined the relationship between spoken language ability and literacy development. At one time it was believed that all early speech and language delays would result in future difficulties with literacy learning (Rutter and Yule 1975), but more recent research

(Bishop and Adams 1990, Catts 1991, Tallal, Curtiss and Kaplan 1989) suggests that the specific nature of speech and language delay determines subsequent reading and writing development. Children who experience early phonological disorders alone are much less at risk of encountering reading and writing problems than those children with both phonological and semantic-morphosyntactic deficits. According to Foley (1993), linguistic ability is a more critical factor than the ability to produce speech. Although articulatory coding was once viewed as essential to the development of phonological awareness.(Liberman, et al. 1967) and, therefore, literacy (Bradley and Bryant 1991, Bryant and Goswami 1987, Catts 1991), more recent studies have indicated that limited articulatory ability does not preclude the development of phonological awareness. For example, Bishop (1985) found that adolescents with congenital dysarthria (unclear or unintelligible speech) were able to spell real and non words, although unable to articulate all the component sounds in their speech. Foley (1993) has suggested that literacy instruction of students with little or no speech, which is limited to word study, may be a determining factor in the lack of understanding of the phonological structure of language. Further, even individuals with anarthria (no speech) can and do develop phonological awareness when they have long term access and use of voice output devices which allow them to construct and hear their written texts.

Given that phonological awareness plays a significant role in reading development, the need for accurate assessment to support the development of phonological awareness is paramount. There are many pitfalls in adapting tasks designed to assess phonological awareness for use with individuals with little or no functional speech (Blischak 1994, Foley 2003). Such tasks usually require adaptations (which enable the AAC user to respond) that involve extraneous operations

increasing spelling, recall, visual, motoric and linguistic demands. Judicious selection of assessment tasks and adaptations is essential if phonological awareness is to be measured rather than the AAC performance (Tunmer and Rohl 1991). It seems that difficulties in developing phonological awareness among individuals who have severe speech and physical impairments may be less a matter of intrinsic differences and more a question of extrinsic environmental differences. Examples of these environmental differences include, reducing literacy experiences to letter and word study; an overemphasis at the syllable and rhyme-level of instruction at the expense of phoneme level intervention (Gillon 2002); neglecting to provide essential tools to support the development of phonological awareness including voice output and word analysis instruction; and failing to find appropriate and reliable formative assessments to observe, monitor, and plan for the individual's phonological development.

Blischak (1994) therefore advocates a move away from traditional literacy instruction of AAC users, supporting instead the development of phonological awareness through meaningful literacy experiences. Successful literacy learning for this population may well depend upon finding ways to augment interaction during book reading (Pierce and McWilliam 1993), increase literacy learning opportunities (Erickson 2003, Light and Kent-Welsh 2002), integrate reading, writing, spelling, word analysis and communication activities (Decoste 1993, Conners 1992,), and employ of voice output and other technology (Sturm 2002).

Information and computer technology may mitigate many of the literacy difficulties encountered by learners with SSPI. Roberts (1988) called computers the “freedom machines” since they allow people with disabilities some independent control over their environment. Computers are

also versatile, serving as writing aids, learning tools, work stations and as communication devices at any one time (Steelman, Pierce and Koppenhaver 1993). They allow independent access to looking at and reading booksand can help reinforce important textual lessons by highlighting print direction and the notion that pages are turned from right to left. They enable often neglected involvement in the writing process, especially activities such as scribbling, drawing, planning, writing, editing, and calculating. They also facilitate access to literacy experiences through speech output, print enlargement, and provide adaptive software for word prediction and spelling (e.g., *Co: Writer* to support word processing) and hardware (such as *Ke:nx* whereby regular keyboards can be adapted). Computers may also motivate writers to write more and improve the quality of their work. The development of writing skills is especially significant for individuals with little or no speech; it not only supports reading development but also may be the only clear way such students can express their creativity and novel ideas. Perhaps we should not be surprised, then, that some AAC users are more interested in writing than reading (Smith 2003).

It may also be that better use could be made of atypical metalinguistic skills that young, augmented speakers sometimes possess (McNaughton 1993). Their early use of graphic representational systems (GRS) and communication instruction, which often includes discussions of terms like ‘word’ or ‘sentence’ may assist in the development of the awareness that language is segmented and sequenced. McNaughton and Lindsay (1995) also suggest that these individuals are atypical in that they do not approach literacy as speakers but rather as GRS processors and users before and as they start to interact with print. Although these children may be disadvantaged by severe motor and speech limitations they *do*, on the other hand, use a

graphic medium, much like traditional orthography, in order to communicate. In this way, children with SSPI may gain experience in processing graphic information alongside and prior to being exposed to traditional orthography. In order to fully exploit this potential orthographic advantage, McNaughton and Lindsay recommend developing strategies to increase a child's understanding between the relationship of their GRS and print, and evaluating different GRSs (ranging from those which are highly suggestive of their referents such as pictograms to those that are quite opaque such as Blissymbols) to determine which may have the greatest positive impact on emerging literacy.

The limited number of investigations into the literacy learning of individuals with disabilities has nevertheless demonstrated that these individuals are given different and more limited literacy opportunities than children without such disabilities. These individuals may also have different facilities in learning the significant aspects of literacy depending on the nature of their speech and language impairment. Articulation and unimpaired cognition may not be pre-requisites for developing phonological awareness, phonics learning and spelling, particularly when voice output is made available and literacy instruction is not limited to discrete skills. The research suggests a possible benefit of integrating the individual’s GRS into their broader literacy experiences.

Methodology

This descriptive study of a literacy program for four primary school students with SSPI who used AAC aids, employed an action research design. A cyclical process of intervention, observation, reflection and modification of practice was desired to present a detailed and multifaceted picture

of teaching and learning language and literacy. Such a design also lent itself to the use of different qualitative and quantitative measures as described below. Case studies were the forum for the analysis of the data collected and the instrument for highlighting the dynamics of language and literacy learning and instruction for each of the children in the study. The intention was to create a relatable, yet complex representation of fostering language and literacy development among young, augmented speakers. In this way, significant parties (parents and professionals) might gain better insight into necessary supports and effective strategies for developing literacy and move from non-existent or 'traditional' approaches that, as the research has shown, have played a significant role in the low levels of literacy achievement among this population.

Data collection

Assessments appropriate to each student's development were administered prior to and after intervention to provide *diagnostic* information for planning purposes and to serve as an *evaluative* measure of student progress and the effects of intervention in the three core areas. Language skills were assessed using a variety of formal and informal measures including the Peabody Picture Vocabulary Test (PPVT); the Nonspeech Test; the Preschool Language Scale–3 (PLS-3); and the Test for Auditory Comprehension of Language (TACL-R). In addition the Interaction Checklist for Augmentative Communication (INCH) was administered to evaluate the functional communication skills and interaction strategies used. Literacy skills were examined using a bank of adapted assessments including: concepts about print (CAP), recognition of letters (LID 1 & 2) & words (WID), writing vocabulary (WD), hearing and recording sounds in words from a dictated passage (D), phonological awareness and knowledge

of phonics (PA), listening comprehension (LC) and reading comprehension (RC). Computer confidence was recorded to show each student's level of independent competence with computers. Four areas were observed including computer access, keyboard skills and finger usage, mouse skills, and a continuum of computer interaction.

Two types of questionnaire were utilized. One was designed to gather general information about language and literacy experiences prior to intervention, as well as more specific information about the students' interests, preferences, family members and significant friends, etc. Such data was key to creating a motivating, appropriate and accessible language and literacy curriculum for each student. Another questionnaire was administered prior to and after intervention and designed to measure changes in the students' perceptions of themselves as readers and writers during the study. Evidence also collected during the period of intervention included observational notes, samples of work and video tapes of the children. Such evidence was useful in demonstrating to parents and school personnel strategies for intervention and the capabilities of the students. Data collected during intervention was also used to develop case studies of each child.

Intervention

Intervention consisted of 2 hours of daily instructional time, Monday- Friday, over a four-week period. It was followed by four visits to the students' schools where effective instructional strategies and contexts for learning were shared with staff. Selection criteria determined that the students were between 5-9 years of age; developmentally disabled with severe speech impairments necessitating their use of an AAC system already in place; assessed as 'beginner' or

'non fluent' readers; able to hear and see within normal limits; and in a seating system that positioned them in a 90°-90°-90° angle if they were non-ambulatory.

The intervention was built upon three interdependent strands:

- Language and communication skills (including vocabulary, sentence structure, grammar and pragmatics) were taught within the framework of total language immersion (e.g., augmentative communication aid use by instructors and students);
- literacy instruction included a focus on the development of individual skills based on literacy assessments and collaborative reading and writing activities to reinforce the social, communicative and purposeful nature of literacy;
- computer instruction and interaction to develop confidence with computers and increase independence among the students.

These three strands were taught within a thematic approach to help create a context and continuity for learning. Themes designed to permeate most of the activities were chosen for each week. These themes were specifically chosen to cover known areas of difficulty in communication for individuals with SSPI (Calculator and Dollaghan 1982, Light, Collier and Parnes 1985). Since Fey's (1986) work has alerted us to the profound significance of being able to control conversations, the intervention commenced with the theme of conversational controls. Over the following weeks, the themes of discussing feelings, relating information about oneself and requesting information of others were introduced. Using these themes, opportunities in language and literacy were designed (and included games reinforcing pragmatic aspects of communication, vocabulary development based on individual needs and desires, conversation 'practice', interactive book reading, guided reading, book reviews and recommendations, and the

writing of poems, individual news and thoughts, group stories, and a newsletter) with the intention of eliciting active involvement in personally significant, productive and expressive tasks. Language and literacy skills were taught explicitly, yet in the context of these language and literacy experiences and in partnership with parents, teachers and other significant parties.

Intervention was implemented by a team of personnel who took on specific, but not exclusive roles. The principal investigator, an educator, focused on supporting the literacy development of the four young, augmented speakers; a speech-language pathologist developed their language/communication and technology skills; a literate, adult augmented communicator modeled linguistic skills using a language immersion approach; an educational assistant was in charge of generating necessary materials for intervention (adapted books, overlays for voice output communication aids, communication symbols, etc); and volunteer speech-language-pathology students supported the children, under supervision.

Data analysis and summary of results

The data collected were varied with the intention of providing information on (a) developing oral and written language skills as well as computer confidence (b) any changes in attitude towards language and literacy learning among the students and (c) the elements of intervention that appeared to be most significant in determining achievement in language and literacy learning.

a) Development of oral and written language skills and computer confidence

As previously indicated, the students were only given assessments that were deemed appropriate. In figures 1 and 2 below, raw scores are reported from the language and literacy assessments used. N/S denotes that an assessment was administered, but no score was achieved.

The language assessments indicate that students, 'R', 'A' and 'K', made progress in their oral language skills (see Figure 1: Comparison of pre and post language assessments). When converted into months, this progress represents anywhere from 3-17 months for these students. 'S' did not appear to grow, in terms of oral language development. Indeed, his score after intervention was lower than the pre-assessment score. 'S''s severe physical impairments meant that administering the assessment was more difficult and more tiring for 'S', and when the post-assessment was conducted, his exhaustion was noted. It was believed that the lower score was more a result of fatigue rather than an indication of a sudden decline in oral language development.

Students:		**'S'**	**'R'**	**A'**	**K'**
Pre-intervention language:	**PPVT**	59	0		72
	PLS -3		16		
	Nonspeech			40	
	TACL- R				103
	INCH				18
Post-intervention language:	**PPVT**	53	12		82
	PLS -3		20		
	Nonspeech			46	
	TACL- R				105
	INCH				30

Figure 1: Comparison of pre and post language assessments

The results of the literacy assessments show that all four students demonstrated growth (see Figure 2: Comparison of pre and post literacy assessments). For 'R' and 'A' this growth was seen in improved understanding of concepts about print and in listening comprehension. 'S' also

developed in these areas, in addition to letter and word identification and phonological awareness. 'K''s assessments also show growth in many areas (concepts about print, letter and word identification, phonological awareness, written vocabulary, listening comprehension and reading comprehension). In fact, in some areas, ceiling effects owing to the scope of the assessments may have limited the researcher's ability to capture the full extent of her progress.

Student		**'S'**	**'R'**	**A'**	**K'**
Pre-intervention literacy	**CAP**	**9/14**	**2/14**	**3/14**	**13/14**
	LID 1	**9/26**	**n/s**	**6/26**	**26/26**
	LID 2	**n/s**	**n/s**	**n/s**	**24/26**
	WID	**n/s**	**n/s**	**n/s**	**18/20**
	PA	**n/s**	**n/s**	**n/s**	**36/43**
	WV				**20/23+13/21**
	D				**11/13**
	LC	**1st grade=80%**	**1stgrade=40%**	**1st grade=60%**	**3rd grade=60%**
	RC				**1st grade=40%**
Post-intervention literacy	**CAP**	**12/14**	**5/14**	**7/14**	**14/14**
	LID 1	**21/26**	**n/s**	**5/26**	**26/26**
	LID 2	**21/26**	**n/s**	**n/s**	**26/26**
	WID	**3/20**	**n/s**	**1/20**	**20/20**
	PA	**6/8**	**n/s**	**n/s**	**41/43**
	WV				**22/23+20/21**
	D				**11/13**
	LC	**2nd grade=60%**	**1st grade=60%**	**1st grade=80%**	**3rd grade=60%**
	RC				**1st grade=60%**

All of the students furthered their computer skills during intervention. Gains ranged from developing the ability to locate a personal file or program icon on the desktop and using arrows to turn pages in interactive books, to more significant skills having a large impact on independence as a computer user. For example, one student, 'K', learned how to use a Trackball

and Trackpad, which increased her access to the computer. She also learned to use the 'return' key, how to 'double click' and 'drag', open programs and print. Further, she became cognizant of when she needed help and how to ask for it.

b) Changes in attitude towards language and literacy learning among the students

A simple questionnaire designed with yes/no probes, communicated through use of picture communication symbols and speech, and administered before and after intervention hoped to gauge the students' changing perceptions of themselves as readers, writers and communicators. On the whole, the students' responses to the probes did not change a great deal during the intervention period. However, their changes in responses did seem significant. For example, 'S' who was in a period of his life where he was becoming painfully aware of his disability and its permanence, became more negative about his capabilities and gave a negative response to "I can read a book on my own" and "People understand what I am saying" after intervention. Interacting with peers who also had disabilities in a context devoted to developing language and literacy skills may have made him more realistic. Prior to intervention, 'A' depended heavily on her father talking for her, but afterwards she responded negatively to the statement, "I like my parents (Daddy) to talk for me" and was a much more active communicator. 'K', whose school literacy experiences, prior to intervention had consisted of copying, word study and spelling, started to see herself as a writer by the end of the program, responding positively to the statement "I like making up stories and seeing them on paper."; and 'R', who had not had opportunities to use writing tools before, affirmed "I like playing with pens and pencils" after intervention.

(c) elements of intervention that appeared to be most significant in determining achievement in language and literacy learning

Case studies were used to provide a full picture of the individuals in the study, explain contexts for their learning, draw together the range of data gathered, and examine elements of the intervention that appeared to be the most significant in determining the language and literacy achievement of each student. The brevity of this paper will only afford a summary of these elements (underlined below) rather than elaborate examination.

Access to appropriate augmentative communication technology was instrumental in enriching expressive vocabulary, participation, spontaneity and independence. Technology had to be reviewed and modified constantly to ensure technical and language needs were being addressed adequately. If technology became too cumbersome, limiting or frustrating, levels of participation, motivation and potential for success declined. For example, one student started intervention using an old VOCA that was limited to a few pre-determined messages enhanced by occasional spelling. These limitations meant that the individual was usually very slow and reluctant to communicate and often unable to participate. When supplied with a PowerBook and communication software during intervention, the student eagerly demonstrated a more sophisticated use of oral and written language, creating novel messages using an array of syntactically-organized vocabulary, spelling, and selecting whole messages for quick interaction.

Appropriate vocabulary provision and multiple opportunities to communicate in a variety of contexts was also essential. During intervention, vocabulary was introduced and updated on voice output communication aids and computers to keep extending the communicative repertoire of each student, enabling them to talk about themselves, express feelings, ask for information, talk with others, interact with and ‘read’ adapted books. Hitherto, many of the students were

dependent on a vocabulary often limited to saying their name, making activity choices and expressing basic needs. Furthermore, most of the individuals had never had opportunities to speak with other augmented speakers, nor had they had many learning experiences where use of augmentative communication was being modeled constantly by the instructors (who used AAC in addition to speech). During intervention, they not only had access to vocabulary, AAC usage was constantly modeled, and motivating opportunities were built into the program for practice and interaction across a range of contexts.

The nature of the learning opportunities offered during intervention differed greatly from those frequently offered in the school environment. In the program, instruction involved a large degree of communication and collaboration among peers. Prior to this, these students had mainly experienced learning through interaction with educational assistants and other school personnel, sometimes at the back of a classroom. Furthermore, school learning experiences often focused on developing discrete secretarial skills, taught out of context, sometimes involving the completion of large numbers of worksheets. During intervention, the thematic approach (which utilized a rich variety of materials, texts and authentic experiences) seemed to be a driving force in making language and literacy learning motivating for the students. The approach also and provided the context, purpose and audience for talking, reading and writing, which appeared to be lacking in the school curriculum. In addition, intervention was based on encouraging rather than protecting students from taking risks. The unusual level of expertise and adult supervision in the program enabled students to experiment with different types of technology in meaningful language and literacy contexts, and have individual communication therapy with a speech language pathologist to develop confidence and competence. The adult augmented speaker on

the staff discussed her experiences of learning to talk and write using a variety of communication aids with the students, and emphasized that her learning not only involved great effort but also involved making 'mistakes' and finding ways to 'recover' from communication breakdowns.

The program was also designed to involve parents and other significant parties. Parents/caregivers were required to take part on Fridays, and school personnel were encouraged to attend. Such involvement was important for sharing learning gains, modeling successful instructional strategies, and motivating the students, some of whom would save their best for these sessions. In addition to supporting the social and academic gains of the students, parental involvement seemed to help the parents, who were at risk of feeling overwhelmed. One parent, a single father, commented on the relief he felt having contact with parents who were also caring for a child with severe speech and physical impairments. In addition, his interaction with the adult augmented speaker on the staff helped to raise his expectations for his daughter.

Physical, and or health issues often determined success or at least the demonstration of success. For example, the progress, participation and socialization of one of the students may have been impeded by her recovery from a *grand mal* seizure and being in a coma shortly before intervention commenced. A post-intervention language assessment conducted with another student following an illness appeared to show a decline in language learning although informal observations during intervention were indicative of growth rather than deterioration in this area.

Economic factors also seemed to be important. When parents struggle to make ends meet, their children often miss out on important learning opportunities. For example, one parent who made his income through a parcel delivery service and could not afford childcare, often had to work at

night accompanied by his daughter riding in the back of his van.. This meant that his daughter was frequently exhausted, had a history of being late for preschool, and had few opportunities for using ACC with her father for either communication or such things as interactive book reading.

While all the students made significant progress when participating in the program, on return to school success was maintained in only two of the students. Long-term success seemed to be associated with certain characteristics and contexts of students in the study, as analyzed below.

Analysis of characteristics associated with enduring success

Maintaining success appeared to be associated with certain characteristics. It is not known, however, which of these factors, if any, has the greatest salience. The two students whose success was maintained differed from the other two students for the following reasons:

- They came from apparently strong, two-parent families who were managing economically, able to spend time supporting the language and literacy development of their children and in a position to advocate for their children's needs within the school system.
- They had two or more typically developing siblings who may have supported language and literacy development through their play and interaction as well as enabled their parents to be more aware of 'developmental milestones' hence increasing expectations for their child with disabilities.
- They both had prior experiences of literacy in school, which although often decontextualized, involved their active engagement to some degree, and also seemed to support their phonological awareness and knowledge of phonics.
- They had profound dysarthria with few or no word approximations, unlike the other students who were developing some words and word approximations particularly after using VOCAs. In other words, there may have been greater incentive among parents and school personnel to enable these students to use AAC than their counterparts who had some ability to articulate.

- They used PowerBooks in addition to dedicated devices with which to communicate. School personnel and parents may have had greater familiarity with this technology than the seemingly 'alien' technology of dedicated devices for communication that would necessitate more preliminary work and training on the part of adults.
- They were returning to schools where they had been placed for some time after intervention. Unlike the other students, they were known by school personnel and considered fully included. They were, therefore, not contending with transition periods that pose challenges for children with SSPI: because they are perceived as 'unknown quantities' and may appear more intellectually challenged because of their inability to articulate. Untrained personnel may have inappropriate or low expectations for them. They may not know how to communicate with them or evaluate/plan for their social, emotional, communicative, technical and intellectual needs.
- They had similar learning patterns that involved a preference for individual time with an adult, to practice and perfect skills before using these in group situations. They appeared not to need as many opportunities to play and explore before participating, as the other students. They may have been perceived, therefore, as more co-operative and less demanding of time and energy than their counterparts whose success waned.

Conclusion

The literature review showed that augmented speakers usually experience literacy in much more restrictive terms than typically developing children. In this study, however, intervention was based on lessons from research among typically developing students where language and literacy learning are perceived as multilevel, active and communicative processes that can be stimulated when teaching enables students to make and modify their own hypotheses. During the intervention it was learned that this active process is highly dependent upon independent means to interact and communicate with texts, teachers, parents, siblings, peers, and other significant partners. If augmented speakers are to gain entry to this active process, non-dependent ways of interaction (including VOCAs, communication books and boards, etc.) need to be in place, functional and regularly updated with appropriate vocabulary. **A key observation from this study is that management of students' technical and language needs is fundamental and**

need to be highlighted in developing a model for teaching and learning based on broader conceptions of language and literacy.

The pedagogy for this study was founded upon the notions that language and literacy development are best supported by: direct instruction building on prior knowledge where grapho-phonic skills are taught in context; formative assessments which inform instruction; encouraging parental involvement; providing collaborative experiences with print and clear models of literate behaviors; using rich narrative resources; attending to personal learning styles; and acknowledging social/cultural contexts. **This study found that young augmented speakers would also benefit from such a model of language and literacy**. Indeed, it was possible to create an environment of direct instruction where students had multiple opportunities to express themselves and develop pragmatic language skills in a variety of contexts as well as develop a love for books that enriched their vocabulary, enlisted their interaction, and helped them learn about emotions and develop empathy. It was also possible to engage these students in writing activities which developed their phonological awareness and phonic skills in context, which proved to be socially, emotionally, and intellectually rewarding and which went far beyond the development of secretarial skills. **Employing different formative assessment measures, accommodating the personal learning styles of the students, and developing partnerships with parents were not only feasible during intervention, but instrumental in the students' achievement.** However, the narrow interpretations of language and literacy learning documented in the literature also seemed to prevail in the preschool and school experiences of the children in this study. The learning environments and attitudes about learning in the program seemed significantly different to those the students had experienced at school. The program appeared to challenge the views of language and literacy and teaching and learning held by many teachers. **There are persuasive indications to suggest that future interventions need to find ways of increasing collaboration with school personnel and develop comprehensive staff education in literacy and AAC In contrast to many of their typically developing peers, these students are unlikely to be capable of learning 'around' what their schools offer**.

During the intervention, **the complexity of addressing these students' technical and language needs, and their different learning styles required multiple types of ongoing assessment**.

While standardized assessments were used to gather some baseline and post-intervention data these provided only a small portion of the information needed to develop the skills of these students. In order to have a full picture of the students (i.e. understanding of what they could do and were attempting to do, their needs, their progress, their strengths and weakness and the way in which they learned) assessment which was built on observation, feedback and discussions among staff, reflection and record-keeping was indispensable for the purposes of planning, preparation of materials and implementation. While formative assessment has been found beneficial in attending to the needs of typically developing children, this kind of assessment is essential when working with children with severe disabilities. Their needs tend to be more diverse and complex and there is an even greater need for planning and preparation of material among these children to ensure their technical and language needs are addressed appropriately.

Another finding was that **attending to the students' personal learning styles seemed to have particular salience for these 'fragile' children** since accommodating their individual learning needs seemed to relieve anxieties associated with being expected to participate actively after mainly passive experiences of literacy learning hitherto. These students learned in different ways and needed different amounts and types of support that included the following:

- opportunities to play and explore within an activity,
- modeling and practice within an activity,
- encouragement and time to speak in group situations, strategies for focusing in group situation,
- extra individual attention and time to work alone.

Close observation and multiple opportunities of working with the children on a one-to-one basis enabled the adults to learn about the students' personal learning styles. Feedback and discussion among the staff and volunteers during daily staff meetings informed decisions about ways to present activities, teaching strategies to be adopted and supports which needed to be in place for each individual to learn. Like typically developing children, these students could enjoy success in an environment centered on their needs.

Parents participation was very significant during the intervention. Parents were key consultants regarding the students' experiences of language and literacy prior to the program.

They also played an active role during intervention. They observed techniques and were guided on how to use these strategies with their children themselves. In most cases they worked with their children at home, supporting them with activities introduced during the intervention. As with typically developing children, parental stimulus and support in language and literacy activities was found to have a positive influence on learning**.**

In closing, this study finds that a model for language and literacy learning for young, augmented speakers should include ways to manage changing technical and language needs, utilize a variety of formative assessment measures, accommodate the personal learning styles, and collaborate with parents. These areas deserve further investigation by parties interested in fostering language and literacy among children who require AAC.

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