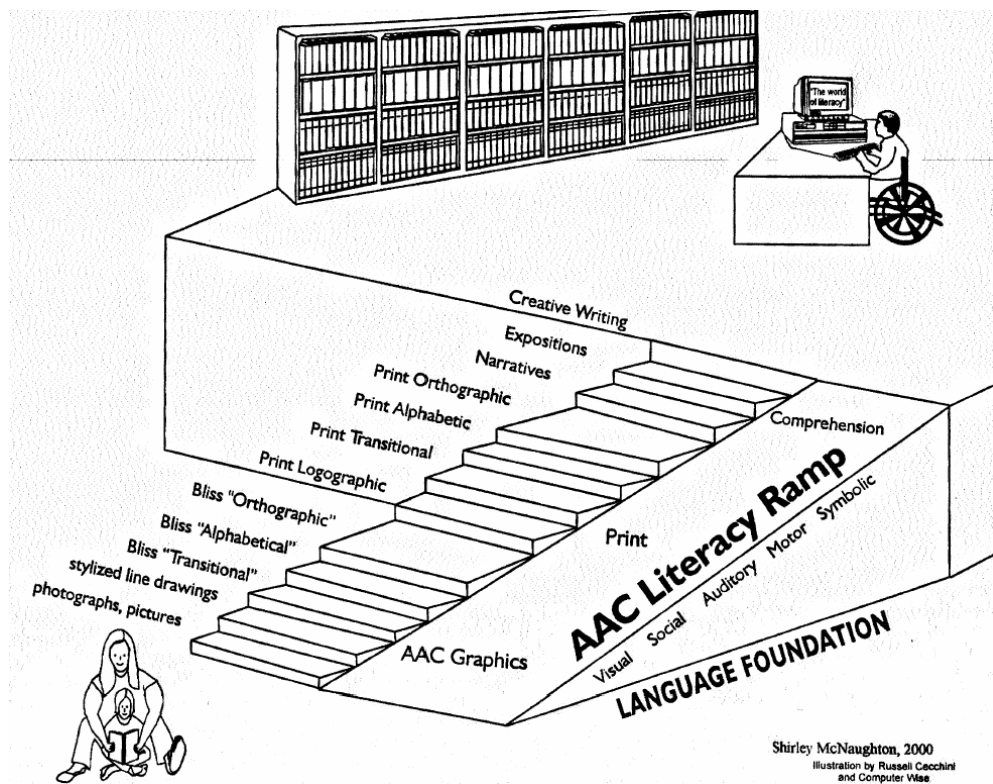


# THE AAC LITERACY RAMP

Shirley McNaughton C.M., Ph.D.

TWO metaphors are used throughout this description of literacy acquisition for AAC users, to offer an image that can be helpful in planning reading instruction. Just as a building needs a strong concrete foundation, so literacy acquisition requires a strong language foundation. Just as ramps replace steps to provide physical access for those who use wheelchairs, so an instructional ramp can provide access to higher literacy levels for AAC users. There are many steps in the

climb to literacy. For persons who are unable to use their speech to help them in their literacy ascent, their AAC system can make a unique contribution to both the instructional scaffolding that supports their learning and the language foundation upon which the scaffolding depends - I am calling this metaphorical structure the AAC literacy ramp.



Shirley McNaughton, 2000  
Illustration by Russell Cecchini  
and Computer Wise

In constructing this ramp, we can rely first on the findings of many established researchers within the extensive mainstream reading acquisition literature. Those to be referenced in this chapter are. Adams, 1990; Daneman, 1991; Ehri, 1991; Siegel 1993; Share, 1995; Snow, 1991; Stanovich 1986, 1990, 1994; Stanovich & West, 1989; Vandervelden &

Siegel, 1997. An excellent short summary of mainstream literacy research can be found in Smith and Blischak (1997). They discuss the changing focuses that have occurred in reading research and the models of literacy learning that are influencing reading instruction. Several language demands of reading and writing that have in the past two decades received

research attention are identified by Smith and Blischak: semantic processing, syntactic processing, metalinguistic abilities, and most notably, phonologic awareness. They observe, "Evidence is growing that sophistication of knowledge about phonologic structure is a critical factor in successfully learning to read and write alphabetic languages". Share (1995), reinforces this position in a comprehensive paper that describes phonological recoding as the sine qua non of reading acquisition. The two spellings ("phonologic" and "phonological") refer to the same processes. Both spellings will be retained in this chapter to respect the original sources. To be added to the above language demands of reading acquisition identified in mainstream literacy research, are visual processing (Stanovich & West, 1989; Willows, 1991), working memory (Daneman, 1991; Siegel, 1993), and language comprehension (Daneman, 1991).

In contrast to the large number of mainstream literacy studies that have been undertaken throughout the eighties and nineties, AAC literacy research must be described as formative. Many more studies are needed, especially those that would provide documentation over the long term of various interventions and literacy performance. The findings to date, however, can be helpful in refining the questions we ask as we plan instructional programs (McNaughton, 1998, pp. 278-307) and in expanding our definition of literacy to include the reading and writing of AAC graphic symbols as well as print. The AAC language papers and literacy research, also enable us to confidently state that there is a strong role to be played through improved literacy instruction helping AAC users achieve higher literacy levels (Berninger and Gans, 1986a, 1986b; Blischak 1994; Dahlgren Sandberg, 1996; Dahlgren Sandberg & Hjelmquist, 1996a 1996b; Foley, 1989; 1993; Foley & Pollaatsek, 1999; Lindblom, 1990; McNaughton, 1998; Smith, 1989, 1992; Sutton, 1996; Vandervelden & Siegel, 1999). McNaughton's (1998) findings, from a study including 33 adults with severe congenital speech and physical impairments (SCSPI), demonstrated that while there was empirical evidence of an overall lower reading performance of the subjects with SCSPI compared to the general population, the pattern of higher reading levels occurring with stronger ecological support supported an explanation based

on external causes. This ecological argument was much more strongly upheld by the results than an argument attempting to attribute lower reading achievement to personal limitations of the subjects (pp. 273-275). Overall, the AAC literacy research combined with the findings of mainstream literacy research provides valuable information to support the building, of an AAC literacy ramp.

### **The Stages of AAC Literacy Knowledge**

At the beginning of the nineties, McNaughtan (1990) classified graphics, education and literacy for AAC users as being at the baby stage and functioning at the identification skill level. David Yoder (1999), co-founder with David Kappenhaver, of the Carolina Literacy Centre, described the stages of knowledge within the AAC literacy field, exemplified in the work of the Centre, as following those of the developing reader.

#### **Stage 1**

*Pre-emergent literacy* - up to the eighties, when professionals doubted that that persons with non-functional speech were capable of learning to read:

*Author's note: It is unfortunate that this attitude prevailed in spite of such notable exceptions as Christopher Nolan (1987) and Christy Brown (1954) and the work of Schonell, who conducted a study in 1956, in which 20 students with cerebral palsy were given reading instruction for twelve months and their progress was compared with a control group matched for chronological age, mental age, reading ability and physical, sensory and speech handicaps to the extent possible. Schonell concluded from her study:*

Although these results refer to only a small number of cases they indicate strongly that cerebral palsied children whose intelligence lies within the range of the ordinary school population and whose sensory defects do not prevent them from benefiting from class teaching can make very satisfactory progress in reading. It also suggests that such children are likely to benefit more from the special instruction given in a school for cerebral palsied children than in the larger and more varied group in an ordinary school or special school for physically handicapped children.

(Schonell, 1956, p. 150)

---

*It is interesting to note that Schonell's second point relating to the benefits to be derived from special instruction in segregated schools is in marked contrast with the policy of integration practised widely to-day.*

### Stage 2

Emergent literacy - beginning in the nineties, when the focus was fixed on the early experiences with print and voice output that could be provided to children with severe speech and physical impairments.

### Stage 3

Supported Autonomous Literacy - expanding the focus the child's preschool experiences, to the provision of supports for reading and writing through instructional scaffolding and technology in the primary school years.

### Stage 4

Autonomous or Conventional Literacy - in which attention is focused on integrating the processes of being able to identify words and comprehending what is read.

While Yoder might confidently argue, and the presentations at the Carolina Literacy Symposium ably demonstrated, that professionals from the Carolina Literacy Centre were operating at Stage 4 in 1999, many instances can be found of AAC users involved in programs planned by instructors who are arrested at levels 1, 2 or 3! To build a literacy ramp for AAC users, *instructors* must function at a Stage 4, professionally. They must provide a ramp that will provide AAC users their special access route all the way to their Stage 4. This ramp is urgently needed by many AAC users!

### The AAC Users' Ramped Steps to Literacy

As in all construction, we begin with the foundation - in this case the *language foundation* - upon which the literacy steps and their accompanying ramp can be built. The strength of the language base will be a strong determiner in how successful the literacy climb will be. The first flight of steps, for which we must provide a ramp, is that mastered by the young speaking child interacting with books and print in a myriad of ways - referred to as emergent literacy. Children without functional speech can use their AAC graphic system, whether it appears as a communication board/book or

on a voice output device, as their means of interacting with others, of "talking" about the books which they "read" with others, of exploring graphic symbols, and of "writing". The third ramped flight of steps provides access to word recognition through facilitating the acquisition of skills relating to phonological recoding. The fourth ramped flight of steps leads to the AAC user's destination - autonomous or independent reading, in which the reader comprehends increasingly difficult content and vocabulary and varied text formats. Providing a strong and secure ramp that draws upon the AAC user's AAC system is the challenge of instructors. It can be an exciting and rewarding occupation!

### The Language Foundation

First we need a definition for language that can relate to the literacy learning of AAC users. Lindblom (1990) offers a constructive perspective with his focus upon duality:

Human languages make combinatorial use of discrete units at two levels of structure. At the phonological level they combine vowels and consonants to form words and other forms. And at the level of syntax they use rules for combining words into phrases and sentences. This combinatorial method is so powerful that, for practical purposes, it sets no upper limit on the number of messages that languages can convey. It is the key to their expressive power. Since it operates both on the units of phonology and on the units of syntax, it has dual structure. In the terminology of the linguist, human languages are said to exhibit duality (Hockett, 1958; Lindblom, 1990, p. 227)

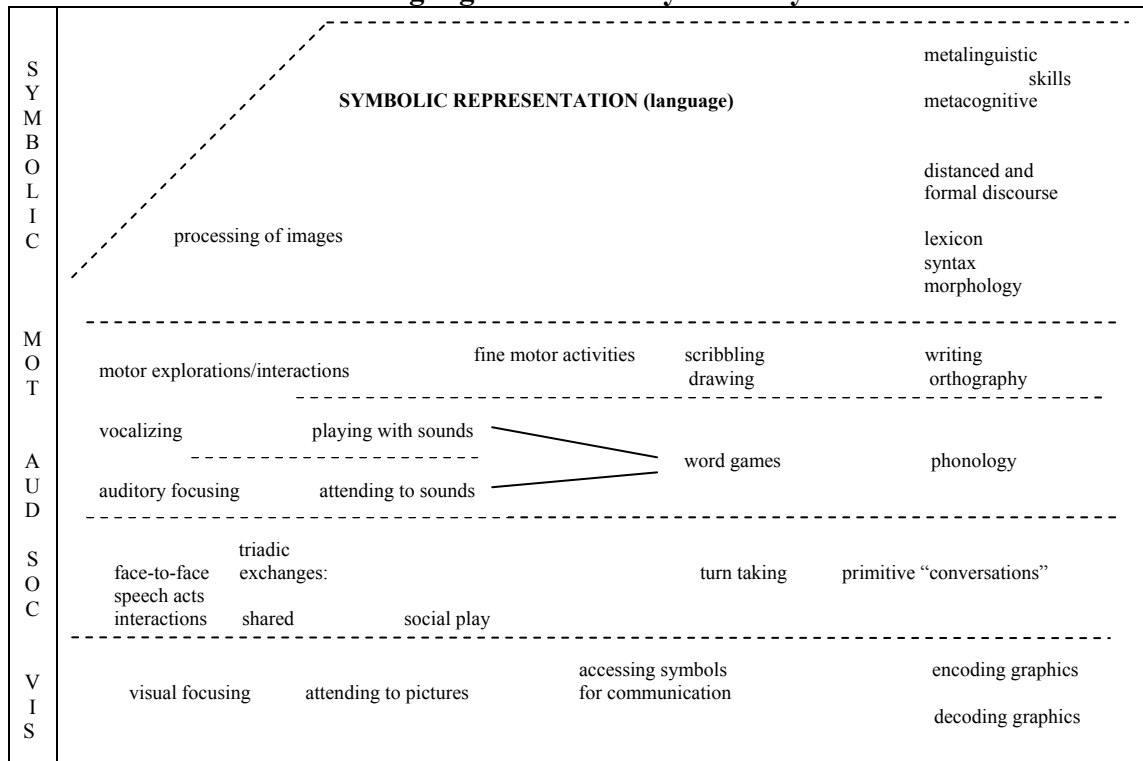
For speaking children, the duality of the language of their environment is applied every time they utter or write a new word or produce an original phrase or sentence. The "combinatorial capability" is mastered through day-to-day interaction. They learn their language through listening to the talk of others, through talking with those in their environment and through early explorations with writing within their drawings. For AAC users, the duality of their native language is presented to them receptively as they listen to the speaking of those who interact with them and observe the print sentences in books. AAC users can only acquire "combinatorial capabil-

ity” expressively if their AAC system provides duality and they are able to access and manipulate word (symbol) and sentence elements.

Sutton (1996) examined two positions taken in the AAC field as to the acquisition of grammar (requiring combinatorial capability at both word and sentence level) by AAC users. Claim One states that the same processes and strategies are used by AAC users as by normally speaking children and relies on theories of language acquisition that focus on linguistic input and comprehension, rather than upon children's own production. Claim Two states that AAC users do not acquire the grammar of language in the

same way as speaking children because they are unable to produce utterances as effortlessly and in the same manner as speaking children. This claim relies on communication-based theories in which the role of language production is emphasized. The need for further study into the issues raised by Sutton is but one of many indications that our knowledge regarding literacy acquisition by AAC users is in its infancy. We can apply the recommendations derived from both claims, however, in considering the language foundation for literacy. In so doing, we will provide rich receptive language experiences and, as well, provide as many opportunities as possible for AAC users to construct their own words and sentences.

**Language And Literacy Pathway**



Snow (1991) provides another view of language, one that focuses upon the strata (layers) of the foundation itself. Her depiction of language as multi-layered is applied in the “language and literacy pathway” (McNaughton & Lindsay, 1995) in which separable paths of development comprising the components of language skill are combined with Keating's (1990) conceptualization of “pathways to the development of expertise”. It is important to note that

Snow's model presumes that “the various components of language are theoretically separable for all children and empirically separable for some, and that developmental progression through the various components might occur at very different rates for a single child” (p. 110).

The “language and literacy pathway” identifies five strands within language development - visual,

social, auditory, motor and symbolic. In considering the development of the child who uses AAC the visual strand takes on special importance. It is through this modality that the AAC user “speaks”. While all children begin with visual focusing and progress to attending to pictures, the AAC user progresses from attending to visual stimuli to using symbols for communication. If these symbols provide language experiences of duality, the learning of the speaking child is better emulated and the AAC user is given a preparation for encoding and decoding print. In the social, auditory and motor strands, individuals who use AAC experience limitations compared to nondisabled persons. In the visual strand, however, their reliance on AAC graphics provides an opportunity for increased attention to be given to symbols at an earlier age. This can offer advantages as the child who uses AAC approaches the reading of print.

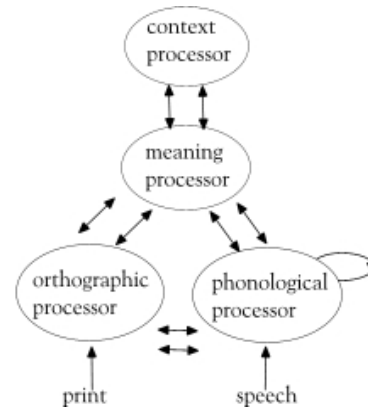
### Two Conceptualizations of Reading Acquisition

To provide a theoretical underpinning for representing literacy acquisition through the language foundation and AAC literacy ramp metaphors, two of the many conceptualizations of reading acquisition have been selected. The connectionist model (Adams, 1990) depicts the processes involved in successful reading. The developmental model (Ehri, 1991) describes the stages of word recognition of the beginning reader.

#### Connectionist Model

The processing involved in reading described by Marilyn Adams (1990) is derived from a comprehensive review of the reading research literature and is strongly influenced by the connectionist framework for lexical processing of Seidenberg and McClelland (1989). In particular, Adams stresses the importance of the interrelation among the parts of the reading system. “As the parts of the system are refined and developed in proper relation to one another, each guides and reinforces the growth of the other” (p. 6).

The different and frequently limited social, auditory and motor experiences of AAC users, can be expected to restrict the development and functioning of the Contexts, Meaning and Phonological processors. This does not mean that there is no instructional



Adams Model of Reading, 1990, p. 158.

support possible, but rather that special planning is needed in order to compensate for the limitations that may be imposed due to the constricted learning experiences of the young AAC user. As graphic symbols are used for communication prior to print, the reading and writing of symbols can provide early experiences in literacy. The extent to which these experiences play a constructive role in the functioning of all the processors will be dependent upon the language capabilities of both the AAC graphic system and the voice output device, and the ability and ingenuity of instructors to take advantage of and utilize these capabilities.

#### Developmental or Stages Model

Within this model, attention is focused on the stage at which the young child first begins to relate to the segments or component parts of words as alphabetic cues (Ehri, 1991, 1992; Frith, 1985). In building upon the stages proposed by Frith, Ehri provides a clear description of four phases of development. These stages are (a) the *logographic* stage in which the letters serve as visual cues and when the child recognizes words holistically as sight words or as a paired associate; (b) the *transitional stage*, when the letters begin to provide alphabetic cues linked to the sounds in spoken words; (c) the *alphabetic* stage when the child becomes able to “phonologically recode”<sup>1</sup> spell-

<sup>1</sup>Phonological recoding, defined by Ehri (1991) as “translating letters into sounds by application of letter-sound rules and then recognizing the identities of words from their pronunciations” (p. 107).

ings into pronunciations according to grapheme-phoneme correspondence rules” (Ehri, 1991); and (d) the *orthographic* stage, when children are familiar enough with the spelling patterns that recur, to apply this knowledge to reading words. Empirical studies based on Ehri's formulation suggest that success in the transitional and alphabetic phases is one of the early indicators of which children will achieve literacy.

It will be helpful to refer to the four processors depicted by Adams, as the steps identified by Ehri are considered within the flights of steps involving the AAC graphic system (first and second flights) and phonological recoding (third flight). As the AAC user arrives at the literacy ramp for the fourth flight of steps, attention can shift to balancing the instructor and environmental support (scaffolding) with the learning of the AAC user drawing on his or her own knowledge and resources. Stanovich (1994) refers to these two types of learning as exogenous constructivism (provided externally) and endogenous constructivism (provided by the learner). The distinction Stanovich makes between *exogenous* constructivism which he applies to word recognition and *endogenous* constructivism which he applies to comprehension is helpful in adapting the literacy ramp to the needs of the learner. In word recognition, the processing has been found to be modular and thus independent of the higher cognitive processes (Share, 1995; Stanovich 1990). Word recognition relies on specific information relating to letter-sound relationships which for many learners can most effectively be attained through direct and explicit instruction. In comprehension, on the other hand, the higher cognitive processes are involved and individuals can generate an understanding of text from their own knowledge base.

### **Ramping the Beginning Steps - AAC Graphics**

The first and second sets of steps to be described here are derived from the hierarchy of graphic systems that has been accepted within the AAC field since the mid-eighties. Within the Vanderheiden and Lloyd chapter entitled “Communication systems and their components” in Blackstone's *Augmentative Communi-*

*cation: An Introduction* (1986), symbols referred to as “static” (including both graphic symbols and objects “that are permanent and enduring” (p. 71 ) were listed as follows (in order of perceived difficulty): objects (actual objects, miniature or representational objects); pictures (photographs and drawings) - - simple (or basic) rebus, other picture sets; Sigsymbols; Pictogram Ideogram Communication (PIC); Picsyms; Blissymbols; graphic representations of manual signs and/or gestures; modified orthography and other symbols; complex (or expanded) rebus; abstract logographs and abstract shapes; traditional orthography (written and printed words); fingerspelling or manual alphabets; graphic representations of fingerspelling; Braille and other static tactile codes (p. 72). It is interesting to note that Picture Communication Symbols (PCS) that are so widely used today were not listed as an identifiable picture set in 1986.

In 1992, Beukelman and Mirenda referred to “static” symbols as “aided” and “representational” and evaluated those that were two-dimensional according to their relative guessability (transparency) and learnability (translucency); and in terms of the populations of AAC users with whom they had been successfully used. Their ordering of perceived guessability and learnability (based on studies by Bloomberg, Karlan & Lloyd, 1990; Hurlbut, Iwata, & Green, 1982; Mirenda & Locke, 1989; Mizuko; 1987) followed roughly the ordering above -photographs and line drawings (PCS, Rebus, Picsyms, PIC, Blissymbolics); abstract symbol systems (Yerkish Lexigrams, Non-SLIP (Non-Speech Language Initiation Program); orthography and orthographic symbols (traditional orthography, Morse code, Braille, phonemic symbols). Other researchers have reinforced this learning hierarchy (Fuller & Lloyd, 1987; Goossens, 1983; Luftig & Bersani, 1985).

### **Beginning the Climb**

**First Set of Steps: Pictures.** On the first step in the climb to literacy there are photographs and pictures. At this level, the individual is learning that a two-dimensional graphic can transmit meaning to another person when it is selected. On the second step, the individual begins to use the stylized line drawings of PCS or rebus, or other simplified drawings. Both the

---

first and second steps can be viewed as a *logographic* stage in which pictures are recognized holistically. For some AAC users this may be the final step, even though it is at the beginning of the literacy stairs. A great many reading and writing activities can be undertaken at this level. It is now possible to write and read PCS or rebus in addition to using them for face-to-face communication (e.g., *Writing with Symbols*, Widget Software Ltd.) For those who are unable to climb to the next step, this literacy with symbols can offer many satisfying experiences.

**Second Set of Steps: Bliss-words.** For many AAC users, however, there are higher steps of literacy achievement within the AAC graphics domain - those that can lead the learner through *transitional*, *“alphabetic”* and *“orthographic”* stages with symbols. Prior to attempting a jump to the next flight of steps involving traditional orthography, there is a set of the steps containing Bliss-words. These are the highest steps prior to print, and there are language and literacy benefits to be gained from spending time at this level.

Blissymbolics is a communication system, originally created by Charles K. Bliss (1965) as an international language. As such it has many features that can contribute to the language learning of AAC users (Hehner, 1980; McDonald, 1980; McNaughton, 1985; Wood, Storr, & Reich, 1992). Bliss-words are composed of Bliss-characters that are sequenced and given new meanings by adding grammatical indicators and word-building strategies for vocabulary extension. The meaning can also be changed by using strategies. For example, the indicators within Blissymbolics enable a Bliss-word to change its grammatical form, from noun to adjective to verb. The tense of the verb can be changed (past, present, future) through adding the appropriate indicator. Plurality can be denoted by the plural indicator. Included within the strategies is the suffix of “belongs to”, which when added to any noun or pronoun denotes the possessive form. Other strategies giving new meaning to Bliss-words include prefixes such as “opposite meaning”, “part of” and “similar to”. The “combine” strategy enables the user to create new symbols by stringing a new sequence of Bliss-characters.

By “spelling” the meaning characters in established Bliss-words and by “combining” an original sequence of Bliss-characters to form a new Bliss-word, the Bliss user gains experience at the first level of language. An understanding of and experience in manipulating the Bliss-characters within Bliss-words orients the learner to analyse the visual elements (letters) within print words that they see in their environments and that they will meet in a more formal way in the next flight of literacy stairs. Of course, the letter elements in words at the third flight of stairs will relate to phonology rather than to semantics as the individual climbs from Bliss to print. The instructional ramp, however, can help the learner discover that the visual analysis that applies to Bliss-words can also be applied to print words.

Bliss sentences are composed of Bliss-words that can be sequenced to follow the native language patterns of the Bliss user. Sentence forms include statements, questions, commands, and can include adjectives, adverbs, prepositions, conjunctions, nouns and verbs. As Bliss users construct sentences to interact with those in their environment, they are building the language competencies that can be applied to deriving meaning from print. They can have independent writing opportunities through Bliss for Windows (produced by Handicom, The Netherlands) or BlissInternet (produced by Blissymbolics Communication International, Canada). As the Blissymbol sentences and newly combined words are written on the computer, or by the instructor on the blackboard, learners are involved in creating their own reading material and gaining valuable pre-print experiences.

In providing language *duality*, Blissymbolics supports the learner through stages similar to those described by Ehri (1991), for print. The Bliss steps at the top of the AAC Graphics flight of stairs can be described as: (a) the first Bliss step at which Bliss-characters provide meaning cues linked to the meaning of the full Bliss-word (*transitional* stage), (b) the second Bliss step at which the Bliss-characters enable the learner to “semantically recode” Bliss-word spellings into the meaning of the full Bliss-word (*alphabetic* stage), and (c) the third Bliss step at which Bliss-character patterns that recur can be applied by the learner to the understanding of new Bliss-words (*or-*

*thographic* stage). Since the components within the Bliss-words relate to meaning, the phonological skills that are required to decode print can be deferred to the next flight of steps. In the meantime, the learner gains language competencies as the language capabilities of Blissymbolics are used to interact in an increasingly sophisticated manner with a range of communication partners. Experience can be gained in using the Orthographic, Meaning and Context processors, depicted by Adams (1990), prior to requiring the more difficult phonological recoding involving the Phonological processor to recognize new words.

Throughout all the AAC Graphic steps, it is important to remember that, while the primary role for the graphics is communication, literacy and language can be nurtured. This can be accomplished by instructors and communication partners taking advantage of the graphic system's language features within a stimulating language environment filled with interactive activities.

### **Ramping the Third Set of Steps to Master Phonological Recoding and Bring Meaning to Print**

The important literacy learning that takes place as the individual climbs the third flight of steps is the skill-building associated with phonological recoding along with an expanding of language abilities as these abilities and world knowledge are applied to the processing of printed words. Print now becomes the medium for further development of the language abilities acquired during the AAC Graphic flight of steps, for further knowledge acquisition, and for extending the quality, type, and number of interactions with communication partners. With print, there are again two levels of structure. At the phonological level, learners combine vowels and consonants to form words. At the syntax level, they use rules for combining words into phrases and sentences.

At this third level of the climb, we return to the stages described by Ehri (1991) and refined by Vandervelden and Siegel (1995). At the first step of the set of stairs to master phonological recoding and bring meaning to print, the learner is recognizing whole words by sight (*logographic* stage). The shape of the letters and the length and the shape of the words serve as visual cues. Meaning is associated with the

entire visual configuration. Many learners can acquire a large "sight vocabulary" and begin the reading of print. They are successful as long as the words they encounter are already known. When a new word is encountered, learners at this stage lack the "decoding" skills to identify the word. Any guessing that occurs will likely be related to what seems to make sense to the meaning of the sentence, within the context of the information provided by the known words. As instruction is given and experiences are provided relating to letter-sound associations, the learner begins to look for cues to the identity of new words through the sounds associated with the letters (*transitional* stage). As the learner gains skill, more and more words can be recognized through applying the grapheme-phoneme correspondence rules (*alphabetic stage*).

Within the transitional and alphabetic stages, a developmental pattern has been documented by Vandervelden and Siegel (1995). They describe the broad term of phonological recoding as a strategy to close the gap between the sounds of each element in a phoneme sequence and the spoken word or pseudoword it represents. They define the development of phonological recoding in early reading as the ability to accurately *read* one-syllable, one-vowel pseudowords and they identify three levels. Within each of these levels, there is partial to full recoding. The levels have been defined by the type of task by which they are operationalized - *recognition* task (speech-to-print matching), *spelling* task (from spoken stimulus) and *retrieval decoding* task (from print stimulus). A detailed analysis of subjects' performance revealed a partial to full developmental pattern of initial consonant, final consonant, then medial vowel processing within a general progression from recognition, to spelling, to decoding pseudowords.

It is important for AAC users that explicit instruction be provided through the literacy ramp during the climbing of these phonological recoding steps. From the findings of Ehri, and Vandervelden and Siegel, we have an indication of the support to give at the beginning steps involving three-letter words. The instructional ramp can provide graduated activities in which attention must be focused first upon the initial letter of words, then on the final letter, then upon the

---

medial letter. Early reading series and informal studies, such as those conducted through the Carolina Literacy Centre, can be helpful in identifying levels of difficulty relating to onsets and rhymes in longer and compound words (Erickson & Koppenhaver, 1999). At this third level of the literacy steps, the most important consideration is to provide planned instruction to assist students in becoming consciously aware of the phonemes in printed words and to provide print experiences that are sufficient in quantity and at a level conducive to the individual learner mastering phonological recoding.

At this level, attention is needed to the provision of writing experiences using the computer and face-to-face communication using a voice output device. Stanovich (1986) uses an analogy to describe the importance of having many opportunities to read and write. He refers to a “Matthew effect” to denote a reciprocal relationship between reading and a language skill that is improved by reading. As the skill increases, it in turn improves reading. An example used by Stanovich is the relationship between vocabulary knowledge and reading proficiency. Reading volume increases vocabulary growth; increased vocabulary spawns further reading ability. In contrast, children with inadequate vocabularies read less and as a result have limited vocabulary development. This in turn reduces their reading growth. The term “Matthew effect” was derived from the Gospel according to Matthew: “For unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath” (XXV:29). Smith and Blischak (1997) provide a valuable discussion of the value of writing, technology and synthetic speech (pp. 439-443) in their examination of literacy for AAC users.

Throughout the climbing of this flight of the literacy steps, the more meaning the individual is able to bring to the words that are being decoded, the greater will be the enjoyment and satisfaction with reading. The learning experiences of the first and second flights of literacy stairs can enhance the meaning the individual brings to the words and sentences in the third flight. It is at this level in the literacy climb that the Phonological processor joins with

the Orthographic, Meaning and Context Processors in the climb to print literacy competency.

### **Ramping the Fourth Set of Steps Towards Gaining Independent Reading Comprehension**

Climbing beyond the third flight of stairs, students can gain increasing independence as they *read to learn*. To the extent that students have acquired a strong language foundation and mastered the phonological recoding skill that enables them to recognize new words and bring meaning to increasingly complex sentence and print forms, they can apply their reading competencies to a wide range of print activities. The Orthographic, Phonological, Meaning and Context Processors work together more and more effectively, enabling learners to interpret different types of texts, increase their world knowledge, gain experience and develop competencies in reading and writing for different purposes and in differing forms - discourse, narrative and expository. The major role of the literacy ramp at this level is to ensure that the educational environment is positive, encouraging and meeting the access needs and interest areas of the AAC user.

Sturm (1999), in looking “beyond emergent literacy”, summarized the literacy experiences for which scaffolds (*ramp*, within the metaphor used in this chapter) can be provided in the primary and secondary grades. For primary grades, the activities in which literacy is applied are fiction/narratives, expositions, journals/creative writing, plays/skits, poetry and songs, riddles and rhymes, worksheets, newspapers, spelling definitions, creating books, thank you notes, pen pal letters, e-mail pals. For secondary grades, worksheets, reports, notetaking, summarizing, outlining, essays and exams, were the writing activities listed. It is obvious, from the wide variety of literacy activities in which AAC users will need to be involved as they move ahead academically that their language and literacy competencies will be applied broadly and will be interdependent, each enriching the other. The ramp for this fourth flight of steps shifts from explicit instruction, the *exogenous constructivism* described by Stanovich (1994), to the provision of opportunities for students, themselves, to direct and expand their abilities, the *endogenous constructivism* described by Stanovich. As their literacy competencies develop, their educational pursuits more and

---

more approximate those of their speaking peers. Ensuring access to equal opportunities for learning becomes the purpose for the ramp, rather than special instructional support

### **An Overview of the Literacy Ramp**

There are two caveats that must accompany the AAC Literacy Ramp. Firstly, a weakness must be acknowledged in reducing literacy learning to the simple metaphors of *language foundation* and *literacy steps with ramp*. We usually think of a foundation as being completed before the structure that will rest on it is begun. In the case of literacy, the language foundation is indeed initiated prior to any informal or formal literacy instruction, through the early interaction between child and parent. Language, however, continues to develop and strengthen throughout literacy acquisition, as described earlier through the "Matthew effect" (Stanovich, 1986) and as depicted in the "language and literacy pathway" (McNaughton & Lindsay, 1995). Further, we usually think of steps in a fixed position one to the other. This is not necessarily the case in the literacy staircase. Witness those children who "teach themselves to read" - both AAC users and typically developing youngsters! We must be sure that this self-taught reading includes the identifying of new words through phonological recoding and does not rely solely on remembering a set of sight words. That being said, the many factors influencing the individual's literacy learning make it imperative that the instructor view the ordering of the literacy steps as but a guide. The AAC literacy ramp must accommodate individuals who skip a step or two or who jump ahead and then move back to take time on each of the steps that were missed previously. Achieving competency at the highest level for each individual is the ultimate goal.

The foundation and ramped steps metaphors were selected to demonstrate the strong relationships between language, AAC graphics and literacy. Within the educational programs of AAC users, these inter-relationships are often not given the attention they warrant. The challenge for instructors is to nurture all three within the educational program. In the early years (the first two flights of literacy steps), this means support to the language learning to

be derived from AAC graphics and demanding that the child be given the highest level of AAC graphic of which he or she is capable. In the primary years (the third flight of literacy steps), it means combining the phonological recoding skill development with ongoing language learning and providing links for the child between print and the AAC graphic system being used for communication. In the advanced school years (the fourth flight of literacy steps), it means ensuring that the student who uses AAC will have access to whatever directions of literacy he or she may choose.

Secondly, a caution must be expressed regarding the strong emphasis that has been placed upon the role of AAC graphics within the first two flights of steps, and the distinction that has been made between the language capabilities of Blissymbols as distinct from picture sets such as PCS or rebus. The opposing position presented by Bishop, Rankin and Miranda (1994), to that of McNaughton (1993) and McNaughton and Lindsay (1995), must be acknowledged. Bishop et al. make no distinction between types of pictures and argue that "the use of graphic symbols may facilitate specific components of print and word awareness, but that the overall impact of these symbol sets/systems on beginning reading may be minimal" (p. 113). McNaughton (1993) and McNaughton and Lindsay (1995), on the other hand, differentiate between Type One, picture-type symbols that are processed holistically and Type Two symbols, such as many Blissymbols, that can be analyzed into their component parts. McNaughton and Lindsay argue further that an instructional advantage can be derived from helping the student who uses Blissymbols compare and contrast the analytic processing of Bliss-words into their Bliss-characters (that relate to meaning) to the analytic processing of print words into their letter-characters (that relate to sound). Brief reviews of these two positions can be found in Loncke, Clibbens, Arvidson and Lloyd (1999) pp. 182-186, and Smith and Blischak (1997), p. 443.

It is important that an open view be maintained regarding the relationship between AAC graphics and print literacy until there are adequate longterm studies to either refute or confirm the observations of this author - observations that are based

on an involvement in Blissymbol instruction since the early seventies. In the meantime, it would seem prudent to take advantage of any language learning opportunities that can be derived from Blissymbolics in literacy learning (McNaughton, 1998), as have been presented in the AAC Graphic flight of stairs.

### Summary

The following suggestions are offered to those providing the language foundation and the AAC literacy ramp:

1. Have high expectations for literacy learning by the AAC user, and adjust the ramp to ensure that the individual achieves his or her highest level of accomplishment.
2. Attend to strengthening the AAC user's language foundation throughout the climbing of the literacy staircase.
3. Differentiate between providing explicit instruction while the learner climbs the first three flights of stairs, and ensuring access to independent learning opportunities when the learner reaches the fourth flight.
4. The goal is literacy competencies for AAC users that are equal to those of their speaking peers as they climb the fourth flight of steps.
5. Remember, success relies upon a strong foundation and a ramp of appropriate and ongoing instructional support.

### References

- Adams, M.J. (1990). *Beginning to read*. Cambridge: The MIT Press.
- Berninger, V.W., & Gans, B.M. (1986a). Language profiles in nonspeaking individuals of normal intelligence with severe cerebral palsy. *Augmentative and Alternative Communication*, 2, 45-50.
- Berninger, V.W., & Gans, B.M. (1986b). Assessing word processing capability of the nonvocal, nonwriting. *Augmentative and Alternative Communication*, 2, 56-63.
- Beukelman, D.R., & Mirenda, P. (1992). *Augmentative and Alternative Communication: Management of severe communication disorders in children and adults*. Baltimore: Paul H. Brookes.
- Bishop, K., Rankin, J., & Mirenda, P. (1994). Impact of graphic symbol use on reading acquisition. *Augmentative and Alternative Communication* 10, 113-125.
- Blischak, D. (1994). Phonologic awareness: Implications for individuals with little or no functional speech. *Augmentative and Alternative Communication*, 10, 245-254.
- Bliss, C.K. (1949/1965). *Semantography-Blissymbolics*. Sydney, Australia: Semantography Trust
- Bloomberg, K., Karlan, G., & Lloyd, LL. (1990). The comparative translucency of initial lexical items represented by five graphic symbol systems and sets. *Journal of Speech and Hearing Research*, 33, 717-725.
- Brown, C. (1954). *My left foot*. London: Fontana/Open Books.
- Dahlgren Sandberg, A. (1996). *Literacy abilities in non-vocal children with cerebral palsy*. Unpublished doctoral dissertation. Goteborg University, Sweden.
- Dahlgren Sandberg, A., & Hjelmquist, E. (1996a). Phonologic awareness and literacy abilities in non speaking preschool children with cerebral palsy. *Augmentative and Alternative Communication* 12, 138-153.
- Dahlgren Sandberg, A., & Hjelmquist, E. (1996b). A comparative, descriptive study of reading and writing skills among non-speaking children: a preliminary study. *European Journal of Disorders of Communication*, 31, 289-308.
- Daneman, M. (1991). Individual differences in reading skills. In R. Barr, M.L. Kamil, P. Mosenthal, F.D. Pearson (Eds.), *Handbook of reading research*, (Vol. II, pp. 512-538). New York: Longman
- Ehri, L.C. (1991). Development in the ability to read words. R. Barr, M.L. Kamil, P. Mosenthal, F.D. Pearson (Eds.), *Handbook of reading research*, (Vol. II, pp. 383-417). New York: Longman.
- Ehri, L.C. (1992). Reconceptualizing the development of sight word reading and its relationship to recoding. In P.B. Gough, L.C. Ehri & R. Treiman (Eds.), *Reading acquisition* (pp. 107-143). Hillsdale, N.J. L. Erlbaum Associates.
- Erickson, K.A., & Koppenhaver, D.A. (1999). Technology supports for balanced word level instruction in beginning reading. Presentation, 8th Literacy Symposium, Carolina Literacy Centre, Chapel Hill, North Carolina, February 4-6, 1999.
- Foley, B.E. (1989). *Phonological recoding and congenital dysarthria*. Unpublished doctoral dissertation. University of Massachusetts, Amherst, MA.
- Foley, B.E. (1993). *The development of literacy in individuals with severe congenital speech and motor im-*

- pairments. *Topics in Language Disorders*, 13 (2), 16-32.
- Frith, U. (1985). Beneath the surface of developmental dyslexia. In K.E. Patterson, J.C. Marshall, & M. Coltheart (Eds.), *Surface of dyslexia* (pp. 301-330), London. Erlbaum.
- Fuller, D.R., & Lloyd, L.L. (1987): A study of physical and semantic characteristics of a graphic symbol system as predictors of perceived complexity. *Augmentative and Alternative Communication*, 3 (1), 26-35.
- Goossens, C. (1983). The relative iconicity and learnability of verb referents depicted in Blissymbols, manual signs, and Rebus symbols: An investigation with moderately retarded individuals. Unpublished doctoral dissertation, Purdue University, West Lafayette, IN.
- Hegner, B. (1980). *Blissymbols for Use*. Blissymbolics Communication Institute.
- Hockett, C.F. (1958). *A course in modern linguistics*. New York: MacMillan.
- Hurlbut, B., Iwata, B., & Green, J. (1982). Nonvocal language acquisition in adolescents with severe physical disabilities: Blissymbol versus iconic stimulus formats. *Journal of Applied Behavior Analysis*, 15, 241-258.
- Keating, D.P. (1990). Charting pathways to the development of expertise. *Educational Psychologist*, 25, 243-267.
- Lindblom B. (1990). On the communication process: Speaker-listener interaction and the development of speech. *Augmentative and Alternative Communication*, 6, 220-230.
- Lloyds L.L.; Fuller, D:R, & Arvidson, H.H\_ (Eds). (1997). *Augmentative and Alternative Communication: A Handbook of Principles and Practices*: Boston. Allyn and Bacon.
- Loncke, F.T., Clibbens, J., Arvidson, H.H., & Lloyd, L.L. (1999). *Augmentative and Alternative Communication: New directions in research and practice*. London: Whurr Publishers.
- Luftig, R.L., & Bersani, H.A. (1985). An initial investigation of translucency, transparency, and component complexity of Blissymbolics. *Journal of Childhood Communication Disorders*, 8(1), 191-209.
- McDonatd, E.T. (1980). *Teaching and using Blissymbolics*. Toronto: Blissymbolics Communication Institute.
- McNaughton, S. (Ed.), (1995). *Communicating with Blissymbolics*. Toronto: Blissymbolics Communication Institute.
- McNaughton, S. (1990). Gaining the most from AAC's growing years. *Augmentative and Alternative Communication*, 6, 2-14.
- McNaughton S. (1993). Graphic representational systems and literacy learning. *Topics in Language Disorders*, 13 (2), 58-75.
- McNaughton, S. (1998a). Reading acquisition of adults with severe congenital speech and hysical impairments: Theoretical infrastructure, empirical investigation, educational application. Unpublished doctoral dissertation, University of Toronto, Toronto, Ontario, Canada.
- McNaughton, S. & Lindsay, P.H. (1995). Approaching literacy with AAC graphics. *Augmentative and Alternative Communication*, 11, 212-228.
- Mirenda, P., & Locke, P. (1989). A comparison of symboltransparency in nonspeaking persons with intellectual disabilities. *Journal of Speech and Hearing Disorders*, 54, 131-140.
- Mizuko, M. (1987). Transparency and ease of learning of symbols represented by Blissymbols, PCS, and Pictsyms. *Augmentative and Alternative Communication*, 3, 129-136.
- Nolan, C. (1987). *Under the eye of the clock*. London: Wiedenfield and Nicolson.
- Schonell, F.E: (1956). *Educating spastic children*. Edinburgh: Oliver and Boyd.
- Share, D.L. (1965). Phonological recoding and self-teaching: sine qua non of reading acquisition: *Cognition*, 55, 151-218.
- Seidenberg, M.S. & McClelland, J.L. (1989). A distributed, developmental model of word recognition and naming. *Psychological Review*, 96, 523 -568.
- Share, D.L. (1965). Phonological recoding and self-teaching: *sine qua non* of reading acquisition: *Cognition*, 55, 151-218.
- Siegel, L.S. (1993). The development of reading: Advances in Child Development and Behavior, 24, 63-97.
- Smith, M.M. (1989). Reading without speech: A study of children with cerebral palsy. *The Irish Journal of Psychology*, 10 (4), 601-614.
- Smith, M. M. (1992). Reading abilities of nonspeaking students: Two case studies: *Augmentative and Alternative Communication*, 8, 57-66.
- Smith, M.M., & Blischak, D.M, (1997). Literacy. In L.L. Lloyd, D.R. Fuller, & H.H. Arvidson (Eds), *Augmentative and Alternative Communication: A Handbook of Principles and Practices* (pp 414-443). Boston: Allyn and Bacon.
- Snow, C:E. (1991). Diverse conversational contexts for the acquisition of various language skills. In J. Miller (Ed.), *Research on child language disorders: A decade of progress*. Austin, Texas: Pro-ed.
- Stanovich, K.E. (1986). Matthew effects in reading: Some consequences of individual differences an the

- acquisition of literacy. *Reading Research Quarterly*, 21, 360-407.
- Stanovich, K.E. (1990). Concepts in developmental theories of reading skill: Cognitive resources, automaticity, and modularity. *Developmental Review*, 10, 72-100.
- Stanovich, K.E. (1994). Constructivism in Reading Education. *The Journal of Special Education*, 28 (3), 269-274.
- Stanovich, K.E., & West, R.F. (1989), Exposure to print and orthographic processing; *Reading Research Quarterly*, 24, 402-433.
- Sturm, J.M. (1999). Beyond emergent literacy: A hierarchy of writing scaffolds for AAC users. Presentation, 8th Literacy Symposium, Carolina Literacy Centre, Chapel Hill, North Carolina, February 4-6, 1999.
- Sutton, A. (1996). Language theory and intervention practice. In E. Björck-Åkesson & P. Lindsay (Eds.), *Communication Naturally: Theoretical and methodological issues in augmentative and alternative communication*, pp. 33-47. Proceedings of the Fourth ISAAC Research Symposium. Västerås, Sweden: Mälardalen University Press.
- Vanderheiden, G.C., & Lloyd, L.L. (1986): Communication systems and their components. In S. Blackstone (Ed), *Augmentative Communication: An Introduction*. Rockville, Maryland: American Speech-Language-Hearing Association.
- Vandervelden, M.C. & Siegel, L.S. (1995). Phonological recoding and phoneme awareness in early literacy: A developmental approach. *Reading Research Quarterly*, 30,854-875.
- Vandervelden, M.C. & Siegel, L.S. (1997). The assessment of phonological processing in early literacy: A developmental approach. In S. M. Clancy Dollinger & L.F. DiLalla (Eds.) *Assessment and intervention issues across the lifespan*, (pp. 77-101). Hillsdale, NJ.: Lawrence Erlbaum Ass.
- Willows.- D:M. (1991). Visual processes in learning disabilities. In B.Y.L. Wong (Ed.), *Learning about learning disabilities* (pp. 163-193). San Diego: Academic Press.
- Wood, C., Storr, J., & Reich, P.A. (1992). *Blissymbol reference guide*. Toronto: Blissymbolics Communication International.
- Yoder, D: (1999). Opening Address, 8th Literacy Symposium, Carolina Literacy Centre, Chapel Hill, North Carolina, February 4-6,1

---

Permission has been granted for the inclusion of the following material (McNaughton, 1998): Model of Reading, appearing on page 5: from Adams, M. (1990). *Beginning to Read*, p. 158, Cambridge, Mass.: The MIT Press.

---