Chapter 9

Functional communication in the classroom

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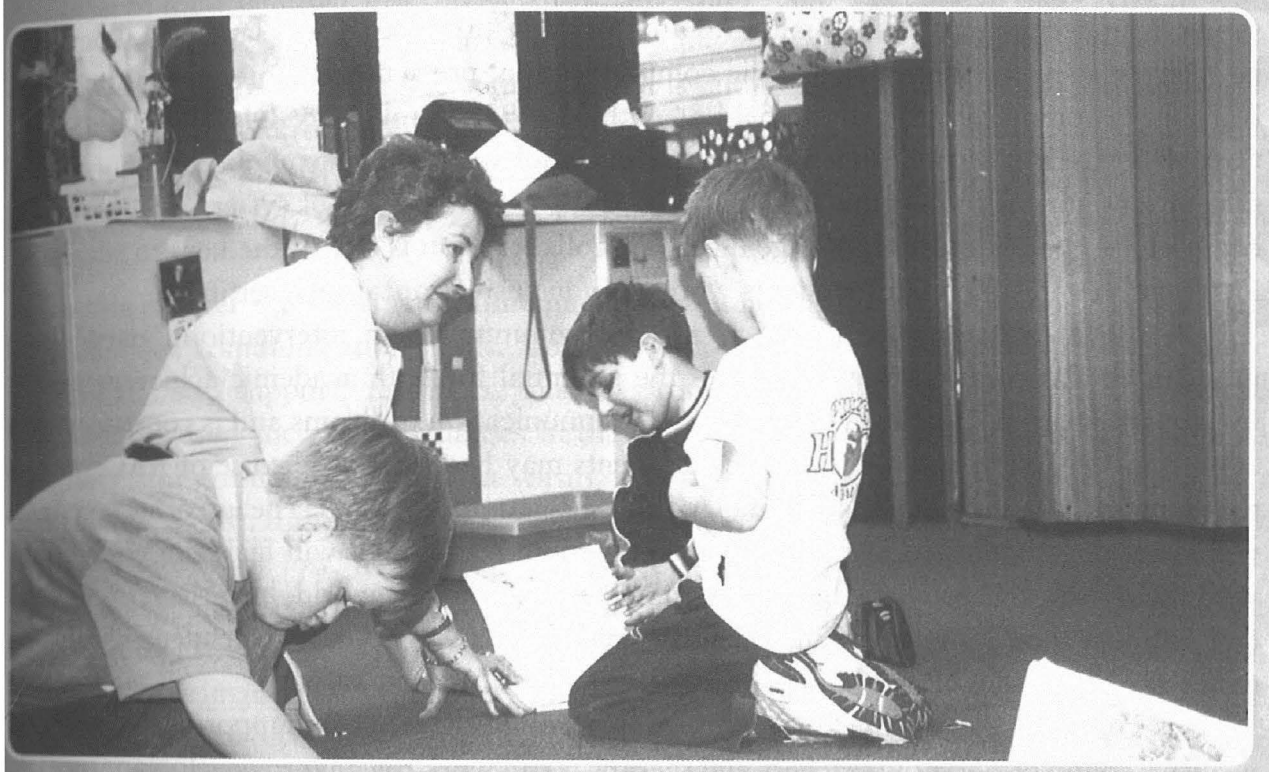


This chapter aims to:

- discuss the importance of communication in classroom and social contexts
- provide an overview of augmentative and alternative communication (AAC)
- explore the concepts of language development and functional communication
- provide a framework for assessing communication in educational settings
- consider how teachers and therapy staff can work with students and their families to improve functional communication outcomes.

Introduction

In this chapter the focus is on students who are identified as having severe speech and language delay and on those who may not be able to use speech as their primary mode of communication. This group includes all students who rely on augmentative and alternative communication (AAC) to communicate. One definition of an AAC system is that of ASHA (1991), which states that AAC is 'an integrated group of components, including the symbols, aids, strategies and techniques used by individuals to enhance communication ... the system serves to supplement any gestural, spoken, and/or written communication abilities' (p. 10).

Thus, the emphasis here is on those students who need additional help with expressive language and also those who have difficulties with understanding what is said to them. It includes students who experience no cognitive deficits but who have severe motor disorder that results in them being unable to produce intelligible speech (for example, students with cerebral palsy). Some students with severe intellectual disability do not easily develop the symbolic underpinnings of language and are unable to produce spoken language. They may be referred to as having non-symbolic communication, pre-symbolic communication, or as being early communicators (Butterfield & Arthur, 1995; Granlund & Olsson, 1999; Siegel-Causey & Guess, 1989). Students who begin school with a non-symbolic communication system may go on to develop the ability to learn a formal symbol system. Whatever the cause of the speech and/or language difficulty, collaboration is one of the keys to successful intervention and support for students who are in inclusive educational settings.

The use of collaborative teams to provide communication interventions, particularly in inclusive classroom settings, increases the potential for both academic achievement and social participation for students with severe communication problems and is consistent with education legislation and good practice. Students may benefit from the use of AAC systems that support both their expressive language and their comprehension. The use of such systems will assist the students to learn within the classroom setting and will facilitate interactions with their peers and teachers, help them to make sense of their world, help them order their day, support their language comprehension and assist them to be independent within the contexts of both school and home.

This chapter explains the role of functional communication in supporting students in inclusive contexts, and how teachers and therapists can work together to develop appropriate communication opportunities for students with different communication needs. The chapter will explore recent research that has focused on students with complex communication needs in inclusive educational settings. In addition, it will provide a number of case illustrations and practical activities.

Communication, learning and inclusive settings

Communication is an integral facet of learning. The classroom is a communicative environment in which communication occurs continuously throughout the day. Teachers communicate with students formally (for example, explaining an algebraic equation) and informally (for example, asking a student how a favourite football team is progressing). Students must be able to communicate effectively with their teachers during learning activities and also with their peers during class and breaks (Hunt, Alwell & Goetz, 1991a; Kent-Walsh & Light, 2003). Indeed,

the school setting provides many opportunities for social interaction and the development of friendships. Clearly, a student with communication difficulties will be disadvantaged in both learning and social activities unless every effort is made to ensure that the student has an effective and functional means of communication (Beukelman & Mirenda, 1998).

When considering communication for students in educational settings, it is important not to overlook other communicative contexts in which effective communication is important. These include communication between teaching staff, therapists, and other service providers, and communication between teachers, service providers and parents (Björck-Åkesson, Grandlund & Olsson, 1996; Duchan, 1993; Friend & Cook, 1992; Giangreco, 2000; Giangreco et al., 1993; Pugach & Johnson, 1995).

Students with complex communication needs

As many as one in seven children has a communication disorder (Harasty & Reed, 1994). Yet most of these children will enter mainstream schools and will cope in these settings with the help of a speech pathologist and possibly some additional educational support. These children may have difficulty understanding what is said or in making themselves understood. They are also at risk of problems with literacy (Bird, Bishop & Freeman, 1995; Morais, 1991; O'Connor, Notari-Syverson & Vadasy, 1996; Prior et al., 1995; Stackhouse & Wells, 1998; Watkins, 1996; Whiting, 1996). These students form part of the regular classroom population.

In this chapter the focus is on functional communication in the classroom for students with complex communication needs. Students with complex communication needs require additional time, support, resources, and classroom adaptation if they are to maximise their learning and social opportunities in the educational setting. Often they have physical disability and are unable to write or easily join in spoken language activities (Beukelman & Mirenda, 1998). If they are not proficient at using their communication system, or if their system is broken or lost, they will be unable to join in most classroom activities. Indeed, these students may spend a large part of their time in school unable to communicate or not participating in academic activities because they are still learning to use their communication systems (Beukelman & Mirenda, 1998). It is essential that the AAC team includes all the people who are involved with the student in the inclusive context. This includes teachers, the student, class peers, and parents, as well as other service providers and administrative staff. The team must understand what is required to optimise the inclusive educational experience for each of the students with complex communication needs (Beukelman & Mirenda, 1998). Full inclusion occurs when the student is fully integrated in the class, participating competitively or actively, academically and socially and is as independent as possible (Beukelman & Mirenda, 1998).

Increasingly, students with complex communication needs are attending inclusive educational settings. They may have cognitive impairment and/or physical impairments and, if they have no functional speech, will benefit from an AAC system (Beukelman & Mirenda, 1998). Initially, general education teachers may feel overwhelmed by the prospect of working with students with severe communication problems; nevertheless, many of these students are participating successfully in inclusive educational settings and achieving their educational goals (Kent-Walsh & Light, 2003).

Augmentative and alternative communication systems

In order to consider AAC and its role with students with communication disorders, it is important to define the populations most likely to use and benefit from AAC systems. AAC is appropriate for use with students with expressive and/or receptive language disorders, including students with autism spectrum disorder (Mirenda & Schuler, 1988; von Tetzchner, 1999; von Tetzchner & Martinsen, 2000); students with cerebral palsy (Dormans & Pellegrino, 1998; Frame et al., 2000; Warrick & Kaul, 1997; Willard-Holt, 1998), students with intellectual disability (Carter, 2003a; 2003b; Iacono, Waring & Chan, 1996; Rowland & Schweigert, 2002), and with students with challenging behaviours (Hunt, Alwell & Goetz, 1988; Mirenda, 1997; Sigafoos & Tucker, 2000).

AAC systems may be unaided (for example, signs) or aided (for example, picture boards, alphabet boards, electronic communication aids) and are often referred to as being either high or light technology systems. High technology communication systems, (that is, 'high tech') (Sigafoos & Iacono, 1993) utilise microcomputers and specialised software. These have the capacity to provide printed and/or voice output. A device that has voice output is referred to as a *speech-generating device (SGD)* (see glossary) because it 'speaks'. The speech may be digitised (that is, natural speech that has been recorded) or synthesised (that is, synthetic speech produced from stored digital data). Low or light technology communication systems (that is, 'light-tech') (Sigafoos & Iacono, 1993) include communication boards, books, and object boards that may be made commercially or by a service provider or family member. These systems also include devices operated by electromechanical switches. Light tech systems are used by beginning communicators, including older students with a severe level of cognitive impairment, those who are unable to access high-tech systems because of severe physical disability, and as backup systems when an individual's high tech system is under repair or unavailable. Many people who use AAC and their families and service providers, favour high-tech devices because such devices have the power of voice output and can often interface with other equipment (for example, computers, environmental control systems). However, high-tech systems are not suitable for all people who need AAC, and are usually expensive. Families may not be able to afford to buy an appropriate system and the educational facility may not have the financial resources to provide and maintain the equipment. An overview of high- and light-tech AAC systems is provided in Box 9.1.

Symbol systems

Speech consists of spoken words that are used to fulfil four purposes (Light, 1988):

- communication of needs and wants
- information transfer
- social closeness
- social etiquette.

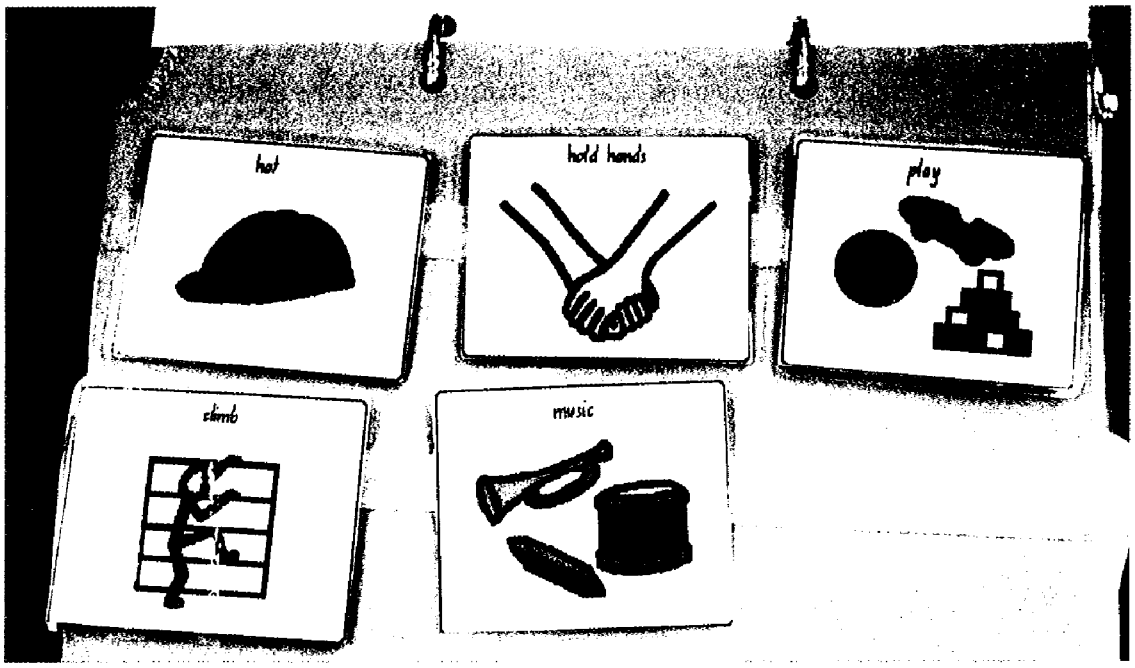
Spoken or written words are symbols, but other types of symbols are also used for communication. Logos, road signs, pictures, and gestures are all examples of symbols that can be used for communication. All AAC systems incorporate symbols that are used to encode and decode messages. Symbol systems used on AAC systems vary in transparency (ease of

deciphering what the symbol means) and it is important to match the symbol system to the student's level of cognitive ability and understanding (Mirenda & Locke, 1989). The easiest or most transparent symbols are real objects, the most difficult written words. Mirenda and Locke's hierarchy of symbols is provided in Box 9.2.

Box 9.1

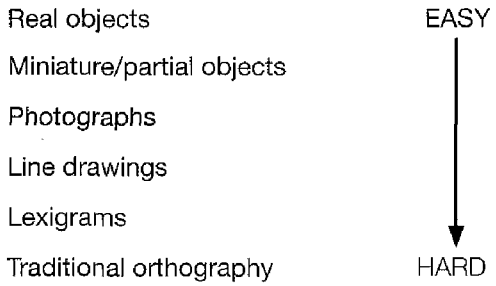
An overview of high- and light-tech AAC systems

High technology	Utilises microcomputers and specialised software Synthesised or digitised speech May interface with a computer, environmental control system or telephone Accessed directly (for example using fingers or head pointer) or indirectly (for example, scanning using a switch) Requires a power source (for example, battery) Requires specialised repair Expensive to purchase and maintain
Light technology – aided	No electronic parts but can include electromechanical switches Accessed directly (for example, finger pointing, eye gaze) or indirectly using another person to ask which symbol is required Examples: letter boards; chat books; object communication systems; schedules; symbol boards Easy to maintain but set up and maintenance can be costly in time
Light technology – unaided	Manual signing Examples: Auslan; British Sign Language; Amerind; American Sign Language; Signed English



Box 9.2

Hierarchy of symbols



Mirenda & Locke, 1989

There are many symbol systems available commercially; these include pictures, line drawings and symbol systems that are designed to provide fast and accurate access to language, for example, Boardmaker™, Compics™, Minspeak™ (Baker, 1982) and Bliss symbols (Bliss, 1965). Teachers working with students who use AAC may need to select the most appropriate system for the individual and be prepared to update the system if necessary. For example, early communicators may begin with an AAC system incorporating objects, then move on to pictures and photos, and may progress to a literacy-based system as their literacy skills develop. Ideally the AAC team will work together to select the most appropriate symbol system for the student who is using AAC but sometimes it is left to the teacher to select symbols or develop a symbol system.

One of the most common reasons for a student failing to use an AAC system is that the system is too difficult to comprehend. There has been a tendency for service providers, including teachers, to label students not using their systems as being unwilling to communicate, rather than recognising that the system may be unsuitable for the student. Careful assessment of a student's abilities is essential when introducing AAC. Communication is a distinguishing feature of humans and an essential component of adequate quality of life. Students have the right to the communication systems and supports that will help them optimise their communication skills and to learn and interact in the school environment.

Students with complex communication needs who use AAC have but one thing in common: they are unable to use speech as a primary functional communication mode. It is not known how many students use AAC or how many might benefit from the introduction of an AAC system (Bax, Cockerill & Carroll-Few, 2001). However, as noted above, most students who do use AAC have congenital disability, including intellectual disability, cerebral palsy, autism spectrum disorder, and/or severe developmental dyspraxia of speech. Some children may need AAC after acquiring a communication disorder (for example, traumatic brain injury).

Just as every student has the right to be educated in an inclusive setting, so every student has the right to the services and technology that enhance communication and assist them in participating in both academic and community activities (National Joint Committee for the Communication Needs for Persons with Severe Disabilities, 2002). Early introduction of AAC not only provides a functional means of communication, but also reduces the likelihood of the use of disruptive and/or destructive behaviours as communicative acts (Beukelman

& Mirenda, 1998; Mirenda, 1997; Sigafoos et al., 1994; Vicker, 1996). However, the introduction of AAC alone does not ensure effective communication. Students who use AAC require their communication partners to understand how to interact with someone with complex communication needs as the story in Box 9.3 by Fiona, an adult with cerebral palsy and complex communication needs, illustrates.

Box 9.3

AAC and inclusion

My education began at a school for children with special needs in 1983. My parents thought that this would be the best school for me, because of access to therapy services. Although I did benefit from this, my education suffered. The school did not cater for someone with my level of intelligence. The teachers were only prepared to teach the basics, and keep us entertained.

When I was about 8, I decided that I wanted to go to an inclusive school. Other children were integrating, but they were able to walk, and talk, easier than I could. However, I wasn't able to go because no one agreed with me. The teachers thought that it was too difficult for children who used AAC to attend a mainstream school.

In 1988 I changed school. In the beginning I attended classes in the support unit and gradually integrated more and more into mainstream classes. I went to a mainstream single-sex high school.

When I started high school, I did not have a high-tech AAC system. I had to rely on an alphabet board and typing messages into a laptop computer for people to read. This had an impact on my interactions with the teachers and other students. Socialising with the other students was difficult. I think it was because it took so much longer to communicate with me. I had an aide almost full time during my junior years at high school. The teachers and students talked to her instead of me. The aide encouraged this, as she had no formal training. She made friends with the girls, which was inappropriate. I had one teacher who walked out of the classroom as soon as he saw me, which was really demoralising for me.

I overcame some of my communication problems with the teachers over time. My social science teacher, in Year 8, noticed I answered more questions than other students. In Year 10, I got my first voice output communication device. It certainly improved my interactions with the teachers and students. It also enhanced my ability to participate in oral activities.

I would like to offer some advice to teachers who have students who use AAC in their class. First, where possible, it is very important to speak directly to the student, instead of only talking to the aide. It may be easier to ask questions requiring yes or no answers. You will need to be aware that you will need to make some adjustments to the curriculum and the student may require alternative assessments. The most important point is to treat the student as an individual.

The inclusion of students who use AAC in inclusive educational settings can have very good outcomes if the right adjustments are made and the school has the right attitude. I managed to get a good HSC result and have a law degree and an honours degree in politics. I'm now embarking on my next challenge: securing employment as a solicitor.

Fiona Given, law graduate, NSW

Teachers' experiences with students with complex communication needs in inclusive settings

To date there have been few studies that have explored the experiences of teachers with students who use AAC in inclusive settings. Soto et al. (2001) conducted a series of focus groups that explored educational teams' perceptions of the critical issues of inclusion for students who use AAC. The participants agreed that inclusion was beneficial for students who use AAC, for parents, the school community and the students' peers. They identified key indicators of successful inclusive programs that included:

- the classroom teacher welcomes and includes the student who uses AAC as a full member of the class
- the educational team works collaboratively
- all the team and school staff have appropriate training
- the presence of a support worker who is involved with the student and the program
- involvement and support from peers in class
- interactions between the student who uses AAC and peers both in and out of school time
- academic participation of the student using AAC
- the student is able to use the AAC system successfully
- adequate services and supports are available
- the student using AAC feels part of the class and school
- the classroom supports the learning of students with different needs
- the school system supports inclusion at school and area or regional level
- there is adequate support for the student within the classroom.

Although this study (Soto et al., 2001) was conducted in North America, it is applicable to Australia and New Zealand or, indeed, any school in which students who use AAC are included. Successful implementation of AAC requires a team effort (Beukelman & Mirenda, 1998; Cumley & Beukelman, 1992). In addition, there have been several research studies that have explored attitudes towards students who use AAC (Beck et al., 2000; Beck & Dennis, 1996; Blockberger et al., 1993; Fisher, Pumpian & Sax, 1998). These studies have emphasised the importance of a positive attitude in ensuring that students who use AAC are accepted and included.

The participants in Soto et al.'s study (2001) identified some barriers to successful inclusion. These included:

- lack of training in AAC
- frequent staff turnover
- lack of administrative support
- no time for collaborative team meetings
- lack of flexibility for people to move out of their individual professional roles
- case loads that were too big
- too much reliance for progress placed on the aide or support worker
- lack of opportunity for the student to participate in academic activities
- a classroom structure that marginalises the student
- lack of transition planning

- the team not feeling comfortable and confident with AAC technology
- AAC equipment breaking down and needing repair
- lack of funding for equipment
- lack of loan equipment or equipment that could be used as a back up
- limitations of the AAC system compared with natural speech.

Some of these barriers could be addressed through training; others (for example, the need for funding, limitations of the system) require major policy changes and ongoing research and development.

An interesting aspect of this study was that participants noted how their own limitations (for example, fear of failure, uneasiness about disability, feeling undervalued by the team members) have an impact on the inclusion of the student. In any collaborative team approach, time spent in planning and ensuring that all team members feel valued and have equal status on the team is well spent as it helps ensure the success of the team, particularly when there are problems to solve (Giangreco, 1996; Giangreco, 2000; Santelli et al., 1998). Soto et al. (2001) concluded that there are three keys to successful inclusion of students using AAC, adequate administrative support, AAC training for all concerned and team collaboration.

Kent-Walsh and Light (2003) interviewed 11 teachers who had taught at least one student who used AAC in an inclusive educational setting. The teachers, in common with the participants in Soto et al.'s (2001) study, were able to identify many benefits, some negative impacts, and some barriers to the inclusive experience. Participants reported that teachers, parents and peers benefited from the experience. Nevertheless, the teachers stated that some students who used AAC did not make adequate academic progress, were socially excluded and did not have equal status with their classmates. In addition, the teachers noted that the use of AAC in the classroom could be disruptive and that it was time consuming. The teachers were interested in AAC and wanted to learn more, but found that additional preparation time was sometimes difficult to schedule.

Some teachers noted that the school itself was not accessible for students with physical disability. They also indicated that large classes, particularly in high school, made it difficult to give enough individual attention to students who used AAC. In this study (Kent-Walsh & Light, 2003), the teachers expressed frustration that they were not always included as part of the AAC team and were not always involved in goal setting for the students. They also noted that their expectations were sometimes different from those of the student's parents. Teachers did not feel that they were well prepared to teach a student with complex communication needs who used AAC and that they experienced problems with setting up the equipment and assessing if the student was learning. They also noted that high tech AAC systems were beneficial to inclusion but were problematic if broken or under repair, as the student then was without a communication system. At least two of the teachers stated that they preferred their students to augment their communication with signing.

The teachers felt that there was some resistance from other teachers to include a student who used AAC, although they conceded that teachers' attitudes can improve. The teachers who participated in the study also reported negative experiences with teacher's aides similar to those reported by Fiona (Box 9.3).

Interactions between students who use AAC and their peers is consistently identified as an important issue (Arthur, Bochner & Butterfield, 1999; Blackstone & Cassatt, 1983;

Calculator, 1999; Carter & Maxwell, 1998; Hunt, Alwell & Goetz, 1991b; McConachie & Pennington, 1997; Soto et al., 2001). Kent-Walsh and Light (2003) found that slow rates of communication had a negative impact on interactions between students who used AAC and their peers. The teachers also noted that the students who used AAC were not always socially adept and that this impacted on their ability to make friends, particularly as they grew older. This highlights the need for careful preparation and training for students who use AAC and their peers prior to inclusion (Beukelman & Mirenda, 1998).

Teachers stressed the importance of students being able to access all the school buildings, classrooms and equipment. They also noted the advantages of small classes for students who use AAC. They considered it important to give the students with complex communication needs real grades for their work. The work and grading systems may be modified, but parents appreciate knowing how their child is progressing. The teachers who participated in Kent-Walsh and Light's (2003) study believed that teachers needed time to adjust to having a student who uses AAC in the class. They also spoke about the mutual support that teachers can give to each other and that this is helpful in changing teacher attitudes and encouraging other teachers to willingly accept a student who uses AAC into the class.

The teachers were in agreement with the participants in Soto et al.'s (2001) study that collaboration is a key factor in successful inclusion. The teachers considered effective communication and collaboration with other team members important, particularly at transition times when the student was moving to another class. They emphasised the importance of having time to observe a student prior to accepting that student into a class and of having detailed notes from previous teachers. Therapists, parents, special educators and other team members all provide important information and support to the teacher and are critical to the success of any inclusion program.

Participants identified three important issues relating to successful curriculum development:

- set realistic academic goals
- try to include students in some classes that are appropriate to their level of skill (for example, a lower aged class)
- some curriculums (for example, art, cooking) are easier to adapt than others (for example, maths, science).

However, it may not be appropriate to include older children with complex communication needs in classes with much younger children. This segregation heightens feelings of difference and suggests that the student using AAC does not belong in the class (Schnorr, 1990). It may be better to include all students in an activity and try to tailor the goal to each student's ability. Teacher's aides and increased time for curriculum planning may help with this.

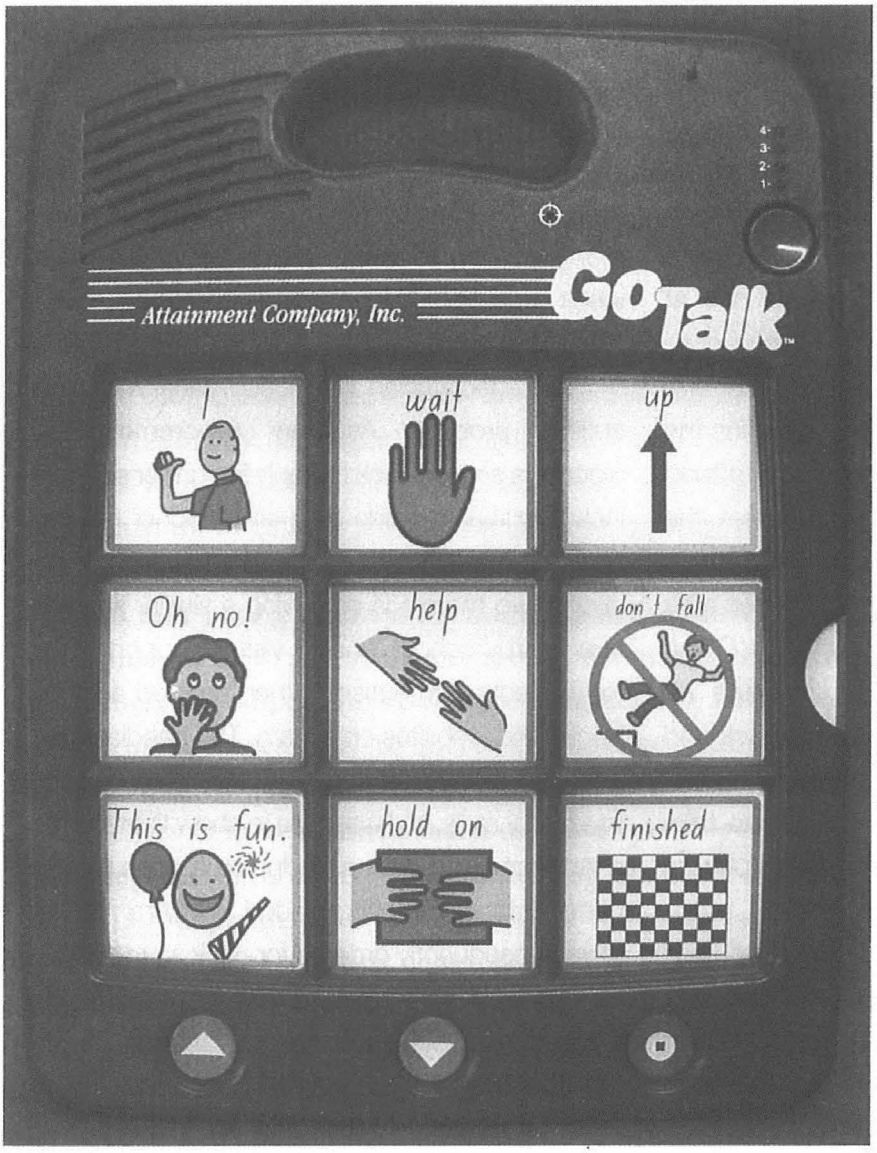
The teachers identified a number of factors that they considered likely to facilitate inclusion for students who use AAC (Kent-Walsh & Light, 2003). These included:

- honest open communication about the inclusion experience
- developing competency in using AAC
- requesting additional planning time
- respecting the student at all times
- including the student in all activities

- matching the technology to the activity
- providing peers with information about inclusion of the student who uses AAC
- maintaining effective team collaboration
- adequate training for team members
- providing the teacher with support from the team
- implementing effective transition planning
- selecting an AAC system that is appropriate for the student.

Thus, these teachers identified the team, student peers, AAC systems and technology and the school itself as critical components of successful inclusion. The issues raised support those identified as important by specialists in AAC (for example, Beukelman & Mirenda, 1998), other researchers (Soto et al., 2001), early childhood teachers (Smith & Kenneth, 2000) and people who use AAC (see Box 9.3).

The two studies discussed here provide a clear indication of the issues that teachers and others who support students with complex communication needs consider important if the inclusion is to be successful. The case study in Box 9.4 illustrates how team members can work together to facilitate the success of the inclusion process for a young child with complex communication needs.



Box 9.4

Voices: My role as an Integration Support Teacher

Jack – a case study

My role as an Integration Support Teacher is consultancy-based, servicing preschool to Year 12. Much of my job entails resourcing classroom teachers with students who have special needs and who receive state funding for their disabilities. Transition to the first year of school can be a challenging time for all and I am often involved in the year prior to the start of school.

Jack (pseudonym) attended mainstream preschool two days per week and was starting Early Intervention (EI) class for two mornings. He had major needs in language, talked in a rapid 'off topic' staccato, did not listen well, and (in his mother's words) was 'very spaced out'. This led to temper tantrums, aversion to change, and delayed social skills. A speech pathologist diagnosed a severe receptive and expressive language disorder.

Jack's prospective teacher visited him at preschool on one of his 'bad days', and confided to the Transition Support Team that she found his difficulties very daunting! Besides the normal orientation day, I suggested Jack attend class for four mornings a week so that the teacher could get to know him in her setting. The EI teacher and an existing teacher aide agreed to support him. I also displayed a 'Going to School' transition photo album made for another student which would prepare Jack and coach him through school routines and events. His mother loved this and volunteered to take the photos. Jack would be in as many photos as possible, with personal captions.

The school counsellor suggested that Jack be referred to a paediatrician for a full assessment to see if he were eligible for other support mechanisms. I recommended an application for a behaviour support teacher to be in place for the start of the year. The EI teacher would also visit.

My base school has 'Boardmaker', a pictorial communication program, so I printed off coloured cue pictures to make a visual timetable for Jack. I prepared behaviour and direction cue pictures, cue tokens like an ice cream 'cool down' shape and a 'my turn' lollipop, and scaffolding stepping stones of 'who, why, what, where' etc. When laminated, these would become useful and fun at oral language talk time. For behaviour we decided to use five 'Smiley' circles on yellow felt. The teacher chose two resource books from a selection I provided, one on language disorders and one on behaviour. I also suggested a beanbag for positive time out that the whole class could use. The teacher was invited to a training and development morning at my base school the following week. This would give her more confidence and further resources.

The paediatrician diagnosed Jack with mild autism, probably Asperger syndrome. This diagnosis entitled Jack to apply for further support including teacher aide time and teacher release time. I subsequently arranged for the teacher to spend two mornings observing a similar student in a nearby school, and to visit a support class for students with autism. I then emailed a list of books and websites on autism. The paediatrician had also expressed concern about Jack's poor fine motor skills, so I was able to show the teacher a range of useful devices including a slope board, pencil grip, and spring-loaded scissors. These were subsequently ordered for Jack.

A gradual attendance schedule was drafted, commencing with morning-only attendance for the first two weeks. Safety contingency plans >

Box 9.4 continued

were prepared in case Jack ran off from class, using examples from other schools. I left an 'induction' support booklet for the new teacher aide, and arranged for some orientation sessions at the commencement of the next school year.

All of those participating in this transition/enrolment process worked enthusiastically and collaboratively. The teacher felt more confident in her ability to manage Jack and meet his educational needs. She thanked everyone for the support and resources.

Elva Fitzgibbon,
NSW Department of Education and Training,
Gosford, NSW

Language development and functional communication

Students with complex communication needs entering inclusive educational settings are likely to have a variety of language needs and abilities. Some may have very little functional communication and severe language difficulties, whereas others may have good language skills but limited or no speech. Functional communication implies that the student will be able to communicate in a variety of contexts in the most efficient way. Many students will use a variety of communication modes (for example, vocalisations, speech, sign or gesture, facial expression or the use of a speech-generating device) to communicate different messages to different partners in different contexts. Teachers need to be flexible in their approach to communication and to accept communication attempts that are socially acceptable. This is rewarding for the student and encourages further communicative attempts. There is no one way to communicate a message – all people use a variety of communication modes (speech, gesture, written symbols).

Language and AAC

Despite recognition of the variety of communication modes that humans use and the need to be able to convey messages in the quickest and most appropriate way, teachers working with students who use or require AAC are often asked if the use of AAC will prevent a student from learning to talk or if AAC facilitates language development.

Longitudinal research on the use of AAC to promote language and communication with children and young adults with intellectual disabilities has been conducted (Romski, Sevcik & Adamson, 1997; Romski & Sevcik, 1996; Sevcik, Romski & Adamson, 1999). These researchers developed the System for Augmenting Language (SAL) and have shown that SAL can be used successfully to increase language production in primary school students and adolescents in secondary school (Romski & Sevcik, 1996).

Teachers helped students learn to use a speech-generating device (SGD) and the teachers also used the SGD when communicating with the students. Over time, the students used the SGD independently and their use of language increased. A detailed description of SAL is beyond the scope of this chapter, but interested readers can find more information in the work of Romski and Sevcik (1996).

It is important to consider intrinsic factors (that is, those that the student brings to acquiring language through AAC) and extrinsic factors (for example, AAC system) when developing a framework to understand language development and AAC (Romski, Sevcik

& Adamson, 1997). Students need to understand the relationship between the spoken word and its referent and the relationship between a spoken word and its visual symbol. Students with limited comprehension must learn the relationship between a visual symbol or sign and the referent before they can use AAC expressively. Some students may never understand this relationship and will continue to communicate using idiosyncratic gesture, vocalisation and physical manipulation of others in the environment throughout their education (Butterfield, Arthur & Sigafoos, 1995; Siegel-Causey & Guess, 1989). These students are referred to as functioning at a pre-linguistic or pre-symbolic level, or as being early communicators.

Students with lifelong disability (for example, intellectual disability) can benefit from the use of AAC to support their communication and learning (Bondy & Frost, 1994; Butterfield et al., 1992; Butterfield et al., 1995; Carr & Felce, 2000; Carter, Hotchkiss & Cassar, 1996; Cutts & Sigafoos, 2001; Goossens, Crain & Elder, 1992; Iacono, Mirenda & Beukelman, 1993; Iacono & Duncum, 1995; Musselwhite & St. Louis, 1988; Stainton & Besser, 1998). However, a number of barriers may impact on services to these students and delay the introduction of functional communication systems (National Joint Committee for the Communication Needs for Persons with Severe Disabilities, 2002). Barriers include a lack of professional staff knowledge (Balandin & Iacono, 1998) and limited or no training opportunities for communication partners (for example, families and support staff) (Light & Binger, 1998).

Students with intellectual disability

The use of sign and gesture to support the language development of people with an intellectual disability is one of the earliest reported uses of AAC (Walker, 1976). Sign and gesture are commonly used with and by students who have an intellectual disability. The use of sign provides a visual cue to comprehension and expresses a message. In a recent study of three children with Down syndrome (Chan & Iacono, 2001), the children produced different gestures for a variety of communicative functions. Limited use of gestures coupled with a lack of clarity in the child's communicative intent may predict poor spoken language and vocabulary development. Adults find it difficult to interpret the child's gestures and other behaviours, and therefore cannot provide appropriate language models (Wetherby, Warren & Reichle, 1998). Chan and Iacono (2001) reported that the children in their study used gestures common to children at similar levels of language development but failed to develop speech concurrently. This study indicated that signing may be an advantage for children with Down syndrome who are not speaking.

Students with intellectual disability may not learn sign fluently, but may benefit from the use of sign. Key word signing (Grove & Walker, 1990; Windsor & Fristoe, 1989) is often used with students who have language impairments and who may be helped by seeing a word signed as an addition to the auditory stimulus. In key word signing only the important content words are signed. The signs are supplemented with natural gesture and may include the individual's idiosyncratic signs and gestures. Key word signing is always accompanied by speech and is sometimes termed *simultaneous communication* (Beukelman & Mirenda, 1998).

It is important that those who interact with the student learning to sign (for example, teachers, teachers' aides, student peers, parents) sign consistently. It is also important that the student has the physical ability to make the signs (von Tetzchner & Martinsen, 2000). Thus,

teachers and peers will need to learn the signs the student is able to use and to build up their knowledge of sign to keep pace with the student's language needs. Learning signing in school is an activity that students, particularly younger students, are likely to enjoy. However, it is an additional task for teachers. Speech pathologists or parents can often assist and provide training and resource materials.

Students learning sign will benefit from implicit and explicit teaching (von Tetzchner & Martinsen, 2000). In implicit teaching of sign, the student is exposed to a variety of signs that are meaningful within different contexts with no specific effort made to directly teach the signs. In explicit teaching, the relationship between the word and the sign is clearly identified and the student is helped to learn the sign. This includes the student practising the sign and being prompted to use it. It also includes hand-over-hand modelling.

Researchers have explored how best to select and teach signs to students who require a AAC to communicate (Iacono & Parsons, 1987; Reichle, Williams & Ryan, 1981; Spragale & Micucci, 1990). To ensure functional communication, signs should be selected for relevance to each individual student within a given communicative context (for example, the classroom, the playground, on the school bus). Signs that are most relevant and meaningful for the student and for those who interact with them will be easier to learn.

If signing is used as an aid to comprehension, it is important that all those interacting with the student use the signs consistently and that the student is rewarded for using sign. It can be argued that the onus is on those without a disability who interact with the student to learn signs and to use them in order to promote communication and language development. However, there is some reluctance on the part of some to use sign, or its use may be dropped, for example, when new staff are employed or when a student moves class. This can occur despite the fact that signing has been shown to be an effective communication tool with the particular student. Additionally, teachers need to be aware that in order to sign students must have adequate hand function to form the signs. It must also be remembered that many students who use sign may also benefit from other forms of AAC. The case study of Sarah in Box 9.5 demonstrates the important role that a teacher plays in ensuring optimal communication opportunities for a student with Down syndrome.

Box 9.5

The role of the teacher in optimising communication

Sarah is 7 years old and is in her second year of schooling. She attends her local primary school with her 9- and 11-year-old brothers. The family transferred to the area at the commencement of the year. Sarah has Down syndrome and a moderate intellectual disability. She is very sociable and settled in quickly to her new school, making a number of close friends. She likes to play soccer during lunch and dress ups during free play. She also enjoys singing and dancing.

At the beginning of the year Sarah's teacher and parents met and discussed Sarah's educational needs. Sarah's parents believed that Sarah's skills in gross motor, play and academic areas such as mathematics would be met by the class program, but were concerned about her speech and language development. Sarah received private speech pathology in the past, but the family was unable to afford further sessions. Sarah's mum became quite upset, >

Box 9.5 continued

saying that she just wanted Sarah to be able to talk and to be liked by the other students. She expressed a willingness to assist in any way she could.

Sarah's teacher paid particular attention to Sarah's communication over the following weeks and noted that she was able to use three to four word sentences, but mainly used two to three words and inconsistently used sign language. She generally signed a main word of her utterance. For example, when Sarah asked, 'Where my book?' she only signed 'book'. Sarah's mother informed her teacher that Sarah learned the signs during private therapy and that she picked them up quickly. Sarah's teacher was usually able to understand her speech, although other teachers and some of the students said that they had difficulty understanding Sarah at times. Sarah's teacher also observed that she became frustrated when not understood and if asked to repeat herself a couple of times she would cross her arms, lower her head and refuse to repeat her words again.

Sarah followed most of her teacher's directions during class activities. Her teacher noticed, however, that Sarah watched her classmates at times and followed their lead, particularly when a new activity was introduced. Also, when Sarah's classmates spoke quickly to her and used a number of sentences together, Sarah seemed to have difficulty understanding. She would wait until she understood the conversation and then join in again.

Sarah enjoyed interacting with her classmates, but disrupted the class by talking during lessons. When asked not to speak, Sarah would stop, but refused to join in the lesson and answer any questions. The school librarian experienced the same problems and informed her teacher that Sarah found it difficult to sit and read to herself.

Each week the class wrote their news prior to presenting it to the class and Sarah recounted events when verbally prompted by her teacher. She required support to sequence the narrative. Each time Sarah was asked to present her story she would repeat a favourite one about going to the city aquarium with her family. Sarah seemed to enjoy the laughter from her classmates when asked not to talk about the aquarium.

Sarah's teacher felt overwhelmed by Sarah's speech and language needs and wasn't sure where to begin. She contacted the support teacher and arranged a joint meeting with Sarah's mother. At the meeting the integration support teacher suggested that:

- a referral be made to the local disability services for speech pathology support
- the communication needs identified by her teacher be prioritised and addressed in that order
- the school purchase Boardmaker and that she would then train Sarah's teacher and mother in its use.

Sarah's communication needs were prioritised in the following order:

- behaviour management systems – class rules and scripts
- visual work schedule with rewards built in
- use of key concept signing
- visual sequence for narratives
- chat pages for specific activities.

During the meeting the behaviour management systems were designed. The main purpose of the systems was to clearly define the expected behaviour and represent it in a way that Sarah could understand. The rewards and consequences for her behaviour also needed to be represented and incorporated into the class behaviour management strategies.

Following the Boardmaker training, Sarah's teacher represented the class rules with Picture Communication Symbols (PCS) to remind Sarah of expected behaviours. These were read with the whole class each morning and emphasised >

Box 9.5 continued

with Sarah prior to lessons in which she had been disruptive in the past. Sarah's teacher was also able to point to them during class to remind Sarah and other students of the rules with minimal interruption to the flow of lessons.

The support teacher also made behaviour scripts to serve as a permanent reminder to Sarah of expected behaviours. The scripts were colour coded 'green' for desired behaviour and 'red' for inappropriate behaviour. Sarah's teacher kept these on Sarah's desk and found them to be very effective. Midway through the year she was able to stop using them and Sarah maintained her behaviour as long as her rewards were included in her work schedule.

Following the training on Boardmaker, Sarah's mother made behaviour scripts for use at home and also made posters consisting of PCS and signing instructions for the core vocabulary used at school. A speech pathologist began working with Sarah and was able to offer in class support to Sarah's teacher to know how to use the signs and to teach the other students. Sarah's classmates enjoyed using the signs and Sarah began to sign more, improving her communication and reducing her frustration.

The speech pathologist assessed Sarah's communication skills and designed additional AAC systems. To assist in addressing Sarah's narrative skills, a system was implemented that consisted of symbols representing 'when, who, what and where' on separate boards and Sarah was taught to select symbols and sequence them to tell her news. Sarah also kept remnants from outings to prompt her to recount different events, such as a movie ticket or lolly bag from a party, and her mum and dad began taking photos of events to serve as an additional prompt.

The speech pathologist and teacher noticed that when classmates couldn't understand what Sarah was talking about, she would sometimes get out her news photos and use them to show her friends what she was talking about. The photos consisted of people and items from Sarah's home, so the speech pathologist made separate photos to represent the people and items and included other symbols to allow Sarah to talk about her family and friends at home. The symbols were organised around topics, such as Sarah's birthday party, her pet dog and ballet lessons. The speech pathologist recommended that people point to the symbols when interacting with Sarah to aid her understanding and to model how to use language. Sarah's mother made additional pages as needed and the book assisted greatly in developing Sarah's vocabulary and use of language.

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Students with physical disability

Students with physical disability may not be able to use signs as a functional communication mode as their physical disability will prevent them from making the signs accurately. They may also have communication disorders that are associated with intellectual disabilities. Other students with physical disabilities have intact language abilities but may not be able to speak because of the difficulty they experience controlling their oral musculature and breathing. Students with cerebral palsy comprise the bulk of those who have physical disabilities that affect speech. In this section we will consider students with physical disabilities who have little, if any, concomitant intellectual disability.

To date there is limited research on the language development of students who have physical disability and who use AAC. Paul (1997) suggested this was because AAC

specialists have focused on ensuring that students who need AAC have functional working AAC systems rather than exploring their language development. She suggested that when working with young children with physical disabilities who use AAC the principles of normal language development are useful to consider, but noted that these children experience specific challenges. For example, if their levels of cerebral palsy are so severe that they have little functional speech, they are likely to have severe motor problems that impact on all of their motor skills including walking. As already noted, this creates problems with both learning and socialisation for students in inclusive settings (Kent-Walsh & Light, 2003; Soto et al., 2001). These students may need to rely on a wheelchair for mobility or on others to move them, and require all areas of the school to be easily accessible. They often require assistance with mealtime management and activities of daily living, and take longer to complete tasks in class. Poor hand function and lack of mobility means that they require assistance with many learning tasks and that class materials must be modified. Secondary students need additional time to complete academic work and may become fatigued when trying to keep up with the school curriculum, including homework. Teachers need to adapt teaching materials and academic curriculums to accommodate the needs of the individual student. This includes presenting materials in different formats and ensuring that the demands on the student are feasible in view of the level of physical disability.

Students may also be absent from school frequently. When young, these students may have spent much time at medical centres, therapy programs, and other appointments and so have had little time for the activities that are known to be critical in early language and reading development (for example, play and activities that foster early literacy skills) (Beukelman & Mirenda, 1998; Koppenhaver et al., 1992; Koppenhaver et al., 1995; Light, 1997). Consequently, they may require additional help with literacy skills and modified reading materials. Many students with severe physical disability have poor levels of literacy, despite having no or little cognitive impairment. Teachers in inclusive settings may feel challenged when developing an accessible curriculum for these students and will benefit if they can draw on the expertise of a collaborative team that include psychologists, therapists, and parents, and involves the student with physical disability. Any AAC system must be flexible enough for a student to transition from one level of linguistic complexity to another and from one communicative context to another (Paul, 1997).

In most cases, symbol sets on AAC systems are not a language system but rather words and phrases selected by caregivers or speech-language pathologists to support communication and meet the student's immediate communication needs (Light, 1997). These symbol sets usually consist of nouns and the communication partner must use guessing, checks, and questions in order to assist the person who uses the system to complete a sentence (Balandin, 1994; Balandin & Iacono, 1993). Communication partners, including speech-language pathologists, parents, and educators, may know exactly what vocabulary the student needs to support play, socialisation and learning (Fried-Oken, 1991; Marvin, 1994; Marvin, Beukelman & Bilyeu, 1994; McGinnis & Beukelman, 1989; Morrow et al., 1993). Thus, the AAC system may not meet all of the student's communication needs. Teachers play an important role in ensuring that students who use AAC have access to the vocabulary they need to facilitate interaction and learning across all of the school and classroom contexts (Morrow et al., 1993). It is also

important that this vocabulary is regularly updated to ensure that it is relevant and current and thus meets the student's communication needs.

Finally, it is imperative that the student has access to a suitable AAC system that they can use easily and without undue fatigue. Many students have AAC systems that are not available at all times during the school day, that they cannot easily use independently, and that they are unable to switch on by themselves. Students must have access to a suitable AAC system and know how to use it. Communication partners, including teachers and peers, need to understand how to interact with students using the system. Teachers must also provide the student who uses AAC with the same opportunities for learning as their peers without disability.

Technology has changed the lives of many students with physical disability accessing inclusive educational settings. Before acquiring any technology a student will require careful assessment by a team of experts that should include educational staff who have an understanding of the student's needs within the context of school and learning. Box 9.6 provides an overview of the barriers and some solutions to inclusion experienced by Annie, a young student with cerebral palsy.

Box 9.6

Annie and her early schooling

Annie attended a state primary school in a city in rural New South Wales and was in her second year of formal schooling. She was the first child with a severe disability to enrol in this school. Annie was diagnosed with cerebral palsy at birth. She has speech dyspraxia and dysarthria, difficulty with the execution of fine motor activities and uses a walking frame. Annie successfully developed a strong social identity with her peer group and, although only partial enrolment was granted for the first three terms of the year, Annie attended the school full-time in the final term. She subsequently progressed to Year 1, receiving approximately 18 hours special-aide time per week for the school year.

Annie's ability to produce natural speech has been severely affected by oral–motor problems associated with cerebral palsy, thus resulting in an expressive-receptive language discrepancy. However, in familiar or comfortable environments it is evident that Annie comprehends most conversational language and is very quick to learn when given verbal explanations accompanied by real-life demonstrations.

Annie successfully augments her communication with a multi-modal language approach: natural gestures, some signs from the Makaton Vocabulary (Walker & Cooney, 1984), animated facial expressions, vocalisations, and a very limited repertoire of spoken words. A low-tech alternative communication system had been evolving in book and board form to assist Annie achieve the communicative functions of greeting, accepting, acknowledging, asking questions, rejecting, denying, protesting, talking about people and places, and teasing.

The contents and format of the communication book have not changed significantly since Annie commenced school. Each page was single sided with nine symbols approximately 2 cm x 2.5 cm. The index included feelings, people, food, school activities, places and holiday activities. The 'people' page had photographs of all her classmates taken from a class photograph. There were many limitations in Annie's system of communication that did not allow her to engage in the typical linguistic, phonological and conversational experiences of >

Box 9.6 continued

other children her age. It seemed essential that her program enhanced her current participation levels, increased her communicative effectiveness and provided strategies to help support and increase her language and literacy experiences. Annie has been screened for visual perception difficulties but there was no significant problem identified.

Annie approaches the computer with a great deal of enthusiasm and confidence. She exhibits a refined coordination and understanding of the functions of a mouse. She can track easily, and demonstrates good click and drag, and drag and drop functions. Annie is familiar with a range of both educational and fun software. As a consequence of Annie's improved recognition of her letters, she can now confidently access a standard keyboard, with mainly the index finger on her left hand. She has been practising using her right hand to hold down the shift key when she wants to make a capital letter. She is familiar with a range of concept keyboard overlays, designed for literacy activities with a QWERTY layout and a programmed sticky shift.

Annie's demonstrated strengths stem from her own individual personality, willingness and determination. More opportunities need to be created for her to participate *actively* with the curriculum. Tasks need to be challenging yet achievable, encouraging her to be a proactive learner rather than a passive recipient of information.

It was important that opportunities to participate more effectively in all aspects of the school experience became a priority. The introduction of an SGD would assist in enhancing these opportunities.

Annie has had to face a number of barriers at school. These included physical barriers such as being unable to access the room without direct assistance from an aide, if no aide was present Annie was left sitting outside the classroom. Knowledge barriers included the teacher being unwilling to acknowledge or respond to the multi-modal forms of communication used and refusing to extend a wait time for a response from Annie. Attitude barriers included no expectation that Annie could participate meaningfully on any level. Skill barriers of staff are still problematic in that there is no training available for them in implementing strategies for using an AAC device in the classroom and/or developing curriculum modifications to increase participation. There is a District Integration Officer who has provided some training in the concept keyboard but knowledge and understanding beyond this piece of equipment is limited, as is funding for any more assistance.

With the modified materials, Annie's ability to ask and answer simple questions about stories and text, and participate in writing activities has been substantially improved. As an introductory program there is evidence that the effort to focus on the overlapping features of speech, graphic symbol and print and coordinate all resources has been a successful approach with Annie's emerging literacy.

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Students with autism spectrum disorder

The use of AAC may benefit students with autism spectrum disorder who have no functional spoken language and those who have difficulty in comprehending language or in understanding and managing their school and home routines. AAC can be used to support both the expressive communication and also the understanding of students with autism spectrum disorder (Light et al., 1998; Mirenda, 2001). Students with autism spectrum disorder may be Gestalt processors (that is, processing the whole rather than components) (Prizant, 1983) and

frequently experience difficulty in taking the perspectives of others. This inability to think of the parts of a problem or situation or consider others impacts negatively on the student's ability to learn in the classroom and to socialise with peers. AAC strategies can be used to facilitate communication development and reduce challenging behaviour (Mirenda, 1997; Sigafoos, Reichle & Light-Shriner, 1994; Sigafoos & Tucker, 2000; Stephenson, 1997). Indeed, Beukelman and Mirenda (1998) stressed the benefit of commencing AAC interventions early. However, to date there is still only a small empirically based research literature that reports the use and efficacy of AAC for students with autism spectrum disorder (Mirenda, 2001; Ogletree & Hahn, 2001).

Echolalia (repeating words and phrases that have just been uttered or uttered some time previously), self-talk, literalness of meaning, and idiosyncratic use of words are all common in students with autism spectrum disorder who do develop speech. The use of AAC may be helpful in supporting the communication of students who exhibit these linguistic behaviours. Some children with autism spectrum disorder seem to have superior visual memory and visual spatial skills and demonstrate reading or spelling skills that are at odds with their overall level of functioning (for example, the ability to find particular words in the telephone book). Such skills may cause the teacher to overlook a student's receptive language difficulty, resulting in high levels of frustration for all concerned and which may result in the student exhibiting challenging behaviours. However, teachers can capitalise on the student's visual ability by introducing AAC systems (for example, schedules and scripts) that ensure that educational activities are supplemented with visual supports.

Students with autism spectrum disorder may benefit from the use of visual AAC systems (for example, photographs, words, signs, schedules boxes and calendars) that support their comprehension and allow them to make sense of their world (Wood et al., 1998). Visual systems can assist students to be independent in the contexts of school and home. The Picture Exchange Communication Systems (PECS) can be used to improve students' spontaneous communication (Bondy & Frost, 1994; Kravits et al., 2002). The PECS program is used to encourage students with autism spectrum disorder to exchange a picture for an activity or item. There are reports that the use of PECS helps students to initiate communication and make choices (Kravits et al., 2002).

The use of a variety of communicant modes including visual timetables and behaviour scripts for an adolescent with autism spectrum disorder is described in Box 9.7.

Box 9.7

The use of AAC with Stephen, an adolescent with autism spectrum disorder

Stephen is 17 years old and has attended his local high school for five years. He has autism spectrum disorder and a mild intellectual disability. Stephen enjoys school and does well in all his subjects, but he particularly enjoys English and food technics. Stephen has an interest in cars and cooking and has had a special interest in science fiction books and movies since he was about seven years old.

Throughout Stephen's time at high school, his parents have offered regular assistance to support his education. When Stephen >

Box 9.7 continued

commenced high school he had a great deal of difficulty settling in and found transitioning between classes and teachers extremely difficult and stressful. His parents created a visual timetable for him with symbols for each subject. Although Stephen was able to read, the symbols allowed him to interpret the timetable quickly and more easily when he was stressed. Initially, Stephen's roll-call teacher also informed him of any changes to his timetable whenever possible and Stephen noted the changes in writing on his timetable. Forewarning him in this way minimised Stephen's anxiety upon arrival at class. His parents also wrote a social story for him about coping with changes to his timetable and included strategies for him to use at these times, such as breathing slowly, counting to 10 and remembering to listen to his teacher.

During his first term at high school, Stephen's parents received a call from his English teacher informing them that although Stephen had been diligent in completing his homework, he had not completed his assignment. Stephen's parents had asked him about his assignment the week before and he had assured them that he was working on it during school time. When they questioned him and looked at his assignment, he had started it, but had not completed the final question on a book review. Stephen told his parents that he hadn't liked the book and that he wanted to review one of his science fiction books. With assistance from Stephen's English teacher, his parents wrote down a guide for him on how to review a book. They also gave him some written rules for completing his assignments and made him a rewards chart that allowed him to work towards buying a new science-fiction book each month if all his homework and assignments were completed.

Later in the same term, Stephen's parents received a phone call from the school principal who asked them to attend a meeting at school to discuss Stephen's social skills. He informed them that some of Stephen's teachers had approached him and reported difficulties with Stephen's behaviour, such as looking in other students' bags, staring at students as they changed into their sports uniform and endlessly talking about science-fiction books he had read. When Stephen's principal had spoken to him about his behaviour, he appeared to understand, but then looked at him quite seriously and told him that he had bad breath. Stephen's parents decided to seek assistance from a support service for people with autism spectrum disorder who recommended developing social stories for each of the situations.

Each year Stephen's parents and teachers have made every attempt to meet his specific learning needs as new situations were encountered and new challenges arose. This year, Stephen's final year at school, is no exception. He is studying a hospitality course at his local tertiary institution that he enjoys immensely. He travels independently to the course, but becomes extremely agitated if the train is more than five minutes late. If Stephen then arrives late to his course, he becomes quite stressed, charges into his class and from just inside the doorway loudly proclaims, 'Stephen is late. Stephen is late!' He is then unable to settle and prepare for his practical lesson. His teacher has to try to calm him and prompt him to put on his chef's uniform and check the task for the day.

One of Stephen's teachers had encountered a similar problem in Stephen's third year at school and with guidance from Stephen's speech pathologist, had written a script for him about what to do if he arrived late to class. He decided to modify the script to outline what Stephen and his hospitality teacher would say to each other. By focusing on positive behaviour and providing Stephen with a set structure to the interaction, he hoped that Stephen would be better prepared to cope with the stressful >

Box 9.7 continued

situation and therefore be able to move onto his required tasks.

He used stick-figure characters and speech bubbles, like a comic strip, to show Stephen that he had to walk up to his teacher and speak to him in a calm voice. He used blue text for Stephen's lines, rehearsed the script with him and sent a copy to the hospitality teacher. The script lines were:

Teacher: 'Hi Stephen. Good to see you.'
Stephen: 'Hi. The train was late today. Stephen is sorry.'
Teacher: 'That's okay Stephen.' Pause 'Today we're cooking ...' Pause 'Please check your schedule.'

To complement the script he also made a schedule from Picture Communication Symbols to assist Stephen in beginning the class activities. He included: 'put uniform on', 'wash hands', 'read the recipe'. Although Stephen talked to himself as he followed his script, saying he was sorry and repeating the directions on the symbols, he soon settled down and was able to participate successfully.

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Moore, McGrath and Thorpe (2000) have suggested that computer-aided learning may be of benefit to students with autism spectrum disorder. Moore, McGrath and Thorpe (2000) suggested that a computer-aided learning system could be used to teach students to use multimedia systems to learn about appropriate social interactions, including playing with others and through observations, role plays and the use of virtual reality. Group work should also be included to prevent the student from becoming isolated from the class. These authors also suggested that computer-aided learning is also helpful for improving communication skills, in teaching symbols, non-verbal skills, and in particular conversational skills, including simulated conversations. This work is in its infancy, but the authors believe that it has the potential to facilitate inclusion for students with autism spectrum disorder in the future.

Functional assessment

The goals of AAC assessment are not only to identify a system that will be functional for the student but to select one that will allow the student to meet future communication needs and challenges (Beukelman & Mirenda, 1998; Cockerill & Fuller, 2001). It is also important to remember that ongoing assessment is a part of any AAC intervention. However, the provision of a suitable communication system does not, in itself, ensure that a student will use it or communicate more effectively. Training of both the student and communication partners is important to ensure that the student gains maximum benefit from the AAC system.

AAC assessment involves a team approach. Currently, the *Participation Model* of assessment (Beukelman & Mirenda, 1998) is used by many AAC teams. In Box 9.8 the three phases of this model are summarised.

As can been seen from Box 9.8, the emphasis is on ongoing assessment. Beukelman and Mirenda (1998) state that 'assessment is not a one-time process. Assess to meet today's needs, then tomorrow's, and tomorrow's, and tomorrow's ...' (p. 149). Because many students with complex communication needs can and do use some speech or vocalisations, it is also important to assess the student's potential to use natural speech as well as their language ability (Beukelman & Mirenda, 1998). However, assessing language is often problematic. Morse (1988) suggested

that if norm-referenced standardised assessment tools are used, the assessor must note any changes and adaptations made to the testing procedures. Scores from standardised tests are not valid if adaptations are made to the assessment materials or the procedures. It is important to recognise that there are many individuals who use AAC who were wrongly diagnosed as having an intellectual disability because the testing materials were unsuitable or the individuals were physically unable to perform the tasks. Misdiagnosis can have a lasting and damaging effect on a student's educational program. AAC specialists may use observation and indepth interviewing to gain understanding of the student's communication needs and abilities. Teachers have an important role to play as they bring experience of education and specific knowledge about the student and the classroom environment to the assessment team. It is important to observe how different communication partners, including peers, interact with the student. As already discussed, it is essential that communication partners know how to interact effectively with a student who uses AAC. It is important that partners do not limit the student by being overly directive or by denying the student a wide range of communication experiences (Hunt, Alwell & Goetz, 1988, 1991a; Light, 1997).

Box 9.8

Description of the 'Participation Model' of AAC assessment and integration

Phases	*Features*
Phase I: Initial assessment for today	*Aim:* To gain a picture of the child's current level of functioning in order to develop a communication system that will meet the child's immediate needs
	Current communication needs assessed
	Physical, cognitive, language and sensory skills assessed
Phase II: Detailed assessment for tomorrow	*Aim:* To develop a system that will serve the child in a variety of contexts with varied communication partners
	System needs to facilitate a variety of interactions (for example, academic participation, social closeness)
	Future interactions and participation considered
Phase III: Follow up assessment	*Aim:* To ensure that the system continues to meet the child's needs as they mature and become involved in different activities across a variety of contexts and partners
	Frequency of follow up varies depending on the needs of the individual
	Young children developing language skills need more follow up assessment; adolescents with developed language starting work need less frequent assessment

continued >

Box 9.8 continued

Levels of involvement	
Full	Same classroom with same age peers, considered part of the class – activities may vary according to student's ability
Selective	Present part of the day, attends some classes and services outside the inclusive setting
None	Not included in age-appropriate general education classes/environments
Competitive	Academic expectations and evaluation the same as for age peers – work may be adjusted
Active involved	Academic expectations lower than for peers but content is similar. Individualised assessments
Independent	Able to participate in an activity with no assistance
Set up	Can participate with assistance to set up (for example, switch on computer)
Assisted	Requires assistance from another to participate

Adapted from Beukelman and Mirenda's participation model of assessment, 1998

It is also important to assess the barriers to successful communication in order to develop strategies to overcome these. Barriers, as noted above (Kent-Walsh & Light, 2003), include negative attitudes, lack of training, limited access and lack of appropriate policies to facilitate communication (Beukelman & Mirenda, 1998).

If a student is to use an AAC device (for example, letter board, communication book, SGD), the team will also need to assess the type of device and the most suitable symbol system (Mirenda & Locke, 1989). In many parts of Australia and in other countries, the family's financial resources to purchase and maintain the devices may govern the choice of device. There are students who could use a high-tech device but who are unable to afford one and rely instead on light-tech devices (for example, communication board, communication book).

AAC assessment is a complex and time-consuming process. It usually includes a motor assessment as well as assessment of vision and hearing. Any student who uses AAC will require regular follow up assessments to ensure that the system is still appropriate for the student's communicative needs, which may change as the student moves through the educational system. This is particularly important not only because needs change but also because technology, and AAC technology in particular, is a rapidly advancing field. Currently, new technology is enabling students with severe levels of disability to ultimately lead independent lives within the communities of their choice.

Technology

Few readers of this chapter would be unfamiliar with technology and most rely on technology to facilitate their study, writing, and day-to-day activities. Such technology includes computers and word processing software, use of the Internet, and electronic diaries. Increasingly, many

professionals and students alike are limited in what they can achieve if their technology fails. Recent technological advances have had a positive impact on the inclusion of students in regular schools (Parette & Marr, 1997). Assistive technology, including power chairs, switches, high tech AAC devices, page turners, joy sticks and speech readers facilitate the inclusion of students with disability in educational environments and enable them to participate in class as actively involved learners.

However, successful implementation is, to a large extent, dependent upon the knowledge, skill and commitment of the classroom teacher (White, Shelley & Donna, 2003). Throughout this chapter there has been an emphasis on teachers' needs for appropriate training and support if they are to include students with disabilities in their classes. White, Shelley and Donna (2003) suggested that higher education institutions must take some responsibility in preparing student teachers to deal with technology in the classroom setting. Assistive technology can facilitate the independence of a student and at the same reduce the one-to-one teaching load of the teacher. However, teachers must have some skill in using the technology, and appropriate support if the equipment is not working. Without this knowledge or support, students may spend a great deal of time unable to participate in the class activities or to learn. Often the technology may be tied to one particular context (for example, the general classroom) and students may not be able to use it in specialised contexts (for example, the science laboratory), thus technology can never fully replace the teacher or peers in academic learning or social interactions.

Indeed, as noted above, it is important that students who rely on technology do not become isolated from their peers at school. Beukelman and Mirenda (1998) advocated that the whole class becomes conversant with any assistive technology used by one of their peers. This approach ensures that students without disability learn more about the student with a disability, which in turn can lead to improved social interaction and peer support.

Assessment of technology is an ongoing process (Iacono & Balandin, 1992; Schutz-Meuhling & Beukelman, 1990). The student's needs and abilities may change with maturation or experience and the research and development in the fields of technology means that new technology is being developed and old superseded at a rapid rate. Thus, it is vital that students have ongoing access to appropriate assessment, funding and training and that there are policies to ensure that students are able to take advantage of the assistive technology available. Similarly, teachers require ongoing training and support to ensure that they can use the technology and facilitate the student's participation in the academic and social environment of school. The assistive technology team is an invaluable resource for teachers, parents and students and an important part of the collaborative team approach (see Chapter 10).

Working collaboratively with students, families and other professionals to improve functional communication outcomes

To meet students' functional communication needs, a clear understanding of students' abilities and support requirements is essential (Kent-Walsh & Light, 2003). Determining these areas and meeting students' needs requires the collaboration of significant people in

the students' lives. Individual consultation may occur with the students, parents and other family members, people who know the students well, and other professionals. It is preferable to meet and work together in a coordinated approach (Giangreco, Edelman & Broer, 2001; Pugach & Johnson, 1995). By working collaboratively, team members are able to contribute knowledge, reflect on the input of others to enhance their own input, share responsibilities, and intervention for the student can be coordinated and interwoven into a single educational plan.

Collaboration must occur at all stages, from assessment to design of communication systems and implementation and evaluation. A commitment from each member to fulfil designated responsibilities and to respect each team member's role is essential. Ongoing communication is a crucial element to the collaborative approach (Santelli et al., 1998).

Initial planning meeting

Collaboration begins when team members meet to plan for the development of the student's communication. This may be the sole purpose of the meeting or the student's communication development could be discussed as part of an overall educational planning meeting. The purpose of the initial meeting is to discuss and document:

- the student's current communication skills and priority areas to address
- proposed strategies to support the student's communication development
- areas requiring further assessment
- the responsibilities of team members and proposed time frames for completion of tasks
- required resources and personnel
- procedures and time frames for reviewing the plan.

Each team member should receive a copy of the communication plan. The role of each team member is dependent upon their knowledge of the student, past experiences, training, time available and access to resources. Designated responsibilities should be negotiated at the initial meeting and renegotiated as required.

Role of parents in a collaborative team

Some parents coordinate the collaborative team, while others prefer to contribute to the team without leading it. Parents are able to support their child's communication development by:

- sharing knowledge of their child's current communication skills, any AAC systems that may be in place and strategies that have worked in the past
- identifying skills to be taught and long-term considerations for their child's communication, such as future employment options
- informing the team of factors that may need to be considered, such as changes in the home environment
- contributing to the design, creation and implementation of AAC systems and communication programs
- evaluating the effectiveness of programs and suggesting required changes
- supporting the acquisition of resources to support communication programs across environments.

Role of teachers in a collaborative team

Teachers usually coordinate the collaborative team and initiate the process by seeking support. Following an initial planning meeting, teachers play an ongoing role in the collaborative team by:

- completing identified responsibilities in the communication plan
- contributing to key tasks that other members may be fulfilling, such as attending interviews for assessment purposes or training sessions
- seeking ongoing information and support as required
- committing to the consistent implementation of AAC
- educating and supporting others to understand the need for AAC and how to use it
- supporting the acquisition of resources
- implementing recommendations from other professionals, such as modification of own communication style with the student.

Role of speech pathologists in a collaborative team

The speech pathologist's primary role is to offer expert guidance in the area of communication. Speech pathologists generally work as consultants within inclusive settings and the amount of support provided depends upon the complexity of students' communication needs and the resources available. Emphasis is generally placed on the development of knowledge, skills and confidence for teachers, parents and support people to be able to provide daily, ongoing support to the students within natural contexts. Speech pathologists, therefore, work side by side with teachers, implementing AAC systems and teaching strategies within the existing class activities. Current good practice is that speech pathologists working with students who have significant disability do not withdraw the students from the classroom for individual intervention. To promote the development of functional communication skills, it is essential that support be provided during usual class activities. In addition to consultations and direct guidance, speech pathologists are able to provide the following:

- Functional assessment of students' receptive and expressive communication skills. Assessment involves observation of students across contexts and with different communication partners, interviews with teachers, parents and family and other significant people and formal assessment as required.
- Reports outlining students' skills and specific recommendations on functional outcomes and implementation strategies. Functional outcomes are developed by considering a student's current abilities/strengths and the skills required to participate in priority activities that occur regularly at school, home and in the community.
- Recommendations for AAC systems.
- Demonstrations of how to use AAC and support to promote successful implementation of students' AAC.
- Training for all people involved in supporting the students' communication.
- Access to resources, including AAC systems.
- A link between home and school to promote consistency of systems and teaching strategies.

Speech pathology consultations

As mentioned previously, a key function of the collaborative team is to identify the priority areas for students' communication development. The priority areas cover receptive and/or expressive communication and are generally identified because of their significance in promoting access to the curriculum, allowing students to reach their full potential or because of their role in addressing challenging or socially inappropriate behaviours. The selected areas and proposed AAC systems are always based on the individual needs of students and although the specific layouts of systems or symbols used may differ between students, common strategies and systems are frequently employed to meet the needs of students with disabilities.

Following an initial planning meeting or as a starting point, teachers and speech pathologists should discuss the following topics and select areas to be addressed.

Environmental changes

A key purpose to modifying the students' environment is the creation of a structured learning environment that facilitates the development of communication and, if required, minimises the occurrence of challenging or inappropriate behaviours. These areas underpin the successful implementation of AAC.

Speech pathologists, for example, are able to offer suggestions to teachers on interaction and communication style. Changing the way in which people interact with the students can make significant improvements in students' comprehension. This may involve changes such as simplifying language, increasing pausing and use of natural gesture, or key concept signing for those students for whom it is important.

The physical layout of the room can also be modified. Some students may need to be seated closer to the teacher to improve attention or be moved away from distractions, such as a turning fan. Students may also need to have clearly defined areas of the classroom for different lessons or labels with corresponding symbols for classroom areas and items. Physical changes to the room may also be required, such as positioning a display board with visual systems near a student's desk.

To promote functional communication, AAC is overlayed onto an existing structure of activities. It is therefore essential that consideration be given to selection of activities, students' participation within activities and the expected outcomes for individual students. Sometimes natural indicators to the beginning and end of activities also need to be implemented, such as getting a student to put craft materials away or ringing a bell to indicate the end of free play.

Schools are environments rich in opportunities to develop communication. For students with disabilities, however, skills are unlikely to develop without specific intervention. Speech pathologists are able to assist teachers to identify opportunities for students to expand receptive and expressive communication skills. Sometimes these will need to be created, such as having an item out of reach to prompt a request or asking another teacher to pay an impromptu visit, so that a student can recount an event that they have rehearsed in class.

Ongoing support for students' communication development requires consistent input from all people who regularly interact with them. It is important that training is provided and that AAC systems are always accessible and explained to new people.

Common AAC systems

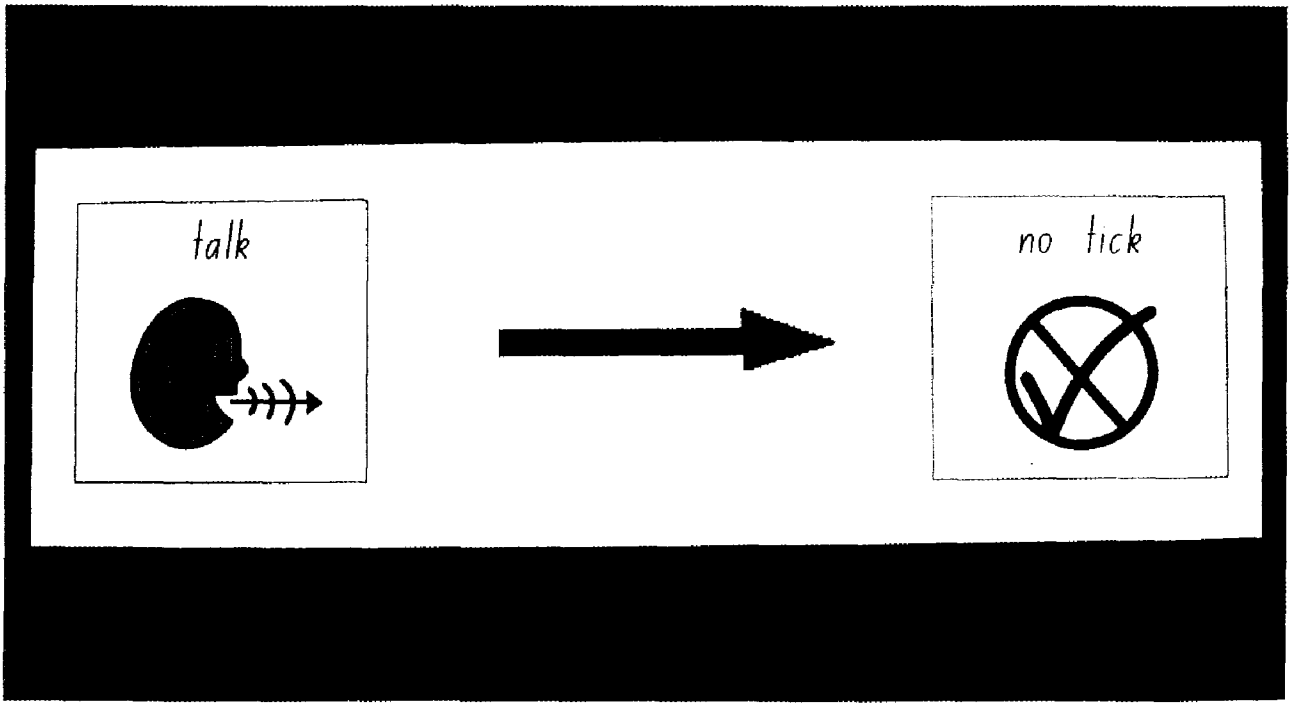
Structures and routines exist within classrooms and schools that can be augmented with communication systems to promote the learning of students with disabilities. Other common AAC systems that are initially implemented are generally components of a behaviour management plan and/or target the development of social skills.

One of the first systems usually introduced is a visual timetable. This may be for a whole class or an individual student and may represent part of a day, a whole day or a whole week. Timetables help students to know their routine, what they are expected to do, to transition between activities and can help them to attend. Changes in routine should be represented on timetables for those students who have difficulty coping with it.

An ability to make requests is a fundamental expressive communication skill. It is imperative that AAC systems are implemented to promote this skill. For younger students or students with significant disabilities, requesting usually involves the use of single symbols to ask for motivating items, such as leisure or food items. Other students may require symbols to serve as a prompt to make appropriate requests, such as a reminder to ask, 'Can you help me please?' rather than becoming upset.

A crucial system to support appropriate behaviour for students with disabilities is the visual representation of class and/or school rules and the accompanying rewards and consequences. This ensures that they have an understanding of what is expected of all students and, because it is represented visually, it serves as a permanent reminder and emphasis can be placed on appropriate behaviour.

In addition to visual class/school rules, behaviour scripts may also be required. Behaviour scripts can be used to highlight a single desired behaviour and the resulting reward through the use of symbols and an arrow between the two. The student is expected to interpret the script as 'If you do this, then this is what will happen/you'll receive.' For example, 'If you read quietly, you can use the computer.' On the reverse side of the positive script is the related negative script 'If you talk, you won't be able to use the computer'.



Some students may benefit from the use of social stories to teach them new skills or remind them of expected behaviour. Social stories can be utilised for those students who are able to understand a simple narrative. They outline the behaviour expected from a student in a particular situation, such as shaking the hands of opponents when losing a game, and congratulating them. Negative behaviours are not included in the stories. The desired behaviour is the sole focus and the stories largely consist of positive statements about what will happen. Social stories can be augmented with photos or picture symbols. Students read through them to help them understand what is expected, remember the expected behaviour and use it in the actual situation.

In-servicing and support for teachers

Specific areas for training and support to assist teachers in meeting students' communication needs should be identified as early as possible. Common areas are the design and use of low-tech AAC systems, use of technology, such as communication software programs or voice output devices and ways to assess communication or identify the communicative function of inappropriate behaviours. Other people may also be able to offer assistance in these areas – parents, psychologists and support teachers.

By considering these areas, teachers are able to meet a number of communicative needs for students and provide a firm basis for the implementation of further AAC systems and teaching strategies as required. Additional needs are generally identified from assessment of individual students or as students encounter new situations.

Summary

This chapter focused on communication and students with complex communication needs in inclusive settings. It included an overview of AAC and a summary of the research that has explored inclusion of students with complex communication needs.

The importance of appropriate assessments, the need for ongoing training and for academic and environmental adaptations were emphasised. Finally, the importance of a collaborative team approach and the role of the speech pathologist in supporting the student and the classroom teacher were discussed.

Discussion questions

1 Luke is a 10-year-old boy who has a mild intellectual disability and severe physical disability and he uses a speech generation device to augment his speech. His teacher believes the device sounds too robotic and is disruptive in class. The teacher frequently asks Luke to turn his device off and only use his speech. Luke tells you how frustrated he is by this and asks you to help him. What would you do?

2 What are the main reasons for using AAC with students who have poor or limited speech and/or language?

3 A high school with 850 students has four students who use AAC. Two students with cerebral palsy utilise speech generation devices and the other two students with Asperger syndrome utilise some light-tech systems. Another two students, a 12-year-old boy with autism spectrum

disorder and a 14-year-old girl with Down syndrome have recently commenced at the school and require AAC. What can be done at a whole school level to support the use of AAC at the school?

4 How can teachers of students with additional needs modify their own communication to promote students' understanding and expressive communication ability?

5 List some possible barriers to effective collaboration between students, teachers, parents and therapists.

6 AAC can be used to prevent inappropriate behaviours and as a tool to teach new skills. If a student presented with a number of inappropriate behaviours, how would you prioritise the behaviours to be addressed?

Individual activities

1 List resources required to make and utilise AAC systems.

2 Most people use visual tools, such as a calendar, or symbols, such as business logos, as part of everyday life. The tools often aid memory, comprehension and may also allow quicker processing of information or completion of actions. Make a list of common visual tools and types of symbols.

3 Indicate whether the following statements are true or false and give reasons for your answers:
   - **a** Functional communication implies that the student is able to communicate in a variety of contexts in the most efficient way possible.
   - **b** Supporting a student to use sign language prevents the development of speech.
   - **c** Collaboration is a key feature in the successful inclusion of students who use AAC.
   - **d** Speech generation devices should only be used with non-verbal students.
   - **e** A line drawing symbol is more difficult to associate with the real item than a photo symbol.
   - **f** A functional communication assessment should involve observations of the student and interviews with people who regularly interact with the student.
   - **g** Early introduction of AAC reduces the likelihood of students using disruptive and/or destructive behaviours to communicate.
   - **h** Determination of a student's AAC needs requires a one off assessment.
   - **i** Letter boards, chat books and schedules are all types of light-technology AAC systems.
   - **j** Students with autism spectrum disorder may become anxious if unsure of upcoming activities or if activities are changed suddenly.

4 Read the case study in Box 9.5 and identify the key factors in promoting the successful development of Sarah's communication.

Group activities

1 People communicate for a variety of purposes, such as to give information or to request assistance and also express themselves in a variety of ways. Create a list of some of the reasons *why* people communicate and *how* people communicate.

2 Read the case study in Box 9.7:
   a What factors would need to be considered when designing a visual communication system for Stephen?
   b Which aspects of Stephen's behaviour and communication are associated with autism spectrum disorder?

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