Children, Sign Language and Multimedia: An Ideal Match

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ABSTRACT

This paper considers the factors that make multimedia an ideal tool for teaching sign language to hearing children in integrated schools. An appropriate vocabulary taught to children would enable interactions during play and would facilitate the formation of social groups between hearing impaired and hearing children. Children have advantages over adults in learning sign language and research has shown that learning sign language has positive outcomes for hearing children. Multimedia is well suited to teaching sign language because it conveys the movement, emphasis and facial expression essential to the meaning of sign language. Multimedia enables the appropriate level of repetition; allows variable levels of interactivity; can assess the user's progress and adjust the difficulty accordingly. Well-designed multimedia is engaging for children as it incorporates engaging elements such as songs, stories, rhymes and explicit teaching presented by fictitious characters.

SIGN LANGUAGE

Hearing impaired people often use manual sign systems to communicate as an alternative to spoken language. Sign languages are rich and complex and are able to communicate sophisticated concepts utilising the visual rather than oral form. Signs are used to represent words and letters. Each sign consists of a number of parts: hand configuration; place of articulation; orientation and movement (Drasgow, 1998, Bornstein and King, 1984, Hudson, 2000, Lederberg et al., 2000). Drasgow states that for profoundly deaf children sign language is "a natural language existing in the visual modality and therefore is fully accessible to these children who rely mainly or entirely on signed input for communication" (1998: 335). There are several unique sign languages used by deaf people world wide, including a number of different sign languages within English speaking countries. For example, American Sign Language (ASL) is used in the United States of America; British Sign Language (BSL) is used in Britain and Australian Sign Language (Auslan) is used in Australia. This research has been conducted in Australia where there are currently approximately 15,000 users of Auslan (Smith, 1996).

INTEGRATION OF DEAF CHILDREN INTO MAINSTREAM SCHOOLS

In Victoria, Australia there are three main modes of education available to deaf children. Children can attend segregated schools for the deaf with other deaf children: these may be day stay or residential. The second option is to attend a congregated school, where there is a special deaf education unit within a mainstream school. Within congregated schools students spend variable amounts of time in special classes and other time in mainstream classes. The third option is for students to attend a fully integrated mainstream school (Komesaroff, 1998). In Australia, as in many countries, there is a trend towards integration of deaf students into mainstream schools. Integration provides the students with the broadest educational opportunities, however, it has significant

implications on the children's social welfare as it may effect their communication with both their teachers and their peers (Smith, 1996).

Both professionals and parents of deaf children express a number of concerns about integration of the children into mainstream schools. Teachers support inclusion of disabled students if they are adequately trained and supported. Parents of integrated children report fears of rejection, teasing and stigmatisation and are concerned that their child will not receive adequate individual attention. Young children with disabilities are more likely to be isolated or alone as they may be less socially mature or lack of communication may hinder friendship (Wall, 2000). Research supports some of these concerns as deaf children in an integrated setting tend to congregate together away from hearing children because of communication barriers (Allen and Karchmer, 1990, Komesaroff, 1998, Wall, 2000). Profoundly deaf children in mainstream settings may use speech reading but only limited comprehension is achieved – sometimes as little as 30% (Grushkin, 1998). Another way to alleviate the communication barrier in this situation is to teach sign language to the hearing children in mainstream schools in order to foster communication and the formation of social groups.

LEXICON SELECTION

Children have smaller vocabularies than adults and more limited requirement for vocabulary based on topics of conversation. This is an advantage in learning sign language to a basic communication level because less words will be required to carry out meaningful conversations. McLaughlin states

The requirements to communicate as a child are quite different from the requirements to communicate as an adult. The child's constructions are shorter and simpler, and vocabulary is relatively small when compared with what is necessary for adults to speak at the same level of competence in a second language as they do in their first language. The child does not have to learn as much as an adult to achieve competence in communicating (1992: 2).

The lexicon selection is a critical factor in enabling communication. There are sign systems with limited vocabularies such as Mackaton (Walker et al., 1984) however, this system concentrates on a functional vocabulary rather than the words required to participate in play. The words included in a "play lexicon" need to be selected so that they are relevant to the children's environment and forms of play.

Table 1 provides a sample of a play vocabulary that would need to be modified to suit the children's particular environment and the activities that were available. The vocabulary is modelled around enabling constructive play and social pretend play. Constructive play is an associative form of play where children play on their own but are aware of other children's construction and add to it to their play. This

Table 1: Example Play Lexicon

Functional	Animals	Colours	Activities Inside	Activities outside	Places/ Social	People
Yes	Dog	Red	Paint	Swing	Friend Shop	You
No	Cat	Yellow	Play Dough	Slide	School	Me
Eat	Horse	Blue	Blocks	Run	Home	Mother
Drink	Cow	Black	Dress Up	Jump	Bed	Father
Want	Sheep	White	Cut and paste	See-Saw	Doctor	Brother
More	Pig	Green	Read	Walk	Patient	Sister
Hot	Bird	Orange	Dance	On	Pirate	Baby
Cold		Purple	Sing	Off	Car	Lady
Dirty			Come	Fall	Plane	Man
Clean			Go			Girl
						Boy

accounts for approximately 50% of the play that occurs in kindergarten and lower primary years. Social pretend play is a co-operative form of play which occurs approximately 30% of the time in kindergarten and lower primary play (Christie, 1991).

SIGN LANGUAGE AND CHILDREN

Research has reported a number of benefits of learning sign language for hearing children of kindergarten and lower primary age children because it presents language visually, kinaesthetically and orally. Daniels (1997, 1994) found that sign language with simultaneous speech increased kindergarten children's vocabulary scores in the Peabody picture vocabulary test. She also found that younger children used language more frequently when taught sign language as a part of the linguistic program in kindergarten. Teaching hearing children sign language promotes visual attention; increases fine motor co-ordination and incorporates an extra sensory channel in the learning process (Cooper, 2002). Good, Feekes and Shawd state that

Children love multisensory learning that involves seeing, hearing, speaking and doing. Sign language can enhance language experience by engaging all of these modalities. Teaching sign is developmentally appropriate practice that promotes acceptance of differences and allows for hands-on language learning in the earlier years (1993: 81).

Learning sign language is a high interest and motivational activity that promotes inclusive teaching for mainstream children as it promotes interactions between hearing impaired and hearing students (Good et al., 1993).

Children are considered better at learning sign language than adults for a variety of reasons. Kemp (1998) discusses a number of affective factors that inhibit adults learning of sign language. 'Language shock' describes the feelings of foolishness or discomfort experienced by hearing adults because of the gestural nature of sign language. Adults can be very self-conscious of movement and facial expression as it is not a dominant factor in spoken language. In contrast, children often utilize gesticulation and exaggeration in play and they are therefore often more comfortable about attempting signs. Husdon notes that adults don't like to make mistakes and when learning sign language, mistakes are very visible. Whereas children are accustomed to making mistakes and adjusting or correcting them without being embarrassed (2000). Adults can suffer from 'cultural shock' when learning sign language as they are not accustomed to being dependent on others, whereas for children, dependence is a more familiar situation (Schumann, 1978). Children have a more naturalistic learning style that works well for learning languages. They naturally imitate people around them, therefore they spontaneously learn signs (Hudson, 2000). Cognitively, children learn languages in small fragments. For example, in sign language, children learn the hand shape, movement and location as individual components and combine them to make sign. Adults, on the other hand, learn in whole sign and compare it extensively to their existing knowledge (Hudson, 2000).

MULTIMEDIA'S POTENTIAL FOR TEACHING SIGN LANGUAGE

The visual and kinetic nature of sign language renders it difficult, if not impossible to learn from a book, as the movement, emphasis and facial expression are not conveyed (Drasgow, 1998). Therefore, traditionally, sign language has been taught from person to person, either from parent to child, or in an educational environment. Gallaudet claims that to acquire sign language

...the new and inexperienced teacher must consent, carefully and perseveringly, to take lesson after lesson off the older teacher who is proficient in this language, while the older teacher must have the patience to give these lessons. For, the language of natural signs is not to be learned from a book. It cannot be delineated in pictures, or printed on paper. It must be learned, in a great degree, from the living, looking, acting model. Some of the finest models, for such a purpose, are found among the originators of this language, the deaf and dumb (1848/1997: 7).

At the time, Gallaudet could not have predicted the advances in technology that have led to the development of other mediums that are appropriate for teaching sign language such as videos and multimedia.

Videos have been utilised to teach sign language as they have several advantages over books. They provide dynamic information and can thereby convey movement, emphasis and facial expression. Videos can be an appropriate way to learn sign language for people who are unable to attend classes, but they should be supplemented by interactions with other sign language users to ensure that the signs are being made accurately. Another advantage videos have compared with traditional classes is that students can progress at their own rate. *Talking hands* (Chobocky and Clancy, 1984) is a series of videos designed to teach signed English to parents of deaf children. It introduces between eight and fifteen signs per lesson and encourages the viewer to take advantage of the video recorders counter and memory function in order to rewind and repeat sections of the program until the presented vocabulary is learned. With the advances in technology that have created DVD, this style of repetition of the same section is easily achieved by utilizing the scene selection function. Videos are useful in teaching Auslan by repetition but they lack the ability to check student comprehension or provide interactivity.

Compared with books, multimedia and videos share similar advantages. Both have the ability to present dynamic pictures and enable sections of lessons to be repeated, but multimedia offers far more to the learning process. Computers enable various level of control to the users, ranging from the program controlling the path, content and timing of the learning experience to the user having total control of their learning experience (Ellis, 2002). In the case of learning Auslan, multimedia could be designed to enable the user to control the rate of presentation of new words and the number of times that the sign is repeated. It could also be designed to guide the user in the vocabulary that is presented or the user could select the words that they want to learn based on themes or topics. Once the signed vocabulary has been developed, it could be used as a program for learning or as a dictionary to 'look up' the correct sign for a particular word. The flexibility that multimedia provides is a great asset. The learner could learn the language wherever an appropriate computer is available. Using a standard computer system, multimedia can check on the students' progress by testing their recognition of signs, therefore, if the computer was in control of the learning process, it could adjust the rate that signs are presented to suit each individual's needs based on feedback from the testing process.

Multimedia designed to teach sign language could incorporate video, image, sound, text and memory aids. The video of the sign being made would show the hand shape, position movement and position relative to the signer's body. Consideration would need to be given to the most appropriate angle to film the signer so that the critical features of the sign could be recognised. The sign that is in the video needs to be named for the learner: an image, text and speech could be combined to fulfil this function. All three elements would be required as the child may well not be able to read the text. In addition to this, multimedia could incorporate memory aids to assist the child in remembering the sign: done by associating the sign with existing knowledge. For example, in Auslan, the sign 'car' is two hands pretending to hold a steering wheel.

In addition to the media elements presented, new multimedia devices could enhance the level of interactivity available to the learning process. Datagloves (have been and) are currently being developed to

recognise sign language (Anonymous, 2003, Anonymous, 1993). This technology is mainly being utilised as a translation device rather than as a learning tool. Multimedia incorporating datagloves with sign language recognition opens up a vast array of possibilities for learning. The learning process could be enhanced by the ability to assess the user's recognition of signs but also to check the accuracy of the production of signs during the learning process. The multimedia program could provide feedback to the user on the accuracy of the hand shape, position, orientation and movement. Using datagloves for teaching children may be too expensive at this time but the cost of these devices is decreasing and may become viable in the future.

CHILDREN, LEARNING AND ENGAGEMENT

One feature of well designed multimedia is the ability to engage the audience. Software for teaching sign language to four to six year old children must be designed to be age appropriate and to introduce the sign vocabulary in an interesting and engaging manner. The use of songs, stories, games and rhymes would be appropriate, in addition to more traditional explicit learning models. Children of this age often learn songs with actions. There are a number of traditional songs such as 'Twinkle, Twinkle Little Star'; 'Rock-a-bye-a-bear' and 'Open Shut Them' that children learn. In addition to this, children learn songs and actions from videos of popular singing groups such as "The Wiggles" and "High Five". Children with these videos learn actions and words by heart by repeating them multiple times because they are enjoyable. Replicating this level of engagement would encourage the learning of sign language by multiple repetitions. Signed children's stories and rhymes are also an appropriate way to introduce sign language as they engage children, and small sections are often repeated so that children join in with more and more of the story. For example, in 'The Three Little Pigs', the phrase, "so he huffed and he puffed and he blew the house down" is repeated multiple times. Games are another technique that could be used to teach sign language through multimedia. Games such as 'Simon Says' encourage children to repeat the actions of the leader. In this way, children could be encouraged to sign in an enjoyable manner rather than by traditional means.

Another consideration in designing multimedia to teach sign language to children is the use of characters to teach sign language as this would facilitate higher levels of engagement. For children it may be more interesting to follow a friendly pirate, a dinosaur or a teddy than a person. Designers of multimedia should follow the lead of television producers of children's programs who have had many years of experience in this field.

CONCLUSION

Multimedia offers new possibilities in teaching sign language, however, there are significant areas of research required to support this development. Research that is required include discovering the most appropriate number of words to present in a session for different audiences; discovering the number of times a sign needs to be repeated in order for people to remember it, the development of lexicons for specific environments, and the most appropriate way to engage children in the learning process. Communication is essential to the formation of social groups, therefore the greater the percentage of the population that learn sign language, the less communication and cultural barriers will exist between deaf and hearing people. Learning sign language is advantageous to both hearing impaired and hearing children in regards to social and cognitive gains. Research should be used where possible to support minority groups in society.

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