Using Information and Communication Technologies to Enhance the Learning Outcomes of a Virtual Community of Students with Learning Disabilities

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Abstract

A growing number of schools provide a separate alternative enrolment for students with special needs. Although there are valid opinions on what is the best method of educating these students integration vs. segregation it has been noted by many researchers that technology can play a major role in the learning process for those student. This paper presents the literature and proposed model to engage several distinct communities in the use of ICT and flexible mode of communication delivery for special schools.

Keywords

ICT, virtual communities, teaching paradigms, students with learning disabilities

INTRODUCTION

There is a growing dilemma about school membership for students with learning disabilities (LD). Although many authors claim that it is best to integrate there students with the mainstream class there is strong evidence to support the existence of segregated school. These schools exist on small funding support for the government and they try to cater for individual differences in a significant way. The paper will refer to these students with special needs under the generic term learning disabilities.

In recent years technology has played a significant role for specific disadvantaged groups, such as the blind and those with movement disabilities, in providing a means to facilitate communication and education (Poon and Head 1985). This paper will outline a research project that is investigating present polices and their application to the use of information and communications technologies (ICT) to enhance the learning of the virtual community of students with learning disabilities.

EDUCATING STUDENTS WITH LEARNING DISABILITIES

The definition of Learning Disabilities is still a little vague (Keogh and Speece 1996), and although LD research continues to grow and to have a significant impact on special education its classification remains problematic due to the vagaries and antagonisms surrounding the definition (Mather and Roberts 1994). At present two definitions are well supported: a legislative definition from the United States found in the Individuals with Disabilities Education Act (IDEA 1997) and the one proposed by the National Joint Committee on Learning Disabilities (NJCLD 1994), a consortium of representatives from organizations interested in LD.

In outline these definitions point out that a learning disability refers to a retardation, disorder, or delayed development in one or more of the processes of speech, language, reading, writing, arithmetic, or other school subjects resulting from a psychological handicap caused by a possible cerebral dysfunction and/or emotional or behavioural disturbances. It is not the result of mental retardation, sensory deprivation, or cultural and instructional factors (Kirk 1962). Specific Learning Disabilities is a chronic condition of presumed neurological origin which selectively interferes with the development, integration, and/or demonstration of verbal and/or nonverbal abilities. Specific Learning Disability exists as a distinct handicapping condition and varies in its manifestations and degree of severity. Throughout life, the condition can affect self-esteem, education, vocation, socialisation, and /or daily living activities (ACLD 1986 :15).

Numerous ‘integration’ or ‘remedial’ programs have proved inefficient towards the ‘total’ learning of this group of students. Researchers including Agran (1977) and Bulgren (1998) support the view that students with

learning disabilities require an alternative approach to their learning. The literature shows that in some selected fields, for example in maths and social studies, specialist instruction has been applied to this group of individuals with little success (Johnson, Gersten and Carmine 1998; Klinger 1998; Swanson 1999).

The role of ICT can be easily realised now as the government has placed strong emphasis on its importance and availability. At a recent seminar Victorian Government Minister: Marsha Thompson, reiterated a major policy to support schools in Victoria in various ways so that students would enhance their learning and employability position prospects. The policy has been also extended to Federal Government level, and tertiary institutions are seeking ways to incorporate ICT to improve graduate outcomes for these students.

TEACHING/LEARNING PARADIGMS

Teaching can be thought of as an interaction between teachers, students, experience and knowledge (Schunck and Nielsson 2001), and the way that these entities interact can be seen in different teaching/learning paradigms. Schunck and Nielsson (2001) outline three different stages in the development of current educational thinking, particularly as related to the use of technology in education. The first paradigm, LP1, is that of the verbal tradition (what Schunck and Nielsson call the paradigm of the past), which is characterised by a verbal flow of information streaming from the teacher directly to the students.

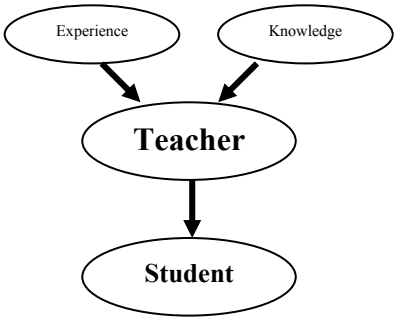

***Figure 1**: Paradigm of the verbal tradition , LP1 (Schunck and Nielsson 2001 - original source unknown)*

In the second paradigm, LP2, what they call the paradigm of today, communication is two way and students also communicate amongst themselves, but the teacher is really still at the centre. It is a paradigm where both teacher and student share responsibility, but the teacher remains the main source of information.

The third paradigm (the paradigm of tomorrow), LP3, differs in placing a knowledge base at the centre and giving both students and teachers important roles. Here, the teacher acts as a catalyst or consultant for students on where information can be obtained. The teacher also communicates their own knowledge and experience to the students, but this fills a smaller part of the interactions than before. This can really be considered as an e-learning paradigm where students make extensive use of technologies such as the World Wide Web to obtain information and experiences. With this teaching/learning paradigm the synchronous presence of both student and teacher is no longer necessary. The learning responsibilities of the students here are for 'searching', rather than 'receiving' as with earlier paradigms.

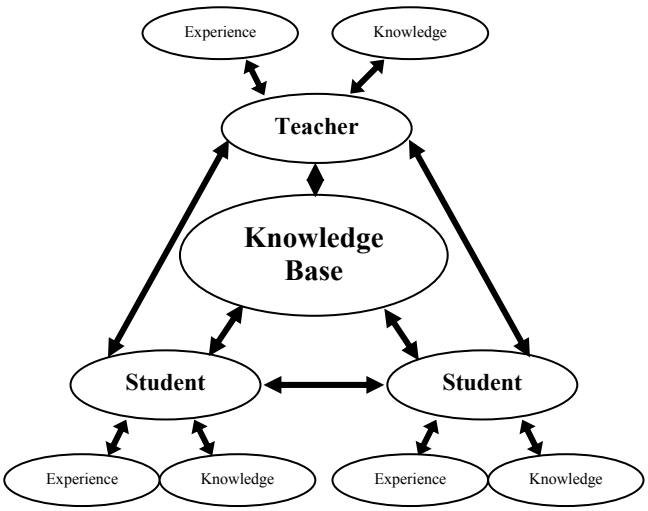

***Figure 2**: The e-learning paradigm, LP3 (from Schunck and Nielsson 2001)*

Learning with ICT

The literature contains examples of early models of learning with the assistance of ICT such as computer assisted instruction (CAI), computer based learning (CBL), and computer based training (CBT) that were used with some success with LD students. Torgesen and Young (1983), Poon and Head (1985), Schmidt et al. (1986), and Wood and Stewart (1987) reported on studies that were carried out with microcomputer programs in literacy and numeracy to develop skills with LD students. Computer managed instruction (CMI) was also used to support teaching in general. In addition to these approaches, games were also used to develop and consolidate reading and spelling skills. The educational needs of LD students were considered and Torgesen & Young (1983) had established two important principles that were adopted in the design of software programs for LD students. These were referred to respectively as:

1. The principle of uniqueness, and
2. The principle of educational necessity.

The former used tasks or methods for motivation, whilst the latter focused on critical problems with LD students. Most effort was placed on development and testing of the software to support more adaptive skills. Yamamoto and Miya (1999) used computer-based teaching with autistic children to develop their language skills, Johnson (1998) used CAI to develop vocabulary skills with LD students and Stevens and Edward (1991) used microcomputer time-delay and CAI to teach spelling to LD students. Clearly the early studies were limited by both hardware and also software, and they weren't very efficient, even though they provided support to the teaching of these students.

RECENT LEARNING MODELS OR CONCEPTS

Flexible learning is a form of learner-centred education designed to cater for individual needs in an increasingly diverse student body. It provides learners with greater flexibility in their preparation for tertiary study, teaching and learning approaches, learning pathways and points of entry and exit. Flexible learning approaches also increase learner choice in content, sequence, method, time and place of learning. Flexible learning approaches are often associated with the increased use of communication and information technologies but do not depend on technology and are unlikely to rely on online learning exclusively. Flexible learning approaches also encourage teachers to vary their response appropriately to address a student's learning request or demonstrated need.

Online learning (also known as *e-learning*, *web-based learning* or *distributed learning*) involves the use of communications and information technology networks, usually the Internet, to support learning. Online learning may include the provision of online learning resources, online support of student-student and student-teacher communication, online student assessment, online student learning support and online administrative services.

Online technology can make a key contribution to learner-centred flexible learning. To do so, online learning must focus on meeting learner needs to improve learning and not just on using technology to transfer information. The main intention of learner-centred flexible learning is to increase learner choice and accommodate learner diversity.

Online learning requires a simple-to-use, stable and reliable communication and information technology network. Servers and networks must be operated and maintained continuously and support must be available outside of Melbourne office hours. In the case of WebCT, this means that robust backup systems must be in place to ensure that WebCT is fully operational continuously.

A recent government project report included the study and role of educational technology in Australian schools. The project was titled "Technology for Learning: Students with Disabilities"; Ministerial Advisory Committee: Students with Disabilities, September 2000. The core research questions that were investigated were:

What are the current processes used by teachers to implement learning programs for students with disabilities using computer-based learning technology? What are the critical components of such processes?

The findings of the project clearly support many researchers (Holzberg 1994) that technology by itself does not make a difference, however, the integration of technology or ICT with effective teaching and learning strategies does provide students that enhance their learning in a considerable manner. There are several aspects which were identified as key inhibitors in schools: staff training, computer literate staff, staff release time, external disability support staff, parents as carers, rural and remote settings, and teacher attitudes to technology and ICT. The current research is examining these inhibitors or blockers closely and trying to develop strategies towards the application of a robust e-learning and technology based model.

BUILDING A LEARNING SOCIETY

It has been demonstrated at the state level that a key aim was to foster an education system in which ICT became part of every day classroom. This required teaching as education system that adequately resourced students and teachers' ICT needs so they would maximise the benefits of ICT in all subjects. Several case studies that relate to this policy framework include: New Realities, RED LAB, and Boosting E-commerce.

Virtual Communities and the Internet

The Collins English Dictionary defines a *community* as "a group of people having cultural, religious, ethnic or other characteristics in common." A *virtual community* is a group of people who share a common interest or bond, but rather than meeting physically they "form communities that cross geographical, social, cultural and economic boundaries" (Matathia 1998:156) and communicate via the Internet (Matathia 1998; Schneider 2000:10). Rheingold (1993:5) defines virtual communities as "social aggregations that emerge from the Net where enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace". Examples of virtual communities, using computer and modem, include groups of older people who share a common life stage, music lovers with an affection for a particular genre, and teenagers battling through 'the trials and tribulations of adolescence' (Matathia 1998:156). Internet-based virtual communities today "allow a wide range of global individuals to argue, share information, make friends, and undertake economic exchanges, in a flexible and socially-compelling common on-line arena" (Barnatt 1998). In contrast, members of an off-line virtual community do not communicate directly with one another but are reliant on 'broadcast' media such as newspapers, TV and radio to sustain their common bonds. An example of a virtual community (Lepa 2002) is the group of Australian older people who use the GreyPath Village web site that provides chat facilities and allows sharing of the common bond of ageing (Bosler 2001). Matathia (1998:156) suggests that these on-line relationships are every bit as strong and permanent as their 'real world' counterparts.

The above definitions also apply to a community of special schools in the outer metropolitan area of a major city, namely, Melbourne. The schools are keen to set up relationships involving students through mainly exchange programs, but there is growing interest to utilise ICT and the Internet. A major project will involve the schools participating in specially designed programs that will engage the students with online learning activities.

It should be mentioned here that each school has been asked by the state government to propose its own Educational Technology plan. The proposed project will incorporate such a plan during the research data collection phase. It is hoped that the data will be useful in providing knowledge about the way technology and ICT can assist students with LD. As an extension, the study hopes to provide guidelines and directions about future career paths or options that are in accordance with DEETYA principles.

A VIRTUAL COMMUNITY OF SPECIAL SCHOOLS

The research will involve a case study of two similar special schools in outer metropolitan area of Melbourne. These schools differ in size and the degree of disability is variable with the smaller of the two schools. The school population in the first school is approximately 50; this includes students from lower primary to upper secondary age groups. The second school is a much larger school of approximately 300 students and it covers a range of abilities both primary and secondary. The school caters for students with mild disabilities and it has a technology – based focus. This is recognised as one of the strengths of the school curriculum.

The aim of the research project is to set up an environment using the Internet and ICT to enable the communication of students through videos, email, and other suitable programs for students of peer group ability / function. There has been a growing interest to set up a virtual community between the schools and expand this further to include a sister school from UK. It is apparent from visits to the schools so far that the schools have formed a relationship with each other. The main difference as far as technology is concerned is that the second (larger one) school is very well equipped with ICT and the school has a well-established technology syllabus. The second school has limited ICT facilities.

The case study will look at meta-data to determine whether or not the students are able to move from the learning model LP1 to LP2 or even LP3, with the aid of ICT. The specific research objectives will examine the how the use of ICT can enhance the following main areas:

1. The learning outcomes that have already been determined by the schools, using the Educational Technology Plan. No change is planned to the school curriculum.
2. The school is currently using Paradigm LP1. The project aims to move the students to LP2 and LP3.
3. There is need to enhance the school infrastructure to make this possible.
4. The measurement (qualitative) will be made of how students interact with each other and between schools.

CONCLUSION

Technology can assist students with LD and research with the virtual community will demonstrate how the relationships are fostered through the use of ICT and Internet-based technologies. The outcome of the research will be a suitable learning model that incorporates technology and human factors in the development of skills and knowledge of students with LD. This research will add to work carried out earlier in the national project in 2000 for this important and vital virtual community.

REFERENCES

ACLD (1986). “Specific Learning Disabilities.” Association for Children with Learning Disabilities (ACLD) Newsbrief 159: 15-16.

Agran, M. (1977). “Teaching Self-Instructional Skills to Persons with Mental Retardation: A Descriptive and Experimental Analysis.” Education and Training of the Mentally Retarded 21: 273-281.

Barnatt, C. (1998). “Virtual communities and financial services - on-line business potentials and strategic choice.” International Journal of Bank Marketing 16(4)

Bulgren, J. (1998). “Effectiveness of a concept teaching routine in enhancing the performance of LD students in secondary-level mainstream classes.” Learning Disability Quarterly 11.

Holzberg, C. (1994). “Technology in special Education”, Technology in Learning, April, p 21

IDEA (1997). Individuals with Disabilities Education Act, United States. 20 USC 1401 [26].

Johnson, G., Gersten, R., and Carmine, D. (1998). “Effects of Instructional Design Variables on Vocabulary acquisition of LD students: A Study of computer-assisted Instruction.” Journal of Learning Disabilities 20(4).

Johnson, G. M. (1998). Students at Risk: Towards a New Paradigm of Mild Educational Disabilities, Sage Publication.

Keogh, B. and Speece, D. (1996). Research on Classroom Ecologies: Implications for Inclusion of Children with Learning Disabilities, Lawrence Erlbaum Associates.

Kirk, S. A. (1962). Educating exceptional children. Boston, Houghton Mifflin.

Klinger, J. K. (1998). "Outcomes for Students With and Without Learning Disabilities in Inclusive Classrooms." Learning Disabilities Research & Practice 13(3): 153-161.

Lepa, J. (2002). "Internet Information Services for Older Australian People." Proceedings of the Pan-Pacific Conference XIX e-Globalization and the Pacific Age, Bangkok, Thailand.

Matathia, I. S., M. (1998). NEXT Trends for the Future. Australia, McMillan.

Mather, N. and Roberts, R. (1994). "Learning disabilities: A field in danger of extinction?" Learning Disabilities Research and Practice 9: 48-59.

NJCLD (1994). Learning disabilities: Issues on definition revised. Collective perspectives on issues affecting learning disabilities, Austin.

Poon, P. and Head, P. (1985). Computers Assisting People. 1st Pan Pacific Computer Conference, Melbourne, Australian Computer Society.

Rheingold, H., 1993, The Virtual Community: Homesteading on the Electronic Frontier, Harper-Collins, NY.

Schmidt, M., Weinstein, T., Niemic, R. and Walberg, H. J. (1986). "Computer-Assisted Instruction with Exceptional Children." The Journal of Special Education 19(4): 493-501.

Schneider, G. P., Perry, J.T. (2000). Electronic Commerce. South Melbourne, Australia, Thomson Learning.

Schunck, L. G. and Nielsson, L. (2001). Varying Learning Paradigms, Danish Armed Forces, Distance Learning Centre (DEC).www.fcfu.dk/artikel/paradigm.htm June 2003. (- original source unknown.)

Stevens, K. B. and A., E. (1991). "Teaching Spelling with a Microcomputer time delay and computer -assisted instruction." Journal of Applied Behaviour Analysis.

Swanson, L. (1999). "Cognitive processing Deficits in poor readers with symptoms of reading disabilities: More alike than different." Journal of Educational Psychology 91(2.): 321-333.

Torgesen, K. J. and Young, K. A. (1983). "Priorities for the Use of Microcomputers with Learning Disabled Children." Journal of Learning Disabilities 16(4).

Wood, L. E. and Stewart, P. W. (1987). "Improvement of Practical Reasoning Skills with a Computer Game." Journal of Computer -Based Instruction 14(2): 49-53.

Yamamoto, J. and Miya, T. (1999). "Acquisition and Transfer of Sentence Construction in Autistic Students: Analysis by Computer-Based Teaching." Research in Developmental Disabilities 20(5): 355-377.

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