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ITP4701

Cultural Influences on Information Technology Skills Acquisition: An Australian Perspective

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ABSTRACT

This paper advocates the engendering of a learning environment that reduces, potential barriers to IT access and equity rather than seeking to identify individuals who experience inequalities as the cause of the problem. Information technology (IT) holds the promise of enabling unlimited access to information irrespective of a person's social situation. To realize this promise particular considerations must be given to the issues of IT access and equity during the primary and secondary education experience (Bors 1987,56). In addition, strategic planning which has as its aim the reduction of existing social barriers that lead to these inequalities must be addressed at the outset by policy and planning decisions. Therefore, considerations of IT access and equity must address the barriers, as well as the opportunities that IT creates. Some of the existing barriers to participation and access in IT are discussed in this paper. Particular attention is given to issues surrounding the access and equity potential of those groups identified by Australian governments as requiring special attention.

INTRODUCTION

> *Men, women and children are most likely to be willing to cross boundaries and assume more flexible identities not only when they understand where they fit in the great scheme of things, but also when they are free from oppression, when what they say, do and believe, is not ignored or trivialized.*
> *(Ryan 1997, 51)*

Particular groups of students have a greater likelihood of experiencing disadvantage with the introduction of IT into the classroom than others. Existing studies suggest that female students, for example, may not be receiving the benefits of IT in the classroom to the same extent as their male peers (Fletcher-Flinn & Suddendorf, 1996; Comber et. Al, 1997; Reinen & Plomp, 1997). While this observation is significant in itself and identifies an issue among this group of students, it does little to address, or alleviate, the source of inequality and access. This identification also implies this group is in some way the source of the problem, diverting attention from the broader and, usually, systemic sources of the problems. Of crucial importance to addressing inequalities and access to IT is the identification and the minimization of broader influences that assist in the perpetuation of these socially constructed barriers. Being identified as a girl does not causally imply that the student will be disadvantaged in accessing IT (Leah & O'Brian 1992). Some girls will experience inequality, however, in the form of barriers such as scarce resources and their relationship to the construction of gender — "girls don't do that" (The Women in Science, Engineering and Technology Advisory Group, 1993; Fletcher-Flinn & Suddendorf 1996, 371). Discriminatory barriers are maintained and largely function in an external relationship to those groups being disadvantaged (Dwyer 1997, 72-76). The classification of women, ethnic minorities, students with disabilities, indigenous students, gay students and students from disadvantaged socio-economic backgrounds and other arbitrary groupings are defined by a relationship to an assumed 'norm' which possesses none of these identifications.

For the purpose of this paper the barriers to access and equity are grouped into the four broad areas of resources, the curriculum, the classroom setting and attitudes. It should be stressed that in selecting these four categories they are just that, categories, and that the key element of this discussion is to shift emphasis regarding the sources of inequality and access from those experiencing inequality to situations and structures which enables the existence of these barriers. The effect of this approach is to require the identification of the sources of disadvantage in order to advocate strategies for the minimization of their influence within the classroom environment.

Resources

Resourcing is a key element in the provision of access to IT. Educational providers obtain IT equipment at varying rates, in what are described as fast and slow tracks. The rate at which equipment is obtained impacts upon an individual's ability to gain access to information technologies, especially in an educational setting (Marginson 1993, 91-101). The maintenance of discrepancies in the availability of IT resources is a significant barrier to equitable educational practice and consequently the even development of IT skills among all students.

Educational environments, when appropriately managed and funded, can alleviate the disparities that exist among the personal ownership of resources (see Bourdieu & Passeron, 1977). Differing domestic situations, the priority given to IT and education in this environment and the availability of home-based educational resources, is beyond the scope of direct government intervention, however, addressing inequality within educational environments can contribute to more equitable distribution of IT equipment for those students. IT tools remain high cost items and require a significant domestic contribution to become an element of the domestic environment. It is well documented both within Australia and overseas, that current information technologies are not equitably distributed through all levels of the student's educational experience (Clark & Ramsay 1990, 238; Reinen & Plomp 1997, 71). Compounding this situation inequality can be experienced at many levels. The unequal distribution of IT resources is experienced between different schools, between individual students and individually between the school and domestic environments.

Resources between Schools

The disparity in IT resources between schools is anticipated to compound as an increased reliance upon the entrepreneurial skills of each school becomes necessary for the acquisition or updating of IT equipment. Not surprisingly, it is those schools situated in more socio-economically affluent areas, and supported by more affluent parents who are leading the private acquisition of high cost equipment that permits a fuller range of IT possibilities (O'Chee 1988, 13). This position, for those other schools who are less socio-economically affluent, can only be achieved when suitable funding enables adequate resourcing to occur. Additionally, there is an increasing tendency to prioritize access to IT resources within a school. The students privileged with greater access to IT equipment tend to have better access to all of a school's valued resources (Hodges Persell & Cookson 1987, 126). This is revealed with the placement and utilization of computers in maths and science courses before being placed in English or art classes. (Hanson 1985, 79-80). Given the necessity, and wisdom, of introducing computers gradually into classrooms and the

burden of limited resource consideration must be given to the equity implications of a school's approach instead of simply perpetuating existing protocols, agendas and assumptions regarding IT.

In a recent international study (Reinen & Plomp, 1997) support was found for the proposition that females "know less about information technology, enjoy using the computer less than male students, and perceive more problems with software" (Reinen & Plomp 1997, 65) and that these differences were evident both inside and outside school. Based on analyses of the results, the authors concluded, that the reasons for the disparity between the sexes, in experience of information technology, might include "parental support, access to computers (in terms of availability and use), amount of female role models and (the type of) activities carried out with computers in school". The disparity of access to IT that individual students' experience at school is further compounded by the variation in the domestic consumption of IT equipment. In Canada, in 1996, the 20% of households with the highest income were four times more likely to have a home computer than the 20 % with the lowest household income (56.6% compared to 13.7%) (Laferriere, 1997). This emphasizes the difference of experience in IT access beyond the school environment and, if left to operate alone, could further contribute to the definition of the information 'rich' and information 'poor'. This disparity would become exasperated if students were encouraged to utilize IT outside the classroom, to access information on the Web, for example.

Information technology has transformed and continues to transform the schooling experience for children living in rural and remote areas (Whiston 1988, 31). Children living on properties or attending small or isolated schools have gained access to an expanded range of courses through the combination of IT and distance education. This development makes it possible for children in remote and isolated regions to remain with their families throughout their secondary education.

Despite the considerable improvement in opportunity that IT has provided to children in these situations not all children are benefiting from access to new technology and improved communications infrastructures. Distance can exasperate the barriers to acquiring appropriate IT resources. For students attending suburban or rural schools in low-income areas, this situation may be repeated, especially when the demand for access to IT resources exceeds the capabilities of funding sources.

Consideration must be given to developing the most equitable strategies for funding IT in schools. This strategy must proceed cautiously to avoid privileging schools that already have, potentially self-funded, technology resources and are considered 'technologically ready'. Considering 'who is ready' in isolation may exacerbate inequities and inhibit providing wide access to the greatest number of students (Fletcher-Flinn & Suddendorf 1996, 369).

CURRICULUM / PEDAGOGY

The four areas identified as impediments to generalized access and equity to IT must necessarily be addressed as a coherent group. Barriers constructed and maintained in relation to resourcing will permeate through to the possibility of a student receiving both access and equitable position in the education sector Dwyer 1997, 72). A discussion about student's access to educational tools obviously impacts to some degree on the curriculum and course development that the students receive. Though it is important to disentangle the differences of inequalities students experience if they do not gain adequate access to the tools to participate in IT as opposed to the knowledge and information that is encapsulated by the area of IT.

Producing quality software which guide students towards curriculum outcomes is an expensive process. When resourcing is inadequate purchasing software of this quality becomes problematic. When the purchase of software of any type becomes problematic purchasing specialized educational software is not a reasonable option. Developing a reliance upon donated or non-customized tools that are devoid of Australian content can also result in the use of American or other culturally inappropriate material. This possibility has direct consequences on curriculum development and the substantive content that may be taught to Australian students.

The Australian education sector, in this sense, is not only constrained by the allocation of resources to IT but also the pedagogical considerations that its use implies (Hansen & Olson 1996, 669). Therefore, as well as requiring software that complements Australian realities, pedagogically sound software is required. For these reasons, policy and benchmarking consideration must be made to ensure that software utilized in the classroom respects the Australian situation of cultural diversity as well as maintaining a cultural sensitivity. In this way the lessons that have been learned about inclusive curriculum development are reflected in educational settings that utilizes new communications technologies.

Innovative IT practices has also assisted non-English speaking students to improve their English language acquisition while keeping up with their peers in other subjects. Where this technology has been used effectively, it has encouraged non-English speaking background (NESB) students to take risks in practising their English and has fostered increased cross-cultural understandings among students (Ryan 1997, 44-45). The utilization of the new and interesting teaching practice and the way a lesson is presented may assist all students in their acquisition of language skills and it is this element this element that needs stressing. The presentation of lessons in an interesting and challenging manner results in the acquisition of better skills and not necessarily its information technology packaging (Hansen & Olson 1996, 673). To highlight this educationalists involved in this area, have suggested that care needs to be taken in selecting software for NESB students as the software currently on the market is often of poor quality (Kersteen et al 1988, 322). Information technology may provide a remedy to inequalities if educators can enable the distribution of content of equal pedagogical quality. Alternately, if this condition of quality is not met, IT may increase the discrepancies of formal learning environments (Dwyer, 1997).

ENVIRONMENT/ CLASSROOM SETTING

Appropriate reflection of the existent success stories of the utilization of IT to overcome barriers to access and equity exist. For example, some of the most exciting results of IT usage in schools has been in the enhancement of learning for students with a disability through the use of various assistive technologies (Curriculum Corporation 1994, 8). If Australia is to stay at the forefront of developments in the area of the utilization of IT in education both practical and creative utilization of the technology is needed. For instance in the US the Corporation for Public Broadcasting is developing retrofitted televisions, closed captioning, synthesized speech, and digitally delivered radio to assist students in their particular environment setting. The utilization of such sophisticated equipment requires both access to an existing body of knowledge as well as forward planning which necessarily equates to an alteration in the existing classroom setting. Assistive technologies when appropriately integrated into the classroom can provide all students with both a dynamic and interesting environment from which to learn.

The classroom setting provides the very important environment in which learning and skill acquisition occurs. The classroom setting incorporating IT into its makeup therefore can either benefit or restrict the individual students learning experience. The wide variety of student life experience, histories and therefore skill's levels and confidence is particular to each and every classroom. To adequately provide access to all students is a challenging task for the educators in these settings. Disparity between social composition in the forms of gender, socio-economic situation (SES), disability, ethnicity, sexuality and such are unique to each classroom. It is for this reason that it is suggested that appropriate blanket style benchmarks should be developed and utilized so as to reduce the barriers associated with access and therefore providing a situation where maximum student inclusion is sort. Awareness of the barriers to equitable distribution of resources and a strategy of targeting such barriers can therefore result in maximum participation and therefore access for students.

The development and maintenance of classroom culture is a dynamic process where group interaction, management and the organization of the classroom are ever changing (Ryan 1997, 37). The introduction and use of IT will have varying repercussions for these sights, it is therefore impossible to predict the outcome for all such settings. Recommendations made from above, which alone target the numbers of computers that should exist in each classroom, or impose specific time allocations to the tools of information technology, do not take into consideration the complexity of the classroom environment. They therefor will not provide an appropriately broad-based approach to skills acquisition and learning for the students involved. However the introduction of IT into the classroom setting in the aim of reducing or at least addressing existing barriers to access and equity is more likely to achieve a goal of maximum participation for all students.

ATTITUDES

Both overt and covert discrimination resulting from attitudinal behaviors continues to be a cause of disadvantage for many students in the classroom (Ryan 1997,39; Dwyer 1997, 71). Government policy makers are particularly concerned in addressing such inequalities for Aboriginal and Torres Strait Islanders (ATSI), NESB and students with a disability. Anecdotal evidence suggests that when schools commence the integration of IT in classrooms, the first classrooms to be equipped are the higher grades, and for math and science. The rationale for such decisions as previously discussed rests on the notion of those students who are 'technologically ready', however this scenario has little room for the possible existence of barriers to becoming 'ready'.

A shift in attitudinal position, to achieve broad-based inclusion and a shift away from problem group targeting, will result in a reduction of barriers and greater utilization of IT by more students. It is the barriers that are created by attitudes of exclusivity, fear and ignorance which result in many students receiving lower levels of equity and access to IT resources and equipment. Attitudinal changes must be addresses at a number of levels including teacher's, parent's and student's.

CONCLUSION

Existing educational practices target specific interest groups who have been identified as problem areas. These groups are largely calculated using traditional sociological group categories. The continuing use of this approach miscalculates the people in these groups as the source of a problem. To realise the promise of enabling unlimited access to information irrespective of a person's social situation a shift in emphasis must occur. The barriers socially constructed to reinforce social situations perpetuate inequalities and therefor must be addressed as such. These barriers are not necessarily constructed around the sociological categorisations of people according to their, ethnicity, gender, socio-economic situation, age or class. Therefor by addressing and minimising, potential barriers to IT access and equity rather than seeking to identify individuals who experience these inequalities as the cause of the problem may indeed better fulfil the promise of enabling unlimited access to information irrespective of a person's social situation.

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