

Cultural Difference and its influence on learning with Computer-based technologies in Schools

Vijendra Lal (October 02)

Introduction

This paper focuses on how learner's cultural backgrounds influence learning with computer-based technologies. It begins by noting the lack of research in this area and then looks at the importance of understanding the cultural backgrounds of learners in designing computer based learning experiences for them. After this it reviews the current debates, research and thinking in the literature relating to cultural differences and learning with computer based technologies. This paper also highlights the different nature of computer-based learning environments of public schools in NSW and the need for future research to address such learning contexts and the differences, which abound within them.

With the rapid growth in the use of computer based technologies in homes, businesses and other institutions, schools and teachers everywhere seem to be currently under a lot of pressure to "technologise learning" (Lankshear, Snyder and Green, 2000) In Australia many schools have taken up, or are in the process of taking up, the challenge to integrate computer based technologies in their classrooms.

Within NSW, over the past decade there has been big growth in the use of computers for learning in schools. The driving force behind this has been the belief that this will help enhance learning and help prepare students for a future where technology is part and parcel of everyday life and one in which they can participate in and contribute to effectively. Usage of computer based technologies and especially the Internet has steadily increased since all government schools got connected to the Internet at the end of 1996.

In spite of this rapid growth in the use of computer based technologies in learning in schools in Australia, research into the impact of these technologies on student learning has not moved at a similar pace. A review of literature relating to learning with computer based technologies in both Australia and internationally shows that whilst there is a significant body of theoretical and anecdotal literature relating to the benefits of using such technologies, there has not been many rigorous and systematic studies that have investigated their impact on teaching and learning in schools (Bennett and Lockyer, 1999), (Harper, et. al, 2000).

With the growing use of technology in schools it is imperative for research to move at a similar pace and investigate in more thorough and systematic ways how the integration of computer-based technologies is changing the learning environments of classrooms and more importantly, how these changes are impacting on the learning of different groups of students especially those who

can be disadvantaged in computer-based learning environments. Some student groups, Roblyer identifies as falling in this category, include those from different cultural backgrounds (especially from minority cultures), those from different genders (especially girls), those with a disability and those from a low socio economic background (Roblyer, 2000). This paper focuses on cultural difference and its influence on computer-based learning.

There has not been a lot of research in this area and this has been noted by a number of theorists and researchers who have focused on the influence of culture on computer based learning. For example Henderson (1996) noted that "the relationship between cultural context and instructional design has received little attention in the educational technology and instructional design literature. Collis et al (1996) similarly indicated that there was little extant research on instructional design for cross-cultural Web site development. Reeves (1997) pointed out that not enough was known about the ramifications of cultural inclusivity for cognitive design of learning resources and that further research is needed. Wild (1999) noted that there had been "few reflections on the educational impact of new technologies on culture". He also pointed out that research relating to designing complex systems for multiple cultures in at an early stage of development and more work is needed in this area. He further argues that despite the lack of identifiable research in this area "there is a clear consensus that culture must have a definite and very strong influence on the design and use of information, communication and learning systems, as well as their management..."(197). Jae-Eun Joo (1999) pointed out that "ethical and cultural matters related to Internet use have been largely marginalised in education" (246). Ziguras (1999) contended that there has been little research in the cultural bases of student experiences of learning in virtual environments. He states that "research is needed to inform the development of relevant, appropriate and culturally sensitive pedagogy for the virtual learning spaces that are increasingly being inhabited by students all over the world" (Ziguras 1999). From these comments it is evident that research relating to culture and technology use in learning is still in its infancy and a lot more needs to be done to understand the influence of cultures on computer based learning environments. This understanding will help to inform the development of appropriate guidelines for the design of computer based learning environments which accommodate the needs of students of different cultures, especially minority cultures which can be disadvantaged in such learning environments.

The importance of understanding cultural backgrounds of learners when designing computer-based learning

Collis points out that it is important to consider the cultural backgrounds of learners when designing computer-based learning because culture shapes learners values, perceptions and goals and determines how they respond to computer-based learning (Collis, 1999)(Collis 1999). McLoughlin and Oliver (2000) also echo this when they state that "the acceptance, use and impact of WWW sites are affected by the cultural backgrounds, values, needs and preferences of learners"(58). Some cultures, for example, may associate

technology with progress and encourage their children to use it. Others may be less accepting of technology due to particular religious or other reasons (Roblyer, 2000). McLoughlin (1999) points out that Euro-American cultures tend to believe that all educational problems would be solved if learners had access to technology. This she maintains may not be the case with all cultures and hence may affect how they view and use computers.

In a review of research findings on learning styles of culturally diverse students, Irvine and York (1995) report that African American, Native American and Hispanic students often demonstrate a learning style which prefers group work and verbal tasks. Also they learn more from materials, which have humour, social content and use a lot of imagination. This learning style often conflicts with the traditional school environment, which tends to encourage individual and competitive learning processes. European American and Asian American students tend to prefer analytical tasks and like learning from materials that are inanimate and impersonal.

With the moves for greater use of computer based learning technologies in education, theorists like Chisholm (1994) who have focused on the relationship between culture and educational computing, have argued that differences in learning style by students from different cultures should guide plans for the integration of computer based learning (Chisholm 1994). She contended that members of cultural groups demonstrate similar cognitive and motivational styles, and that this is the case even across different social classes within the same culture. She further argued that despite individual differences within cultural groups there are cultural patterns in how most members of cultural groups prefer to learn and interact with others. And these should guide how computers are used in the classroom so that they support how such students learn best.

Research on how Culture influences Computer-based learning

From my review of the current debates, research and thinking in the literature relating to cultural differences and learning with computer based technologies, there appears to be currently two major assumptions. The first is that students from different cultural backgrounds use and think about computer-based learning technologies in different ways. Proponents of this assumption state that computer-based learning environments need to be designed in ways, which accommodate the needs and learning styles of such students. They have suggested a number of guidelines and models for doing this and I will be focussing on them later on in this paper. The second assumption is that in spite of such guidelines and models for accommodating the needs of culturally different students, many are still being disadvantaged when studying in computer-based learning environments. Let us explore each of these assumptions more fully.

There have also been a few studies done, which have supported the assumption that students from different cultural backgrounds think about and

use computer-based technologies differently. These are reviewed below together with some reflections on their limitations.

Owens et al (1998) in his study found that there were significant differences in computer technology use by students due to their ethnicity and gender. They focused on gender and ethnic related differences in technology use amongst students in secondary schools science and mathematics classrooms. A large number of tenth grade students (15,577) completed surveys. They represented both genders and came from African American, White American and Hispanic backgrounds. Their findings showed that male students reported they used the computer more than females in science and maths classes. The female students reported they used the calculator more than males in maths classes. African American students reported using computers more often than Hispanic and White American students in science and science classrooms. The researchers attributed this to these students more positive attitudes towards computers and because they received more help from teachers to raise their academic levels. Also White American students reported using calculators more often than Hispanic and African American students.

This study seems a bit limited both in its methodology and findings. By just using a survey it has managed to get data on just what the students reported. No observations were done nor was there a detailed follow up of a manageable sample of students to corroborate what students reported with what actually happens in practice. Also its findings were limited to just how often they used technology in maths and science classes only. Moreover there was no focus on how or why they used it, their perceptions on how these technologies influenced their learning, and other variables affecting their use of technology.

Branden and Lambert (1999) who researched the influence of culture on Open and Distance Learning and vice versa, found that people form culture based attitudes towards the use of technology. From their research on the framework of the European Open University network project, they noted cultural differences between larger European regions regarding technology use in education. For example, those from northern and Western European countries preferred studying with computers whereas those from South and Central Eastern countries felt a high competence was needed for working with computers and preferred to work in small groups. They also had a preference for audio and visual material rather than computer based information.

What appears from this research is a very general sort of finding with no attempts to delve into the reasons for the preferences demonstrated by the cultural groupings from different countries. Also there is no outline of the methodologies used to arrive at these findings. These details will be forthcoming in a book the authors have written which is in press at the moment.

Chen et al (1999) focussed on cultural considerations in the design of online learning environments in Singapore and found some interesting cultural patterns amongst Singaporean tertiary students. With use of data collected

from field notes of project group activities, interviews with students, on-line conversation logs, minutes of meetings and student journals, they noted that in online collaboration students valued trust building with the mentor. They found that dialogue was facilitated well due to the design taking into account the local cultural context. They also found the practice of anonymous identities in online communication was not a help but a hindrance to communication in the Singaporean culture. This led them to emphasise that "social and cultural understandings need to be explicit and up-front, before participants are able to build the online networks of trust upon which effective communication and learning is based" (228) (Chen 1999)

This study had a limited focus in that it just concentrated on online interaction in a particular cultural context. It would be interesting to see if the findings regarding Singaporean student preferences in online interactions hold true in other educational contexts where one has students from many diverse cultures learning together.

Kum et al (2000) investigated the effects of cultural background of tertiary learners and their perceptions of web based learning with the use of a survey type of questionnaire. They found that Anglo Saxon students felt more confident and had lesser difficulties than Asian students. Such differences they suggest call for a more differentiated approach in web based learning in culturally diverse learning contexts.

The fact that this study just used surveys gave it limited data. Interviews would have helped to find out the reasons for the preferences demonstrated. Observations could have also helped to cross check to see if what the students said corroborated with what they did.

Huber and Schofield (1998) studied how Costa Rican boys and girls think about and use computers in primary school in grades K, 2, 4, and 6. The research methods they used included observation of classes and semi-structured interviews with teachers and selected students from each class observed. The observations were done 4 days a week over eight weeks and field notes were written in an expanded form 1-3 hours after each observation. Their key finding was that cultural and social forces of the Costa Rican society strongly influenced student attitudes towards computers.

The methodologies used in this study has enabled it to get at rich data and thick descriptions have been possible due to the combined methodologies of observations and semi structured interviews in naturalistic classroom settings in the Costa Rican school setting. One shortcoming of this study is that the observations were restricted to only 8 weeks which does not seem long enough. Also the few students who were interviewed were not subjected to detailed case studies.

Liang & McQueen (1999) investigated the experiences of 18 adult learners from different cultural backgrounds when learning with the internet through the use of surveys, interviews and observations. Regarding student expectations about the teachers they found that most of the Asian students believed that

the teacher should offer more information instead of waiting for students to request this and preferred more teacher direction. Western students on the other hand preferred more interaction amongst students.

Given this study was done over just a 12 week period within the context of one single course which used online technologies its findings relating to students experiences of online technologies is very thin in description. For example none of the perspectives of any of the students interviewed are presented in their own words. A longer engagement with this group, perhaps in two different course contexts may have yielded richer descriptions and more in-depth analysis and insights.

Taken as a whole the above studies show a number of patterns. Most of them have been done in non-school based contexts and have focused mostly on online learning environments (Liang & McQueen, 1999), (Chen et al, 1999), (Branden & Lambert, 1999), and (Kum, et al, 2000). Only two of these are based in schools (Owens, 1999) and (Huber & Schofield, 1998) and out of these only one focused on students learning experiences in a school context (Huber & Schofield, 1998).

Another pattern evident from these studies is that most of them have used quantitative methodologies like surveys (Branden & Lambert, 1999), (Kum, et al, 2000 (Owens, 1999). Findings of such methodologies, whilst they reveal interesting patterns, they do not enable corroboration between what students say regarding computer use and what happens in the real world of computer based learning. Nor do they get at the perspectives of students and understand things and seek meanings from their points of view.

The assumption that culture influences learning and that we need to design learning environments which are culturally inclusive and accommodate the needs of students from different cultural backgrounds has been part of the thinking behind the push for multicultural educational policies which were introduced in Australia from the 1970s. This happened after the failure of the previous assimilation policies, which attempted to assimilate immigrants into the dominant Anglo-Australian culture. It has also led to the belief that in designing learning with the use of computer-based technologies, cultural differences of learners and its influence on learning need to be taken into account. Consequently various guidelines and models have been proposed for the design of learning for students from different cultural groups for both learning in general and learning with computer based technologies. These guidelines and models, one would have hoped, would have helped to accommodate the needs of culturally different students but as pointed out by a number of theorists they haven't. Instead they claim that students from different cultures, especially minority cultures, are still being disadvantaged. It is to these issues we shall now turn to.

Models and guidelines for designing learning to accommodate cultural difference

Some of the multicultural education policies introduced in attempts to accommodate the needs of students from different minority cultural backgrounds have included community schooling, mainstreaming and inclusive curriculum (Singh, 1994). Singh in this review of these policies argues that they all have some basic flaws and proposed an approach to revising the core curriculum called “inverting the curriculum”. Community schooling he argued, separated and silenced disadvantaged groups from criticising the dominant education system. Mainstreaming tended to represent race and ethnicity as being marginal to society. The problem with the inclusive curriculum policy, he argued, was that it assumed that the problem of an exclusionary curriculum could be solved by simply including minority perspectives in the curriculum instead of rearticulating the way in which such perspectives are represented in the overall curriculum framework. The inverted curriculum approach he proposes attempts to construct curriculum from the standpoint of the least advantaged in society like the cultural minorities and the marginalised. This he argues is a more effective approach to reinvigorating social justice initiatives in education.

Singh’s arguments are in the context of learning in general. How do these translate to learning in computer-based learning environments? Over the last decade with the rapid rise in the use of computer based technologies in education a number of guidelines and models have been proposed to accommodate the needs of students from different backgrounds, including different cultural backgrounds. Guidelines and models, which have been offered, relate to the following:

- How to design of WWW based course support sites so that they can be adaptable to different types of cultural differences (Collis, 1999).
- How to design web sites for cross cultural communication and interaction (Collis & Remmers, 1997)
- How to select content and visuals in web sites for cross-cultural use. (Collis & Remmers, 1997)
- How to create WWW based course support sites for cultural inclusivity. (McLoughlin and Oliver, 2000).
- How to design sites for use in local cultures. (Chen, Mashadi et al, 1998)
- How to use the multiple cultural model of instructional design for developing computer based learning resources. (Henderson, 1996).
- How to design culturally inclusive online learning environments can be culturally inclusive in accordance with constructivist principles (Holzl, 1999)
- How to evaluate computer based learning resources for cultural sensitivity. (Reeves, 1997)

It is evident from these models and guidelines offered for accommodating the needs of learners from different cultures, that most of them focus on how to create culturally inclusive online learning environments. What they do not address are situations like the computer-based learning environments where computer use is very much mediated by a classroom teacher and where online technologies are just one part of learning with computers. This actually is the case in many NSW schools at the moment. How relevant are these

guidelines and models for such learning contexts? This is an area, which needs to be researched.

Shortcomings of Design Models and how Culturally Different Learners are being disadvantaged

With these guidelines and models one would have hoped that the needs of learners from different cultural backgrounds would have been accommodated in the design of online computer-based learning environments and educational software. But as Henderson points out, this does not seem to be the case (Henderson, 1996). She contends that in the design of learning resources for computer-based learning environments there is often deracialization in that cultural minorities are often made invisible and are being disadvantaged in their learning. (Henderson, 1996).

Henderson outlines a number of reasons for this. (Henderson, 1996). Firstly it often happens due designers being unintentionally culture blind or adopt a culturally homogeneous approach to design. This leads to exclusion and silencing of issues of cultural contextualization and the universalization of a dominant groups knowledge and culture. Secondly it happens due to the fact that words like multiculturalism, cultural diversity and cultural pluralism create feelings of general controversy and this leads designers to adopt avoidance strategies which result in deracialization. Thirdly deracialization happens due to not much significance provided to cultural context in learning theories which inform instructional design. This leads to courseware in which the user has no identity other than that of “the learner”. Designers need to recognise that knowledge acquisition is very much a socio cultural process as Vygotsky’s learning theories put it. The intellectual development of individuals within a cultural group are moulded by their ways of thinking and doing. For example social activity within the cultures of Aborigines and Torres Straight Islanders, mediates cognitive development in culturally appropriate ways. Hence asking why type of questions is not accepted in their cultures as a strategy for teaching and learning. Also it is not acceptable for adults to demand learners to demonstrate understanding and abilities as they are allowed to demonstrate this when they feel ready and with methods and settings of their choice. The fourth reason for deracialization results from a perception that calls for incorporation of multiculturalism in courseware is really “political correctness run rampant”. This view is often held by those who consider certain disciplines of knowledge like mathematics to be culturally neutral. Even constructivist designers, who understand that all knowledge is open to criticism and different interpretations, ignore in their design the different realities that exist in non-western cultures. Lastly deracialization in software happens due to the perception that it is naïve to accommodate multiculturalism in design. This perception is often held by those who feel it is not cost effective to attempt to include everyone’s ethnicity and learning style in our diverse society.

Henderson also reviews a number of strategies to avoid deracialization and discusses some of their shortcomings. She then proposes a multiple cultural model to design computer-based learning environments that promotes equity

of outcomes for all learners, especially those from disadvantaged minority groups. This model attempts to incorporate the academic culture of learning together with the mainstream and minority cultures.

Apart from Henderson, other theorists have also highlighted the shortcomings of design models and guidelines. Their key criticism has been that most of these models tend to be of a general nature and provide guiding principles for designing resources for students in general rather than for specific target groups like cultural minorities. Stanton (2001) for example points out that there are many difficulties being encountered by designers of computer based learning environments. "Research evidence suggests that the present status of knowledge is at best somewhat wanting and at worst contradictory and unhelpful" (Stanton 2001, 181). He further points out that development in design of learning environments are "only likely to occur through empirical research into instructional theory and a better understanding of how people use CBLE". (Stanton, 2000:176)

So with regard to how computer based resources and learning environments should be designed to cater for the needs of culturally different students, whilst there are a number of guidelines around, not many are based on actual studies of how students from culturally different backgrounds use computer-based learning technologies. This may be part of the reason why the needs of students from different cultures are not being fully accommodated.

Other theorist like Forster (1988) have contended that despite the great diversity of cultures in Australian classrooms of today, and despite the existence of multicultural policies and models of accommodating different cultures, there is a tendency for teaching and learning to happen in ways which are designed to support the learning style and preferences of pupils from the mainstream Anglo-Australian culture given that they constitute the majority of students in most school classrooms. Such an approach ignores the needs of culturally different students especially those from minority ethnic groups. The mainstream students are brought up in ways that fit in with the culture of the school. Culturally different children, given that they have a different set of values and beliefs and worldviews, due to their different socialisation in the home, are often not at ease with the Australian classroom culture. However the powerful socialising influence of the school culture and the motivation to succeed, leads to conformity amongst most of these students and they soon adjust to the demands of schooling and respond in ways in which the teacher thinks is appropriate. However there are some students, like those from Aboriginal backgrounds who don't conform and get marginalised as a consequence.

Conclusion

So from the above discussion it becomes evident that the cultural backgrounds of students from different cultures, influences how they use and think about learning with computer based technologies. This has led to the assumption that guidelines and models based on the experiences of such

students are needed to design computer-based learning environments in which they can benefit from positively. The current guidelines based on the conceptualisations of some theorists, as has already been pointed out, are mostly for designing online learning environments and their effectiveness has been questioned. These guidelines also need to be re considered in computer-based learning environments of schools where online learning is currently just a small part of the students overall computer-based learning experience. And these guidelines need to be adapted and refined from the findings derived from real use with real learners working in realistic and naturalistic computer-based learning settings of schools. This is where future research needs to make a contribution and assist policy makers, school administrators, teachers and computer-based resource designers in understanding how students from different cultural and other backgrounds experience and perceive learning with computer-based technologies. This understanding will help in the development of appropriate guidelines which will help to ensure that computer based learning environments and resources are designed in ways which facilitate the learning of students from different cultural and other backgrounds.

References

- Barry Harper, John Hedberg, et al. (2000). *The On-Line Learning Experience: The State of Australian On-Line Education and Training Practices. Review of Research*, Australian National Training Authority.
- Bennett, S. and L. Lockyer (1999). *The Impact of Digital Technologies on Teaching and Learning in K-12 Education*, Curriculum Corporation of Australia.
- Branden, J. B. and J. Lambert (1999). "Cultural Issues related to transnational Open and Distance Learning in Universities: a European problem?" *British Journal of Educational Technology* 30(3): 251-260.
- Chen, A. e. a. (1999). "Cultural issues in the design of technology-enhanced learning systems." *British Journal of Educational Technology* 30(3): 217-230.
- Chisholm, I. M. (1994). "Culture and Technology: implications for multicultural teacher education." *Journal of Information Technology and Teacher Education* 3(2): 213-228.
- Collis, B. (1999). "Designing for difference: cultural issues in the design of WWW-based course-support sites." *British Journal of Educational Technology* 30(3): 201215.
- Collis, B. and E. Remmers (1997). *The World Wide Web in Education: Issues related to cross cultural communication and interaction.* Web based

- instruction. Englewood Cliffs, New Jersey, Educational Technology Publications: 85-92.
- Henderson, L. (1996). "Instructional Design of Interactive Multimedia: A cultural critique."
- Holzl (1999). Designing for Diversity within online learning environments.
- Huber, B. R. and J. W. Schofield (1998). "I Like Computers, but many Girls don't": Gender and the Sociocultural Context of Computing. Education, Technology, Power: Educational Computing as a Social Practice. Albany, State University of New York Press.
- Joo, J.-E. (1999). "Cultural Issues of the Internet in classrooms." British Journal of Educational Technology **30**(3): 245-250.
- Kum, C., C. Vanessa, et al. (2000). The Use of Web-Based Learning in Culturally Diverse Learning Environments. AusWeb2K, Southern Cross University, Southern Cross University Press.
- Lankshear, C., Snyder, A. and Green B. (2000). Teachers and Technoliteracy, St Leonards, NSW: Allen and Unwin.
- McLoughlin, C. (1999). "Culturally responsive technology use: developing an on-line community of learners." British Journal of Educational Technology **30**(3): 231-243.
- McLoughlin, C. and R. Oliver (2000). "Designing Learning Environments for Cultural Inclusivity: A Case Study of Indigenous Online Learning at Tertiary Level." Australian Journal of Educational Technology.
- McQueen, A. L. R. J. (1999) "Computer Assisted Adult Interactive Learning in a Multi-Cultural Environment."
- Owens, E. W. (1998). "Sex and Ethnic related differences amongst High School Students' Technology use in Science and Mathematics." International Journal of Instructional Media **Vol 25**(1): 43-55.
- Perkins, D. N. (1991). "Technology Meets Constructivism: Do they make a Marriage?" Educational Technology (May): 18-23.
- Powell, G. C. (1997). "Diversity and Educational Technology: Introduction to Special Issue." Educational Technology **37**(2): 6-14.
- Reeves, T. C. (1997). "An Evaluator Looks at Cultural Diversity." Educational Technology **37**(2): 27-31.
- Singh, M. (1996). Multiculturalism, policy and teaching. Understanding Teaching: Curriculum and Social Context of Schooling. E. Hatton. Marrickville, Harcourt Brace & Company, Australia: 293-301.

Stanton (2001). "Theoretical Perspectives in Designing Learning Environments."

Wild, M. (1999). "Editorial: Accommodating issues of culture and diversity in the application of new technologies." British Journal of Educational Technology **30**(3): 195-199.

Ziguras, C. (1999). Cultural Diversity and Transnational Flexible Delivery. Ascilite.