WHAT DOES TECHNOLOGY FOR EFFECTIVE PEDAGOGY DEMAND OF LEARNERS AND INSTRUCTORS?[1]

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RESUMO

Para Robbins et. al. (2002), há uma ligação importante entre o emprego das modalidades de comunicação intermediadas pelo computador, o ensino e a aprendizagem do aluno. Um levantamento de estudantes e entrevistas com professores tinham indicado que o uso do *email* e *software* para manejo *online* de curso contribuiu positivamente para o desempenho dos alunos porque se envolveram mais no processo de ensino-aprendizagem de diversas maneiras. De acordo com a literatura, durante este processo, tanto professor quanto alunos, assumindo maiores responsabilidades para ensinar e aprender constroem novos compromissos em suas relações. Utilizando estas informações como arcabouço teórico-metodológico, desenvolvemos observações, entrevistas, e grupos de foco com estudantes com a finalidade de investigar se os professores, com apoio de tecnologia computacional utilizando o correio eletrônico e programas para armazenamento *online* de material didático, ajudariam a nutrir uma pedagogia mais participativa. A análise descritiva e interpretação básica dos dados indicaram um aumento nas comunicações dos estudantes e das respostas dos professores. Isto é, com a utilização dos meios de comunicação pedagógica mediada pelo computador, professores e estudantes aumentaram as suas interações que possibilitaram maiores ganhos pedagógicos por todos envolvidos no processo.

Palavras-Chave: Tecnologia, Fatores Culturais, Características dos Estudantes, Ensino-Aprendizagem

ABSTRACT

According to Robbins et al. (2002), there is an association between the use of computer mediated communications and teaching and learning performance of students. A survey of students and interviews of instructors had indicated that the use of email and on-line course management software increased the teaching and learning performance of students as they became more involved in the teaching-learning process in diverse manners. Instructors and students are believed to assume greater responsibility for learning-teaching as new relational commitments are made by both groups. Based upon this framework, we engaged in observations, student interviews and focus groups, to investigate whether instructors, with the assistance of technology tools such as email and on-line course management software, did nurture more participatory pedagogical relationships. The results of the data analysis and basic interpretations showed that student communications and instructor responses increased through email and an expanded use of online discussion boards. That is, with communication-mediated technologies, both students and instructors increased their interactions that led to greater pedagogical gains by all parties involved.

Keywords: Technology, Cultural and Individual Student Factors, Learning-Teaching.

* Recebido em: agosto de 2005
* Aceito em: dezembro de 2005

[1] This study was initially presented at the II Congresso Internacional de Educação da Univ. Federal do Piauí, UFPI, December 15-17, 2004, as part of a round-table discussion regarding technology in Education, and had as participants, besides the authors, Dr. Dorothy Ettling, also of UIW, San Antonio, Texas, EU.

INTRODUCTION

This study continues to explore the association between the use of computer mediated communication (CMC) and preferred teaching methods and increased learning performance by students. With the continuous innovations in the field of information technology, the range of new technologies now include the internet, world wide web, CD-Rom, printed, audio, video, and other electronic media forms. In themselves, these forms of information transfer have transformed distance education into a new practice with ramifications and immense modifications. These changes engender new teaching techniques that tend to allow for the production and dissemination of knowledge in ever-changing ways. Similarly, new data and information units are acquired, constructed, treated, stored, and transferred. The fact that information and data have acquired new forms and features has influenced knowledge in several ways. Concurrently, work with and for knowledge has also been transformed.

That is, teaching and learning, two basic elements related to what is considered knowledge, the essential material of education, also continue to suffer modifications (CAMPBELL, 2004). What we presently have is an open "learning system […] [that] can be adapted by learners or trainers to the particular needs of learners, teams or groups of learners from different surroundings or cultures. It is modular in order to facilitate its adaptation, updating or its re-engineering" (PAQUETTE, 1998, p. 18). Questions related to availability of technological resources, institutional climate-awareness-readiness for change, individual instructor-learner attitude to pedagogical shifts, and cultural (or better still, multi-cultural) adaptability, are crucial for understanding CMC more adequately.

The participants for the present study were limited to international students from Taiwan studying full-time at a small private university in San Antonio, Texas. These students were of particular interest to the researchers as practitioners as they represented the sixth cohort in five years to enter the organizational leadership doctoral program which allowed for the continuation of the study through observation and focus groups. Thirty-one of 38 students voluntarily responded to a survey and nine of the 38 students were purposefully selected for participation in group interviews.

SUPPORT OF THE LITERATURE

The nature and characteristics of the changes brought about by CMC place crucial responsibilities upon education professionals. The need to try to understand these phenomena as forms of thinking-doing from pedagogical (teaching methodologies) and didactical (teaching practices and techniques) perspectives, is as urgent today as it was in previous decades. Needless to say that teaching as instruction, conveyance of information/data, invitation or stimuli to remain open cognitively to what society and the academic community consider relevant, can really only take place when there is learning. That is, learning understood as assimilation of knowledge forms, either as modified information units or even as

somewhat whole data systems. In turn, attitudes, values, behaviors, and interests are also affected as a result of this learning process. How does information technology, specifically computer mediated communication forums, influence the teaching-learning interactive continuum?

As interactive processes, teaching and learning depend upon parties who willingly engage themselves in activities revolving around knowledge. Through such activities, education as a meeting of thinking persons takes place. For teaching to occur, there must be students interested in learning. In the more traditional classroom setting, these individuals are contextually restricted. Spatially, they normally share the same basic coordinates; they are together in a defined physical space. There is an instructor totally responsible for managing all aspects and phases of the teaching-learning process. Even when there is the so-called student-centered classroom, this too is dependent upon the instructor. Teaching tools, materials, and other information transmission elements are also generally concrete, defined by real time and other real modes. More explicit and objective interactions between instructor(s) and learners is the main characteristic of the traditional teaching strategy (CUBAN, 1986; GOODLAD, 1984).

With the mediation of computer information technology, this physical proximity gives place to and becomes dependent upon "transactional distance [...] the extent to which the teacher manages to successfully engage the students in their learning" (BENDER, 2003, p. 6). Even when students have a shared space with the instructor, if this latter does not succeed in appropriately keeping the students engaged, "transactional distance" would remain a considerable barrier. Computer mediated teaching strategies merely seem to eliminate spatial distance, because space is re-interpreted and transformed into educational benefits. It becomes contexts in which information, production, collaboration, and assistance become possible (PAQUETTE, 1998).

Besides, there could also be temporal differentiation between instructors and students. The normal synchronic arrangement that prevailed in the classroom's interplay of the past is interrupted, if not completely transformed into interactions that could be primarily asynchronous. Since any member of the teaching-learning community can log on at his/her convenience to carry on the learning process, flexibility becomes the underlying frame of reference.

This flexibility involves much more than just questions of distance and participation. Though somewhat related to the two elements above, the key elements include technology, pedagogy, implementation, and institution. According to Collis and Moonen (2001), these elements help bring about flexible learning in terms of time, content, entry requirements, instructional strategies, resources, delivery, and logistics. These same elements are sustained by unlimited choices offered to all involved in the learning activities. As a result, "learning ... is not only a knowledge-acquisition process but also a process of gradual participation in and contribution to a professional community" (COLLIS; MOONEN, 2001, p. 23).

By implication, to measure the effectiveness of that which is acquired and/or contributed, the opinions of participants in the process need to be investigated. The individual understanding and definition of the factors that guide how flexible learning occurs, and even more importantly, if it is happening at all, should be looked at as a habitual practice institutionally and by the individuals involved in CMC. This is even more so when we remember that any

> learning system offers the different actors various ways of accessing and processing information, […] for research and communication, for process-related advice, for collaboration among learners as well as among other actors who facilitate the learning process (PAQUETTE, 1998, p. 22).

So as to retain flexibility as the focus in flexible learning, and thus give meaning to the learning that occurs as a social process, certain other features have to be continuously taken into consideration. Apart from the elements above that need to be considered when CMC is utilized to strengthen flexible learning, some other factors need special attention on a continuous basis. One of these is that each student should be made to feel as a full member of the group. According to Bender (2003), research showed that students' feeling of belongingness directly affected how they evaluated their learning in CMC environments. Such a situation places different kinds of responsibilities upon instructors in order to reach and maintain students' attention and interest more adequately, so as to remove or reduce any resistant "transactional distance."

A tone that is simultaneously friendly, inclusive, conversational, warm, and accepting of individual students must be set. Each prospective learner needs to feel as an integral part of the learning community by accepting his/her contributions, and directly responding to each of these contributions. There is the need to explicitly demonstrate to the students that each is being listened to and cared about. This connectivity is considered vital at the beginning of the experience. With time and more familiarity with the technology, interaction strategies, and course content, the instructor might step back and let the learners carry on the process. Nonetheless, though this professional may be 'absent,' he/she must never disappear totally (BENDER, 2003).

Online, the instructor maintains presence by serving as the instrument for making students feel secure so that they can fearlessly continue to be active participants in the group. This is possible through giving, receiving, and integrating individual contributions to make them intellectually relevant and cognitively connected to self and the community. To do so effectively, the instructor becomes the actor responsible for managing other actors and events, while he/she simultaneously monitors, makes available, and adapts all information and its flow. When an instructor helps create this secure space, students also help maintain and allow it to grow purposefully.

Instead of adopting a unilateral instructional strategy, maintaining the pulpit posture, instructors need to depend upon a more Socratic style. What is essential is the need to ask questions that demand thought-

provoking answers. Encouraging students to use “yes-no” answers, has not been found helpful; they shut out a student’s creativity and impose cognitive limitations. Rather, questions that stimulate responses that serve as bases for further high-level questions and more reflective answers ought to be prioritized. According to the social constructivist pedagogue Paulo Freire (1970), this is dialogical pedagogy. In this question-driven pedagogical paradigm, questions encourage learners to reflect upon their own experiences in order to come up with answers reflecting a critical take on their past and the context in which they find themselves. This way, learning comes to symbolize the interdependency and the equal importance in the roles of learner and instructor. And this is so because “dialogue,” an essential component of any meaningful communication, is only possible between social actors who recognize that they are partners interacting for a common purpose (FROSNOT, 1996). In the case in point, education is the basis for the interactions.

Using this strategy, an instructor strives to create an environment wherein productive interactions of a cognitive nature take place and each participant’s unique contributions form the general bases for some collaborative knowledge construction-production-dissemination. This in turn reinforces the building process of the learning community. In developing this community, there is some danger that in the CMC environment, academic questioning descends into “how to” and not “why.” The risk that the technical can easily overshadow the critical in this setting is always real (APPLE, 2003).

The expectation is that success-prone learning is an activity developed through a partnership by socio-educational actors with different but complementary roles. As partners, each is individually expected to carry out his/her role expectations adequately. While the student assumes the role of primary learner, the instructor becomes the learner-facilitator. In this role, the instructor facilitates the learning process by advising, appraising, assisting, collaborating, animating, coaching, and helping select the system design. He/She also helps to adapt it as well as does everything to guarantee its maintenance. In doing all these, the instructor also learns from the different kinds of interactions and activities he/she helps to maintain (VERDEJO; DAVIS, 1998).

In today’s globalized higher education classrooms and course offerings, the need to best attend to the cultural diversity of the learners is paramount. This diversity can be national, regional and international. The multi-cultural in its varied manifestations is a supporting framework that ought to drive what happens in flexible learning. How to most effectively get CMC as an intermediating forum for helping develop a learning process that is socially integrative of diverse groups is another point of reference whose importance must be seriously considered. It has been appropriately observed that “One consequence of these changes is that students are now a much more diverse group, particularly in cultural characteristics, and are more likely to study in mixed modes

that are suited to flexible learning" (WILD; HENDERSON, 1998). Diversity, principally based upon cultural factors, becomes crucial when we remember that this phenomenon and its varied consequences, most meaningfully define today's educational systems and processes.

Globalization affects CMC and its essential components (technology, pedagogy, questions of implementation and institutional determinants) in no small ways. In fact, people can only find meaning and purpose in them when in specific cultures. Accordingly, the need to take culture into consideration seems a moot point. However, there are presently two opinions regarding how globalization influences culture, especially national cultures. While there are arguments that globalization does indeed bring about cultural convergence (ADLER, 1991; CHILD, 1981), there are others that support a divergence theory, arguing that globalization in fact has only reinforced cultural differences (HOFSTEDE, 2003; LEWIS, 1996; NELSON; CLARK, 1994). While one is left to appreciate either of these cultural theories, the essential and "pervasive view is that culture is a manifestation of ways in which an identifiable group adapts to its changing environment; that people belong to more than a single cultural group, embodying a subset rather than a totality of a culture's identifiable characteristics; and that they do not remain totally allegiant to their birth culture (WILD; HENDERSON, 1998, p.133).

Within the larger human group culture, there are those cultural groups that exhibit more collective values and behaviors. For example, while the general culture of the United States is more individually oriented, the Taiwanese and Chinese cultures are relatively more collective (HOFSTEDE, 1984). These factors are of no small relevance in the processes of learning-teaching as socially constructed processes.

That cultural importance can never be overstated, is the standard contemporary educational thinkers and practitioners hold in high regard. National or even local cultures help us understand learners. Nonetheless, because of the complex nature of this human phenomenon, group culture cannot be expected to serve as the ultimate guide to understanding any individual's cognitive capabilities, social interests, academic orientations, or motivational factors.

Individual characteristics that impact culture remain decisive even when the learner and instructor (learner-facilitator) are aware of and tirelessly incorporate elements that attempt to respect these individualities in their learning partnerships. Dissimilarities of every nature remain important when treating education because of the symbolic nature that permeates every person's interpretation of information and the meaning-making process. A more appropriate appreciation of CMC and flexible learning as social processes depend upon productive partnerships that are continually renewable. This happens through acquisition of information/data from others, and sharing the same or other results with others. If any of these phenomena lack the necessary cultural framework, the expected learning could become impossible.

METHOD

The methodology used was based on the experiences of the researchers and students being surveyed and interviewed. The principal concern in all aspects of the research was to reach some further relevant understanding of CMC. With this in mind, we resorted to a case-study strategy. Through this, it was possible to learn further about this complex phenomenon. We were able to gather, not only extensive and relevant information, but even more importantly, we could employ more recommended analytical techniques. These made the interpretation and understanding of the phenomenon in its context and even beyond, more viable (MERTENS, 1998).

This study depended upon a mixed method, duplicating the self-designed questionnaire used by Robbins et al. (2001) followed by focus group interviews. The quantitative data was collected as a response to the questionnaire using email. The qualitative data was collected in group interviews or focus groups conducted by the researchers. The interviews explored the phenomenon of CMC in some of its important facets. The researchers conducted semi-structured interviews with two groups of five and four participants. Each group participated in two separate interviews to avoid responses being filtered through the views of a single interviewee. Sessions were tape recorded and used as a check to the notes taken by each researcher.

Data analysis employed a concurrent nested model (CRESWELL, 2003). Quantitative information was organized and given basic descriptive statistical treatment. To analyze the qualitative data, we employed content analyses as these facilitated the deeper understanding we were looking for with regards to CMC. We tried as much as possible, to explore CMC as a part of our continuous efforts to make higher education more intellectually challenging, socially meaningful, culturally relevant, and politically less exclusive.

FINDINGS

The findings are examined in multiple levels (CRESWELL, 2003) beginning with demographics, moving to a survey analysis and display in tables, and finally, reporting the values, beliefs, and practices of the participants identified in focus groups to expand the quantitative findings. In addition, the Tables compare the demographics and survey results to the findings of Robbins et al (2001).

DEMOGRAPHICS

The response rate in the 2004 study was 82 percent with one survey deemed invalid by the researcher bringing the total response to 30 (n) out of 38. Of the 30 participants, 16 were male and 14 were female. Compared to the participants in 1999, fewer participants were male (Table 1).

Table 1
Comparison of participants by gender

Male n (%)		Female n (%)		Total	
1999	**2004**	**1999**	**2004**	**1999**	**2004**
22 (69%)	**16** (53%)	**10** (31%)	**14** (47%)	**32** (69%)	**30** (53%)

The majority of participants identified themselves as under the age of 39 in both studies. However, Table 2 shows a greater percentage of participants in 2004 were under 29 years of age.

Table 2
Comparison of participants by age

Age	1999 N (%)	2004
20-29	**9** (29%)	**17** (57%)
30-39	**15** (46%)	**12** (40%)
40-49	**8** (25%)	**0** (0%)
50?	**0** (0%)	**1** (3%)

Survey

In response to the questions of frequency of use, students in 2004 show a slight increase of use, with more responses moving into the "some," "often," and "frequently" categories, while percentage rates decreased in the "never" and "rarely" categories (Table 3).

The results on Table 4 indicated an increase in agreement about computer mediated communication use. Specifically the 2004 participants indicated a stronger agreement over the 1999 participants to the advantages CMC has over traditional in-classroom study and a stronger agreement to the increase use of CMC by professors as an instructional tool in the classroom. In 1999, 28% of the students "strongly disagree" or "disagree" with the statement, *my professors use CMC as an instructional tool in the classroom;* in 2004, no respondent disagreed with this statement, while 83% (43% and 40% respectively), "agree" or "strongly agree" with the statement.

Table 3
Survey questions of frequency of use of CMC

Question	Year	Never N (%)	Rarely N (%)	Same N (%)	Often N (%)	Frequently N (%)
1.How oftenhave you used CMC on campus?	1999	**3** (9%)	**2** (6%)	**14** (44%)	**5** (16%)	**8** (25%)
	2004	**0** (0%)	**7** (23%)	**11** (37%)	**6** (20%)	**6** (20%)
2.How oftenhave you used CMC on campus?	1999	**1** (3%)	**6** (19%)	**1** (3%)	**4** (13%)	**20** (62%)
	2004	**1** (3%)	**2** (7%)	**4** (13%)	**7** (23%)	**16** (53%)
3.How oftenhave you posted questions to the online discussion board?	1999	**2** (6%)	**3** (9%)	**14** (44%)	**11** (34%)	**2** (6%)
	2004	**0** (0%)	**2** (7%)	**14** (47%)	**7** (23%)	**7** (23%)
4.How oftenhave you responded to other student's questions posted to the online discussion board?	1999	**4** (13%)	**1** (3%)	**13** (41%)	**9** (28%)	**5** (15%)
	2004	**0**(0%)	**6**(20%)	**13**(43%)	**5** (17%)	**6** (20%)

Table 4
Survey questions regarding CMC use

Question	Year	Strongly Disagree N (%)	Disagree N (%)	Uncertain N (%)	Agree N (%)	Strongly Agree N (%)
1. Using translation software increases the speed of reading and understanding.	1999	5 (16%)				
	2004	3 (10%)				
2. Using translation software reduces the need to check dictionary definitions.	1999	0 (0%)				
	2004	2 (7%)				
3. CMC improves typing skills.	1999	1 (3%)				
	2004	0 (0%)				
4. CMC reduces study time.	1999	3 (9%)				
	2004	1 (3%)				
5. CMC improved my online research skills.	1999	2 (6%)				
	2004	0 (0%)				
6. CMC has increased my comfort level with online research.	1999	2 (6%)				
	2004	0 (0%)				
7. CMC has increased my interaction with other students.	1999	3 (9%)				
	2004	1 (3%)				
8. CMC has increased my communication with my professors.	1999	1 (3%)				
	2004	0 (0%)				
9. CMC has advantages over traditional in-classroom study.	1999	1 (3%)				
	2004	0 (0%)				
10. CMC has improved my ability to learn.	1999	1 (3%)				
	2004	0 (0%)				
11. My professors use CMC as an instructional tool in the classroom.	1999	1 (3%)				
	2004*	0 (0%)				

* One no-response to question

Focus Group

Two groups of students, five students in one group and four students in the other group were asked three semi-structured questions. The first question asked, “What have been your experiences with CMC?” The overwhelming majority of students’ experiences prior to the doctoral studies included using email to communicate with their professors and deal with online grade matters. Additional comments from students included references to a distance learning course and a personal website. A follow-up question to the first was: “Are some tools (email, discussion board, etc.), more helpful than others?” The use of the discussion board in on-line course management software, especially Blackboard, was identified as the most helpful of the tools currently being used to support their learning. One student clarified using the posting on the discussion board as a “memory check.” Students made comments that indicated they had an acute awareness of email use and its practical advantages.

The second lead question was, "How does CMC benefit your learning?" The responses included saves time (no time or location limitations), easier to share information, extends learning (time to reflect and consider other perspectives), improves research skills (online searches and technical alternatives). For second language students like those we worked with, CMC provides the extra time needed when code switching.

Regarding the third question - "What are the differences between traditional teaching and using CMC technologies in the classroom?" - relevant responses included comments such as: "traditional instructors dominate, CMC allows for a more student-centered environment, the role of the instructor changes". However, the students emphasized that technology is only a *tool for teaching.* So as one student participant stressed, "Teaching and learning are human activities. CMC can only be useful when both instructor and students maintain some kind of human contact."

The follow-up question was: "Do you plan to be a traditional teacher when you return to your instructional assignment?" The prevalent response was – *it depends.* Explaining further, one participant claimed that if she taught in Japan, she would be traditional. However, if this same student taught business courses in Taiwan, she would like to try a more non-traditional approach. One participant would like to use CMC depending on the availability of technology tools. Another said, *either…; technology is a tool and I would choose to use it in both traditional and non-traditional settings.*

One student reminded us –

> Learning is a social activity, and other people have to be involved. Another continued, Yes, because our culture sometimes makes it difficult for us to learn well only using the computer. For me personally, the teacher and my classmates really help me to learn. Still another added – When a subject is new, I prefer to have a teacher tell me, face-to-face, all he/she knows… that helps me together with my colleagues.

Discussion

Instructors continue to use technology to support their preferred teaching styles. As an example, teachers who use lecture, classroom discussion, and research papers as their primary mode of instruction limit their use of technology to email, email attachments, and grade postings. Instructors identified as non-traditional in addition to email, use computers with projection devices in the classroom, tools available through online student management software such as Blackboard, and instructional software. Students are also in transition in accepting the pedagogical shift that instructors are making with the use of technology tools in teaching. "Technology helps move the act of learning from hearing (and forgetting), from seeing (and remembering), to doing (and understanding). It helps bring about the active learning we educators all encourage, but find difficult to do" (GAINES; JOHNSON; KING, 2004). Most students have indicated an interest in using CMC in their own university classrooms upon their return to Taiwan.

It is worth noting that a good number of the participants also made comments regarding the need to take cultural factors into consideration when it comes to CMC and learning. For others, there were concerns about individual learner characteristics. The strong possibility that both cultural and individual variables can indeed affect how effective CMC can be as a *learning tool*, could be strong warning that though technology does help, its effectiveness needs to be evaluated on a permanent basis. Instructors may prefer technology to formal classroom sessions, but there should be the added concerns as to whether ALL their students understand what is being taught, and if each is being challenged appropriately. We believe that without adequate responses to concerns like these, pedagogy shifts encouraged by CMC would only increase the divide between instructor and learner. In other words, while the instructor would "instruct," the learner would "only have to learn."

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