

From Face-to-Face Classrooms to Innovative Computer-Mediated Pedagogies: Observations from the Field

Mohammad Issack Santally
University of Mauritius

Abstract

In this paper, we present a case study concerning a Masters level course in Computer-mediated communications and pedagogy delivered at the University of Mauritius through e-Learning mode. We provide a brief overview of the program, its rationale and the pedagogical approaches that have been used to design the modules that are delivered in the first semester. There are currently 15 students enrolled on this course, and we relate our experiences and observations on the field in this article. We also expose our findings from a questionnaire survey that was done with the students towards the end of the semester to get the feedback on their perceptions on the program and on its pedagogical approaches. This is a very crucial step since this batch of students are supposed to be the agents of change in the reconceptualization of the teaching and learning process. We end up identifying some key factors that are perceived to be barriers to the actual wide-scale implementation of such approaches to education.

Introduction

e-Learning, technology-enhanced learning and concepts like computer-mediated pedagogies are currently emerging fields in education that is receiving widespread attention from educators, researchers, teachers and practitioners all over the world. The number of national and international e-learning/computers in education conferences are increasing yearly where presenters expose new and innovative ideas, revolutionary and sometimes controversial practices, and systems/technologies that have been developed to facilitate the implementation of these new modes of education.

One of the main advantages of delivering web-based educational materials is that the same content is delivered to a number of students and can be accessed with no restrictions of time and place. However, there is a wide belief that using the web as only a new kind of delivery medium for educational materials does not add significant value to the teaching and learning process. The integration of technology in learning, needs to address the very important issue of enhancing the teaching and learning process, rather than just being seen as a new flexible delivery medium (Nichols, 2003). The web therefore can be seen as (a) a new delivery medium for distance education materials; (b) a flexible and rich medium (in terms of multimedia) for students to access their learning materials and (c) a medium offering a new paradigm for learning.

In this article, we present a case study concerning a Masters level course in Computer-mediated communications and pedagogy delivered at the University of

Mauritius through e-Learning mode. We study the perceptions of the students who are supposed to be the agents of change in the reconceptualization of the teaching and learning process. In doing so, we identify some key factors that act as barriers to the efficient implementation of such approaches. In fact, we find that the reality on the field is quite different from the current expectations and targets that have been set by promoters of such types of education. Especially in under-developed and developing countries, although there is a push towards these approaches, the minds of some educators have not yet been convinced that they have enough resources and facilities to carry out the tasks that we expect them to in an efficient way.

e-Learning as a New Paradigm for Teaching and Learning

The most basic form that e-learning could take would be as a replacement for the traditional print medium that is sent through postal communications to students dispersed across the planet. In this mode students' learning could be enhanced and supported by computer-mediated communication tools like forums, email, chat rooms and advanced tools like internet-based video-conferencing. Garison and Shale (1990) however, postulate that the notion of independence and autonomy in educational transaction in distance education seem to overshadow two-way communication between the teacher and the student. However, on the Internet, students can communicate with peers also and work in collaboration on some tasks thus reducing the feeling of isolation that they used to face in traditional distance learning settings that relied mainly on print-based materials and postal communication.

e-Learning can also be used to offer pedagogical support to on-campus students. This is often defined as technology-enhanced learning. The Internet provides an infrastructure that supports the diffusion of hypermedia courseware elements. This combination of multimedia objects in a hypertext supported environments make the acquisition and comprehension of some concepts easier for students. There has been much research illustrating the benefits of integrating multimedia in instructional materials to enhance the learning experience of the learner (Astleitner & Wiesner, 2004). It is also widely postulated that multimedia is a very useful tool to address students with different learning and cognitive styles (Ayersman & Minden, 1995).

Contemporary researchers in education focus mainly on the use of the Internet infrastructure to implement new learning paradigms grounded in more socio-constructivist settings. They insist that the Internet should not be used as only a medium for delivery of electronic materials but should be viewed as a medium that supports new learning paradigm, pedagogies and instructional approaches and that facilitates the construction and application of knowledge through authentic and collective activities (Schneider, 2003).

An Activity-Theoretical Approach to Teaching and Learning

Activity-theory is one of the main developments that characterize contextual approaches to cognition. The cultural-historical theory of activity was initiated a group of psychologists in the 1920s and 1930s. The basic concept of the approach was formulated by Lev Vygotsky (1896-1934). According to Vygotsky, psychology in the 1920s was

dominated by two unsatisfactory orientations, psychoanalysis and behaviorism. Vygotsky (1978) formulated a completely new theoretical concept to transcend the situation: the concept of artifact-mediated and object-oriented action. A human individual never reacts directly (or merely with inborn reflects) to environment. The relationship between human agent and objects of environment is mediated by cultural means, tools and signs. Human action has a tripartite structure.

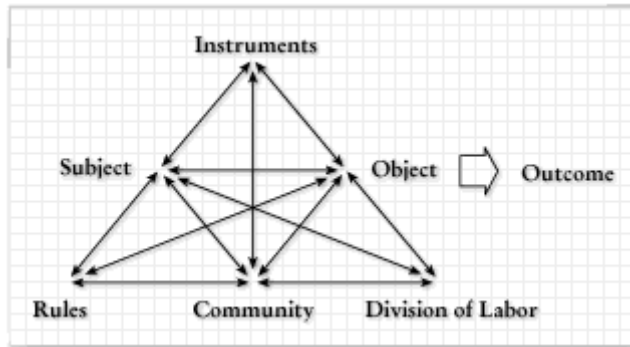


Figure 1: The structure of human activity (Engestrom, 1987)

Adapting from the concept of activity theory, we define our system of activity as an educational ecology, a (micro)-educational system linking an educational (virtual) community and shared resources, through technologies (tools). The activity of the community consists of interactions between its members and also with the external world to produce new knowledge & resources for capacity building (Fig 2):

- Community mutualizes human resources.
- Technology is the instrument.
- Shared resources are available locally but also elsewhere through an external community of *proxies* (close friends, physically not so close).

At the University of Mauritius, our framework is therefore based on the educational ecology concept where teaching and learning is re-conceptualized as an activity framework governed by the following rules:

- *Self-Reliance*: Act using the resources available locally using for example our learning object repository.
- *Empowerment*: Enable subjects to react immediately to changing circumstances by having access to decision-making.
- *Interdependence*: Obtain resources elsewhere in order to act, to mutualize [human] resources using Internet, and peer-networks.
- *Asynchrony*: Enable subjects to operate as quickly as possible, given local circumstances.

- *Reflexivity*: Enable critical thinking and creativity to continuously improve current practices.
- *Commitment*: Regulate social interaction, reciprocity and collaboration for knowledge construction and sharing.

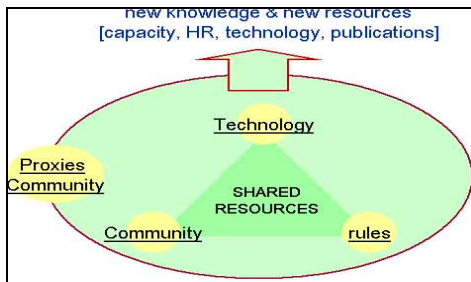


Figure 2.0: Structure of an Educational Activity

The University of Mauritius Masters Course in Computer Mediated Communications and Pedagogy (CMCP)

The principal objective of this Postgraduate Program is to train professionals, who after a minimum of two years of studies and industrial placement, will be able to master the engineering of e-learning content development, communication and pedagogies to benefit companies and public administrations. Beyond the response to significant needs and the creation of an economic niche on a national level, it is also a question of consolidating a process of regional development which, taking into account the infrastructures of technology, should end up in the integration into a network of schools, as the one currently created in the EU (European Union). The intention is to create special links with businesses, making it possible to offer them specific support for retraining of their staff while developing promising niches of activity. Moreover, the “practical” approach chosen as a teaching model is intended to fill the skills deficit, as expressed by professionals.

An Innovative Approach to Teaching and Learning at the University

The program is delivered neither through the traditional classroom-based delivery nor through the classic e-learning approach. We firmly believe that classic e-learning through well-structured platforms, diffusion of contents online with structured chapters and classic activities such as open-ended questions and Multiple Choice Questions defeat the purpose of using e-learning to foster innovative pedagogies and to promote knowledge construction and autonomous development of the student (Santally & Senteni, 2004).

The program is more centered towards knowledge construction, socialization and collaboration based on a set of authentic activities (Fig 3) that will help the student develop an understanding of the subject matter, formulate personal learning goals

depending on their professional interests and to use a set of pedagogical and technological tools to support them in the process. The instructional design of the program has been done with contemporary models. We applied the MISA (*Méthodes d'Ingenierie de Systèmes Apprentissage*) framework for instructional design and used the modeling tool MOT (*Modélisation Objet Typés*) (Paquette, 2003) to create prototypes of learning activities.

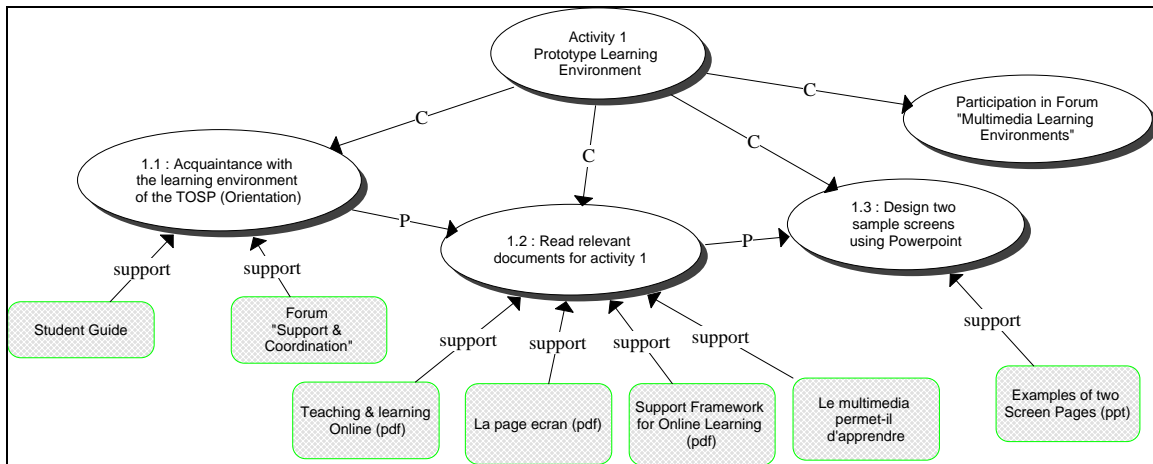


Fig 3: Model of an activity using MOT

A prototype activity includes the online collaborative editing of a glossary of terms related to the module they are studying using for instance, wikis. A Wiki is a piece of server software that allows users to freely create and edit web page content using any web browser. Every student needs to have a wiki as his web log, which we call journal where he records all the activities, problems, and other issues related to his learning experience in the course. These activities form the core of the students' continuous assessment that mainly focuses on the targeted competencies and skills that the student needs to demonstrate using higher order cognitive skills.

Furthermore students have access to online forums dedicated to support them in the learning process. Each forum is designed for specific purposes. One forum is entirely dedicated to administrative support of students, i.e. announcing important dates for class tests, coursework deadlines, and other course related matters. Furthermore, there is a virtual socialization space where students are able to interact with each other on matters of their personal interest such as soccer, politics, get-together and other social events.

For each specific module, students have access to a forum dedicated for technical problems and support where technicians try to help students with specific computer and web site problems to ensure that the course goes as smoothly as possible. A forum is also available for each specific pedagogical activity that students need to carry out where they share their experiences, expose their problems, propose solutions and discuss with peers and lectures about the activities. Participation on such online activities is marked.








MSc CMCP		
 Administrative Support/Coordination This forum is dedicated to administrative queries relating to the MSc CMCP concerning module registration, regulations, examinations and timetables, scheduled meetings, problems with modules, internet access....	13	19
 Student Presentation Present yourself in this forum, meet peers and socialise.....	14	14
 Socialization Space This space is especially dedicated to you as an online community for socialisation purposes..talk about your hobbies, interests etc....	8	14
ILT6010: Cognitive Sciences and Learning		
 Technical Problems and Support This forum is specially dedicated for you to report any technical problems you are experiencing relating to the module	4	12
 Coordination This is the place where your tutor will assist you in organisation and planning of your work for the module.	10	22
 Activity 2: Knowledge Map in Cognitive Sciences In this activity, you need to produce a knowledge map/network of your understanding of the documents you have read (you will be provided with these) on cognitive sciences. You can discuss issues related to this activity here.	5	23
 Activity 3: Guide for a Cognitively Engineered Pedagogy This activity is a group work and in special cases students may be allowed to work individually. This is the place where you discuss matters related to the activity 3.	12	27

Fig 4: Snapshot of course related forums

From an activity-theoretical point of view, learning is being reconceptualized in the sense that the course contents are no longer the object of the activity but they are perceived as tools to help learners achieve the object, which is now some skills, or competence that they need to develop. For instance, from figure 4, in the context of the module on Cognitive Sciences, the students need to create a tutorial guide for educators and pre-service teachers on the implementation of a cognitively engineered pedagogy in their classrooms.

The Virtual Learning Environment

The CMCP program is delivered through a course portal (figure 5) that the students can access with a common username and password through the Internet. The same content is given to the students on CD-Rom to minimize Internet browsing to read activity guidelines and documents relevant to carry out the activity. Students are however encouraged to visit the web site quite often so that they may be aware of latest changes, modifications and news relevant to the program.

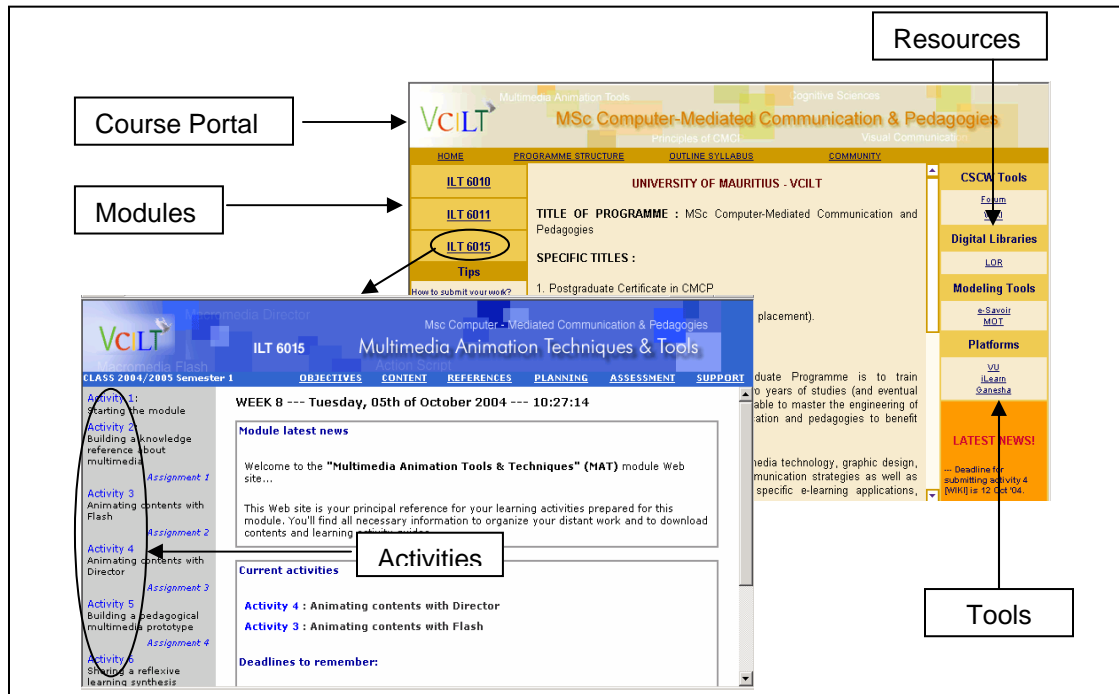


Fig 5: The MSc CMCP Course Portal

The CMCP course portal has been designed in a very simplistic approach in the sense that the pages are mainly static and light in terms of technicalities to promote maximum usability for the students. On the left-hand side, they have links to the modules they are following in the current semester and from the figure, we can see a snapshot that clearly demonstrates coherence and consistency in the design. On the right, they have access to a range of tools, digital libraries, learning platforms and forums that are common for all modules they are taking. The portal itself, the range of tools and description of the activities form the instruments that the students will use in the course to achieve the targeted outcomes.

A Model of an Activity: Creating a Knowledge Map of the Subject Domain

In the module on Cognitive Sciences and Learning, one of the practical skills to be developed was the use of the knowledge-modeling tool MOT. On the other hand, on the cognitive skills level, student were expected to become familiar with the field of cognitive sciences, terminology employed and related concepts that constitute the field. As a first activity, they had to read a set of documents pertaining to the field of cognitive sciences and then use the MOT software to create a knowledge model of what they have understood from the reading exercise.

Construct a knowledge model in cognitive sciences

Aim of this activity

To familiarize with basic concepts related to the field of cognitive sciences as proposed by researchers.

Duration: 20 hrs

Activity Plan

Tasks	Modality	Week	Duration	Exchanges	Notation
2.1: Initiation to knowledge modeling with MOT	Individual	2	7 hr	Forum: MOT	none
2.2: Discover the cognitive sciences	Individual	2-4	7 hr	Forum: Knowledge Map in Cognitive Sciences	none
2.3: Elaborate my knowledge model	Individual	5-6	6 hr	Forum: Knowledge Map in Cognitive Sciences	15 %

Points to Note

The forums are always at your disposal for any queries related to the activity.

[2.1 Initiation to knowledge modeling using MOT](#)

[2.2 Discover the cognitive sciences](#)

[2.3 Elaborate your knowledge model](#)

[2.4 Guidelines for submission of activity 2](#)

Fig 6: Guidelines for Activity

In this case, the students have an object to achieve, i.e. a knowledge model for the domain of cognitive sciences (Step 2.3). The instruments will be the different documents related to the cognitive science field and tutorials (Step 2.2) on the MOT software (Step 2.1). The community will consist of the lecturers, peers and technical support staff who will interact on the asynchronous forums. Since all the students have done the same activity (but produced different knowledge maps), they are invited to upload their maps online by having a kind of poster presentation in a virtual seminar. In the virtual seminar, they present the underlying principles and rationale behind their model and answer to questions set by other participants. This allows the students to become engaged in knowledge construction, sharing and reflexive processes on their own work. While carrying out the activity the student needs to log in his/her personal web log his experiences, what he/she liked and disliked about the activity, what problems he encountered and how he/she solved them.

Observations from the Field

It is currently the eighth week of the semester (consisting of 15 weeks) for the Masters program in CMCP and 15 students are presently enrolled. The students come from various academic backgrounds such as French, Agriculture, Computer Science, Physics, Math and Engineering. Most of them are primary school teachers and secondary school education officers. We also have a policeman with an Information Technology background. The first session of the course was a face-to-face one and most of the students were very motivated to follow such a non-conventional course. They were delighted with the fact, that there will be no formal lectures and classroom attendance is not a pre-requisite to sit for the exams.

The principle is that attending classroom lectures does not guarantee successful learning, which is different from passing an exam. We define the occurrence of successful learning in our program as a three phased activity: (a) Knowledge Acquisition phase; (b) Knowledge Application Phase; (b) Knowledge Construction through Sharing and Reflexive Practice. The students carry out the first two phases after going through the detailed activity guidelines and the third phase normally has an overlapping component with the other two phases. This is normally carried out online through collaborative learning tools such as a discussion forum and it is a continuous process of negotiation, sharing and reflection with the peer community.

During the first weeks, we observed the various activities that were carried out online, student attitudes, feedback, and behavior during face-to-face seminars. At this stage, the students started to realize one important aspect of the course that was completely mismatched with the reasons of their rejoicing for not having classroom lectures. Their workload has greatly increased through this new learning paradigm and they realized the importance of good time management. They were not devoting enough time to read the guidelines for the activities and this was affecting their confidence. As a result, some of them wrote to ask for weekly face-to-face sessions. This would however defeat the very purpose of the course. Our answer to that was very simple and it was in fact a question that made the students reflect on what they have asked. How can we effectively teach you not to teach through classroom lectures by having classroom lectures?

From the beginning of the semester, one student was not completing any of the activities but he was present in all the face-to-face seminars that were organized. When we queried him about the activities he admitted he was in a real mess, and that he felt being part of the team when he comes to the seminars but at home he just cannot manage and as soon as he is stuck he abandons the work. The intriguing thing is that we sent him emails and asked whether he had problems so that we may offer him full support. Amazingly, he never responded but when he met us face-to-face then it was really a different situation.

The fact that the students following the course were not physically separated from each other by long distances, they used to meet regularly to discuss among themselves and support each other in the activities. The positive side of this was that a dynamic situation evolved and this created a momentum in learners lacking behind to catch up. Furthermore we were pleased to see that there was a mentality shift from competition to

collaboration and collective work. However, a few students who were lagging behind or had some difficulties in the learning process started to feel awkward and as a result lost confidence in themselves. This had a negative impact because instead of being motivated to catch up they started thinking to eventually dropout, although none of them actually did it.

Questionnaire Survey Results

A questionnaire was then circulated in the last weeks of the semester among the 15 students enrolled on the program to get the feedback on their current experiences and attitudes towards this novel teaching and learning approach. An online forum was also opened to allow students to share and exchange their views concerning the program. The questionnaire contains information in the following categories: (a) their personal information, academic and professional background, (b) their experience and proficiency level in information technology, and (c) their general perception of the program and of its new teaching and learning approaches. The following are questions that were set in the survey and the responses are briefly described:

Question 1: How would you rate your proficiency level in ICT?

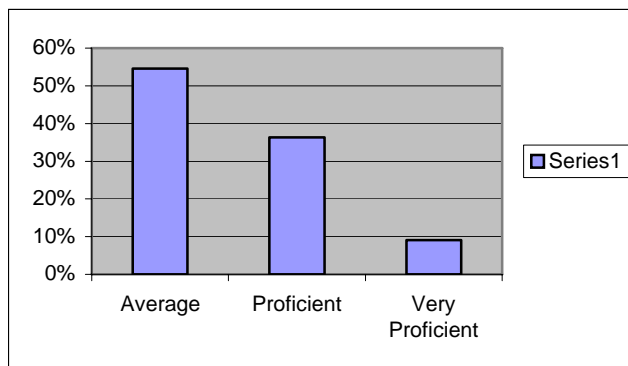


Fig 7: Proficiency level in ICT

From the graph above we find that more than 50% of the students enrolled rate their proficiency level in information technology to be average while 36% claim to be proficient while 10% think they are very proficient. In fact those who are very proficient are all graduates in Information Technology and work in the same sector.

Question 2: Do you find that your learning is more fruitful with this approach?

Only one student (out of 15) found that his/her learning was not fruitful with this approach. While he acknowledges that the approach is good, he finds it difficult to work on his own (i.e. independently) since it is difficult to understand concepts and that he would feel more secure if face-to-face meetings were held.

Question 3: Would you prefer to revert back to the traditional approach?

When asked whether they would prefer to revert back to the traditional approach 81% responded negatively while 19% said that they would revert to traditional classrooms and use the online component only as a supplement to the classroom lectures. The amazing thing is that even some of those who found that learning were more fruitful with this approach wanted to revert back to the traditional system.

Question 4: Do you feel you have enough support (technical, pedagogical, academic) to carry out the course?

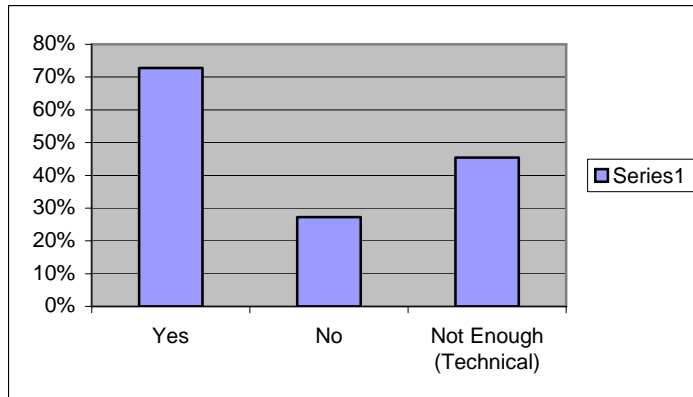


Fig 8: Proficiency level in ICT

While most of the students are satisfied generally on having enough support for the course, it seems that approximately 50% of the students are not satisfied with the technical support they are receiving from the course. On the other hand only 25% felt that tutorial and academic support was not enough. This figure coincides with the % of students being not so proficient with Information Technology.

Question 5: Would you be prepared to act as agents of change for this new conceptualization of the teaching and learning process?

When asked about this aspect, all of the students answered yes. The principal reason of their positive attitude is that there is a paradigm shift in education towards web-based education and that they want to keep up to date with new and innovative methodologies in education. Some reasons are more classical such as “it enables learners to become autonomous”, “one can learn at his own pace and do the course at home” etc.

However, 20 % of them posed some conditions before they can be prepared to act of agents of change to promote such type of education. Some of the conditions were that the cost of connection to the Internet should decrease, that there should be a face-to-face session for the first introduction of any new topic, and change of curriculum, and high-level policies to promote such types of education.

Barriers Identified to the Teaching and Learning Process

Change in Teaching and Learning Culture

It is clear that these students are experiencing this change in the teaching and learning process for the first time and therefore there will still be an adaptability curve for everyone. In Mauritius, the 'spoon feeding' concept is still prevalent and still forms the foundation of our educational system. However, most of the students have been able to adjust to the new style while some are still facing problems. For instance, some students have very serious communication problems. They do not communicate at all and this makes it very difficult to assess their progress in the course. This may also give us an indication that the transition should have been done in a gradual and smooth manner rather than through a direct process. The load of work might also be reviewed to allow students to catch up in case they lag behind due to any unforeseen circumstances.

Proficiency Level in ICT and Lack of Technical Support

Although we find that most students were proficient enough in the use of computers and information technology, they were completely new to computer-mediated communication tools such as forums, wikis, learning object repositories and even in the efficient use of messaging systems like email. In other words, they were suffering from a lack of proficiency in Internet uses and applications. This problem arises since most proficiency level training in Information Technology focus on office automation tools such as word processing, spreadsheets, presentation software and databases.

Technical problems with computers also pose difficulties to the students while following the course. Computer breakdown and system crashes affect the students' learning and consequently they have to come to the university premises to do research work and to complete their assignments. Sometimes these problems are minor, but since the students lack the experience and exposure to computers, they just cannot progress any further. The lack of technical support therefore can have a very negative impact on the students' learning experience.

Professional and Social Commitments

Most of our students are mature learners who have professional and social commitments. For instance, we have education officers who give private tuition after hours and a policeman who has very strict professional obligations. Since this mode of education demands a lot more in terms of research, and commitment from the student, they find it difficult to adjust and fit the exigencies of the program into their already heavily loaded professional and social life.

Internet Costs and Access

Some students pointed out that the course is costing them more than they planned especially that Internet access in Mauritius is still considered to be expensive and that middle class people cannot easily afford such costs. The course demands active participation online and most activities demand extensive research and literature reviews from the Internet and students find it difficult to afford. Ultimately they have to come more often to the University for Internet access to do research work and to participate in asynchronous online discussions.

Evaluation and Assessment Policies

Evaluation and assessment practices are important milestones in the teaching and learning process. From our experience in traditional courses, students shape their learning according to the assessment and evaluation modalities so that they perform better in the exams. The problem we have experienced with the CMCP course was that although the emphasis was laid on a competence-based approach to evaluation, at the end we had to give students a written examination that would count up to 60% of the marks. This means all their hard work during the semester in the scheduled activities would be scaled down to 40%. This was a major barrier since this approach favors a content-based pedagogy. We were stuck by the rules and regulations framework of the University and to change such a process involves a lot of bureaucratic procedure.

Conclusion

It is clear from the observations and the survey data that the students on the program are convinced about the benefits and importance of a reconceptualization of the teaching and learning process. However, we have identified some key elements that act as barriers to the efficient adoption and application of this type of educational approaches. Some of these factors are directly related to the fact that we are in a developing country where access to the Internet and related costs do not permit students to show their commitment. Students' professional activities and social commitments are also a barrier towards their learning in this novel environment. This is one paradox of online learning since the activity-based approach needs a compromise with the so-called flexibility of distance learning programs namely the concept of 'learn anywhere and anytime'. The level of commitment and study hours has increased with this new mode of teaching and learning. On the pedagogical level, there is a need to review policies about the evaluation and assessment of students' learning since conventional ways of examinations are totally in contradiction with the educational philosophies behind such a course. On the other hand, we find that in such courses, technical support also plays a crucial role in ensuring a smooth learning experience. Finally, there is also a need to compromise to the different variables affecting the teaching and learning process. For instance the syllabus and load of work given to the students can be re-adjusted if we really want to promote learner-centeredness.

References

- Astleitner, H., & Wiesner, C. (2004). An integrated model of multimedia learning and motivation. *Journal of Educational Multimedia and Hypermedia*, 13(1), 3-21.
- Ayersman, D., & Minden, A. (1995). Individual differences, computers and instruction. *Computers in Human Behaviour*, 11(3-4), 371-390.
- Engeström, Y. (1987). *Learning by expanding: An activity-theoretical approach to developmental research*. Helsinki: Orienta-Konsultit.
- Garrison, D., & Shale, D. (1990). *Education at a distance: From issues to practice*. Melbourne, FL: Krieger.
- Nichols, M. (2003). A theory for eLearning. *Educational Technology & Society*, 6(2), 1-10. Retrieved December 10, 2003, from <http://ifets.ieee.org/periodical/6-2/1.html>
- Paquette, G. (2004). L'ingénierie cognitive des systèmes de téléapprentissage [Cognitive engineering of learning environments]. In A. Senteni & A. Taurisson (Eds.), *Pédagogies.net: L'essor des communautés virtuelles d'apprentissage* [Pedagogies.net: Supporting virtual learning communities] (pp. 40-45). Québec, Canada: Education-Recherche.
- Santally, M., & Senteni, A. (2004). A cognitive approach to evaluating web-based distance learning environments. *Instructional Technology and Distance Learning*, 2(1), 45-53. Retrieved March 3, 2004, from http://itdl.org/journal/Feb_04/article04.htm
- Schneider, D. (2003). Conception and implementation of rich pedagogical scenarios through collaborative portal sites: Clear focus and fuzzy edges. *Proceedings of the International Conference on Open & Online Learning*, 1(1). Retrieved January 10, 2004, from <http://icool.uom.ac.mu>
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge: Harvard University Press.