INCORPORATING WEB-BASED LEARNING INTO A MIXED – MODE DISTANCE EDUCATION DELIVERY FORMAT: CHALLENGES AND POSSIBILITIES

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INTRODUCTION

The new information and communication technologies (ICTs) are being hailed by many as holding the key to increasing the supply of education proportionate to the demand. The potential of a combination of existing and new technologies to reduce costs, increase access, expand range and quality of education and training options and make real the promises of life long education has been recognized by international organizations such as the World Bank, and academic institutions.

The University of the West Indies Distance Education Center (UWIDEC), notwithstanding its relative short history, must position itself to take full advantage of the possible advantages of the application of ICTs in the education process. In doing so however, the institution must ensure that the process of change involved in applying ICTs to the delivery of the programme is a smooth one, which enhances the existing structure and delivery. The UWIDEC has therefore embarked on a long-term research and development project, designed to monitor and evaluate the expanded use of the ICTs in programme delivery and to identify and analyse the key factors required to facilitate its sustained growth in the university's distance education programme.

This paper, which represents the second stage of this research and development study, examines the challenges faced in incorporating web-based learning in a mixed-mode distance delivery format. It analyses the key factors which mitigate against the smooth incorporation of an additional mode of delivery and the possibilities for the future.

BACKGROUND

In 1996, the University of the West Indies Distance Education Centre (UWIDEC) was set up with the mandate to expand on the university's earlier initiatives of distance teaching that were implemented through UWIDEC's forerunner, the University of the West Indies Distance Teaching Experiment (UWIDITE). The core technology used by UWIDITE was audio-conferencing which linked several remote sites across the region to facilitate the synchronous delivery of selected courses and programmes.

[1] The writers acknowledge the contribution of Ms. Alicia Martin who is serving as Research Assistant in the project on which this paper is based.

The UWIDITE telecommunications network has since been upgraded under UWIDEC and has been expanded to incorporate other technologies to support file transfer, computer mediated communication (CMC) and Internet access. The network itself now comprises 28 sites[2] located in the 16 contributing countries of the UWI that are connected via a 64 kbps leased circuit to form a TCP/IP wide area network. The main hub for the network is located in Port of Spain, Trinidad, with a subsidiary in Mona, Jamaica. At the POS hub, there is another 64 kbps dedicated connection to the Internet that serves most of the sites in the wide area network.

Each site is equipped with one or two audio-conferencing rooms as well as a student laboratory of at least 10 computers that are connected in a local area network. These computers have a Pentium 133 MHz processor, 32 MB of memory, a 2GB hard disk drive, a CDROM drive and a sound card. The computers are installed with Microsoft Windows NT Workstation 4.0 and Office Professional software.

UWIDEC now employs a mix of media in the delivery of the university's distance programmes, with pre-packaged print materials being the core component supported by face-to-face tutorials and audio-conferencing. Even though the telecommunications network itself now comprises more technologies, audio-conferencing has continued to be the only one used for programme delivery. Consequently, a key aim of the research and development project mentioned above is to incorporate computer-networked on-line teaching and learning into the delivery mix of the university's distance programmes.

While the UWIDEC network provides the connectivity for this additional delivery mode, the Web CT software on which the on-line teaching/learning environment is built is physically located on the St. Augustine campus on a server that is housed in the Information Technology (IT) Services unit of the campus. The UWI St. Augustine campus has a dedicated 256 kbps connection to the Internet and the Web CT server shares this connection with other servers on the campus. Thus, in this initiative to introduce on-line teaching and learning into the distance programmes, UWIDEC is working in partnership with the IT Services unit of the St. Augustine campus.

WEB-BASED LEARNING: AN OVERVIEW

With the growing use of web-based technologies in formal education, there are emerging different modalities in which the computer-networked environment is being used for instructional delivery. UWIDEC's approach to the use of the Web can be regarded as falling at the lower end of Eastmond's (1998) continuum of Internet-based distance education. Along his continuum, Eastmond identifies three types of Internet use. Type I, at the lower end is described as traditional distance learning supplemented with Internet activities. He explains further that this type "allows students to participate in e-mail exchanges with instructors and other students, support on-line research in libraries … and may also make use of on-line discussion groups…" (p.34).

[2] Since the start of this project, another site has been added to the UWIDEC network. It is located in Nevis, and is connected to the network through the site in St. Kitts. For the purposes of this study, however, only 28 sites are being considered.

Whatever the approach to using the Web, there is general consensus among educators that the environment works best when it does not replicate traditional classroom practice. Harasim et al. (1995) cite earlier research conducted among teachers to emphasize differences in educational practice between traditional and networked classroom settings. The research they cite claims, for example, that students become active participants; access to teachers becomes equal and direct; and the teacher-learner hierarchy is broken down (pp.14-15).

For many educators, the ultimate goal is the creation of networked classrooms "wherein asynchronous electronic conferencing is used to build shared collaborative spaces as a means to achieve set learning goals" (Campos et al., 2001, p.37).

A key question that arises though is, to what extent do learners share these perceptions of teaching and learning on-line? This study aims to add to the research into students' perceptions about learning in a web-based environment.

FIRST PHASE OF THE STUDY

Earlier, we mentioned that this paper is reporting on the second phase of the study. In the first phase, data were gathered to assess the readiness of the institution and students respectively for engaging in on-line teaching and learning. The institution was defined primarily in terms of the human and non-human resources mobilized in and around UWIDEC for developing and implementing the on-line teaching/learning exercise. The human resources included the technical support staff at the St. Augustine campus IT services unit (CITS), UWIDEC's Telecommunications Manager, the curriculum specialist and editor of UWIDEC's course materials development team, the course coordinators (lecturers), the site coordinators and/or their assistants, the site technicians, and the research assistant attached to the St. Augustine-based research team. The non-human resources comprised the hardware and software for supporting the use of the WebCT environment as well as the end-user computer equipment at the sites. The students were the distance students who accessed the university's distance programmes at the 28 sites mentioned above.

For the purposes of this phase, a sample of six of the 28 sites were selected and questionnaires distributed to students registered in four courses offered as part of the B.Sc Management Studies programme. The main purpose of the questionnaire was to gather demographic and socio-economic information about the students, and to investigate capability levels in three areas of computer use, namely manipulating the physical components of the computer, creating and editing files or documents, and accessing and using the Internet. No sampling was required for the institutional readiness aspect since the relevant personnel were more or less self-selected based on the roles identified above.

Overview of key findings

One important finding of this phase was that the technological infrastructure provided by UWIDEC, with support from the St. Augustine campus-based IT services is capable of supporting on-line teaching and learning for the university's distance programme. At the same time the issue of increased bandwidth needs to be addressed urgently.

In terms of staff at the sites, the technician emerged as a key member of the system since it is that person who must interface directly with the student. Overall the data seemed to show that there were two important qualities necessary for the efficient performance of this category of staff, namely a strong customer-service orientation and the capacity for problem solving. The presence and absence of both these qualities were very evident in the data reviewed.

On the campus, the success of the operations was seen to depend to a great extent on the quality of the interaction between members of the UWIDEC-based course development team (curriculum specialist, editor) and the course coordinators (lecturers). The data showed that some attempt was made to initiate dialogue with a view to clarifying goals and roles but that this did not go very far.

As far as the distance students are concerned, based on these data, it would appear that the age range of UWIDEC's student population is lower than what has come to be regarded as the typical age of the distance student, which is about 40 years. The highest percentage of the sample (41%) was between the ages 25-35, while 17.3% were in the 20-25 bracket. One would need to investigate further whether this lowering of the age range is a Caribbean phenomenon or whether it is also applicable worldwide. In terms of occupation, some 60% of the population surveyed can be categorized as professional or clerical workers. Given the trend towards the computerization of these types of workplaces, one can assume that a high proportion of UWIDEC students may at least be functioning within a computer environment.

In terms of income, the data showed that some 22 % of distance students earn monthly salaries of US$500 or below. Given the cost of living in most Caribbean countries, this level of earnings would be considered low. It would appear therefore that a fairly substantial number of low-income earners are accessing higher education through the distance route. However, while 42% of the persons in this income group had computers in the home, the proportion with home-based computers among those earning in excess of US$1000 was 71%.

With respect to access, a large proportion of those surveyed indicated that they had access to computers in their homes. Of particular interest to UWIDEC is that, while 75% said that they have access at UWIDEC sites, only 9.6% considered the site as the place where they had most access. While this may be considered a positive sign in terms of the spread of computer acquisition in Caribbean society, it may also be the case that the type and quality of service that UWIDEC provides is not of a standard to attract its student population to make use of these services.

With regard to computer skills, most of the persons sampled (88.8%) considered themselves capable of manipulating the physical components of a computer. However only 53.2% deemed themselves very capable of creating and editing files and 51.4% rated themselves at a similar level in accessing and using the Internet.

SECOND PHASE OF THE STUDY

This phase, like the first was designed around UWIDEC's first attempt to put aspects of selected courses on-line using the Web CT software. As mentioned earlier, UWIDEC's

current delivery mode utilizes pre-packaged self-instructional print material as the core component of its delivery mode. Elements of the print materials for four courses were extracted for developing the on-line environment. The courses were SY14G, Introduction to Sociology; FD10A, English for Academic Purposes; MS23B, Caribbean Business Environment and SY32E, Industrial Sociology.[3] Students registered in these courses were provided with usernames and passwords to access the relevant material on-line. The sample used in the first phase of the study was drawn from the population of registered students who were all given access to the on-line materials of the courses for which they were registered.

The purpose of this second phase, therefore, was to gather data from this same sample of students in order to examine their perceptions about their initial experience of on-line teaching and learning.

Research Method

As indicated above, this phase of the study was built around students' participation in an on-line teaching/learning experience. The research method therefore describes both the environment that provided the context of the study, as well as the actual measures employed for data collection.

The on-line environment

Elements of the four courses were extracted from the print materials for developing the on-line environment. Each course site consisted of varied combinations of the following sections:

Course Information
This section included general information on the course such as the course title and course code, the name of the course coordinator (lecturer) and e-mail address if available, an overview of the course content, course goals and objectives.

Syllabus
The syllabus section contained a list of course units, major topics and sub-topics dealt with in these units, a course schedule including recommended dates for completing study of the respective units and in some instances, a reading list for the course.

Assignment
A description of the mid-semester assignment was provided, along with instructions for submitting the assignment, a deadline for submission and information on grading.

Calendar
The calendar was used to provide dates for the audio-conference sessions, and deadlines for submission of assignments.

[3] While Web CT was used for the first 3 courses, the lecturer for SY32E opted to use BlackBoard, which is a free software available on the World Wide Web.

Mail
This tool was intended as a means of communication among students, course coordinators and tutors.

Discussion Board
The discussion board was used for asynchronous communication. With the guidance of course coordinators, discussion topics were posted on the course websites. Students were able to read, search for messages or enter into discussions on the course. Although it was possible to post private discussions, only public discussions were posted. In other words, all discussions were open to students, tutors and course coordinators.

Announcements/What's New
This included information that came up as the course progressed and contained elements such as deadlines for assignments and additional readings.

The above course elements were selected on the basis of discussions with course coordinators and examination of existing course materials and delivery. It was felt that the WebCT website could be used to fill gaps in the print and audio conferencing components of the delivery by allowing for other kinds of interaction among students and course coordinators in particular. It was also felt that it would allow for easier access to any new or additional information that arose during the delivery of the course.

Course Documents
This element was available only on the Blackboard web site for the course SY32E – *Industrial Sociology.* Course units, which were also available to the students in the form of print materials, were placed on the site under this heading.

Informing the Students

Students were informed of the on-line course components by three mechanisms:

- direct correspondence from the Campus Coordinator of St. Augustine
- via notices posted by site coordinators
- by course coordinators during audio-conference sessions

Step-by-step instructions on accessing the WebCT websites were printed on flourescent paper (in the form of flyers) and sent to all sites for posting on notice boards. Technicians and course coordinators were also asked to provide students with instructions on accessing the web site. Following are the instructions that were provided in the form of a flyer:

1. *Go to the website webct.uwi.tt*
2. *Click on log on to*
3. *Type in the password provided by your site technician*
4. *Click OK*

5. *A screen indicating the course(s) for which you are registered will appear. You should select the line change password at the top of the page and follow instructions to change the password you have received to one of your choice.*
6. *After following steps 1-5 you should have access to your webCt course(s)*
7. *If you have any problems, contact your site technician.*

A questionnaire was administered to the sample of students identified above. It was designed to gather data in the following areas:

- Accessing the course
- Use made of on-line course materials
- User preferences in the on-line environment

A greater proportion of the items in this second questionnaire were open-ended as it was considered appropriate that participants should be allowed to express themselves freely about their perceptions of their on-line learning experience.

Finally, questionnaires were administered during this survey to facilitate correspondence between these data and those collected from the first phase. Thus, this aspect of the study included cross-tabulations between selected data drawn from the surveys of both phases.

Limitations of the study

In terms of responses to the questionnaire, the response rate in this phase was far lower than that attained for the first. Moreover, given the intention to match data from both phases, only 51 questionnaires could be analysed and these came from only 3 of the 6 sites targeted[4]. It is evident therefore that the findings of this aspect cannot be considered representative of the wider population of distance students of the University of the West Indies (UWI). The results described below are therefore tentative. Nonetheless, it is our view that the data generated by this limited survey, and in particular the qualitative data, provide important insights that should be noted.

Results and Discussion

These results are presented according to the main sections of the questionnaire as identified above.

Accessing the Course

According to the data, more than 90 percent of the students in the sample knew that courses were on-line, this information being provided mainly by the course coordinator. A high percentage also indicated that the site coordinators and tutors also proved good sources of information. It is evident therefore that, in terms of the provision of information, the institution performed creditably from the students' point of view.

While a high proportion of students knew that courses were on-line, only 54.5 percent of the students attempted to log on to the web sites. The major reason given for not logging

[4] Given the smallness of the sample size, no analysis will be done for the individual sites.

on was insufficient access to a computer, while some students also pointed out that limited time was a constraining factor.

When the above data are examined in relation to data on locations from which persons had access to a computer, it is apparent that those who had access to a computer at home were more likely to attempt to log on than those who had access in other locations. 76.5% of persons who had access to a computer at home attempted to log on, compared with 70.5 percent of persons with access to a computer at their place of work and 65.1 % of persons who had access to a computer at a UWIDEC site.

While these data seem to suggest that a significant proportion of UWIDEC students are in a position to access on-line course materials from home, it should be noted that this cohort is a subset of the 55% who attempted to log on. Overall therefore, it would appear that a substantial proportion of the distance student population might not perceive themselves as having the conditions necessary to log on to on-line course materials.

It is evident that, notwithstanding the increase in home-acquisition of computers, there is still an important role that UWIDEC must play in terms of providing access. At the same time, one is reminded of the finding of the first study where only 9.6% of respondents identified UWIDEC as the location where they had the highest level of access.

When asked about difficulties in logging on, there was an almost even spread between those students who said it was very difficult to log on (27.3%) and those saying it was not difficult at all (29.4%). The two main options selected as difficulties experienced in logging on were slow connection speed/slow computers (27.5%) and problems with the server (17.6%). However, cross tabulations with data from the first questionnaire suggest that students' capability could also have affected ability to log on.

This was seen across the three areas of capability in using computers identified in the first questionnaire, namely, manipulating the physical components of the computer; creating and editing files and documents; and accessing and using the Internet. This is not surprising however, since instructions provided assumed knowledge of the "jargon" of more than a basic level of computer capability, e.g. "go to website", "click on".

When the lowest level of capability is looked at, namely manipulating the physical components of the computer, 34.1 percent of persons who were very capable and 50 percent of persons who were capable found it was not difficult to log on to the on-line courses. By contrast none of those describing themselves as fairly capable or as not capable made the claim that it was not difficult to log on to the on-line courses. It is apparent therefore that persons must at least be "capable" of manipulating the physical components of the computer in order to be able to log on to web-based courses with some level of ease.

The data collected on those students who were capable of creating and editing files reveal a similar pattern. 56.2 percent of those persons who were capable or very capable found it was not difficult to log on to the on-line courses. On the other hand, only 25 percent of persons who were fairly capable or not capable could make a similar remark.

With regard to the association between accessing and using the Internet and difficulty in logging on, it seems that persons with Internet skills have an advantage over those with lower level computer skills. According to the data, 45 percent of persons who were very

capable of accessing and using the Internet found that it had not been difficult to log on, while only 16.7 percent of persons who were not capable found that it had not been difficult at all to log on.

The data seem to suggest that success in logging on is determined by a combination of factors. However, while not disregarding the impact of technological factors, it is apparent that there are capability and access issues that may need to be addressed.

Use made of on-line environment

This section of the results is further subdivided into what was accessed and how this was done.

What was accessed

When asked which areas of the on-line environment they accessed most, the highest number of respondents (49.0%) identified the option 'Course Information'. The Discussion Board which was the next highest identified, was selected by only 25.5% of the respondents, to be followed by 'Course Documents' which, based on the data, was accessed the most by only 23.5%. Of interest is the result that only 7.8% identified 'What's New' as one of the areas they accessed the most.

You will recall that the option 'Course Information' referred to that sector of the web environment that contained the course overview, course objectives, profile of the course coordinator and the course assignment. It was the first component that was put on-line and it remained in place throughout the semester. It is likely that the high proportion of respondents selecting this option is due to the fact that when the site became available, it was the only component already on-line and it was at that time that most students accessed the site.

On the other hand, it is likely that respondents did not associate the option listed in this item of the questionnaire with the names of the locations in the on-line environment. Rather they may have interpreted the term in a wider generic sense to describe what they perceived as the content of the entire on-line environment. This perspective seems to be supported by responses to the follow-up open-ended question that asked students to give reasons why they accessed the particular area(s) identified the most. Responses included

- *In order to be updated with the necessary information needed for the course.*
- *To get information on the course*
- *For updated information*
- *To obtain as much information as possible about the course.*

This theme persisted in the responses to another question in which students were asked to state what they liked most about the on-line experience. Responses to this item also reflected the priority students gave to the issue of information acquisition. What they liked best was, for example,

- *How well the information was organized*
- *That I would be able to access the information that was otherwise unavailable.*
- *Availability of course material at a more acceptable time for preparation of assignments*
- *The on-line experience is very informative and the information shared is accurate. There is much clarification and assistance given to students.*

Another aspect of the data that appears to support the observation that information gathering was the primary motive for going on-line, was the amount of time per visit that students claimed that they spent on-line. Only 2% of respondents said that they spent more than an hour on-line. Another 16% stated that they spent between 45 minutes and an hour. About 30% spent less than half an hour per visit. Students seemed to log on, check for information, then log off.

This emphasis on the capability of the environment to provide information was not the primary intention when it was decided to incorporate web-based learning into UWIDEC's media mix. As was mentioned earlier, self-instructional print materials constitute the core component of the media mix. All the core subject matter content was already available in these materials. To the extent that there was information on line, this was largely reproduced from the print materials to provide readily accessible support for higher-level intellectual activity as students interacted with one another and the course coordinator using the discussion board. However, rather than playing a secondary supporting role, information acquisition seemed to be emerging as a dominant feature in terms of students' experience of learning in the web environment. Overall, students need to be encouraged not to see the web environment as a tool for the transfer of static information.

As already stated, it was envisaged that the Discussion Board would have been the main area of focus for students, providing a forum for the exchange of ideas and the discussion of issues pertinent to the course content. When asked what they used it for, as much as 33% selected the option 'read information', while only 8% said that they used it to 'respond to questions' and 'make comments' respectively.

The outlook of this minority appeared to surface in the subsequent explanations about what respondents liked about learning on-line. One individual offered the view that,

- *Individuals were able to supply what they understand about the course so that others can benefit.*

Another claimed that,

- *It facilitated feedback from the tutor (course coordinator) and also gave other students a chance to ask important questions.*

What these responses suggest is that at least a minority of students had a view of learning as an exercise that involved two-way communication, and the active participants of both teachers and learners. These students did not simply see themselves as passive recipients of information handed down from an expert.

Navigating within the course

It is instructive that, in response to the question 'What did you find most useful in finding your way through the on-line environment?', 61% cited the help button with only 26% choosing 'Instructions from UWIDEC' and 16%, the site technician. You will recall that the Research Team had provided written instructions and in addition, the site technicians had the responsibility to provide hands-on assistance to students. Based on these data, it would appear that the students did not think that they could rely on the assistance provided by UWIDEC.

When asked further how easy it was to access the areas that they had identified (see earlier results), only 7.8% felt that it was very easy, 25.5% considered it easy, 17.6%, fairly easy, and 9.8%, not easy.

When these data about ease of navigation are linked to capability in accessing and using the Internet, 20% of those who were very capable as compared to none of those who were not capable found that it had been very easy.

What this suggests is that closer attention needs to be paid to navigation issues.

Looking towards the future

Recommendations for improvement can be divided into four categories.

Reduce technical problems
One set of suggestions highlighted the need to remedy the technical problems that students encountered. These remarks included,

- *(I would like) a server that stays on-line*
- *The server should not be down so often*
- *I would hope that something could be done to speed up the UWI network*
- *Faster access to information; server too slow*
- *All the computers (should be) properly connected to the network to avoid seeing error messages. A browser which is easy to follow to access all information present in the system*

Comments such as these are triggered by a message from the web browser whenever the browser 'times out' in attempting to retrieve a web page from Web CT. There are a number of reasons for this. In one instance, it may be that the Internet connection at the server is slow and/or congested. Such a situation calls for increased bandwidth. In reporting on the first phase of our study we noted that the Web CT server, located on the St. Augustine campus, shares Internet connection with other servers on the campus. The problem is one of limited bandwidth. Until this problem is addressed, the only way to alleviate this situation is for students to seek access outside peak hours.

Another possible reason is a slow and/or congested Internet connection to the user (student). This problem lies within UWIDEC's domain and calls for increased bandwidth between the hub site and the user. Since UWIDEC's primary concern at this stage is access at the centers/sites, increase in bandwidth can be achieved in any of three ways. One way is to increase at the hub site, but the positive effect of this may be restricted if the leased circuit connection between the hub site and the centers remains at 64kbps. Another is for each of the 28 sites to use a local ISP (Internet Service Provider), which raises further issues of management and security at the site. The third is to shift from land-based leased lines to VSAT. A discussion on the pros and cons of this option are beyond the scope of this paper.

The third possible reason for the technical problems described by the students is the speed of the students' computer. This could be either a software or hardware problem. If the latter and it is due to the age of the computer, then replacement is the only solution. In this regard, one recalls the entry made by one of the site technicians in his logbook as part of the first study, that "the year 2002 is here and we still have 150MHz computers (at the centers)".

In addition to the above, other technical improvements called for were

- *Passwords that work*

and

- *More user-friendly site*

The latter may be an indication that the design of the course environment needs to be re-thought and tested.

The underlying message in all of the above is that if students are unable to use the new technologies because of hardware or other problems, the level of trust necessary to encourage student use will not be built.

Manage the on-line teaching activity more efficiently

One student called for

- *Speedy response from course coordinators to students' postings on the discussion board.*

Another, extending on the same theme, said

- *There should be some form of structure put in place for students and overseas tutors (course coordinators) especially when questions are being asked by students, as too much time is wasted.*

Other comments in this category addressed the issue of the timing for placing materials on-line. One student felt that

- *All course materials (should be) placed on-line before the semester begins*

Another did not share this view but still recognized that there had to be some systematic, organized procedure for doing so over the course of the semester. From that student's perspective, improvement would be,

- *Having a specific time for accessing certain information.*

Along that same vein, another student commented,

- *Materials and information should be more readily available for students to access. Sometimes even after lectures (teleconference sessions) materials mentioned are still not available on the site.*

Provide more assistance for exam preparation

A third category showed a clear bias for content that could assist in the preparation for examinations. One student called for

- *More clear guidelines especially during exams –(students should be told) the chapters (units) they need to pay particular attention to.*

Another wanted

- *More assignment-related literature to assist us in compiling assignments.*

Other related suggestions were,

- *Sample answers to exam-type questions especially for sites without reference material*
- *(Students should be able) to retrieve past papers and to try exercises to be corrected on-line.*

There were two responses that did not fall within any of the categories identified above, but which are significant enough to warrant attention. One student asked for

- *The tutors(course coordinators) to be seen on TV.*

This suggestion seems to derive from the perception that students need to 'see' their teachers if they are to learn.

The second was unique in that it shifted the focus away from the institution to the students themselves. The respondent was of the view that,

- *More students should take part.*

You will recall a similar minority outlook in response to the question "What did you like most about the on-line experience?" What remarks like these suggest is that, notwithstanding the greater demand about what the teaching institution must do, there is still a certain degree of sensitivity among students that the teaching/learning process also requires the active participation of the learner.

Overall, there was a positive response from students to on-line delivery, with the majority (66.7%) indicating that they would like to use the environment again. Two such students captured the essence of the interactive nature of teaching and learning in the computer mediated communication (CMC) environment in the reasons they provided for their positive response. One commented that,

- *On-line courses are very helpful and motivate students to do the course because of the 'in-touch' feeling that it provides students.*

Another, referring to a course that she was currently doing rather than any of the four related to this study, expressed the view that,

- *EC22A (Topics in Economic Development) seems to be a very interesting topic; it also appears to be very relevant to us in the Caribbean in particular. It would be nice to exchange ideas on that topic with other students.*

Not all students were as positive about the new technology. One respondent, who answered 'no' to using the environment again, gave as a reason that

- *It was better to have tutors who are face-to-face.*

You will recall that the issue of visual contact in the teaching/learning situation also arose in response to another question discussed earlier. If this asynchronous CMC mode of instructional delivery is to be used to its full potential, UWIDEC must acknowledge that at least for some students, the absence of the visual may be regarded as a factor impeding the learning process. Given the long history of face-to-face communication in the conventional classroom setting, further research needs to be done to investigate the factors inherent in that setting that may impact on learning in an environment without visual cues.

Emergent issues

Given the many deficiencies highlighted by students in the implementation of this initial on-line teaching-learning experience, one may ask the question should UWIDEC have undertaken this initiative at this time? In light of the technical problems encountered and the inability to put materials on-line in a timely fashion, was UWIDEC ready to begin teaching on-line? Should the focus have been on upgrading and/or enhancing the resources before implementing this innovation? The issue of 'the right time to start' is always going to be a difficult one for institutions engaged in implementing change and it

is especially so for change agents in developing countries where resources are always less than what is required to get the job done.

In terms of the technical problems cited, it should be noted that the issue of increased bandwidth is currently receiving attention both at the level of the St. Augustine campus IT Services and within UWIDEC itself.

As far as the human resources are concerned, there is no doubt that, with the addition of the on-line component, the already stretched team of personnel from the telecommunications and course development units of UWIDEC as well as teaching staff from the faculties were not in a position to deal adequately with this innovation. You will recall that the on-line component is being incorporated into an already existing media mix, comprising a core component of self-instructional print materials supported by audio-conferencing and face-to-face tutorials. The current delivery mode is therefore complete in itself. Tasks related to the new initiative are therefore competing for time and space with existing functions.

It should be noted that with the increase in both student numbers and the number of course offerings, the synchronous audio-conferencing delivery mode is becoming less sustainable. It is therefore becoming increasingly evident that the synchronous must ultimately yield (some) ground to the asynchronous.

While acknowledging the inadequacies highlighted, we are of the view that there were benefits in initiating the exercise at this juncture. Future development work, in terms of both technological and human resources can be informed by these experiences.

Another question emerging out of the study is, to what extent should student demands be met? The responses that students gave at several points in this survey reflect a strong demand to have conventional classroom practices re-created in the CMC environment, complete with all the features associated with this didactic mode of teaching. One cannot deny that to use the technology in this manner would be to deprive the very students of the real potential for interactive and collaborative learning of which it is capable.

While noting the dominant clamour for more of the same, one cannot ignore the minority voices making their own claims for more active learner involvement in the learning process and for greater interactivity. UWIDEC will do well to recognize that attributes of a non-didactic approach to learning are already present in the student population and that this is a positive factor that can be built on.

Another issue emerging pertains to the relationship perceived between students' capability at three pre-determined levels of computer use and their competence in managing their learning on-line. This seems to point to a need for a non-credit introductory course specifically designed to prepare in-coming students for the on-line experience. Schramm et al. (2000) also emphasize that students must receive adequate computer-related training before beginning an online course.

Projections

In light of the foregoing, the following are being considered to continue the research and development project:

1. Instructional design issues

Attention must be paid to the "mechanical" aspects of the course design, to ensure that the site is visually appealing and user friendly. There will be a need to bring some level of standardization to the course elements, such as icons and titles. This will help students become familiar with, and ultimately more comfortable in the course environment.

Secondly, and of major concern, are the more substantive course development issues. Careful course planning must be done well in advance of the start of a semester to ensure that on-line elements supplement and\or complement existing printed course materials. Emphasis can be placed on providing material that acts as a forerunner or orientation to the more demanding material in the course package. In the case of readings in particular, "lighter" alternatives can be provided to introduce students to course topics or to provide more current information, where readings in the print packages may have become dated. Linked to these additional on-line materials can be on-line self-assessment activities, such as short-answer quizzes or multiple-choice tests, and also including higher-order question-types to provide opportunity for deeper engagement with the materials.

Another area of concern related to the design of the on-line courses, which was brought out in the study was the need to find an effective way to encourage interaction among course participants. The data generated by the study revealed that students are reluctant to participate in the interactive elements of the on-line courses such as the discussion board. Special attention must be paid in future to encouraging their participation. A possible way of doing this may be for course coordinators to develop discussion topics out of the deliberations of the audio-conference sessions so that the teacher-learner oral exchanges in the familiar synchronous environment can be seen as providing the stimuli for the text-based interaction in the less familiar asynchronous setting. Participation can be further encouraged through the assignment of marks or grades for contributions to discussions.

2.Dialoguing with course coordinators

Previously in this study we pointed out the importance of the role of the course coordinator as a motivator for students and a source of information. Course coordinators are also instrumental in developing the on-line course environment and monitoring its

use. Given that their time is limited, it is necessary to devise an effective strategy that would allow much of the monitoring role of the course coordinator to be transferred to a dedicated member of the UWIDEC staff. This would require timely and clear communication flows between course coordinator and staff member. The staff member would act as the implementing arm of the course coordinator, by transferring information between course participants.

3. Further research and development work

The results of this study point to the need for an assessment of the levels of computer literacy of new and continuing UWIDEC students with a view to preparing them for accessing on-line courses. The institution would need to consider designing relevant computer literacy courses for in-coming students to ensure that they meet the standard required to negotiate a web-based environment.

Quite apart from offering computer training for students, attention must be paid to developing the "instructional" skills of the UWIDEC site technicians, to guide students in accessing web-based materials. Technicians may need to be provided with some variation of a "train-the-trainers" programme, which can prepare them to be instructors to students, rather than simply "trouble-shooters".

Finally, given the perceived tendency towards passivity, there is need to initiate a research study to analyse the impact of face-to-face teaching on the willingness and capability of adult learners to take responsibility for their learning and to be active participants in the teaching-learning process.

CONCLUSION

With the seemingly fast pace of technological development worldwide, there is the temptation to rush headlong into the provision of education via the use of ICTs. This preliminary research study points to the need for careful analysis of the many facets of on-line education before institutional commitment is made to delivery of on-line programmes. In particular, assumptions about students' capability and readiness to use ICTs, technological capacity of the institution and preparedness of teaching staff can all impact on the effective delivery of courses and programmes. On-going research and monitoring, as well as tailoring programmes to suit present human and infrastructural resources are necessary. There is also need for developmental planning which considers the growth capacity of the institution and the changing needs of growing student populations.

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