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The Introduction of Online Learning: A case study of YCMOU

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There are many reasons why Indian open universities are adding online learning opportunities to their course offerings. Two universities, the Indira Gandhi National Open University (IGNOU) and the Yashwantrao Chavan Maharashtra Open University (YCMOU), have been developing online aspects of their programs for some years. This article documents the experiences at IGNOU and then examines the situation for online development at YCMOU. Lessons can be learned from both experiences. These include being strategic in choosing which courses to offer, and in deciding which services to develop for which clientele. Choosing those that will bring the greatest enhancement in flexibility and efficiency for the least amount of new skill requirement from learners is likely to be of biggest benefit. Keeping cognizant of the computing context of learner sub-groups and enhancing learning through additional optional online services is most likely to result in effective courses and quality student services while maintaining efficiencies in financial logistics.

Introduction

In India, a country of great diversity, the imbalance between the intake of students and those seeking places in higher education is almost overwhelming. In 1950–1951, when the government's first 5-year plan was introduced, there were 30 universities catering to 263,000 students. Since then, the figures have risen dramatically so that in 2005 there are "over 300 universities and 13,500 colleges [serving] over 10.5 million students" (Panda, 2005, p. 207).

About 20% of those students are served through distance education. The Indian government considers distance education to be an integral part of its higher education strategy and proposed in its tenth 5-year plan (2002–2007) that every state should have its own open university and that the percentage of new students served by distance education should rise to 50%, an increase of approximately 4 million learners (GOI, 2005).

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Concurrently, there has been an explosion of interest in Web-based services. The pressure comes not only from particular disciplines such as business, engineering, and computing science and from government reports (GOI, 2003), all encouraging the rapid expansion of student numbers in IT fields, but also from traditional universities that are turning to online learning to serve those students they cannot admit due to insufficient places, and from large entrepreneurial companies that have formed virtual institutions to offer computer-based programs. The open universities find themselves under pressure to adopt e-learning and yet, because they serve a much broader clientele than their competitors, they must meet the challenge within the context of the country's low rate of connectivity. This case study was designed to explore the implementation of e-learning in one of these large open universities.

Yashwantrao Chavan Maharashtra Open University (YCMOU) was chosen for a number of reasons. One of the state open universities, it was founded by Professor Takwale, who with Professor Reddy, the founder of Indira Gandhi National Open University (IGNOU), are considered the pioneers in Indian distance education. It is one of the three mega universities with an annual active student enrolment of over 100,000 students (Distance Education Council [DEC], 2001). It is also one of the three open universities (with IGNOU and Netaji Subhas Open University—NSOU[1]) that offer some programs exclusively online (Panda, 2005).

Administrative Issues of Mega Open Universities

Daniel (1999) examined the growth of a selection of open universities that had current registrations of at least 100,000 students and focused on their ability to survive. He pointed out that the administration of such institutions is complex and requires constant balancing and that as they move into adopting flexible learning they will have to reassess their strengths and be very conversant with their costs: "Working with a widening range of learning technologies with very different cost structures will be a challenge to all universities offering distance education" (p. 64), he concluded, since the varied costs of different technologies make straightforward economy of scale models no longer accurate.

In his analysis of mega universities, Daniel saw the course production process, the student support system, and the management system as crucial to effective functioning. He was concerned with the turn towards instructor-led online classes and warned that this would lead to a drop in productivity (based on the staff/student ratio) unless the system allowed students to learn more efficiently or was able to reach much larger numbers. Rumble and Latchem (2004) similarly argued that, as interactive technologies are introduced, unit costs will rise sharply resulting in a reduction in size in order to reduce costs. Bates (2000) suggested that what is most often missing in higher education management is "*strategic* vision, that is how technology can be used to change the way a university or college does its core activities or business so that it can reach out to new needs and new target groups" (p. 58).

In examining the issues surrounding the educational use of digital media in the British Open University courses, Mason (1996) also discussed some of the

organizational (i.e., financial and administrative) implications of adopting these technologies. Her points are similar to those of Daniel: that the learning effectiveness and costs of these technologies need to be constantly monitored before and after decisions are made. Daniel quoted Sparkes (1984) who found that "as the media of distance education become more sophisticated, academic productivity, as measured by the ratio of the student hours of work generated for each hour of academic input, is decreasing steadily" (p. 41) and concluded that this represented a real drop in productivity unless the newer media allow students to learn more efficiently or reach a much larger number of students. The exploration of distance education management is still relatively new, and Daniel's "three-legged stool" of quality learning materials, effective student support, and efficient logistics (p. 40) is essential to keep in mind in exploring the organization of a mega university such as YCMOU and the decisions involved in its implementation of the newer knowledge media.

Developments in Online Learning

Until fall 2004, only two universities in India, IGNOU and YCMOU, offered full courses online and employed Web-based learning support resources (Panda, 2005). The developments of IGNOU's four online programs have been documented in a series of studies.

The first initiatives were by the School of Computer and Information Sciences which began providing its course content for the Certificate in Computing and Bachelor and Master's in Computing Applications online in 1997 (Sharma, 2001). At first, there were only 100 designated centres throughout the country where students could access these materials. The large enrolments from students who lacked personal computers and were unable to access sufficient IGNOU-approved computing centres resulted in 1999 in the university giving students the option of moving to a traditional distance education format (Reddy & Srivastava, 2001). Over 1,000 students, however, chose to continue with the Web-based option.

Partly in response to the recommendations of the National Taskforce on IT and Software Development (GOI, 1998), IGNOU launched the Virtual Campus Initiative. Three programs were developed: the Bachelor of Information Technology (BIT), the Advanced Diploma in Information Technology (ADIT), and the MBA program (Management Education through Interactive Delivery Systems—MEIDS) all of which used Web-based technologies to provide access to learning materials and counselling.

Courses in the information technology programs included a 60-minute live satellite-based interactive teleconferencing session per week, prerecorded video lectures, regular lab work, as well as additional materials, asynchronous counselling, and peer discussions, all online. Specific telelearning centres (TLCs), which were equipped with adequate computers, teleconferencing equipment, and library facilities were identified. The first cohort of 1,266 BIT students was surveyed and of the 35% who responded, 75% liked the flexibility and independence and those who had easy access to the TLCs found it an exciting way to learn (Sharma, 2001). However,

students disliked the video lectures which necessitated going to a study centre and 50% used a business centre or cyber café to access the course. Most students (80%) downloaded their study materials and resented the additional cost involved. They also commented on the need for more frequent and timely feedback and better support from the local centres. Given the enormous increase in enrolment in computer programs, "from 484 in 1990 to more than 100,000 students in 2000" (Sharma, 2001, p. 9), and the need to control the quality of the service provided to students, IGNOU has opted to set up its own TLCs in cooperation with its regional centres.

The objective of the MBA–MEIDS program was to increase access to continuing management education for those students who could access the materials electronically at work or home and to streamline administration by having more services online. MEIDS students could access online admission and counselling services through a number of identified partner sites that could provide complete connectivity. The program used a combination of print and audio/video on CD-ROM. Supplementary support, including additional course material, computer-generated assignments, and questions were online. While the overall objective has been achieved, the small number of enrolments and of partner sites suggests that this program is still in the early stages (Sharma, 2001).

Mishra (2002) created a design framework for online learning environments which was then used in developing a Postgraduate Certificate in the Management of Displacement, Resettlement, and Rehabilitation (PGCMRR). The course included units with self-assessment, mentor support, synchronous chat, and asynchronous discussion forums (Mishra & Jain, 2002). About 133 students registered over four terms were surveyed but only 16 responded (Mishra, 2005). The majority of responses were from students who had completed the program. The most frequently accessed segment was the discussion forum with peers.

More recent initiatives include the development of a prototype for Web-based learning for Library and Information Science professionals (Kanjilal, Ghosh, & Kumar, 2004a, 2004b). Each module involved print, slide shows, streaming videos, e-tutorials, and quizzes and its major feature was that individual students' contributions could be traced and their progress and learning curve automatically generated. The pilot program has been successful and the model is planned for use in other ICT-related programs for Library and Information Science professionals.

Comparative Studies

Two comparative studies involving IGNOU and YCMOU students have been reported. Dikshit, Gaba, Bhushan, Garg, and Panda (2003) examined the attitude, motivation, and preferences of online learners in the two open universities. Students were selected from the three programs that were entirely online: the BIT and PGCMRR from IGNOU and the Diploma in Electronics (DIE) from YCMOU. The PGCMRR return was so low that this group was removed from the analysis. In all, 38% of 600 BIT and 42% of 100 DIE students responded to the survey. In

general, the DIE students were predominantly female and more held graduate and postgraduate degrees but most classified their Internet skills as at a beginning level while the BIT students were mainly male, with senior schooling completed, but with more Internet experience and at an intermediate skill level.

The majority of IGNOU students rated their self-teaching materials, access to tutors, and tutor quality highly but were less satisfied with the mode of assessment (rated poor by 30%) and the library resources (rated poor by 60%). The YCMOU students were pleased with access to tutors, the mode and quality of assessments, and library services, but were less satisfied with the quality of the self-teaching materials (rated poor by 33%). In terms of the mode of delivery, almost half (47%) of the IGNOU students preferred Web-based learning (WBL) or CD-ROMs with some face-to-face (f2f) support while YCMOU students were almost equally divided between WBL, WBL and f2f, and WBL, f2f, and other media. To access their materials, both IGNOU and YCMOU students tended to use TLCs regularly and Internet cafés occasionally while YCMOU students also signed on occasionally from homes or offices.

The second study (Zhang & Perris, 2004) researched the efficacy of online learning among 11 open universities in Asia. Based on the data provided, IGNOU offered 69 online courses, the majority being in the humanities (26) followed by science and technology (15) and business and administration (10) courses. YCMOU offered 34 courses in all, the vast majority (25) being in science and technology. Too few IGNOU students replied to the survey to be included in the analysis. These YCMOU students more often accessed the Internet from work and from cyber cafés. They saw the advantages of online learning as enhancing student–instructor communication, providing equitable opportunity to contribute, and providing the opportunity to share resources with others but they found opportunities for student–instructor interaction less frequent than in face to face, and saw themselves as more comfortable with print-based learning. Technical problems and lack of familiarity with this way of learning were their biggest barriers.

These studies have begun research in an area that is of increasing importance to India's mega universities. Khan (2001), recently the Vice-Chancellor of IGNOU, noted:

> Technology is crucial to India as an emerging knowledge-based society, for expanding the reach of extension activities, fostering networks of scholars, and raising standards of provision…. It is imperative to expand our use of ICT. Strategic alliances with technology providers have given our students access to the Internet, especially for computer courses. We've constituted another taskforce to explore ICT applications in human resource development, promote an ICT culture, new academic initiatives and educational networking, and review our infrastructure and investment requirements. Our primary concern is to make our systems more learner-centred. (pp. 150–151)

The state open universities share IGNOU programs so it is probable that they too, depending on their resources, will also seek to include online learning as one of their options. Hence, the importance of exploring the introduction of online learning at YCMOU, comparing the findings with those at IGNOU, and proposing recommendations that may benefit not only open universities but also distance learners.

Method

Based on the work of Stake (1995), a descriptive case study of YCMOU was carried out between January 2002 and August 2004. In discussing the nature of qualitative research, Stake emphasized the importance of interpretation as method. He explained how interpretation works:

> We try hard to understand how the actors, the people being studied, see things. Ultimately the interpretations of the researcher are likely to be emphasized more than the interpretations of those people studied, but the qualitative case researcher tries to preserve the multiple realities, the different and even contradictory views of what is happening. (p. 12)

Case studies are based on extensive fieldwork where time is spent on-site meeting with and observing participants in order to "make sense of or interpret phenomena in terms of the meanings people brought to them" (Stake, 1995, p. 4). In this case, the main campus was visited on a regular basis and four regional and six local centres were also visited. The fieldwork involved a combination of formal and informal interviews, focus groups, observations, and document analysis.

The interviews were with present and former Vice-Chancellors, senior administrators, faculty, staff, and students at the main campus and at the regional and local centres. Data analysis was ongoing and concurrent with data collection. Since the development of trust was paramount, multiple interviews were held with interviewees over this time, with the focus moving from general topics, to specific issues and back again. This recursiveness helped in the thematic analysis of the data and also provided for a test of reliability since the multiple narratives could be examined through comparison and over time.

According to Lincoln and Guba (1985) validity or "trustworthiness" of qualitative research is concerned with truth, value, applicability, consistency, and neutrality and the findings should be credible, dependable, confirmable, and transferable. A variety of techniques helped ensure trustworthiness of the data. First was extensive time spent on-site. Glesne and Peshkin (1992) identified time as a critical factor in achieving trustworthiness: "Time at your research site, time spent interviewing, time to build sound relationships with respondents—all contribute to trustworthy data" (p. 16). Regular conversations gave opportunities to clarify or check statements with respondents. Data from multiple correspondents was triangulated and with official documents and field observations and the key informants were asked to verify the report's credibility.

The case study method provided an appropriate means to explore the development of e-learning at YCMOU since it is in-depth, extends over time, and uses an emergent design which adapts to the changing circumstances revealed by the study data.

Yashwantrao Chavan Maharashtra Open University (YCMOU)

YCMOU was established in July 1989 as a state university with a mandate to serve the region through distance education. It operates from its main campus at Nashik, through eight regional and over 1,440 local study centres, offering almost 40 different academic programs and over 230 courses (Reddy, Srivastava, & Pandey, 2000). It was

opened as a mass university meaning that it was to serve all the people of the state by offering a wide range of professional, technical, vocational, and practical certificate, diploma, and degree programs. To encourage participation it has relaxed entry rules, flexibility in course combinations, and choice in the place and pace of study (YCMOU, 1998, 2001). Every year, about 100,000 students register for its various programs and the total number of registered students is about 600,000 (YCMOU, 2002).

There were eight Schools: Agricultural Science, Commerce and Management, Computer Science, Continuing Education, Education, Health Sciences, Humanities and Social Sciences, and Science and Technology. Each School has a specific focus and clientele. They ranged from the School of Continuing Education, which had targeted the urban unemployed, to the School of Agricultural Sciences, which placed its major emphasis on rural farmers. In contrast, the School of Education restricted its programs to employed teachers while the School of Humanities and Social Sciences encouraged entrants who had passed secondary school examinations at the 12th Standard. The Schools of Computer Science (SCS) and of Science and Technology (SST) worked closely with industry partners and provided a range of diploma and certificate programs in Computing Applications as well as undergraduate and graduate programs in Electronics and Mechanical Engineering.

Each School was led by a Head who managed the academic activities within that area. Approximately 40 faculty members were shared among these Schools. The development of instructional materials was the responsibility of the Academic Services Division which provided instructional development, research and evaluation, and training services. YCMOU had its own production facilities for print and audio-visual materials (including television, radio, audio and video cassettes, and science kits) and had begun using computer technologies in a number of its courses. Student services were handled by a specific division. They monitored the services provided at the regional centres and assisted in student registration, the provision of student materials to the regional centres for distribution, and the development and implementation of test banks for ongoing course evaluations and final examinations.

Each School had its own network of study centres that serviced its students. These centres were usually in a local educational institution or industry location and provided services under a leasing agreement. They were independent units subject to regular review and their academic counsellors were not considered YCMOU faculty. This meant that Schools made considerable efforts to develop strong links with these centres and tried to streamline procedures to ensure consistency of services.

By 2003 there were over 1,440 study centres, 8,949 academic tutors, and 1,020,000 students (Panda, 2005). To cope with the rapid increase in numbers, the university had begun to rely on computerization and automation to maintain the efficiency and quality of the programs and services to students.

Implementation of e-Learning at YCMOU

At YCMOU, e-learning goals and initiatives are embedded in the institutional 5-year plans. Under its first Vice-Chancellor, Dr Ram Takwale, the university adopted a

three-tier format involving regional and study centres and proposed "certain student support activities [related to these centres] to enhance its overall efficiency and effectiveness" (Garje & Rastogi, 1995, p. 119). One of these was the development of a system of on-demand and online examinations. Another was the automation of its library resources. Started in 1992, this was completed in 1997 (Shewale, 1998).

A major impetus for online learning occurred under the leadership of the third Vice-Chancellor, Professor Ashok Pradhan, who was appointed Vice-Chancellor of YCMOU in 1997. His 5-year plan included a focus on technological developments involving the Internet. During VC Pradhan's tenure, YCMOU established a local area network (LAN) at its headquarters in Nashik and developed its own website, www.ycmou.com, where relevant and important information about the university and the programs offered by the Schools was posted. These can be seen as major initiatives given the importance of a robust infrastructure to the automation and digitization of YCMOU's administrative services.

In 2002, the Commonwealth of Learning, based in Canada, presented an award for institutional excellence to YCMOU. The citation read in part:

> What impressed the panel particularly was the institution's use of technology, not just to attract a wide range of learners but to provide sustained academic support to retain them in the system. To do this the university did not adopt a "one size fits all approach" but variety of practices online with the students' preferred learning styles and access to technology.

In 2002, the appointment of the fourth Vice-Chancellor, Professor Sabale, coincided with the development of the tenth 5-year plan (2002–2007). The goal of the plan was "liberating the learner" and under Professor Sabale's leadership several changes were made to help realize this objective. He had firm opinions about the future direction of the university. He strongly believed in the impact of globalization and the need to ensure that the university kept up with current changes. He explained that learning had become networked and one needed to think globally. He proposed to strengthen the regional and local study centres by increasing the speed and level of their computerization and to connect all the regional centres and district centres through the Internet providing them with one-way and two-way audio teaching, direct videoconferencing, and distributed classroom facilities. This coincided with the plans of the state government that had launched a new corporation, Maharashtra Knowledge Corporation Limited (MKCL), to provide "information technology-enabled education in all university, colleges, and other educational institutions" (Rao, 2001, p. 3).

In July 2004, the fifth Vice-Chancellor, Dr Rajan Welukar, was appointed.

Online Administrative Student Support Services

Despite the lack of technical infrastructure especially in rural areas which made a complete move to online unlikely for some years Schools had begun online developments. These can be classified as providing either administrative or academic support

services to students and study centre coordinators. Administrative services include pre-admissions counselling, admission and registration services, program counselling, and examinations services.

A concerted effort was made to move to provide online pre-admissions counselling, and online admission and registration procedures in selected programs in the Schools of Computer Science and Science and Technology in 2002–2003, with Education offering the service in the 2004 school year. Many of the School web pages not only contained general information about courses but also provided access to both the entire program calendar as well as to detailed course syllabi. This was seen as helping learners make more informed program and course choices (Killedar, 2001). By 2004, pre-registration counselling services using an online discussion forum on program advising for students was added to the Schools' web pages.

YCMOU was the first open university to offer professional degree programs in teacher education, and education students form about 40% of the university's clientele. The School of Education decided to offer its services online in 2004 and began with the dissemination of admission lists through its website. The School chose to use Marathi rather than English for its web page because of the low English skill level of its students and, since many were unfamiliar with websites, developed explicit instructions to guide them through the process. These instructions were also helpful to study centre counsellors, many of whom were unfamiliar with Internet searching. The School chose to review students' reactions to the administrative services to get their feedback on the clarity of the process.

As reported by Dharankar, Barve, and Barve (2004), a survey was distributed to a random sample of those students who came for interview following the posting of their admission notice on the website. From the 1,090 responses, 66% were able to access the website and find the admission information and 64% were able to do so based on the instructions provided and their own skill level. Cyber cafés were the most common access venue (60%) and for most (73%), the process took 30–60 minutes to complete. Almost a third of students did not have access to Internet services, 79% didn't have the correct URL, and 59% thought that the path from the home page to the forum was complicated. Finally, 25% either could not use the Internet or were not close to an access point, while another 13% felt that it was too expensive to do so.

Based on the results, the School moved to redesign the web page to make the path more direct and to minimize the time needed for downloading the information. The growing number of cyber cafés means that students' problems in obtaining access will diminish but the very small number who accessed from home (5%) needs to be taken into account in planning for participation in the academic forums and virtual classroom modules (VCMs). The School plans to continue Web-based development in tandem with developments of the State's ICT infrastructure.

Online admission meant immediate student registration and allowed for the necessary financial documents to be dispatched efficiently to the students. Once fees were received, the students could be immediately supplied with materials, all duly noted in their online file.

Since many students enquired about their programs at their local study centres, these two Schools pioneered an online information service for these study centres. Besides the posting of course syllabi, they included the dates of examinations for staff and students as well as specific services for study centre coordinators such as lists of required documents pertaining to specific administrative procedures. These services are now listed on the Education web page. Development of an online study centre guide to assist in the efficient administration of programs and counselling of students was in the planning stage.

One of the major costs associated with distance education is the administration of final examinations. At YCMOU these examinations were held in every academic subject and were heavily weighted in the final grade. They included both multiple-choice and short answer questions. Previously, academic counsellors were hired to mark the final examinations. Through the use of optical readers and associated software developed in-house, computerized evaluations of student's examinations were introduced. Their use eliminated the problem of unfair practices or biased markings previously pointed out in student feedback. Extensive question banks were developed and multimedia-based CDs were provided to the study centres for the benefit of students in connection with specific academic programs. These contained final examination samples and synoptic answers to guide both academic counsellors and students. Among open universities, YCMOU had taken the lead in the area of student evaluation (Rastogi, 1999) and was proceeding to use on-demand examinations in some courses. Final examination results were also available on the Web once a student entered their examination number.

Online Academic Student Services

In going online, YCMOU continued to follow its philosophy of providing academic support to students through a variety of media. Discussion forums, virtual learning modules, and self-help tests were common components of the Schools' online offerings.

Since students could access the online university services at the study centre or through a growing number of cyber cafés, three schools (SCS, SST, School of Science and Technology 4, and SOE) developed discussion forums for students and academic counsellors. These were threaded asynchronous discussion modules where students and counsellors could post questions to the discussion forum or email the course instructor directly. Academic counsellors hired for this purpose monitored and responded to the discussion forum and email enquiries. The threaded discussion had a keyword search feature to allow for efficient retrieval of pertinent information. At the time of the study only a small number of students used this service but the Schools expected it to grow rapidly.

Recognizing that not all study centres had adequate Internet access, the Schools also provided virtual learning modules (VLMs) on CD and video-cassette. In these modules a subject expert explained the most difficult concepts and applications in the course. An appropriate combination of slides, illustrations, photographs, and

video-clips was used to illustrate the topic. Students could use the VLMs in the study centres, or download them directly from the Internet.

Generally, students rented rather than purchased texts, and had limited access to library support materials. Besides having the library resources online so that the list was accessible to students and study centre coordinators (Shewale, 1998), staff members in the School of Continuing Education converted the content of over 1,000 course textbooks into an e-audio format to provide a Web "radio" facility (Mahajan, Sonone, & Gujar, 2003) which students could access at the study centres. This allowed students greater access to the content and it was hoped would encourage them to work through materials by listening on a regular basis.

Both the Schools of Computer Science and Science and Technology used end of chapter or unit self-help tests which were available online and provided the student with an immediate score and response. Initially described by Bhadane (1993), they were developed by Professor Killedar (2002a) to help students understand what the major concepts were, what they should study, and how they should respond on test items.

One staff member provided his assessment of his School's activities in program development:

> With the implementation of technology we are highly motivated to do two things: First, ours is the only School in this university and probably in India to reach students completely online [with this program]. Second, our discussion forums are a great eye-opener and as it is open to all, we do get to clarify our issues. I personally feel we have done tremendous work. If we are provided with the proper training, we could do even better.

Currently (2005), YCMOU is advertising its new Bachelor and Master degrees in Architecture. The programs have four components: f2f counselling at the study centres (available for 280 hours per semester), VCMs, online counselling through discussion forums, and self-help tests. This combination of online and study centre options is the most frequently used format at YCMOU. It allows students choice of venue, enhanced academic guidance, and increased flexibility.

Research on YCMOU Online Courses

One of the programs offered entirely online was the Diploma in Electronics Engineering offered by the School of Science and Technology. About 5,000 students were registered in the program in 2002–2003 (More, 2004). This program contained VCMs, available on CD-ROM and online via streaming technology, as well as an online test centre and an asynchronous discussion forum (Killedar, 2002b). Each VCM ran for about 20 minutes. More (2004) described an expert review process undertaken by the School to enhance the pedagogical basis of the VCMs. The online testing referred to self-testing opportunities which students could use to assess their competency. The discussion forum had two components. The academic forum was used by an online counsellor to respond to students' course-based queries, while the student services forum provided additional services such as

a program calendar, study guide, and course advice. YCMOU undertook an evaluation of the program in 2000–2001. All 2,221 registered students were sent a 26-item questionnaire and the response rate was 410 (18.46%). More (2003) summarized the findings:

> The EEDP students access the university Web site more frequently for information regarding student services such as for answers to specific queries about the examination schedule, results, and registration-related matters, than for academic counseling and guidance. (p. 11)

Many students commented that they were not aware of the e-learning facilities. Some noted that they needed encouragement to access the VCMs at the study centres and that they found the cost of accessing Internet facilities through cyber cafés prohibitive. The pattern of responses suggests that while the use of the online services was lower than expected, those who did use it found it helpful and enjoyable. More made two major suggestions: first, the development of more VCMs that extended the knowledge in the text, kept specialist terms to a minimum, and covered more of the syllabus, and second, increasing student awareness through greater visibility on the website, more active support from study centre counsellors and coordinators, and through supporting means to Internet access.

In 2002, the School of Commerce and Management sought to evaluate student satisfaction with its WBL programs and surveyed students in a cross section of online management programs (Palande, 2003). From the 200 responses, they found that the majority were taking the programs to enhance their career prospects and update their knowledge and skills in management. They rated their course materials (80%), their access to tutors (70%), and the quality of the tutorials (87%) as good, and found the mode of assessment to be good or very good (70%). They were less pleased with the quality of the assessment, 55% rating it poor while 40% rated it good, and with library resources, rated very poor by 60%. Given a variety of options from online only to various combinations of online and f2f activities, 55% chose "mainly WBL-enhanced with face-to-face learning and other modes (e.g., TV, radio, teleconferencing)" while 30% chose "Interactive CD material with face-to-face support." Given their other choices, it was evident that while students wanted some f2f time, they did not want this to be as much as 50% and most wanted it to be combined with other multimedia options as well as WBL. Palande (2003) noted that these responses "were clearly in line with the present situation regarding e-learning in India. The major hurdles were the high cost of using the Internet, its slow speed, difficulties in access, technical limitations, and unfamiliar learning methods" (p. 204).

Issues

Although YCMOU was very proud of its developments in online education, faculty and administrators recognized that many issues remained to be resolved. These were

classified as infrastructure issues, study centre issues, student issues, and the ragged front for development.

The context of their students was a major factor for many of the Schools in deciding on the extent of their participation in online education. While the Heads of Schools were generally supportive of the possibilities of e-learning some said that from their own experience, the digital infrastructure, especially in rural areas, made a complete move to online services unlikely for some 5–10 years.

One major concern of the School of Education was the implementation of online education for students. Several pressures combined to make this a major imperative. The state government has encouraged the introduction of ICTs in schools. The university itself was promoting online initiatives and the Distance Education Council had agreed to provide support to all programs that implemented online learning. Several other pressures caused the School to hesitate. Foremost among these was the reputation of the School's program. According to participants, even the National Council of Teacher Education that approved teacher education programs was still apprehensive about implementing this mode. Because staff members preferred to use email for interaction with students, the School recognized the need to orient staff, students, and academic counsellors regarding the use of Web-based initiatives, hence its evaluation of online admissions in 2004. Although the School planned to add new technology-based initiatives the Head of the School was clear that unless the State and the central government provided better technological facilities to all the districts in Maharashtra, it would not be feasible to initiate online education for all students. He explained:

> The digital divide can be bridged only if certain conditions are met. The programs need to be cost-effective. Constant technological maintenance needs to be conducted at the study centres. The software available in the regional language has to be computer friendly and a uniform pattern of access is required. People need to change their attitude from closed to open. There has to be an appropriate and adequate infrastructure and political influence and interference should be kept to a minimum in policy decisions.

The faculty members were also sceptical of the possibility of providing successful teacher education through Web-based instruction. They believed in the importance of actual classroom practice and contact sessions for the development of reflective practice and critical analysis. Furthermore, they felt themselves to be already overworked and without any time to learn how to use the new technologies. The administrators thought that they needed to develop a new paradigm of teacher education in order to resolve this situation and take account of the affordances of the Web.

Study centres are an essential tier in the provision of services to YCMOU students. The university has a large network of local study centres but the level of their services varies widely. While some centres for the School of Computer Science were in computer labs, other centres were in local work sites or in higher education institutions depending on the appropriate context for the School's target learners. Under the initiative of Professor Sabale, Internet access was being developed in over 500 centres throughout the state. This was seen as doing much to help strengthen

the infrastructure and provide points of access. The addition of computing facilities at the local study centres where coordinators and students could access administrative materials, instructional resources, and registration and program advice meant that students were less likely to seek these services at the regional centres. This effectively made YCMOU a two-tier system and deepened the relationships between the Schools and their study centres but weakened their relations with the universities' regional centres.

Besides the variability in the quality and sustainability of the digital infrastructure and the range of services available from the local study centres, faculty and administrators were also concerned about their learners. Some were concerned about learner access while others, who did their course designs in Marathi, thought that much needed to be done to develop an appropriate script and user-friendly software before their students could do online work. Some mentioned students' lack of keyboarding and basic computer skills. However, those who had developed online aspects of their programs were certain that these would become essential services. The students could access up-to-date course and program information, do self-help tests, review difficult materials, and seek assistance and discussion through the email and forums. They thought that study centres would compete to offer online access since they were paid on the basis of the numbers of students they retained and providing Internet access would become a factor in students' choice of a study centre.

YCMOU has chosen to pursue online education and the integration of online program components on a ragged front by taking advantage of fortuitous changes in their environment rather than by following a prepared strategic plan. This results in a range of outcomes, some more developed than others, hence the reference to the unevenness of the front of the development wave. Where the students need to be able to demonstrate computing skills and such skills are required in their workplace, the university has forged ahead to develop a range of administrative and support applications to enhance the learning options for students. At the same time, in other areas, such as in the School of Agriculture, such developments are much more long term. Nonetheless, the university has recently negotiated, in cooperation with companion institutes and universities, to develop a virtual university focused on agriculture in arid lands that will be mainly online. In this way, YCMOU hopes to keep its development concurrent with emerging possibilities so as to keep its programs competitive in the marketplace. By choosing to develop an online version of its student services, it hopes to ensure that online education permeates the university's offerings and is not associated with instructional materials only.

Recommendations

The approach of YCMOU provides potential lessons for other mega open and distance institutions. An institutional technology plan is essential. Institutions must keep up with the challenges of new technologies. According to Daniel (1999), "anything that changes the relationship between people and knowledge has very important implications for the university" (p. 11). This means that planning on a

ragged or broken front is often more effective than following a single blueprint. It is crucial to be able to make the most of new possibilities while sheltering the remainder of the institution from the development issues. Besides institutional technology plans, institutions need to regularly monitor their external environments to inform a holistic vision for the university that embraces the transformative possibilities as well as replication efficiencies of the Web.

Communications are vital especially in distance education universities and the computerization of communication services provides another option for students who are able to access computers. It also provides for a more efficient administrative system with faster turnaround time in serving students and student centre coordinators. Where students are able to access the services in study centres, the provision of a variety of online components from specific lectures to self-help tests which can enhance their learning also encourages the development of computing skills among students. At the same time, care must be taken to choose carefully which services are provided in order to maintain quality. Setting standards such as maximum length of delay in providing student feedback and avoiding downloading costs on students will help avoid some of the most obvious known student concerns.

The ragged front development of a variety of services and learning resources has enabled YCMOU to avoid Daniel's concern about the attendant costs of the online classroom model. The use of VCMs when combined with the option for discussion—whether online or at the study centres—provides for a different instructional model. However, the VCMs are supplementary resources and students still depend on the print study guide and textbook. IGNOU print course materials were more highly regarded by students and this may reflect the learning design work which informs their development. Each medium requires a different design.

It is also important to recognize the differing needs of regional and study centres based on their learner characteristics and to carefully identify and select what is relevant. For example, the use of CD-ROMs provides an essential alternative to downloading from the Internet for those study centres with stand-alone computers. Providing such alternatives, which can be changed and adapted with changing learner characteristics, provides learners with choice.

Daniel (1999) emphasized the importance of balancing three components: quality learning materials, effective student support, and efficient logistics. A senior administrator at YCMOU acknowledged that balancing these differing facets of a complex organization was not easy but noted that in terms of e-learning, YCMOU had achieved substantial developments in all three areas. YCMOU has taken an important step in providing online learning through a variety of components that assist students learn and help them manage their programs. Together with IGNOU, their online learning initiatives provide useful examples for other Indian open universities.

Note

1. Netaji Subhas Open University (NSOU) is one of the newest open universities. In September 2004, it launched three professional development IT-based courses in cooperation with the

National Association of Software Services Companies (NASSCOM), which represents 850 partners in the software industry. The course titles are Chief Information Office Development, Intellectual Property Management, and E-governance.

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