Providing Access to Technology Degrees: The Strategic Use and Evaluation of Distance Learning Technologies

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ABSTRACT - *Distance learning technology has been widely used as a means of delivering individual courses to offsite locations. The School of Technology (SOT) at Kent State University offers only Baccalaureate and Masters Degree programs at its Kent campus. The Associate Degree programs are housed and granted within the Regional campus system. To better serve our students throughout Kent's eight campus system and maximize the efficiency of our human resources, the decision was made to use distance learning technology as a strategic tool. In one program, Computer Design and Animation Engineering Technology, much coursework is offered via distance learning from the Tuscarawas regional campus to the Kent campus. The challenge this program faced was in determining the best method for course delivery without compromising the quality. For another program, Business Management and Related Technologies, the success of offering courses to serve students at the Kent campus hinged on the ability to carry classes with low enrollment during the initial phase while awareness levels of the course offerings began to build. The question became, "Could distance learning technology be used as a strategic tool rather than as a primary means to offer courses leading to a degree?" This paper will present a model which depicts how these programs through the strategic use of synchronous distance learning technology answered this question. The strengths and weaknesses associated with various types of distance learning technologies and their appropriate application will be presented from both the instructor and student viewpoint.*

I. CHALLENGES

Hands-on experience and modeling are two ingredients found in most Computer Design and Animation programs (Patacca). The BS in Technology 2-plus-2 option in Computer Design and Animation Engineering Technology faced the challenge of including the hands-on experience viewed essential to the program yet still delivering the course via distance learning in a synchronous video conferencing format from the Tuscarawas campus regional campus of Kent State University (Bichara).

The Business Management and Related Technologies (BMRT) program, facilitated by the Trumbull Regional Campus of Kent State (KSUT), faced a different challenge when providing access to coursework at the Kent Campus. As the courses were initiated several challenges arose. The first obstacle was the amount of resources available to staff the courses. Because a sufficient number of courses would need to be offered in a given semester to capture the attention and create student interest in the program, there was a constraint on the limited available resources. Effective utilization of faculty was needed, but of equal importance was the quality of the resource. It was essential for us to use faculty familiar with the program in order to establish relationships with students in the courses and strengthen retention.

The next challenge for the BMRT program was that of economics. Courses across all universities need sufficient levels of enrollment in order to be taught. However, during the introductory phases of the course offerings it was recognized that time would be needed to increase awareness levels and to build a cohort of students in the courses. Canceling classes in this early stage would hinder the success of any future class offerings. Therefore, it was imperative to find a way to offer classes without significant economic loss.

II. DISTANCE LEARNING AS A SOLUTION

To overcome these challenges, the use of various types of distance learning (DL) technologies was considered. Could DL be used effectively to minimize constraints on existing resources in order to build enrollment? Could it effectively deliver courses without compromising the hands-on learning essential to success in many of the courses?

Each technology was carefully considered on a course by course basis in order not to compromise the level of student learning for the sake of the technology. What follows is an assessment of each type of distance learning technology tool available at KSUT as a viable channel of distribution for coursework. Each medium was evaluated on its ability to accomplish the set objectives of effectively providing access to courses and building enrollment.

III. ASYNCHRONOUS LEARNING

The DL technologies available to deliver coursework fell into two categories of learning environments, asynchronous and synchronous. Asynchronous learning environments involve communication among participants over elapsed time rather than real time. This is most commonly associated with web-based courses.

The benefits to using this technology to accomplish the objective, providing access, are considerable. Web-based courses offer flexibility in scheduling and location. Students are not required to be at a particular location at a designated time, thus allowing greater access to the courses. This can be well suited to our efforts to deliver the course from a regional campus. Individuals reluctant to travel to the larger Kent campus could still have access to the course, needing only a computer and internet service to participate.

While this technology would accomplish the objective of access, it was not considered initially as we felt other technologies would better accomplish the objective of building enrollment. We believed that the lack of faculty-student interaction, particularly in the early stages of coursework, might not be advantageous to retention. Another drawback to its use was the enormous amount of time needed to prepare a course for initial delivery via the web. Simply converting material used in the traditional classroom method for web use can be ineffective and does not take full advantage of the medium (Bourne, et al.). While user friendly course management tools such as VISTA are available to Kent faculty to convert courses to an on-line form, such tools do require familiarity and training by the instructor to use effectively. As Sigle noted, it is not reasonable to expect faculty to be effective using any type of DL technology without the proper training and experience (93).

IV. SYNCHRONOUS LEARNING ENVIRONMENTS

The second category of learning environments available was synchronous**.** Synchronous learning environments involve communication among participants in real time. Two DL tools in this category have been utilized. Polycom was the first synchronous

DL tool to be utilized for delivery of BMRT courses from KSUT to the Kent campus. It was chosen initially for its portability and its ability to bring the students in on the classroom discussion with minimal conversion of course materials. The flexibility to move the equipment from room to room based upon class size was essential to success in synchronizing course schedules between the two campuses. It also gave the students at the remote site some advantages. They could control the camera's zoom lens functionality for a closer view of work being presented if necessary or change the camera angle. This lessened the burden on the instructor from having to constantly check the student's view and made the class run smoother. Polycom also has the open microphone which means that communication between sites can occur without requiring participants to press and hold a button in order to be heard. This feature created a closer resemblance to the natural interaction found in the traditional classroom.

In using Polycom, we discovered that it was highly suited for courses in our program that are lecture style or require a lot of group interaction. Its meeting style format accommodates the back and forth discussion. However, when we attempted to use the technology for more quantitative courses, its disadvantages became apparent. One of the drawbacks was its lack of built-in presentation tools. This was problematic for students at the remote site when trying to view a large number of problems on the board or to see overheads.

To accommodate the style of course that involves a lot of board work computations and problems, VTEL was used. VTEL is a room-based video conferencing system and is considered the traditional distance learning system. One of the major advantages of this system is the number of presentation tools available to the instructor. In addition to the lecture view and standard whiteboard, instructors have a control panel which allows them to change the students view from the instructor, to the Elmo opaque projector, to the spreadsheet on the PC at the touch of a button ("What is Room-Based"). This format was chosen for a BMRT finance course over Polycom for that reason.

One of the drawbacks discovered was the use of the students' microphones at the instructor site. When the instructor was "live", the students would often forget to utilize the microphone so that their counterparts at the remote site could hear them. This made the flow of interaction somewhat awkward, but the problem can be easily overcome with an initial class orientation and repeated reminders.

For some of the courses, a hybrid of both Polycom and VTEL was used. VTEL was utilized at the instructor site in order to make available all of the necessary presentation tools. Polycom was employed at the remote site. This capability gave the remote site flexibility in room scheduling, thus allowing for more effective space utilization. For instance, a small conference room could now be used as classroom space for courses with small enrollments. The students benefited from this arrangement as a result of the closer interaction with their peers and they could interact easily with the camera. The collaboration that was taking place among the students as they worked out computational problems was apparent throughout the semester. They took on the role of coaching one another. The main difference from a one-to-one Polycom connection for the students was their inability to control the camera. Their view was controlled from the instructor site.

Another similar technology that is being used to deliver courses in the Computer Design and Animation program is a system which was built from commercially available software. It has an open-end

architecture which enables software and hardware to interface. This system gives students the ability to follow the computer design and animation development on the monitor. Both instructor and student can interact with the program being run on the screen. This is particularly useful when reviewing problems or assisting students with their animation. The strength of this system is that the interactivity closely mirrors that of the traditional classroom (Bichara).

Another technology that is available throughout the Kent State University system, but which has not yet been utilized for the BMRT courses, is LearnLinc. LearnLinc is a PC-based conferencing system that allows synchronous conferencing to be both video and audio or just audio ("What is PC-Based"). The accessibility aspect of LearnLinc makes it an attractive alternative to the other synchronous learning tools. Because it is PC based, the students must have a computer available to them. While this can be provided on a campus in a classroom specifically designed to support the technology, it is not necessary. A course can just as easily be accessed from a home computer that has broadband internet capability, a microphone, and a camera ("What is PC-Based").

LearnLinc closely emulates the interaction of the traditional classroom by allowing discussion between the instructor and students to take place in either a discussion mode or in a hand-raising mode. Similar to the traditional classroom, the degree of interaction is controlled by the instructor.

One of the drawbacks to any DL tool is limited visual interaction. LearnLinc addresses this limitation with a feature called "glimpse", which enables instructors to see the desktop of individual students and monitor the progress of their work ("What is PC-Based"). Students can also provide feedback to the instructor regarding the pace of the class (too fast, too

slow). In terms of helping the BMRT program meet its objective of providing access to coursework, LearnLinc is an exciting technology to explore for future classes.

V. STUDENT PERSPECTIVES

Fifteen students who had participated in BMRT courses using distance learning technology were surveyed. The groups were comprised of students who had taken courses using either the VTEL or Polycom technology or both. The majority of the students surveyed had taken more than one BMRT course with different instructors each time.

The objective of the survey was to garner the students' perceptions about the courses delivered in the distance learning format as compared to that of the traditional classroom. Three areas were addressed: level of course quality, level of difficulty, and course areas most affected by the use of the technology. The results of the survey revealed the following:

- Sixty-one percent of respondents perceived that the technology had slightly reduced the level of quality of the course.
- Thirty-eight percent of the respondents perceived that the course was more difficult in the DL format versus a traditional classroom format.
- The majority of respondents cited spontaneous interaction with the instructor and communication with other classmates as the areas most adversely affected by use of DL technology.
- The majority of the students indicated that they would take another course using DL technology if given the opportunity.

While the results of this survey were not normed against those of students taking other DL coursework at Kent State nor could they be generalized, it is

interesting to note the consistency of the findings to those cited in another experiment conducted at two foreign universities. In this particular study, two areas of difficulty that were identified in the synchronous learning environment were the delay in communication channels and the inability to gauge student reaction in parallel to the lecture (Esteve et al.). Each of these areas greatly reduces the spontaneous interaction between the lecturer and the students. As in our survey, these communication barriers may have influenced the students' perception of the level of quality about the course.

The perception of lower quality could also be due to equipment failures, which can be detrimental to the effectiveness of the course. Our survey indicated that every student who responded had experienced technical difficulty at least once during the semester. Despite the faculty being well prepared, equipment failures can cast a negative light on the entire lesson (Valentine).

VI. CONCLUSION

As courses in each of these programs continue to be offered at the Kent campus, the experiences gained from the use of DL technology and the lessons learned will play an important role in determining how the technology will be further utilized. Based upon our experiences, we learned that DL technology can be used as a strategic tool to attract and retain students to the program. However, based upon the individual strengths and weaknesses of each DL tool, it also became evident that the technology could not be effectively applied to every course in the curriculum. Yet, given its many advantages, the evolution from using DL technology as a catalyst to using it as a collaborative medium in which to deliver high quality instruction is likely.

VII. REFERENCES

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