Identifying Exceptional Online Learning: Optimal Tools and Strategies in Distributed Environments

Mike Menchaca, Ed.D.
Department of Educational Technology
University of Hawaii at Manoa, USA
mikepm@hawaii.edu

Abstract: The purpose of the research was to evaluate an existing online Masters delivered through distributed, distance learning. Through the evaluation, the significance of technology tools, pedagogic strategies, and how they interact in distributed environments was addressed. Data were collected from student surveys, faculty surveys, student interviews, and student portfolios. The Empowerment Evaluation methodology was used to triangulate data collected from multiple stakeholders to lend credence to the conclusions made, which included: technology tools in distributed environments should appeal to multiple learning styles of students; appropriate strategies in distributed environments included: processing content, discussing content, problem-solving through collaboration, reflecting, and building a community of learning; tools and strategies complement each other; face-to-face interaction was significant; and the evaluation revealed the program met goals and objectives.

Introduction

Even though researchers have analyzed the effectiveness of media-assisted distance education since the 1930s, findings have mostly addressed traditional delivery methods characterized by the utilization of television, satellite, and compressed video technologies (Johnstone, 1997). Contemporary researchers argued that the nature of distance education was being transformed to include the utilization of interactive, communications-based technologies (Dede, 1998; Van Dusen, 1997; Watson, 1997). Institutions were increasingly relying on these new technologies to deliver not only courses but also entire programs (Blumenstyk, 1999; Dede, 1998; Drucker, 1992). Moreover, many early researchers argued these institutions incorporating modern, communications-based technologies for delivery would continue to grow (Dede, 1998; Drucker, 1992; Dyson, 1997; Peters, 1997). Thus, not only would distance learning programs rely more on interactive communications, but also there would be more of these programs.

Early researchers could not have been more on the mark. Online courses and programs, many relying on interactive communications-based tools, have proliferated (Dede, Whitehouse & Brown-L'Bahy, 2002; Dede, 2004; Fletcher, 2004). Fletcher notes "distance learning programs are offered by two-thirds of colleges and universities, and the percentage of institutions offering accredited degrees through distance learning has

increased to about 55%" (2004, p. 2).

However, although teaching and learning was increasingly being delivered via communications-based technologies such as the Internet, researchers lamented there were few comprehensive or programmatic evaluations conducted in the area of online delivery (Belanger & Jordan, 2000; Farrell, 2001; Harper, Hedberg, Bennet, & Lockyer, 2000; Jones, 2000; Marshall, 1997; Phipps, Wellman, & Merisotis, 1998; Schwitzer, Ancis, & Brown, 2001). Researchers also pointed out that even those studies that actually did evaluate online learning fell short of providing conclusions more significant than merely anecdotal evidence or lessons learned (Borland, Lockhart, & Howard, 2000; Phipps, 1999). In short, there existed a "paucity of true research" (Phipps, 1999, p. 2) with few actual evaluations forthcoming (Marshall, 1997; Phipps et al., 1998; Watson, 1997).

In order to evaluate online learning, a better understanding of its operation and definition was needed. Traditionally, distance education utilized one or more tools to deliver content over long distances (Groff, 1996). Some of these tools included: written materials sent via postal mail, cable television, satellite, phone conferencing, or perhaps two-way video conferencing. Research focusing on traditional distance education has tended to focus on student outcomes, student attitudes, and overall student satisfaction (Phipps et al., 1998) and not on underpinning pedagogic strategies or programmatic objectives. Where pedagogic strategies have been analyzed, they were examined more from the perspective of how face-to-face lecture modes and delivery methods could be reproduced through some form of video technology (Jones, 2000). In sum, much of the available research evaluated only traditional distance education delivery methods.

Yet most researchers agreed that these traditional methods did not function optimally in environments relying heavily upon the usage of communications-based technologies (Blakeslee, 1998; Dede, 1996, 1998; Watson, 1997). Marshall (1997) argued that in order to begin to understand why and how interactive technologies should be utilized, a "systematic and comprehensive evaluation" of existing and proposed methods must be conducted (p. 194). Further, "the temptation with any new technology too often is to apply it uncritically which, in the end, works to the detriment of both the technology and the purpose it was intended to serve" (p. 293).

These newer forms of delivering education that focused on the utilization of communications-based technologies had been called various names including "virtual classrooms," "networked classrooms," "virtual campuses," and "virtual universities" (Harasim & Stephen, 1996). Early adopters of these newer forms of delivery incorporated such technologies as electronic mail, the World Wide Web, and synchronous chat (Groff, 1996). To distinguish courses and programs that utilized such methods from traditional distance education delivery models relying on video, this researcher provided an operational definition for online delivery. Courses and programs that *significantly rely* at least sixty percent upon interactive, communications-based technologies for delivery were referred to as engaged in distributed, distance learning (DDL).

Early adoption of DDL tended to focus on the transference of face-to-face methodologies to technology-based ones. This was evidenced by the terms used to describe these technologies: terms such as networked classrooms and virtual universities seemed to argue for a virtual representation of their in-real-life counterparts. Whether these technologies and methods significantly differed or were the same as traditional face-to-face ones remained largely unstudied (Harasim & Stephen, 1996).

Relatively little agreement regarding online pedagogic strategies, existing technologies, and credible design for DDL could be found in extant literature (Harasim & Stephen, 1996). Johnstone (1997) attempted to define "what are the instructional design principles that make distance learning most effective" (p. 55), referring in particular to what she termed "telecommunicated learning." She argued persuasively that a critical component of any tele-mediated distance education program was its design. Yet she wondered whether such programs were actually designed and whether those designed were designed well (1997).

In summary, in Distributed, Distance Learning two major areas needed elaboration and clarification: (a) identification of existing online pedagogic strategies and technologies, and (b) an evaluation of these strategies and technologies in use.

The Study

In order to address the need to evaluate distributed learning environments and determine optimal online tools and strategies, this research evaluated an existing Master's in Educational Technology at California State University, Sacramento delivered through Distributed, Distance Learning, known as the Internet-based Master's in Educational Technology, or iMET program. The iMET program is an innovative program designed to meet the need of educators who can guide teachers and students in utilizing the rich resources available through the Internet and other forms of technology. A cornerstone of the program is the recognition that candidates may live at a distance from the university, may be working professionals, may be raising families, and/or may be pursuing other interests. Founding faculty at CSU, Sacramento worked with trainers from the California Department of Education's California Technology Assistance Project (CTAP) as well as local and regional educational leaders to design a program that met the needs of schools, administrators, teachers, technology coordinators, and other educators. Hallmarks of the iMET delivery system include: building an active community of learners through a cohort-based program; a combination of 75% on-line and 25% face-to-face class meetings; coursework which is project-oriented, including innovative electronic portfolios focusing on reflective learning and review by peers and colleagues; and the application of proven teaching strategies as appropriate in both on-line and face-to-face instruction. Students are expected to apply coursework to their own particular context and environment. The portfolios demonstrate the emphasis on real world experiences and working in conjunction with local stakeholders.

In sum, the purpose of the study was to present research describing optimal approaches to delivering distributed, distance education based on a longitudinal evaluation of an

existing online program. Based on the research, the significance of technology tools, pedagogic strategies, and how they interact in distributed environments was studied.

For the study, a comprehensive, multiple stakeholder perspective was followed and data were collected from student surveys, faculty surveys, student interviews, student portfolios, and programmatic documentation. The student survey consisted of an eighty-five question survey with a combination of quantitative, open-ended, and demographic type questions. A total of fifty-eight students from three cohorts over two years completed the student surveys. The faculty survey consisted of a sixty-four question survey with a combination of quantitative, open-ended, and demographic type questions. A total of six faculty-members who taught in the program over two years completed the survey. The student interview consisted of open-ended questions based in part from preliminary findings from the student and faculty surveys. Four students from each cohort were randomly chosen for a total of twelve students to participate in the student interviews. One student chose not to participate in the interview. Student portfolios were the culminating requirement for the completion of the Masters degree. An analysis was performed on a random sample of student portfolios: six portfolios from each cohort. The analysis was divided into three major categories and twenty total subcategories and used a four-point grading scale to determine whether students met the objectives of the portfolio and therefore of the overall program.

The Empowerment Evaluation (Fetterman, Kaftarian, & Wandersman, 1996) methodology was used to triangulate data collected from these multiple stakeholders. This method was chosen because it approached evaluation from the standpoint of stakeholders and triangulated data from many different categories (Maykut & Morehouse, 1994). For example, when making recommendations, data was triangulated from student surveys, faculty surveys, and student interviews to ensure such recommendations were based on consistent data from multiple sources. The method was open-ended and easily customizable for many different programmatic needs. In addition, the method addressed concerns and approaches identified in the Review of Literature. The following data were studied:

1. Student and faculty surveys focusing on how technology tools were integrated into the iMET program;
2. Student and faculty surveys focusing on how pedagogic strategies were integrated into the program;
3. Interviews with a sample of students focusing on how technology tools and pedagogic strategies integrated and interacted in the program; and
4. Student surveys and interviews, faculty surveys, and an analysis of student culminating experience portfolios focusing on how the program met its goals and objectives.

Findings

As a result of the research, several significant findings were made. Findings were initially broken out by data set (student survey, faculty survey, student interview, and student portfolio). Upon analysis, it became clear that the most significant findings were

evident in at least two out of the three data sets. For the purposes of this paper, minor findings uncovered in only a single data set (e.g., from just the student surveys) were not reported. Only the most significant findings found in multiple data sets were herein included. These findings included:

- The availability of technology-based tools, such as online collaboration, electronic communication, and web publishing, made it more likely that students would participate compared to a traditional program in which students would have had to rely on face-to-face classes and paper and pencil assessment. Student and faculty data indicated students would more actively participate in discussions and meetings than if these tools were unavailable. One student stressed the importance of "appealing to the different style of learning of different students" and indicated that the tools used in the program made this possible.

- Faculty and students repeatedly mentioned the importance of the reflection process as a key component to student success in the program, referring specifically to the discussion group software as an important factor in the reflection process. Students were also more likely to comment on each other's work, providing critical feedback and suggestions for modification. Students commented that the ability to easily share and comment on work provided for richer, stronger overall products.

- Students were more likely to see connections to the "real world," noting specifically that assignments were based on solving problems within their own "locus of control" and "where the rubber meets the road." Students consistently indicated that problem-based, collaborative assignments taking advantage of the tools available provided a direct connection to "real world" problems and were useful in their professions. When referring to work produced for the program, one student commented "I actually use it with my 6th graders."

- Flexibility in the learning environment was provided by the availability of multiple tools. Many tools were considered critical for successful learning in an online environment. Students viewed the usage of asynchronous and synchronous tools as equally important, each appealing to a particular learning style, such as discussion and collaboration for synchronous and reflection for asynchronous tools.

- Face-to-face interactions were determined to be the most critical component in the online learning environment. At first, this conclusion seemed counterintuitive. That the success of distributed, distance learning was dependent upon face-to-face interactions seemed to be a less than ringing endorsement for distance education. However, a consistent complaint of existing online courses and programs was the heavy dropout rate. Yet the iMET program had significantly lower dropout rates not only for online courses, but even compared to the traditional Master's programs.

- The inclusion of face-to-face interaction, especially for the purpose of building community, was a key success factor for the program. Students and faculty, even those initially wary of too much face-to-face time, strongly endorsed the inclusion of face-to-face time in online learning environments, especially at the onset of the program. The face-to-face retreat and renewal meetings created a sustainable community. Students did not feel isolated in the iMET program. This was due in large part to the community-building activities which the students repeatedly stated sustained their ability to interact and collaborate with peers during long periods of working online without face-to-face meetings. No student indicated a desire for less face-to-face time.

- Students and faculty indicated overall satisfaction with the program. Students indicated that they would not have enrolled in the program had it been offered in a traditional format; thus, the university was able to attract students who would not otherwise have matriculated.

Conclusions and Discussion

As a result of the study and based on the research findings, several significant conclusions were drawn. These conclusions were triangulated and reported only if evident in at least three out of the four data sets. The four data sets included: (a) student surveys, (b) faculty surveys, (c) student interviews, and (d) an analysis of student completed Masters portfolios. A discussion of six major conclusions follows.

#1 Technology tools in distributed environments should appeal to multiple learning styles of students. Critical tools included: synchronous environments, asynchronous environments, and web-based content. Technology tools enhanced learning, creating an environment often superior to traditional formats.

Faculty and student data consistently indicated the importance of using **technology tools** that appealed to a wide range of learning styles. Participants identifying themselves as "visual learners" appreciated the ability to access curriculum and content presented in graphic formats. Participants identifying themselves as "social learners" appreciated the ability to collaborate online with peers in real time chat discussions. Participants identifying themselves as "readers and writers" appreciated the ability to work asynchronously and publish to discussion boards. Although many participants indicated a preference for a particular technology tool (e.g., discussion board over chat), no single technology tool was preferred by the majority. In other words, data did not indicate a clear "winner" for a particular online delivery method. The various methods for delivering online instruction were appreciated nearly equally. Upon analysis, these methods were divided into the following categories: (a) synchronous environments, (b) asynchronous environments, and (c) web-based resources.

#2 Appropriate strategies in distributed environments included: processing content, discussing content, problem-solving through collaboration, reflecting, and building a community of learning. Learning in a social context was critical to the success of online learning.

Faculty and student data also consistently indicated the importance of using **strategies** that appealed to a wide range of learning styles. As with technology tools, participant data did not indicate that any particular strategy was more important than any other. Although many participants indicated a preference for a particular strategy (e.g., problem-based learning over reflection), no single strategy was preferred by the majority. In other words, the various strategies mentioned were appreciated nearly equally. Upon analysis, these strategies were divided into the following categories: (a) processing content, (b) discussing content, (c) problem-solving through collaboration, (d) reflecting, and (e) building a community of learning. Additionally, collaborating and community-building were consistently indicated as the most significant factors contributing to student success by both students and faculty alike.

#3 *Face-to-face interaction was crucial for establishing a community of learning.*

Faculty and student data consistently indicated the importance of face-to-face interaction for establishing the bonds necessary for student collaboration and success throughout the program. This conclusion seemed to be one of the most significant. Many students that initially expressed skepticism and even reluctance for having to travel to the university for even a minimal amount of time per semester later lamented the paucity of overall face-to-face time. In short, students that did not initially even want to participate face-to-face consistently desired to have even more face-to-face time with their peers throughout the program. Student comments indicated that face-to-face time was important for establishing connections not only with peers but also faculty members.

#4 *Tools and strategies complement each other, including using web-based media for processing content, using synchronous tools for discussing content, using synchronous tools for problem-solving through collaboration, using asynchronous tools for reflection, and using synchronous tools and face-to-face interaction for building community. The utilization of specific tools with appropriate strategies deepened student understanding and strengthened their ability to solve complex problems.*

When defining optimal delivery methods for online learning, data revealed certain strategies worked best with certain tools. Figure 1 provides a graphic representation of how these tools and strategies interacted. Figure 1 displays the most effective tools and strategies and their interaction. The tools that students consistently determined to be most critical were: (a) face-to-face interaction, (b) synchronous communication, (c) asynchronous communication, and (d) web-based content. The strategies students consistently determined to be most effective were: (a) discussion, collaboration, and community-building, (b) reflection, and (c) assessment. The diagram displays how these tools and strategies typically interacted in the program. Recorded information, in the form of synchronous chat logs, asynchronous discussions, web-based content, email communications, multimedia presentations, and even face-to-face meetings, could be processed in many ways using the tools available. *Certain* tools worked best with *certain* strategies. For example, discussions, collaboration, and community-

building were best conducted using synchronous tools or face-to-face interaction, while deep reflection was best accomplished using asynchronous tools.

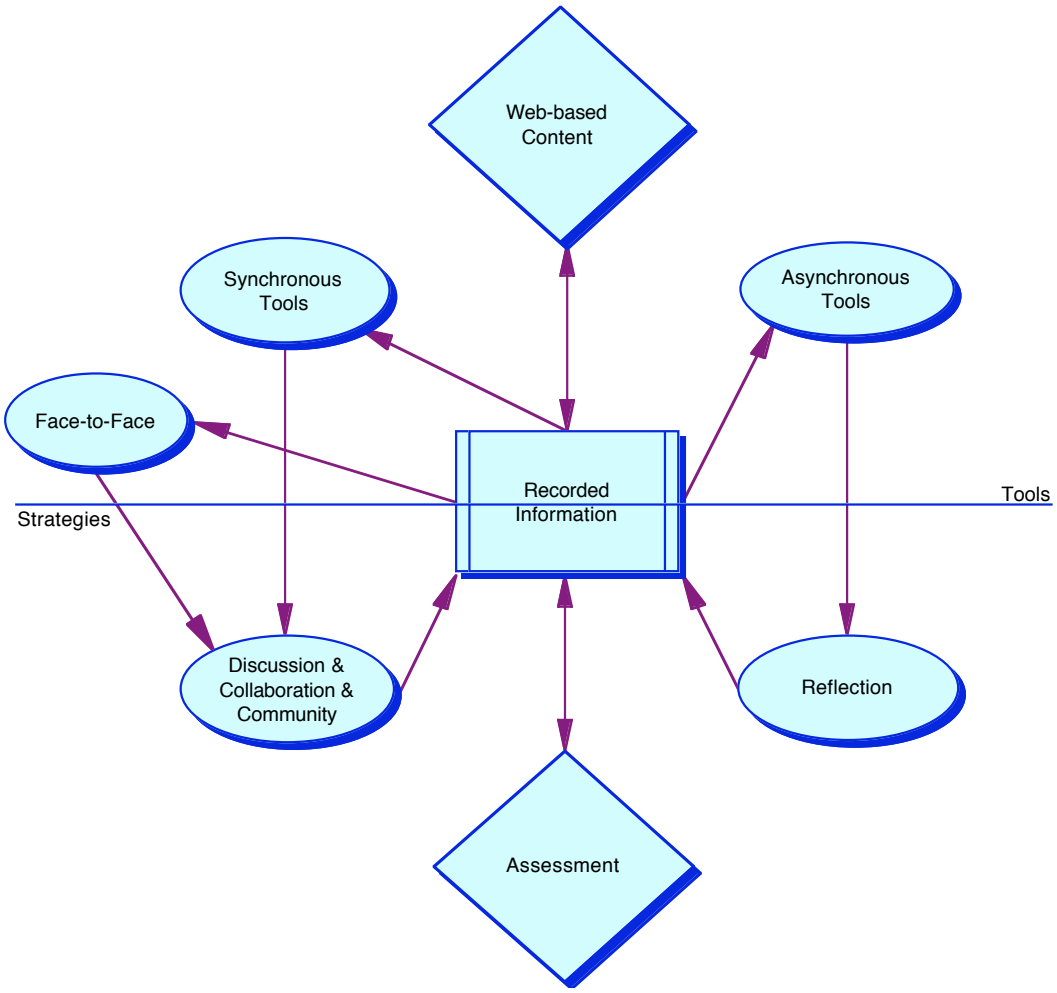

Figure 1: A model for understanding the interaction of tools and strategies.

#5 *The evaluation revealed the program met goals and objectives. The evaluation determined more than just students were satisfied; it determined why students were satisfied. Students operated in a powerful, flexible environment where they could engage in complex problem-solving within a community of practice using sophisticated tools and sound strategies.*

Overall, data indicated not only were students and faculty members satisfied with the tools and strategies embedded within the delivery model, but that the entire environment was optimally designed to ensure the greatest chance for student success. The high completion rate and review of student portfolios further indicated that graduates benefited from a program that while flexible was also demanding and adhered to high standards for scholarly excellence.

#6 The program ultimately produced graduates with sound research skills, strong leadership and staff development capabilities, and solid understanding of how technology can best be integrated into teaching and learning.

Finally, a follow-up study along with the analysis of graduate portfolios indicated graduates not only met the objectives defined by the program (e.g., ability to conduct practitioner research, understanding of complex technologies and their adaptation in teaching and learning) but also that graduates were finding new or modified positions as educational technology leaders (e.g., school or district staff development specialists, community-college instructors, county-office technology specialists, part-time university instructors). The methods embedded within the program created a strong enough community of learning that graduates still communicate regularly via email lists and occasional face-to-face get-togethers as of the time of the writing of this paper.

NOTE: The iMET program is fully-accredited by the Western Association for Schools and Colleges (WASC) as a program in which more than 50% of the coursework is delivered via distributed, distance education. The program combines 25% face-to-face and 75% online technologies. Visit http://imet.csus.edu for more information.

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