

Face-to-Face versus Online Coursework: A Comparison of Costs and Learning Outcomes

[Terry Herman](#) and [Savilla Banister](#)
Bowling Green State University

Abstract

This study documents the transformation of a graduate-level course for teachers that had traditionally been taught in a face-to-face (f2f) model, in multiple sections, at a large university. By designing the course for online delivery and developing various interactive multimedia modules, the university was able to offer the course at a considerable savings while maintaining quality. The faculty worked in close collaboration, strategizing creative solutions to maintain the academic rigor and integrity of the course. Student papers and projects were analyzed and compared from both the f2f and online versions of the course to determine academic quality and learning outcomes.

The impetus for offering an increasing array of online courses at the postsecondary level has been growing at a remarkable rate (Kearsley, 2000; MacKinnon & Aylward, 1999; Presby, 2001; Simonson, Smaldino, Albright, & Zvacek, 2003). Although there is considerable debate about whether the primary reason for such a drive is economic rather than pedagogical, researchers are engaged in exploring how learning outcomes are achieved in e-learning environments (Stacey & Rice, 2002). This particular study presents evidence of positive learning outcomes achieved in an online graduate course and delineates correlations between student achievement and course design. Taking a design-based research approach (Baumgartner et al., 2003; Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003), we focus on the process of learning, as well as the factors of the online course design that impact student learning. In addition, data collected document the cost and labor savings that can be generated in moving a course to online delivery, while maintaining a high level of academic rigor.

This study explores pedagogical issues related to an online graduate course in curriculum theory and practice from the perspective of teacher and learner. Data collected and analyzed for this unique critique include scoring rubrics for projects and papers completed by students in both the f2f and online versions of the course; enrollment and cost analysis records for both delivery methods for the year 2004; archival records of course online chats; instructor virtual office hours; and student group discussion forums. Instructor and student reflective journals, conversational interviews, and midterm and final student course evaluations also inform the discussion.

The course, called *The Curriculum*, was traditionally offered throughout the year in 16 sections, both on and off campus at Bowling Green State University (BGSU), with a total enrollment of nearly 300 students. Because this course is required for all students seeking masters degrees in Curriculum and Teaching, Classroom Technology, and Administration and Supervision and is chosen as an elective by many graduate students in other disciplines, it was a high-enrollment course with the potential of being used throughout the state as a core course for teachers and school administrators continuing professional development. By redesigning the course for Web delivery and developing interactive, multimedia modules that could also be used in f2f instruction, this course could reach on-and-off campus audiences more efficiently, reducing costs by decreasing the number of faculty needed to deliver the course while also increasing enrollment. The redesign moved the course to an online model while maintaining high academic quality, as evidenced by student performance.

This study documents the results of redesigning a graduate course for in-service teachers for Web delivery. The challenges encountered during the course redesign are explored and discussed in the following section. Research methodology, strategies employed for design engagement, student learning outcomes, summary of results, and conclusions follow, as well.

The Challenge of Redesign

Attempting to relocate a high-demand, graduate-level course from a f2f mode of delivery to a completely online environment was riddled with complications. The purpose of this course, *The Curriculum*, was to provide an introduction to the foundational areas affecting the design and development of curriculum. These foundational areas include the history, social forces, philosophy, and psychology behind many of the curriculum practices and issues existing in schools today, as well as the nature of the curriculum development process. As a result, the course was designed to increase the learner's awareness of the field of curriculum and to introduce specific skills in design and development.

This course was in high demand. All Ohio K-12 teachers must earn a masters degree, and this course is required for BGSU's masters in education degrees. Because many off-campus cohorts were a part of these degree programs, faculty members were traveling 30 to 60 miles to teach this course, with enrollments of 15 or less, at times. By redesigning this course using the online model, the course could be offered for 30 students in a section, combining cohort students and on-campus students.

The online model still followed the academic calendar and was offered during the fall, spring, and summer sessions. Eventually, the course may move completely to the online model. This type of redesign would allow for fewer sections, fewer faculty members, and increased enrollments for the course, resulting in significant cost savings.

In order to facilitate and defend this migration (from f2f delivery to completely online delivery), effort was concentrated in two areas. The first entailed placing emphasis on designing an online course that was engaging and interactive while documenting this development. The second focused on ensuring academic rigor and tracking student learning outcomes, in comparison with the f2f model.

Research Methodology

This particular course was originally redesigned for Web delivery, supported by a grant from the National Center for Academic Transformation (NCAT; <http://www.center.rpi.edu/>). The focus of NCAT is to improve the quality of instruction in higher education, while demonstrating cost savings. NCAT instruments, including the Center for Academic Transformation Course Redesign Checklist ([Appendix A - 35K PDF](#)), were used in this course redesign to document these elements. Additional data sources supported the NCAT structure, but provided increased rich description of the student experience in an online learning environment and indications of student dispositions impacting their academic success. This article provides a foundation for subsequent manuscripts that will explore additional implications and conclusions drawn from this extensive data set summarized in Table 1.

Table 1
Data Set

Data Source	Analysis	Impact
Enrollment, Instructional costs	NCAT cost-per-student protocols	Cost savings
Student Course Assignments	Common rubrics for f2f and online sections	Learning Outcomes/Quality of Course Design
Online Discussions(8-10 during semester)	Thematic Discourse analysis	Learning Outcomes/Quality of Course Design
Email Correspondence(400-700 messages per semester)	Thematic Analysis	Dispositions for Online Learning/Quality of Course Design
Student Surveys (Likert-scale and open-ended responses)Pre, Midterm & Post	Descriptive statistics and thematic analysis	Dispositions for Online Learning/Quality of Course Design
Student Focus Group	Thematic analysis	Dispositions for Online Learning/Quality of Course Design
Student/Instructor Journals	Thematic analysis	Dispositions for Online Learning/Quality of Course Design

Design for Engagement

The course described herein was a graduate course traditionally delivered in a seminar format. Students were expected to read course assignments carefully in preparation for class discussions each week and actively led class discussions based on course readings.

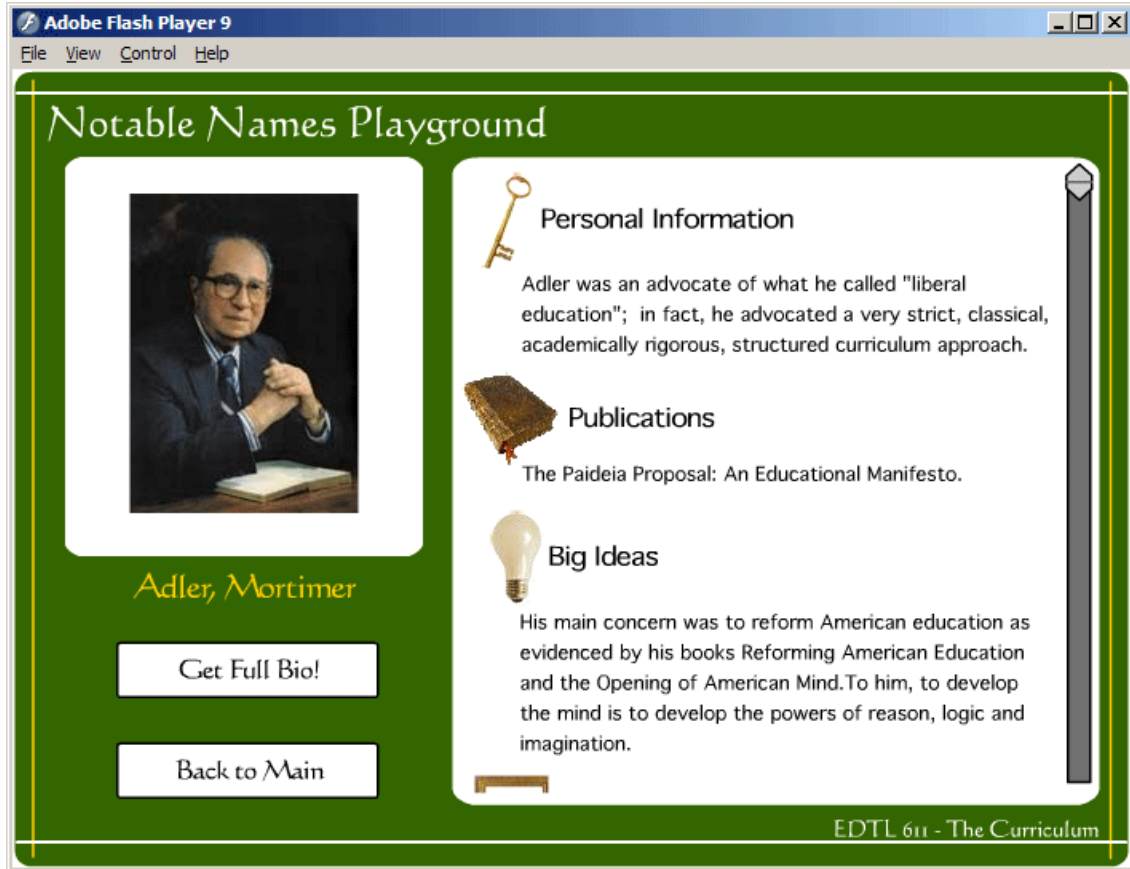
In addition, students completed a major project for the course, culminating in either a written research paper on a curricular topic or developing their own set of curricular materials. Instructors in the course evaluated student progress based on student responses and engagement in the conversations around the history, social forces, psychology, and philosophy surrounding school curriculum. Students were expected to demonstrate a mastery of these issues in their culminating final project.

In order to continue this type of Socratic dialogue around course texts and rigorous exploration of the issues inherent in the course, the redesign was carefully crafted to evoke authentic student engagement with the material. Some of this engagement was accomplished through well-designed online discussion forums that posed provocative questions and divided students into small groups or teams, rotating leadership responsibilities. In these types of forums, the instructor “lurked” and rarely intervened directly in the forums, allowing students to grapple with the issues presented in an open exchange (see <http://edhd.bgsu.edu/~sbanist/611/sampledisc.html> for a sample post and rubric used to evaluate online discussions). Once a discussion was completed, the instructor posted a general response to all the forums, giving specific feedback to various groups, but not individuals. (Individual responses, when needed, were sent via e-mail, and not to the class as a whole.)

Although structuring these types of forums can effectively nurture student learning, additional online activities were also integrated to further stimulate interest and comprehension of the course material. To accomplish this, several interactive, multimedia modules were included in the course redesign. The course redesign team first researched existing software resources, online resources, and textbook supplementary materials to determine if such interactive, multimedia elements existed relating to the course content. It was argued that, whenever possible, pre-existing resources should be used in the redesign to save development costs. Some open-ended resources such as Seeing Reason, a concept mapping tool, (<http://www.intel.com/education/seeingreason/>), or resource banks such as the Catalyst Ohio Resource bank (<http://www.ohiorc.org/cor/>) and Merlot (<http://www.merlot.org/>) were mined for possibilities, but yielded no usable elements. The decision was made to create specific interactive multimedia modules for the course.

The design team expected to develop additional interactive, multimedia modules for this course that were not currently available, and plans had been drafted early on. These modules provided students with mini-lectures in digital video and/or Flash-based audio/presentation-slide hybrid models. Activity modules were created that allowed students to manipulate and sort information related to curricular issues. For example, pictures, biographic data, and curricular philosophies of approximately 30 curricular theorists were housed in a Flash-based module (see [Module 1](#)). Prior to working with this module, students were to view a “Mini-Lecture” video explanation by a professor (see [Video 1](#)). Students were prompted to match the appropriate theorist with their curricular theory and received feedback on their responses. Students were able to use the module multiple times, until they were able to correctly identify all theorists. Instructors were also able to review the work of students to determine student mastery of this material.

Another module provided students with a virtual chat environment in which each member took on the identity of one of the previously studied curriculum theorists. The students then conducted a conversation to solve a selected problem based on their assumed identity. This virtual role play activity forced students to think more creatively about the theories they were studying and gave the instructor substantive evidence of misunderstandings or misinterpretations.



(Click on image to view Module 1)

Because of the interactive elements embedded in the course redesign, various learning styles were accommodated. The discussion forums provided opportunities for students to question and refine ideas and concepts presented in the course readings. Digital video mini-lectures and animated presentations, combining the instructor's voice-over explanations with presentation slides, allowed students to review course materials from the instructor's perspective in a format similar to a f2f lecture environment. The various interactive, multimedia activities embedded in the redesign online model of the course gave students immediate feedback on their responses and time to repeat and revisit the modules as often as they liked. This type of learner control encouraged individualized progress as the course proceeded.



(Click on image to view Movie 1)

Online delivery of the course was facilitated through Blackboard, BGSU's course management system. Most students were already quite familiar with this interface, and

students new to the system were provided with numerous support mechanisms to ensure their comfort and efficiency in the online educational environment. Students received login and navigational instructions via e-mail and paper mailings. Links and download instructions for any plug-ins (e.g., QuickTime, Flash, Acrobat, etc.) needed were provided and were accessible for those using assistive technologies. Students were informed about personal workstation's multimedia capabilities required to access course multimedia. Technical help was also provided through the Student Technology Center, BGSU's support structure for students using technologies. This organization houses online tutorials (written and video) on its Web site and provides face-to-face tutoring if students came to campus for assistance. The university's distance education department offered a variety of supports for students, including a help desk, written and online Frequently Asked Questions (FAQs), and animated tutorials.

Staff from these entities provided technical support for teachers and students from the time enrollment occurred until a course was completed. Because the course presented here was a media-rich environment, the staff assisted in audio/video format issues, assuring that files were converted and uploaded in open source formats whenever possible. Quick links were provided to facilitate student downloading of any needed plug-ins or applets, and the course shell, itself, had an area dedicated to troubleshooting these types of issues. CD-ROM or DVD copies of course media files were also provided to students who requested this media option.

Student Learning Outcomes

As the online redesign was occurring, faculty members collected assessment data across traditional and redesign sections in order to document student learning in the course. To ensure consistency across course delivery options, the same assignments and scoring rubrics were used. The following paragraphs describe the process of chronicling student learning outcomes associated with the course.

As a graduate-level course, assessment of students has always relied heavily on student performance tasks. Specifically, in this curriculum course students have produced a course of study evaluation, a curricular trends reaction paper, an ideology reflection, a textbook analysis, and final research paper. To obtain data on student learning from the traditional and redesigned course sections, the evaluation plan focused on the final research paper. During the pilot phase, data from the final research paper were collected from parallel sections of the course. A common rubric was developed and used for traditional sections of the course during the spring of 2004, allowing faculty to practice applying the criteria and aligning their standards. Interrater reliability was determined during this process, as faculty members separately scored student work and met to compare and discuss disparities. Some of the criteria for the common rubric included clarity, breadth, and depth of coverage, academic writing style, and use of extensive bibliography that includes both print and Web sources. Once faculty members were able to reach a consensus on scoring these items, they were able to grade student work consistently from both the face-to-face and online sections of the course.

During the first semester offering of the course, data from the redesigned course (1 section, 43 students) and traditional sections (3 sections, 52 students each) were collected in the summer of 2004. Two faculty members used the common rubric to score each research paper. In other words, each research paper was scored twice. Faculty members compared scores and worked to resolve any variance in scoring, clarifying the rubric and processes. Results from this process were shared with all core faculty members, in order to assure standardized scoring on future research papers. Results from the piloted

parallel sections were used in the data analyses. Preliminary results indicated no significant differences in the learning outcomes of online vs. f2f students.

In addition to assessing student learning by this plan, data were collected via online, secure student surveys to determine the quality of student services and support offered throughout the course delivery ([Appendix B](#) - 35K PDF). A discourse analysis thematic coding rubric based on Bloom's Taxonomy (1956) was also employed in the assessment of discussion forums ([Appendix C](#) - 21k PDF). The following paragraphs delineate the impact of the design decisions on student learning. Table 2 summarizes the discussion.

Table 2
Discussion Summary

Design Elements of the Course	Impact on the Learner
Clear expectations and instructions	Lessened anxiety; increased student sense of self efficacy
Weekly patterns of assignments and activities (and assessment of these)	Supported self-regulation and ability to consistently complete course assignments
Timely feedback	Maintained focus and minimized confusion
Quality materials (text, online readings, multimedia modules)	Introduced to challenging and provocative discourse
Weekly small group discussion forums	Clarified content, generated practical connections, built community

The design decisions made by the instructor of the course clearly had an impact on the learning experiences of the students. Most of the students were apprehensive about taking a course online and were skeptical of their abilities to be successful. However, the clearly articulated expectations and instructions provided by the instructor had the effect of lessening anxiety and increasing students' sense of self-efficacy. One student commented, "I now know exactly what is expected from me, which eases some anxiety." Another student shared, "Overall, it (the course) was an excellent experience. For most of us the online experience was a new one but the professor went out of her way to help with the technology aspect..." These comments convey the positive effect clear expectations and instructions had on the students.

Another design choice influencing students' level of success in this online course focused on establishing routines of study. The weekly patterns of assignments and activities (and the assessment of these) resulted in students developing self-regulatory practices. These habits allowed the students to complete course assignments consistently in a timely manner and progress steadily through the course. The consistency of expectations supported students in developing a comfortable pace of reading, discussing, and project work.

Timely feedback was another element of the course design enabling student success. Again, because students were new to the online environment, they were uncertain about their performance in the class. This insecurity was compounded by the lack of some academic performance cues normally present in a face-to-face environment. Students did not have a good sense as to how others in the class were doing on assignments, not being privy to their projects and grades, so instructor feedback was even more critical. Eighty-nine percent ($n = 17$) of students agreed with the statement, "This instructor provides

prompt and constructive feedback to students regarding their performance in this course.” Eighty-three percent agreed with the statement, “The instructor for this course provides avenues for communicating with students as questions arise.” These responses were gathered from the midterm survey, and similar responses were received on final course evaluations. Students were appreciative of the guidance and explanations given in relationship to their academic work. This feedback helped them remain focused and productive in their efforts.

High quality course materials were also essential to students’ accomplishment of course objectives. Selected texts and online articles and resources challenged students’ thinking and served as catalysts for engaging discussions. Ninety-four percent of the students responded, “the required readings for this course are challenging and provide a foundation for student learning and course activities.” The scholarly discussions in which students participated were inspired by the assigned readings and instructor guiding questions. One student summarized, “The course was content rich and gave numerous opportunities to apply theory to our classrooms.” The perceived relevance of the material also added to the student interest and investment in the course. A student shared, “I thought this course made me very accountable for my work. The reading and assignments were well related and worthwhile.”

Finally, the small group structure of the course not only provided a venue for productive discussions, but also supported the development of community. Students got to know the members of their group and built relationships that transcended the academic realm of engagement. One student noted that the greatest strength of the course included “learning about different curricular materials from others in the class.” The small groups enabled students to clarify assignments and make practical connections between the course material and day-to-day classroom teaching. Students developed strong relationships with members of their group, even though they never met face to face.

The Bottom Line

Although we believe that enrollment for this course will continue to grow as a result of this redesign, the primary cost reduction strategy was to reduce the number of sections offered and to increase the section size. In so doing, we necessarily reduced the number of faculty members needed to teach the course. In 2003, 293 students were enrolled in the curriculum course; these students were enrolled in 16 sections over the three terms (fall, spring, summer). Fall and spring sections enrolled over 20 students per section, while the summer sections averaged about 14 students per section, with one section enrolling only seven students. Eight sections of the course were offered in the summer to accommodate the many cohort programs off campus. Redesigning the course for online delivery reduced the number of sections to 12. In 2003, the course costs calculated to \$280.53 per student. The course cost dropped to \$123.20 per student when four sections of the online model were offered and would drop to \$103.60 per student if the course eventually moved to a complete online model. This is a substantial savings, considering an enrollment of nearly 300 students each year in this course. The online delivery method allowed students from various off-campus cohorts to take the course together, increasing section enrollments, and saving faculty from traveling to remote locations for this class. In addition, several university Visual Communications Technology students assisted in developing the interactive multimedia modules for the course as part of their graduate studies. This approach provided the project with high-quality multimedia products, without additional development costs.

Conclusions

This innovative course redesign process has yielded several positive results. Continued faculty professional development has been offered as core faculty developed assessment criteria and course materials for the redesign of the course. Stimulating conversations continue regarding the development of interactive multimedia to support all sections of the course, and faculty members have committed to continued collaboration in the design process. Visual Communications Technology students continue to serve as the technical designers of these deliverables, as the faculty plays the role of client. This model is one that efficiently and effectively uses university resources, while providing authentic experiences for multimedia students. This process has succeeded in providing an online course that engages students in the learning process, supports strong student learning outcomes, and provides significant cost savings to the university. Maybe online education can be a win-win-win scenario, after all.

References

- Baumgartner, E., Bell, P., Brophy, S., Hoadley, C., Hsi, S., Joseph, D., et al. (2003). Design-based research: An emerging paradigm for educational inquiry. *Educational Researcher*, 32(1), 5-8.
- Bloom B. S. (1956). *Taxonomy of educational objectives, Handbook I: The cognitive domain*. New York: David McKay Co Inc.
- Cobb, P., Confrey, J., diSessa, A., Lehrer, R., & Schauble, L. (2003). Design experiments in educational research. *Educational Researcher*, 32(1), 9-13.
- Kearsley, G. (2000). *Online education: Learning and teaching in cyberspace*. Toronto: Wadsworth.
- MacKinnon, G. R., & Aylward, L. (1999). Six steps to improving the quality of your electronic discussion groups. *Journal of Instruction Delivery Systems*, 13(4), 17-19.
- Presby, L. (2001). Seven tips for highly effective online courses. *Syllabus*, 17.
- Simonson, M., Smaldino, S., Albright, M., & Zvacek, S. (2003). *Teaching and learning at a distance: Foundations of distance education* (2nd ed.). Upper Saddle River, NJ: Merrill Prentice Hall.
- Stacey, E., & Rice, M. (2002). Evaluating an online learning environment. *Australian Journal of Educational Technology*, 18(3), 323-340.

Authors' Note:

Terry Herman (hermant@bgsu.edu) and Savilla Banister (sbanist@bgsu.edu)
Bowling Green State University