
AC 2011-1368: HOW EDUCATIONAL INSTITUTIONS CAN HANDLE MORE STUDENTS WITH FEWER FACULTY MEMBERS

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Preparation for Online Teaching and Actual Practices for Technology-Oriented Courses

Introduction

East Carolina University received a University of North Carolina System General Administration grant that focused on the development of a delivery model for large online courses. “A Pilot Project for Scalability of On-Line Classes in Technology Systems” was developed to meet the growing demands of online courses in the Bachelor of Science in Industrial Technology (BSIT) program. Enrollment in this degree completion program for Associates of Applied Science (AAS) graduates has grown from 170 students in 2005 to 451 students in the fall of 2008 with a large percentage of these students taking their courses online.

The goal of this project was to develop a delivery model that met the needs of this growing population while insuring quality in both teaching and content. Within the delivery model, a Learner Manager was identified as the content expert and Content Integrators were identified as day-to-day facilitators of the course. The pilot project had to investigate how to deliver the content and manage the course throughout the semester. Also, assessment of the pilot program was needed to make sure that the quality of education was of high standards. The preliminary stages were conducted during the summer and the fall 2008, while the implementation of the model was conducted in spring 2009.

Bachelor of Science in Industrial Technology

The Associates of Applied Science (AAS) degrees were once considered terminal degrees and developed for people seeking technical skills to join the workforce. Students in community colleges who wanted to transfer to a four year institution would seek an Associates of Art (AA) or Associates of Science (AS) degree. East Carolina University developed a pathway for graduates of AAS degree programs to receive their four year degree without having to start completely over. The Bachelor of Science degree in Industrial Technology (BSIT) can be completed either face-to-face or totally online.

The BSIT has seen dramatic growth over the last three years. In 2005, there were 170 students enrolled in this program. This number has drastically increased to 451 students in the fall of 2009 with a majority of the students taking their classes online. Enrollment is expected to increase and this does not take into consideration recruitment of military personnel, employees at industrial and technical companies, and community colleges outside of North Carolina. The growth in enrollment is not only in this program but across East Carolina University as well.

East Carolina University has committed both resources and time to the development of distance education programs. The university is a recognized leader in distance education within the state of North Carolina, with 45 degree programs and 27 certificate programs offered online at both the undergraduate and graduate level. In the fall of 2000, ECU enrolled 1,160 online students. By spring, 2009 that number had ballooned to 8,804. These numbers include both true distance education students – students that only take courses online – and on-campus students that because of schedule or other reasons, take an online section of a class as opposed to the face to face version. Distance education continues to grow at ECU, both in terms of headcount and semester credit hours produced. In the course of one year, from spring 2008 to spring 2009, the semester credit hours produced online grew by 15 percent – a substantial figure.

This growth is not only happening at ECU, but nationally as well. It is reported that during the 2006-7 academic year, there were 12.2 million distance education enrollments in post secondary institutions (Parsad & Lewis, 2008). This is a staggering number as it was reported during the 2000-2001 academic year; there were only 2,876,000 in distance education college courses (NCES, 2003). Of course, the result of this growth is that more online sections of courses have to be offered, and there will inherently be a pedagogical and administrative struggle for the university to accommodate these students without adding faculty or sacrificing quality. A new delivery model was needed to meet the anticipated student enrollment in the BSIT program that would maintain quality while maximizing university resources.

Meeting the Online Growth Demands

The research on how educational institutions are handling the growth of online enrollments is minimal. Burruss, Billings, Brownrigg, Skiba, and Connors (2009) remarked on class size and “minimal research at the postsecondary level” (p. 38). The authors go on to say that the number of online students is increasing and with a shortage of faculty class sizes are increasing. Colwell and Jenks (2004) added “Faculty can face pressures from administration to “maximize” class sizes in online courses to make them more efficient or profitable” (p. 1).

There is concern from educators about the quality of education when class sizes are increased; however, the study found that students in online courses are generally satisfied regardless of the size of the class (Burruss et al., 2009). Colwell and Jenks (2004) stated that communication was somewhat sacrificed in large online classes and recommended that these classes “be staffed by faculty who are assisted by graders, graduate assistants and/or instructional designers to help them manage the burden” (p. 7). The authors go on to state that classes larger than 20 students should be split into smaller groups. More research needs to be conducted as the growth of online education increases and educational institutions try to manage the growth.

Delivery Model

The delivery model of our pilot study utilized a Learner Manager and Content Integrators to deliver instruction to four online sections of a writing intensive course with enrollment of 25 students per section. The course chosen for the project itself was Technical Writing; a course that all students enrolled in the BSIT program must take, regardless of whether the student is a face to face campus student, or an online student. Many of the online students

take this course in their first or second semester at ECU; thus it is a course that must be offered regularly and in increasing numbers. The course itself is capped at 25 students per section because it is a writing class. Students write one paper per week throughout the semester, with the papers growing longer and increasingly more complicated as the semester progresses. As a result, grading of the students work takes a considerable amount of the instructor's time. The Learner Manager for the project was the instructor of record for this course and was responsible for all of the content including: announcements, the syllabus, assignments, grading rubrics, exams, lectures and discussion prompts.

The course was delivered online. All the lectures were created using Camtasia which is a screen recording software providing visuals of Power Point slides and the lecturer's face and audio recording of the lecture. This allowed the Learner Manager to deliver all of the course lectures across the multiple sections. Word versions of the lectures were also available. There was a Content Integrator for each of the sections. The Content Integrators were PhD students in Technical Writing at East Carolina University and therefore content experts in the material being taught. The Content Integrators were responsible for grading all assignments, monitoring the discussion portion of the course, and answering day to day questions and concerns from students.

Prior to the beginning of the semester, the Learner Manager delivered training to each Content Integrator that included a review of the course , course materials, assignments and assessments measures and the course organization in the electronic platform, Blackboard. The course content was the same across all sections since the same Camtasia lecture was used in each section, along with the same assignments and discussion prompts. The authors also wanted to be assured the assessment of the course would also be the same. The goal was to minimize subjectivity of grading that can be inherent in a writing course; therefore each Content Integrator was provided detailed rubrics for each assignment and guidance in grading. The Learner Manager and Content Integrators also communicated regularly during the semester to assess progress and discuss any problems.

Cost Effectiveness

As enrollment continues to rise, universities need to investigate alternative methods of delivery to meet the demand in a cost effective manner. This is especially true in the current economic climate, as universities struggle to make do with shrinking budgets without impacting services to students. Currently eight sections of the pilot course are offered each semester servicing 200 students, but increasing demands will necessitate offering 10-12 sections a semester, servicing 300 students. In Table 1, a comparison of personnel expenditures for different delivery methods is shown.

Delivery Method	Full time faculty salary average at \$55,000 a year	Adjunct salaries at \$4,000 a section	Content Integrator salary at \$2,000 a section	Total Salary expenditure per academic year
3 full time faculty	\$165, 000	\$0	\$0	\$165,000
2 full time faculty and 2 adjunct faculty	\$110,000	\$32,000	\$0	\$142,000
1full time faculty and 4 adjunct faculty	\$55,000	\$64,000	\$0	\$119,000
1 Learner Manager (full time faculty), 12 Content Integrators	\$55,000	\$0	\$48,000	\$103,000

Table 1: *Comparison of yearly personnel costs*

The comparison is of 12 sections (a semester) of an online course over two semesters for a total of 24 online courses. For this comparison, full time faculty members are non-tenured or tenured track faculty teaching four classes a semester. Utilizing a Learner Manager and 12 Integrators saves \$23,000 to \$62,000/year over previous delivery methods.

Research Methodology

This current study examined students’ perception of quality of instruction and social presence in an online course. The participants in this study were students in an online undergraduate technical writing course. The study gathered survey data to address the following research questions:

1. Do students perceive the instruction in the online technical writing course to be of quality?
2. Do students perceive social presence in the online technical writing course?
3. Do students from the regular size online technical writing course and students from the large size online technical writing course agree upon the perception of instruction?
4. Do students from the regular size online technical writing course and students from the large size online technical writing course agree upon the social presence?

Participants

Two groups participated in this study: undergraduate students enrolled in a regular size online technical writing course and undergraduate students enrolled in a large size online technical writing course. The regular size online course consisted of an enrollment cap of 24 students and these students were distance education students whom take all their coursework at the educational institution online. The large size online class had an enrollment cap of 96

students and consisted of both face to face students who were taking an online course and students who take all their courses online. The total possible population for the study was 120 (96 students in the large class and 24 students in the regular sized class) students.

Instrumentation

The survey instrument consisted of questions from other institutional surveys and distance education experts reviewed the final survey instrument for validation and reliability. There were eight questions in the quality of instruction section and five questions in the social presence.

Survey questions in the quality of instruction consisted of questions regarding, timely response to student questions, useful feedback on tests and assignments and enthusiasm in teaching the course. Participants were directed to select on the following: Strongly Agree, Agree, Neutral, Disagree, or Strongly Disagree. Additional questions targeted social presence which has been identified as a strong component in online student satisfaction. These questions consisted of items such as feeling comfortable participating and facilitation of online discussions. The survey concludes by asking for suggestions for improvement and other comments.

Data Collection and Analysis

Data was collected and usable responses totaled seven students from the regular size online technical writing course and 18 students from the large size online technical writing course. Descriptive statistics (frequencies and means) and correlated t-tests (t statistic and p value) were used to answer the research questions comparing the mean for the students in regular and large size classes for each question. These responses were analyzed using SPSS (Statistical Packages for the Social Sciences) software program and an a priori alpha level of 0.05 was selected as a threshold for statistical significance.

Findings

As noted for each question the respondent could answer one of the following: Strongly Agree, Agree, Neutral, Disagree, or Strongly Disagree. The responses were coded as follows: Strongly Agree=5, Agree=4, Neutral=3, Disagree=2, and Strongly Disagree=1. For each question, the means of the survey questions were calculated for the regular and large size courses. The mean scores for both courses were categorized into three levels, agreement (3.5-5.0), neutral (3.4-2.6) and disagreement (2.5-0.0). Results for quality of instruction are summarized in Table 1 and results for social presence are summarized in Table 2 and discussed in sections below.

The eight questions in Quality of Instruction could be subdivided into three sections. The first section covered the atmosphere of helpfulness and teacher enthusiasm in the course. An interesting point, the mean scores for both courses were over 4.00 indicating that these questions were viewed as agreement of quality in these areas. For Question One ($p=0.254$) and Question Two ($p=0.305$), this difference in perception between the different sized courses was not significant.

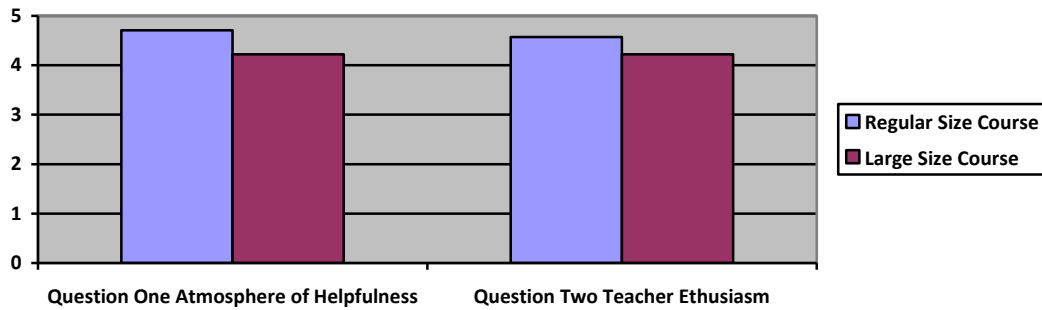


Figure 1: Questions One and Two for Quality of Instruction

The second group of questions in Quality of Instruction consisted of Questions Three through Six. These questions includes: the opportunity to ask questions, timely instructor response, course organization and delivery, and useful feedback on tests and assignments. The mean scores for both the regular and large courses are shown in Figure 2. The means for all four questions for both sized courses were well above 4.0 and indicate that there was agreement of quality for these questions. The p values for all questions (Question Three=0.235, Question Four=0.307, Question Five=0.421, and Question Six=0.068) did not indicate a significant difference between the regular and large size courses. However, Question Six (The instructor provided useful feedback when returning tests and assignments) did have a p value of 0.068 and showed there was a difference of perception but not seen as statistically significant.

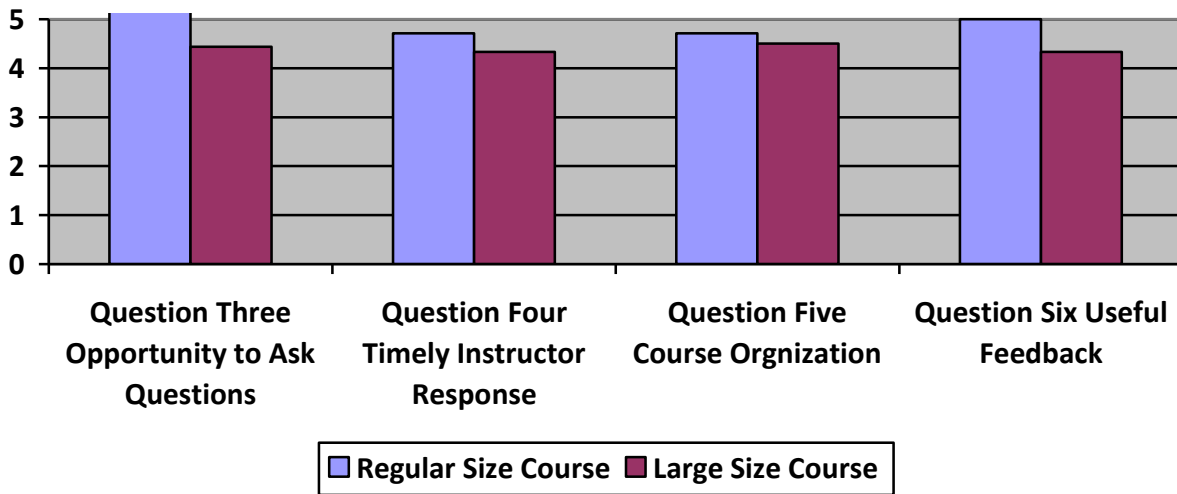


Figure 2: Questions Three, Four, Five and Six for Quality of Instruction

The final section of questions from the Quality of Instruction included questions on adequate technical support and having little technical difficulty in the course. The mean scores for both sized classes again were over 4.0 and are shown in Figure 3. This implies that there is

agreement of quality for these two questions. The p values (Question Seven=0.798 and Question Eight=0.582) confirms that there is no significant difference in perception of quality between the regular and large sized courses.

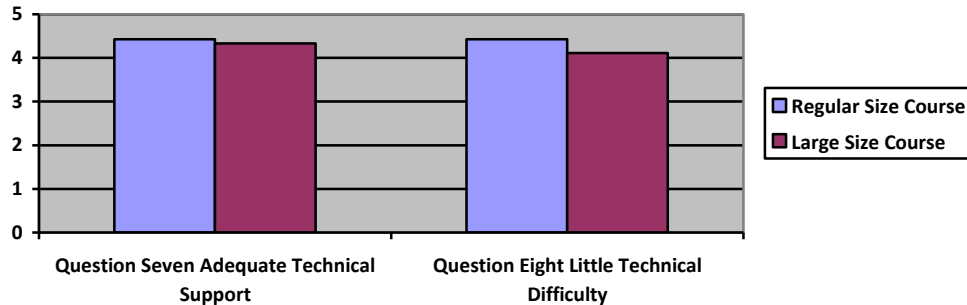


Figure 3: *Questions Seven and Eight for Quality of Instruction*

The Social Presence questions had five questions that were divided into two sections. The first section dealt with the student feeling as a member of a group and a sense of an online community in the course. The mean scores for both the regular and large sized courses were above 4.0 and were demonstrated agreement of social presence in the courses. The mean scores are depicted in Figure 4 below. The p value for Question One was 0.164 and 0.276 for Question Two indicating that there was no significantly difference in perception of social presence between the two groups for these questions.

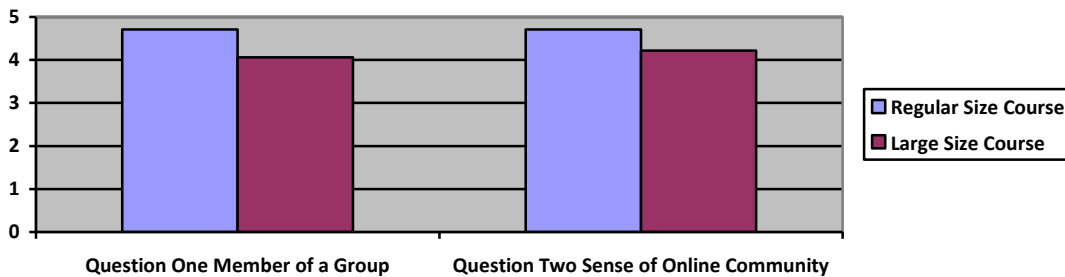


Figure 4: *Questions One and Two for Social Presence*

For the second section of social presence questions, the questions related to course participation comfort level, expressing opinions comfortably, and instructor facilitation of online discussion. The mean scores were above 4.0 as depicted in Figure 5 and indicate agreement of social presence in both courses. For Question 3 (p value=0.674), Question Four (p value=0.443) and Question Five (p value=0.458), this difference in perception was not significant.

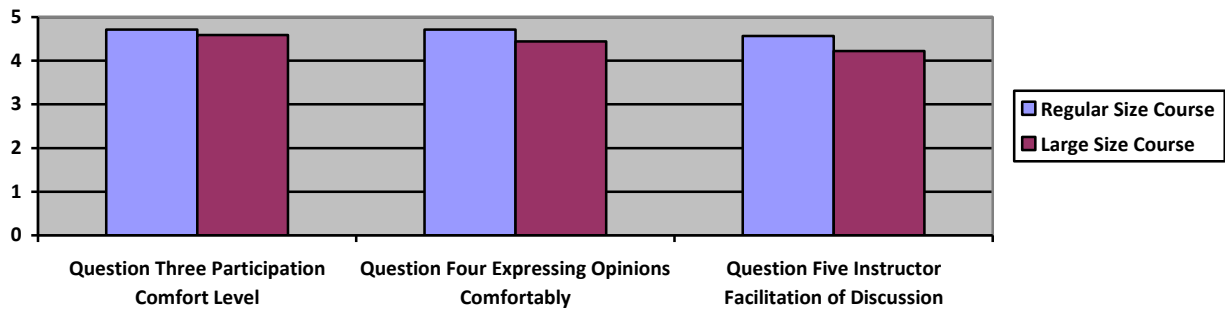


Figure 5: *Questions Three, Four, and Five for Social Presence*

In Table 2 in Appendix A, the mean scores for both the regular and large sized courses are shown for each question in Quality of Instruction area along with p values. It is interesting to note that in all eight questions, the mean scores for regular size course were higher than the large size course. However, the large size course's mean scores all were above 4.00, well above the level of 3.5 which was designated as minimum level for agreement. The highest mean score for the regular size course was Question Six with 5.0. Question Six referred to the instructor providing useful feedback when returning tests and assignments. The highest mean score for the large size class was Question Five (4.50) which asked the student if course content was well organized and delivered in an effective manner. The p value for Question Six (0.068) was not considered statistically significant but was lowest value of all the questions.

The mean scores for both the regular and large sized courses are shown in Table 3 in Appendix B for each question in Social Presence area along with p values. Again, all mean scores for the regular size course were higher than the large size course. Additionally, the large size course's mean scores were all above 4.00 which indicate agreement of social presence in the course.

Discussion of Findings

Four findings emerged from this study. First, both regular and large sized courses perceived quality of instruction in the online undergraduate technical writing course. Second, both regular and large sized courses perceived social presence in the online undergraduate technical writing course. Third, the regular and large sized courses agreed on the perception of quality of instruction in the course. And fourth, the regular and large sized courses agreed on the perception of social presence in the course. However, the authors note that the population was small and further research should be conducted.

1. Perceived Quality of Instruction. Regular size and large size course students both perceived that there was quality of instruction in the online undergraduate technical writing courses. Considering the level of categories (agreement (5.0-3.5), neutral (3.4-2.6), and disagreement (2.5-0.0), in all eight questions both courses mean scores were in agreement. The question that had the highest number of disagreement for both courses was Question Eight which asked the student if they had little technical difficulty participating in the online course.

2. Perceived Social Presence. Regular size course and the large size course students both perceived that there was social presence in the online undergraduate technical writing courses. All the mean scores were above the minimum for agreement (3.5) with the lowest mean score being 4.06 for Question One in the large size course.
3. Agreement on Perception of Quality of Instruction. There was concurrence between the regular and large size course students on the perceived quality of instruction in the online undergraduate technical writing course. There was no significant difference in perception of quality of instruction between the regular and large courses.
4. Agreement on Perception of Social Presence. There was concurrence between the regular and large size course students on the perceived social presence in the online undergraduate technical writing course. There was no significant difference in perception of social presence between the regular and large courses.

Implications

This study identified two implications that are listed below followed by a discussion of each implication.

1. Higher education institutions should consider this delivery model for their online courses. The growth in distance education has been increasing, and institutions have to meet these demands. This delivery model assists institutions in meeting the demand while maintaining quality of instruction.
2. During slow economic times, higher education institutions are being asked to do more with fewer resources. Even though most institutions attempt to cut back on auxiliary and administration services and maintain faculty and instructional services, this delivery model could assist institutions in maintaining quality instruction with fewer costs.

Conclusion

The course selected for this pilot project was an upper level technical writing course. This is important to note because of the subjectivity that is involved with writing intensive courses. The model developed for this pilot project included extra steps to insure that the grading of assignments was uniform across the different Content Integrators. The steps included specific grading rubrics, training, and sample test grading among the Content Integrators. Taking these additional steps would be important if this model was replicated in a writing course, where grading can become subjective and differ from instructor to instructor.

This model was successfully implemented in the writing intensive course and is replicable for these types of courses and other courses that have more objective assessment measures. This model is applicable across most online courses taught in higher educational institutions.

This new delivery model for large sections of online courses should provide a standard for higher educational institutions to pattern their online courses. The model utilizes technology to standardize the subject matter which should assist in assuring all students receive the same instruction. The grading rubrics should also minimize subjectivity of grading and control biases. The model also provides training and interaction among Learner Managers and Course

Integrators, which will provide for continual improvement of the model. Finally, the cost savings should be substantial and provide an economical option for managing growth in online courses and programs.

References

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APPENDIX A

	M	f	t	p	df
Question One			1.17	.254	23
Regular Size Class	4.71	7			
Large Size Class	4.22	18			
Question Two			1.05	.305	23
Regular Size Class	4.57	7			
Large Size Class	4.22	18			
Question Three			1.22	.235	23
Regular Size Class	4.86	7			
Large Size Class	4.44	18			
Question Four			1.00	.307	23
Regular Size Class	4.71	7			
Large Size Class	4.33	18			
Question Five			0.82	.421	23
Regular Size Class	4.71	7			
Large Size Class	4.50	18			
Question Six			1.92	.068	23
Regular Size Class	5.00	7			
Large Size Class	4.33	18			
Question Seven			0.26	.798	23
Regular Size Class	4.43	7			
Large Size Class	4.33	18			
Question Eight			0.56	.582	23
Regular Size Class	4.43	7			
Large Size Class	4.11	18			

Table 2: *Quality of Instruction*

APPENDIX B

	M	f	t	p	df
Question One			1.44	.164	23
Regular Size Class	4.71	7			
Large Size Class	4.06	18			
Question Two			0.43	.674	22
Regular Size Class	4.71	7			
Large Size Class	4.59	17			
Question Three			0.78	.443	23
Regular Size Class	4.71	7			
Large Size Class	4.44	18			
Question Four			1.12	.276	23
Regular Size Class	4.71	7			
Large Size Class	4.22	18			
Question Five			0.76	.458	23
Regular Size Class	4.57	7			
Large Size Class	4.22	1			

Table 3: *Social Presence*