Perceived Satisfaction and Demonstration of Learning Using Online Assessment with Traditional Undergraduate and Online Graduate Students

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Abstract

Online Washington State University master's degree engineering and technology management students and University of West Florida traditional undergraduate electrical and computer engineering students use Blackboard and D2L, respectively, for learning management systems (LMS) for online assessments. Both sets of students completed an online multiple choice assessment and then completed the same survey which covers student preferences regarding functional satisfaction, online versus traditional assessments, and perceived demonstration of knowledge. The purpose of the research is to provide a preliminary explorative comparison of perceived satisfaction and demonstration of learning using online assessment between traditional undergraduate and online graduate students. Overall the online graduate students' results followed the similar trends with traditional undergraduate students. All the students found their respective online assessment system easy to use and access. The majority of the students preferred online to handwritten exams; however, approximately half of the WSU students perceived that they could have demonstrated their knowledge better in a traditional assessment.

Background

Master's degree students in the online Engineering and Technology Management program at Washington State University (WSU) enrolled in EM 580 Quality Control and Reliability use Blackboard for LMS assessments. The course is delivered live via Blackboard Collaborate where students can interact with each other and the professor using audio, video, and chat features. Because the course is taught online, it lends itself well to online exams in Blackboard. Thus, the WSU students chose to be in an online program and would expect online assessments. On the other hand, senior electrical and computer engineering students at the University of West Florida (UWF) who enrolled in EGN 4950 Capstone 1 use D2L (formerly Desire2Learn) LMS as a supplement to a traditional lecture based course. While the undergraduate students in EGN 4950 have all had many experiences with D2L because it has been frequently used in their previous coursework and their coursework includes required courses that are taught online as well as traditional lecture based courses, they did not specifically enroll in an online program.

Although the WSU and UWF students employ different delivery methods, both use online learning management systems for assessments. To the authors' knowledge, no research exists that explicitly attempts to compare how traditional undergraduate students compare to online graduate students in their feelings about using online assessments and if they feel that they were able to show the depth of their knowledge with an online assessment compared to a traditional in-class paper assessment. Therefore, the purpose of the research is to provide a preliminary explorative comparison of perceived satisfaction and demonstration of learning using online assessment between traditional undergraduate and online graduate students comparing the ordinal data results from the same survey.

Introduction

Traditional classroom learning may be greatly supplemented with online resources which could help overcome the common misconception that online learning is a solitary, self-paced, non-instructor led activity[1]. Using a traditional face-to-face lecture retains the social and participation aspects that are a key factor in the success of online learning[2] while gaining the technological advantages of instant feedback and resource materials available form online homework packages. The 2010 meta-analysis performed by the U.S. Department of Education[3] found that, on average, students in online learning conditions performed modestly better than those receiving face-to-face only instruction. Moreover, incorporating online learning could help address the Sloan-C quality elements including: learning, cost effectiveness, institutional commitment, access, and faculty and student satisfaction[4].

Although the successes and student opinions of online learning are well established, the fact that the students in the present study are from different levels with delivery methods could illuminate differences in perception about using online assessments. Therefore, a survey was constructed to compare how online graduate and traditional undergraduate students' felt about using online assessments for their respective discipline specific class.

Methods

Both the EM 580 WSU students and the EGN 4950 UWF students completed the same survey after completing an online assessment via their respective online learning management systems. The non-anonymous Likert Scale survey is shown in Figure 1. The questions only deal with their experience with Blackboard/D2L and not with the performance of the professor or student in class. Thus there was no need to make it anonymous, and the students volunteered their names with the survey. The survey asked questions relating to the following aspects of online assessments: functional satisfaction, online versus handwritten exams, and perceived demonstration of knowledge. All "questions" are actually statements that the student must express their strength of agreement or disagreement. Students that either strongly agree or agree with the statement would respond with a 1 or 2, respectively and students that disagree or strongly disagree with the statement would respond with a 4 or 5, respectively. A response of 3 means the student feels neutral and neither agrees nor disagrees with the statement.

1 is strongly agree, 2 is agree, 3 is neutral, 4 is disagree, 5 is strongly disagree.

Functional Satisfaction Questions

_____ 1. Blackboard/D2L was easy to use.

_____ 2. The Blackboard/D2L website was always up and running when I needed it.

_____ 3. I would recommend using Blackboard/D2L for exams to others.

Online vs, Traditional Assessment Questions

_____ 4. I preferred using Blackboard/D2L to complete my exam over traditional handwritten exams.

_____ 5. The immediate grading and feedback provided in Blackboard/D2L is important to me as a student.

_____ 6. I would prefer that all of my classes made use of Blackboard/D2L or a similar online assessment system.

Perceived Demonstration of Knowledge Questions

_____ 7. I feel like I was able to show my depth of knowledge as well online in Blackboard/D2L than I would have with traditional handwritten exam.

_____ 8. Knowing I was going to take the exam online in Blackboard/D2L made me feel more confident that I would do well on the exam than if I had known it was a traditional handwritten exam.

_____ 9. I feel like I did better on the exam because it was in Blackboard/D2L than if the exam consisted of traditional handwritten exam.

Figure 1. Survey assessing student experience with online assessments.

Results

Twenty-three EM 580 WSU students and twenty-four EGN 4950 students participated in the survey after an online assessment. Figure 2 shows the percentage of EM 580 students who agreed or strongly agreed with each question, and Figure 3 shows the same information for EGN 4950 students.
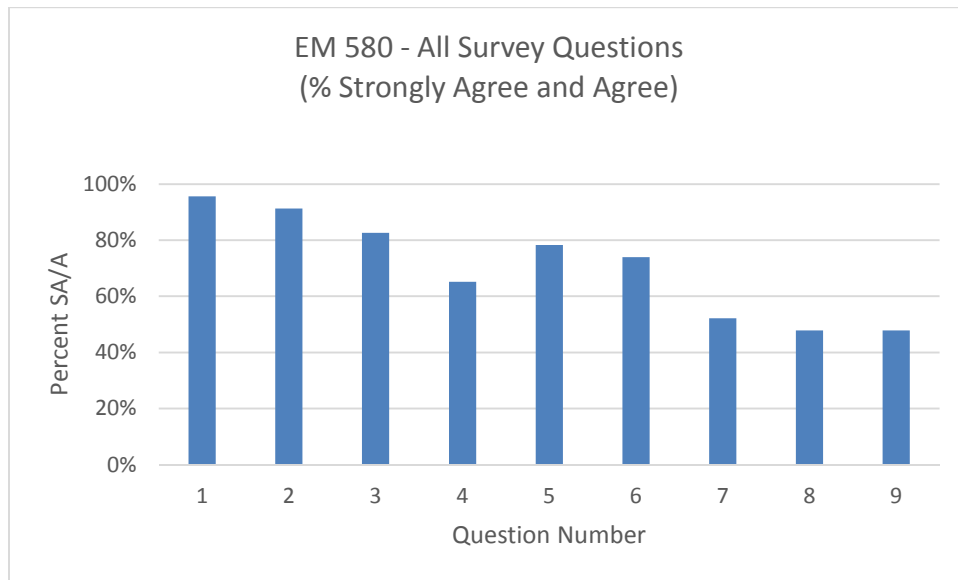
Figure 2. Percentage of EM 580 students that agree or strongly agree with each survey question.
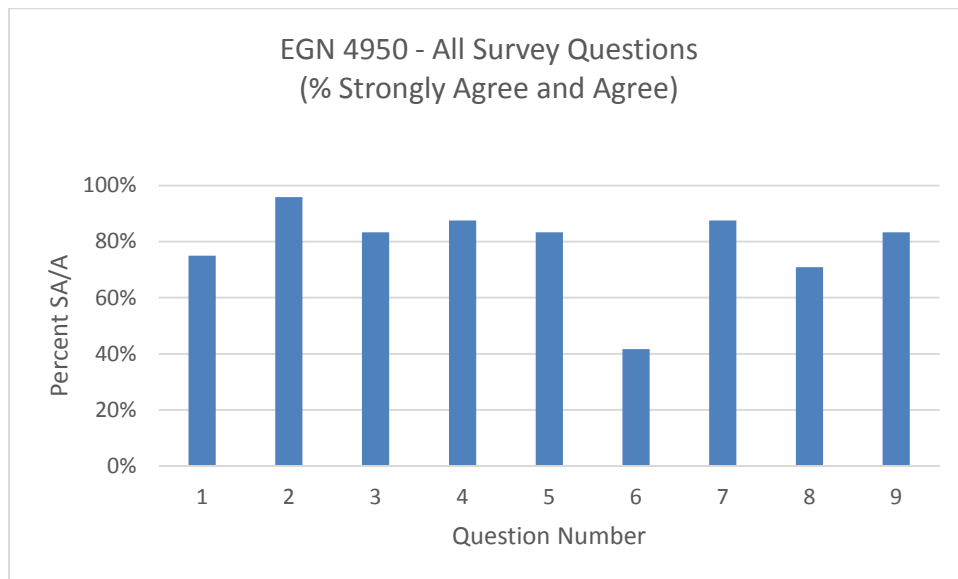

Figure 3. Percentage of EGN 4950 students that agree or strongly agree with each survey question.

Grouping the results by question category in Table 1 shows an average of 90% of the EM 580 students agree that the online system is functionally satisfactory. A slightly lower percentage of the EGN 4950 students agree on the overall functionality (85%). Next, an average of 72% of the EM 580 students preferred online to traditional assessments which was very similar to the EGN 4950 cohort (71%). The only major difference between the two classes was the percentage of students who wanted all of their classes to use an online learning management system. The majority of students in the traditionally delivered program at the University of West Florida did not want all of their classes to use an LMS for assessments. Lastly, an average of 49% of the EM

580 students perceived that they demonstrated their knowledge of the subject matter better using the online assessment as seen in Table 1. These scores were higher for the EGN 4950 group.

Table 1: Average level of positive agreement grouped by question category.

Question Category	Average level of Positive Agreement EM 580	Average level of Positive Agreement EGN 4950
Functional Satisfaction	90%	85%
Online v. Traditional Assessment	72%	71%
Perceived Demonstration of Knowledge	49%	81%

Discussion

The survey results were analyzed by calculating the percentage of students that agree or strongly agree to each question. Because Likert survey data is ordinal in nature, it is inappropriate to use most parametric testing procedures[5].   Although many authors ignore this distinction and erroneously apply parametric methods to Likert survey data, the results of parametric testing on ordinal data cannot be properly interpreted.

The data from Figures 2 and 3 indicate that most students "strongly agree" that their online assessment was easy to use and access from questions one and two.   Table 1 shows a high agreements (90% and 85%) with being satisfied with the functionality of the online assessment system.   The majority of WSU students (72%) of the class preferred online to traditional assessments which is interesting because they have chosen to enroll in an online master's degree. This mirrors the 71% of the UWF class that also preferred the online to the traditional assessment. The UWF students did not agree to the statement that they wanted all assessments online. Slightly less than half of the WSU students (49%) felt that the online assessment allowed them to demonstrate their knowledge as well as on a traditional assessment. The UWF students strongly agreed that this particular online assessment was better at demonstrating their knowledge than an in-class assessment.

Conclusions

Although this is preliminary data intended to explore differences in perceived satisfaction and learning between online graduate and undergraduate traditional students, the survey results suggest that all the students found their respective online assessment system easy to use and access. The majority of the students preferred online to handwritten exams, and both groups of students

generally hold a favorable view of online assessments which is consistent with the findings of most other research[6] with the exception that half of the WSU students perceived that they could have demonstrated their knowledge better in a traditional assessment.

Bibliography

1. J. Bourne, D. Harris, and F. Mayadas, "Online engineering education: Learning anywhere, anytime," *Journal of Online Education,* January 2005.
2. Richardson, J.C., and Swan, K., "Examining Social presence in Online Courses in Relation to Students' Perceived Learning and Satisfaction," Journal of Asynchronous Learning Networks , Vol. 7, No. 1, 2003, pp.68–88.
3. U.S. Department of Education, Office of Planning, Evaluation, and Policy Development, "Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies*,"* Washington, D.C., 2010.
4. Moore, J.C., "Elements of Quality: The Sloan-C Framework", Needham, MA. Sloan-C, 2002
5. Jamieson, S., "Likert scales: how to (ab)use them," *Medical Education,* Vol. 38, 2004, pp. 1217-1218.
6. A Mayadas et al., "Online education today," *Science* 323: pp. 85–89, January 2009.

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