

SCREENCASTS AS A LEARNING RESOURCE TO ENHANCE A QUANTITATIVE BUSINESS METHODS COURSE

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ABSTRACT

The challenge of teaching the required Quantitative Business Methods course is the diversity of Excel and quantitative skill levels of the students. Some students are able to keep up with the course assignments while others become frustrated and fall behind. Screencasting is a technology that is used to capture each action a user is performing on their computer screen accompanied by audio narration describing what the user is doing on the screen. The screencasts were used to demonstrate Excel lessons and example problems for the class. Screencasts were recorded outside of class and posted to the course management site. Student survey results indicated that the majority of the students who viewed more than 25% of the screencasts found them to be helpful for completing the homework assignments, staying up to date in the course, studying for the tests, and completing the course project. Technical difficulties were encountered downloading and viewing the screencasts by the students. Further study of the effectiveness of the screencasts is suggested. To overcome the technical difficulties that were encountered by using the course management system to post the screencasts, students could be provided with a CD-ROM of the screencasts at the beginning of the course.

JEL: A2; C88

KEYWORDS: Screencasts, Podcasts, Lecture recordings, Camtasia studio

INTRODUCTION

Quantitative Business Methods is a required course in the business program for management, marketing, finance, and accounting majors. The challenge of teaching the required Quantitative Business Methods course is the diversity of Excel and quantitative skill levels of the students. The majority of the students in the business program are transfer students. The pre-requisite Statistic, Algebra, and Introductory Computer courses are taken primarily at community colleges. Most students have not taken an Excel course in over a year and some students have never taken an Excel course. Students have expressed concerns about the difficulty of the Quantitative Business Methods course, their Excel knowledge, and keeping up with the homework for the course.

The classes have 30-35 students making it difficult to give individual attention during the lab time. The classrooms that accommodate these students are physically large making it difficult for the professor to physically navigate the room to help students. Some students are able to keep up with the course assignments while others become frustrated and fall behind. To address the concerns of students about completing assignments and keeping up to date with the course the professor developed screencasts outside of class to provide a supplemental learning resource to help students. This paper reviews the experiences of a professor using screencasts during the fall 2008 semester to enhance the core business course Quantitative Business Methods.

The remainder of this paper is organized as follows. In the next section, the relevant literature is discussed. A discussion of the data utilized in the paper follows. Next the test results are presented. The paper closes with some concluding comments.

LITERATURE REVIEW

In this section, a review of the literature is provided. The literature review is organized as follows. First the literature related to computer aided instruction is presented. Next, more specific literature related to podcasts is discussed. Finally, a discussion of the mechanics of screencasts is presented and finally the literature related to screencasts is discussed.

Computer Aided Instruction

In the 21st century technology is a critical tool for enhancing the student learning experience. With the growth of distance learning courses computer aided instruction has become essential for enabling students understand course content and learn how to use software. However, computer aided instruction is not new. Early models date back to the 1950's (Bontempt, 2003). Initially computer aided instruction was viewed as a replacement for a teacher or as "skill and drill" instruction (Bontempt, 2003). Computer based instruction follows a student centered instruction model that is more effective than traditional classroom instruction because it allows students to learn at their own pace (Bontempt, 2003).

The level of student motivation can determine the outcome of computer aided instruction just as computer aided instruction can help motivate students with low levels of motivation for learning (Bontempt, 2003). Computer aided instruction that is supplemental to classroom instruction has shown significant increases in achievement across all disciplines (Kinzie, 1992). Newer technologies such as podcasts and screencasts are being used as part of distance learning and face to face courses as learning resources. The following sections will review the effectiveness of these types of instruction methods at universities worldwide.

Podcasting Lectures-An International Initiative for Universities Worldwide

A podcast is a digital media file that is distributed on the web using RSS (Really Simple Syndication Technology) a form of web syndication that identifies and retrieves new files when they are made from a source. A user subscribes to podcasts in which the content is automatically delivered to their computer (Winterbottom, 2007). Special research projects have been undertaken to study the effects of podcasting technology at universities worldwide.

Early uses of podcasting were by faculty at Georgia College and State University in liberal arts courses using i-pods starting in 2002 (GCSU, 2009). The use of the i-pods increased student engagement by having students create podcasts outside of class and post them to the course management system. During the 2005-2006 academic year the enrollment in these courses increased to over 40 new i-pod enhanced classes being offered (GCSU, 2009). Faculty found that the i-pod allowed them to "maximize higher order thinking in class by shifting less demanding tasks outside of class" (GCSU, 2009) with students having more critical thinking discussions in class (GCSU, 2009).

The IMPALA project was funded under the Higher Education Academy in the United Kingdom in early 2006 with partners including University of Leicester, Royal Veterinary College London, Kingston University and the University of Gloucestershire (IMPALA, 2009). The first outcome of the project was that podcasts needed to have a purpose within in the course to address a particular pedagogical issue. The podcasts were integrated into online courses and used as supplemental instruction for face to face courses. Some of the applications of podcasts generated by faculty who participated in the IMPALA project were providing summary lectures, recorded lectures, instructions for field trips, and giving feedback to students (IMPALA, 2009). Students used podcasts to generate their own content such as interviews of experts, documentaries of field work, and class discussions (IMPALA, 2009). The researchers learned that video works better than audio for practical-based learning such as providing instructions on how to use a

software program, field-based learning, and for visual-based learning such as laboratory session demonstrations (IMPALA, 2009). Video has the disadvantages that the file sizes are large and it will require a camera if there needs to be video of the instructor. Podcasts have the advantage of being reusable giving instructors the flexibility to update their work easily and share it with others (IMPALA, 2009). An instructor could develop a digital repository of podcasts for future use or of student work for assessment (IMPALA, 2009). The research showed that student-developed podcasts “promoted active, independent and collaborative learning” (IMPALA, 2009).

Universities in Australia, Canada, United Kingdom, and the United States are podcasting lectures for their students (Lee, 2007, Nie, 2008, Pinder –Groover, 2009; Winterbottom, 2007). In January 2006 Apple Incorporated marketed a software package called iTunes U to universities to host and manage online resources such as podcasts (Apple Incorporated, 2009). Universities that use iTunes U include Cambridge University, Oxford University, Stanford University, Harvard University, Texas A&M University, Massachusetts Institute of Technology, and Carnegie Mellon University. The company promotes the use of video and audio podcasts as allowing students to “study at their own pace, wherever and whenever they want” (Apple Incorporated, 2009).

At universities internationally faculty have had the same concern that student attendance would decline if in class lectures were recorded. However, this was not the case as recorded lectures had a minor effect on attendance (Copley, 2007, Gosper, 2009; Lane, 2006). Students worldwide have reported that they use the lectures to review the material, for exam preparation, for note taking, or when they can not come to class due to illness or emergency (Bongey, 2006; Copley, 2007; Harpp, 2007; Gosper, 2009). Students attend class because they like the classroom interaction (Copley, 2006; Gosper, 2009) and structure (Copley, 2006) of having face to face meetings. Even though the recorded lectures have had a minor impact on attendance students have reported viewing the recorded lectures instead of attending class on days when they only had one class, but not as a regular habit (Gosper, 2009). The studies of recorded lectures have focused on large lectures classes. Evidence from a Washington State University study indicates that students think recorded lectures are more appropriate for class sizes over 100 rather than for small classes of less than 50 students (Lane, 2006).

Podcasts were developed as supplemental materials for a Water Resources Management module from the Earth Sciences and Geography department at Kinston University (IMPALA Project Exemplar, 2009). The podcasts were 5-6 minute audio files that reviewed key concepts, introduced the next week’s lecture, and provided additional material, but did not repeat the lecture. Student feedback was assessed through questionnaires about their listening patterns of the podcasts and reasons for not listening to the podcasts. Student focus groups were also used to assess the podcasts. The feedback from the students about the podcasts was positive. Students found that “listening was easier than reading” (IMPALA Project Exemplar, 2009). The new tool increased their curiosity in learning as podcasting was a “new way of learning” and the students wanted to learn about how it works (IMPALA Project Exemplar, 2009). They liked having a summary of the lecture. The instructor found that it took up two hours to create a five minute podcast and would like to have students involved in creating the podcasts (IMPALA Project Exemplar, 2009).

Screencasts

Screencasting is a technology that is used to capture each action a user is performing on their computer screen accompanied by audio narration describing what the user is doing on the screen. Screencasting is well suited for software tutorials and demonstrating basic concepts (Educause Connect, 2006). It allows students to learn at their own pace in a self directed manner (Educause Connect, 2006). Screencasts are well suited for classes with students that have varying levels of proficiency with a subject. Students who would find the material remedial can choose not to view the screencasts while other students who find the

material very challenging can view them several times and rewind them when they need the information repeated (Kroski, 2009). This technology is effective for both visual and auditory learners as there is video and narration that is less complicated than written directions (Rethlefsen, 2009). Camtasia Studio and other screencasting packages allow for editing. When making a presentation using screencasting software the presenter is forced to perform the demonstration in a step by step manner describing every action they are performing on the screen. Users of the packages can edit non value added speech such as “um” or “uh” and wasted motions reducing the time and increasing the quality of the presentation beyond the level of an in person presentation (Undell, 2005).

The major advantage to screencasting is that lessons are delivered succinctly. Screencasts are different from recorded lectures, in that, they should not last more than 10 minutes (Costello, 2009; Whistlemedia.net, 2009). A screencast is intended to promote active learning. It should not contain any wasted speech or motions on the computer screen. Recording should take place using a professional headset microphone in a quiet area. Before recording it is recommended that the screen resolution be adjusted to 800X600 (Costello, 2009). In order to effectively deliver a screencast the instructor should script the lesson in advance. A written script may be prepared in advanced. The audio track should not be silent for more than 3 seconds (Whistlemedia.net, 2009) which can be accomplished through editing (Undell, 2009). Both the voice narration and the video can be edited. Screenshots and narration can be inserted or removed. Through editing Undell was able to reduce a 10 minute screencast to 3 minutes (Undell, 2005). Title slides are recommended to guide the user through the presentation (Whistlemedia.net, 2009). Callouts such as arrows can annotate the screen during the presentation to call the users attention to important features. After the screencast there are a variety of options for production. In academic settings screencasts are posted to course management systems or to blogs. Files are saved in a format compatible with the file size, resolution, hardware, and software for the users (Educause, 2006).

Traditionally students learned how to use library resources by trial and error, asking a librarian, or attending workshops offered by library personnel at the library. Screencasts were initially used primarily for library tutorials (Peterson, 2007). Librarians at Schwabe Williams, & Wyatt in Portland, Oregon and the Off Campus Library services at Indiana Wesleyan University’s Adult and Graduate Studies program have developed screencasts for instructional tutorials for searching online databases (Information Today, 2007). Screencasts were developed by the computer automation librarian at Schwabe Williams, & Wyatt for Endnote bibliographic software training and for demonstrating how cataloging such as adding a volume to a serial, creating a new copy, and how to change the location of an item is done (Information Today, 2007).

Washington State University has developed a database of 21 screencasts for its Tour and Tutorials page (Washington State University, 2009). Some of these resources are similar to those previously described including screencasts for specific types of database searches for books and articles by citation and creating endnotes. Other resources guide users on how to borrow an item through interlibrary loan, provide instruction about reliability, validity and authority of resources; and how to save preferred searches (Washington State University, 2009).

Creating screencasts is time consuming for librarians. Since there are many common user issues the Animated Tutorial Sharing project was started to promote the sharing of screencasts by librarians (ANTS, 2009). The ANTS project is sponsored by The Council of Prairie and Pacific University Libraries (COPPUL) which is a consortium of 20 Canadian university libraries located in Manitoba, Saskatchewan, Alberta, and British Columbia (COPPUL, 2009). During February 2009, the Library Information Literacy Online Network web was started to provide librarians with screencasts using open source software and wikis to share ideas.

Is computer based library training as effective as traditional classroom training? To answer this question Canadian researchers (Zhang, 2007) reviewed 10 studies of computer assisted instruction versus face to face instruction for teaching undergraduate students basic library skills such as library cataloging, interlibrary loan, and online searches. These studies were from the United States, Canada, and Australia. The researchers found that computer assisted training was equally as effective as face to face training for basic library skills to undergraduate students (Zhang, 2007). The implications of this research along with the COPPUL project are that having readily available online training for library users can potentially create library training that is more accessible for users who can not attend in person training. For students that need training for a specific skill while completing a last minute assignment having screencasts available for quick training may prove to be very valuable resource.

Faculty use screencasts to provide feedback to students on course work such as papers or projects (Educause, 2006). The majority of students preferred voice feedback to written comments on returned papers in a study of students taking a writing course (Still, 2006). Voice feedback provides a context for the student letting them listen to the instructor's criticisms about their paper (Educause, 2006; Still, 2006). Listening to an instructor giving feedback is more personalized similar to direct conversation with the instructor (Educause, 2006; Still, 2006). It enhances the connection between the student and the teacher especially for commuter students who may not feel as tied to the campus community (Kates, 1998). Podcasting was also shown to provide more personalized and effective feedback for participants in the IMPALA 2 project (Nie, 2006). The disadvantage of audio recordings is that they can be complex requiring the listener to concentrate and process the information (Still, 2006). The screencast is visual and provides voice narration. Unlike a voice podcast the student can see exactly what the teacher is criticizing and hear the instructor's feedback for reasons for the grade. The screencast eliminates the cognitive load that voice only feedback requires allowing the student to better focus their attention on how to correct their mistakes.

Research Studies about the Effectiveness of Using Screencasts for University Course Instruction

Research studies about the effectiveness of screencasting have been conducted in Australia, United Kingdom, and United States. Winterbottom (2007) developed a series of lectures for a second year environmental science course at the University of Stirling, a university in the United Kingdom (Winterbottom, 2007). Eight lectures were recorded outside of class using Camtasia Studio. The students completed a questionnaire about their access patterns and the effectiveness of the lectures. The majority of the students (85%) responded that they liked having the screencasts with 76% indicating that they would like to have more lectures delivered in this format (Winterbottom, 2007). Students had a tendency to fall behind in the course with "45% reporting that they accessed all or most of the lectures within a week of release, 34% started to access them regularly, but fell behind, and 21% only accessed them during final exams week" (Winterbottom, 2007). Students reported technical difficulties on the questionnaire, however, did not report them when they encountered them. The drawbacks to screencasting reported by the students on the survey were the time it took to view the screencasts and that it was easy to fall behind in viewing the lectures. The students enjoyed the flexibility of being able to view the lectures at any time rather than being constrained to the class schedule (Winterbottom, 2007). The author concluded that screencasts should be used as a supplemental resource for teaching the theoretical material of the course rather than a replacement for face to face teaching so as to use the class time for discussion and practical based teaching (Winterbottom, 2007).

In the United States, Pinder-Groover (2009) developed screencasts to supplement a large lecture course MSE 220, Introduction to Materials and Manufacturing. Several different types of screencasts were created. These screencasts included "explanations for topics that were identified by the students as unclear"; homework, quiz and exam solutions, and lectures (Pinder-Groover, 2009). Student's responses to an online questionnaire indicated that the majority of the students thought the screencasts were helpful

for “clarifying misunderstandings, to supplement the lecture material, and review for the exams.” Despite the student opinions that the screencasts were helpful in learning the material their screencast usage did not correlate with student performance (Pinder-Groover, 2009). Another study similar to the Pinder-Groover study also did not show improvement in student performance when mini-lectures were posted to the course management system, despite extensive student use (Harpp, 2004).

Researchers from Australia experimented with screencasts to determine whether they would be effective for students to learn BlueJ so that they could transition the skills they learned with BlueJ to writing JAVA code. The study found no significant effect of screencasts for learning BlueJ (Lee, 2008). The authors concluded that there needed to be follow-up research to determine whether there were other factors such as the students not being prepared to participate in the data collection for the study that contributed to the results (Lee, 2008).

Students have traditionally been expected to learn how to use software with textbooks that have screenshots and step by step directions. With this approach students often need individual or group support in order to use the software (Mount and Chamber, 2008). With larger class sizes providing individual attention to students is difficult for professors. Professors teaching at small colleges and universities often do not have a teaching assistant for the course making it more difficult to attend to the needs of individual students. At the University of Nottingham, Mount and Chambers encountered these difficulties with teaching students how to use Geographical Information Systems software using printed materials. Additionally, GIS software required geography students to understand discipline specific knowledge in order to grasp how to use the software. To overcome the frustrations that students were experiencing using printed materials, Mount and Chambers created 24 video podcasts to replace the 60 pages of paper based manual and 45 screenshots (Mount and Chambers, 2008). Instead of using paper manuals, the students viewed 136 minutes of video podcasts that were available as downloadable video podcasts or as streaming video on the WebCT course management site (Mount and Chamber, 2008). Students reported that the new method of instruction motivated them to become independent learners as they were able to learn at their own pace. The video podcasts had the effect of creating individual instruction without needing a staff member present to help the student. The rich media of the moving images and narration of the podcasts compared to the still images of the paper screenshots allowed them to learn the material independently so that they did not need help from the tutor (Mount and Chambers, 2008). These results are consistent with prior research by Durbridge that audio has the advantage over printed media by “adding clarity and meaning and motivating the student “by conveying a directly a sense of the person creating those words” (Durbridge, 1984).

The researchers noted that the video podcasts were not a “quick fix”, but rather part of a clear teaching strategy in which students had the skills and technology to use the podcasts (Mount and Chambers, 2008). The video podcasts were an effective instructional technique because they were less redundant and abstract than text materials allowing the learners to process the information more efficiently (Mount and Chambers, 2008). With increased learning efficiency and a more flexible approach to learning students became more motivated and engaged (Mount and Chambers, 2008).

Video podcasts have been effective in helping students prepare for laboratory sessions. The teaching staff at the Royal Veterinary College in London prepared narrated animated video podcasts about anatomical specimens of tissues and structure used for study during laboratory and practicum sessions. The specific topics for the video podcasts were selected by asking student focus groups to identify the topics that were most difficult. The 5 minute video podcasts were delivered through the course management system. The advantage to having the podcasts available before the laboratory sessions was that access to the specimens was limited on a personal and individual basis due to the class size in the modules. By having access to the podcasts, students were able to use their video i-pods to learn the material at a time that was convenient for them making it easier for them to prepare for laboratory sessions ahead of time (Cox,

2008). During the laboratory sessions students were able to use the staff and session time more efficiently as a result of the video podcast allowing them to be more prepared for the practicum (Cox, 2008).

Summary of Literature Review

All of the prior studies reviewed about screencasting and podcasting show that students worldwide in Australia, Canada, United Kingdom and the United States like the flexibility of being able to view them at their own pace. Having this convenience increases student motivation to learn. The cognitive load to understand screencasts and podcasts is less than reading printed materials as research has shown that children are wired to speak and listen, but not read (Lee, 2007). The screencasts do not necessarily correspond to an increase in performance, however, students do report that they like having them as a supplemental resource. Moreover, if the screencasts were not made available as a resource, students who miss class or do not have thorough notes may become frustrated and not complete the course. An individual student may not perform as well if they had not had this resource available, a variable which the research studies do not measure.

DATA AND METHODOLOGY

The professor created screencasts to demonstrate Excel lessons and example problems for the Quantitative Business Methods course. Screencasts were recorded outside of class using Camtasia Studio 6.0 software and posted to the course management site. The presentations were edited to remove wasted motions and unnecessary speech. Camtasia Studio supports high definition quality video for the web and mobile devices. It allows the user to capture full screen videos and zoom in on important actions that the user is performing. The screencasts files posted to the course management system were windows media files. The professor made four different sets of screencasts. These screencasts were screencasts that were Excel tutorials (13 screencasts), demonstrations of example quantitative analysis problems (6 screencasts), screencasts that reviewed the sample tests (3 screencasts), and screencasts that were posted to help students do their project (4 screencasts).

RESULTS

There were five criteria that were used to assess the learning outcomes achieved by the screencasts. The five criteria were: 1.) student feedback on a survey about the screencasts and other teaching techniques 2.) percentage of students submitting homework assignments during the fall 2008 semester compared to prior semesters 3.) quality of homework submitted during the fall 2008 semester 4.) number of hits to the course management site where the files were stored and accessed and 5.) test scores.

Criteria 1: Student Feedback Survey

A student feedback survey was administered during the middle of the semester to assess the effectiveness of the screencasts. Of the 28 students in the class 21 completed the survey and 14 of the 21 students said they viewed the screencasts outside of class. The survey was analyzed in terms of the entire class response, students who had viewed less than 25% of the screencasts, and responses of students who were regular viewers. A regular viewer was defined as a student who viewed at least 26-50% of the screencasts. Five students were classified as regular viewers. The major limitation of the survey was the small sample size.

Columns 1 through 4 of Table 1 list the topic of the screencast, the number of students who viewed the screencast, the percent of students from the entire class who viewed the screencast, and the percent of regular viewers who viewed the screencast. The most popular screencasts were the screencasts for the

Table 1: Screencasts Viewed by Students

Topic	Number of Students Viewing Screencast	Percent of Students Viewing Screencast	Percent of Regular Viewers Viewing Screencast	Percent of Students Claiming to Know Skill at Beginning of Semester-Not Regular Viewers	Percent of Regular Viewers Self Reporting to Know Skill at Beginning of Semester
Scenario Manager	9	64%	100%	6%	0%
IF Statement	8	57%	100%	12.5%	0%
Screencasts for Project	8	57%	100%		
Basic Formulas	7	50%	80%	69%	40%
Calculating Loan Payment	7	50%	100%	31%	20%
Absolute and Relative References	6	43%	100%	12.5%	0%
Using Goal Seek to Find Breakeven Point	6	43%	80%	6%	0%
Decision Making Under Uncertainty	5	36%	80%		
Screencasts for Sample Test	4	29%	60%		
Decision Trees	2	14%	40%		

This table contains data from the student feedback survey to determine which screencasts were watched by the students in comparison to their self reported Excel knowledge at the beginning of the semester. There are no figures reported in columns 5 and 6 for decision making under uncertainty or decision trees screencasts as the survey did not ask if students had prior knowledge about these topics. Multiple skills were included in the screencasts for the project and sample test so no data is reported in the 5th and 6th columns. A higher percentage of students who viewed 0-25% of the screencasts or did not view the screencasts self reported knowing Excel skills at the beginning of the semester than students who were regular viewers of the screencasts.

scenario manager, IF statement, and the project. These were screencasts that few students reported having prior knowledge about. However, the decision trees screencast, screencasts for sample tests and decision making under uncertainty were the least viewed and contained material specific to the Quantitative Business Methods course. It is speculated that since more class time was spent on these topics that students may have not needed to view the screencasts. The primary reason reported for not watching the screencasts by 71% of the students who did not watch the screencasts was that they learned the material in class or by using the textbook.

The data in columns 5 and 6 of Table 1 is being used to assess what percentage of the students who viewed a screencast in comparison to their prior knowledge of the skill at the beginning of the semester. There are no figures reported in columns 5 and 6 for decision making under uncertainty or decision trees as the survey did not ask if students had prior knowledge about these topics. These were topics that were specific to the Quantitative Business Methods course. Multiple skills were included in the screencasts for the project and sample test so no data is reported for prior skills in the 5th and 6th columns. It would be expected that students who already knew a particular skill would be less likely to view a screencast about that skill. A higher percentage of students who viewed 0-25% of the screencasts or did not view the screencasts self reported knowing Excel skills at the beginning of the semester than students who were regular viewers of the screencasts.

Table 2 is a summary of the percentage of students rating the screencasts as helpful or very helpful for completing the homework, completing the car decision case study, studying for the test, and staying up to date with the course that had viewed 0-25% of the screencasts, were regular viewers, viewed the screencasts for the project, and viewed the screencasts for the sample test. There were 9 students who viewed 0-25% of the screencasts, 5 students who viewed at least 26% of the screencasts, and 7 students who did not view the screencasts. The students who viewed 0-25% of the screencasts thought they were most effective for helping them do their homework as 88% of the respondents rated the screencasts as helpful or very helpful for completing the homework. Over 50% of the respondents who viewed 0-25% of the screencasts rated them as helpful or very helpful for completing the car decision case study, studying for the test, and staying up to date with the course. All of the regular viewers rated the screencasts as helpful or very helpful for completing the homework and staying up to date in the course.

Table 2: Effectiveness of Screencasts as a Resource

	Percent rated helpful or very helpful by 0-25% of viewers	Percent rated helpful or very helpful by regular viewers	Percent rated helpful or very helpful by respondents who viewed the screencasts for the project	Percent rated helpful or very helpful by respondents who viewed the screencasts for the sample test
Complete the homework	88%	100%		
Complete the car decision case study	55%	60%	75%	
Study for the test	66%	80%		75%
Stay up to date with the course	55%	100%		

Table 2 is a summary of the percentage of students rating the screencasts as helpful or very helpful for completing the homework, completing the car decision case study, studying for the test, and staying up to date with the course that had viewed 0-25% of the screencasts, were regular viewers, viewed the screencasts for the project, and viewed the screencasts for the sample test.

To specifically evaluate the effectiveness of the screencasts for completing the car decision case study and studying for the test the responses from respondents who viewed these specific screencasts were tabulated. There were 4 respondents who viewed the car decision case study and 8 respondents who viewed the screencasts for the project. The screencasts for the car decision case study and studying for the test were rated as helpful or very helpful by 75% of the respective respondents.

Criteria 2 & 3: Quality and Quantity of Homework Submitted

The percentage of homework submitted increased from 72% during fall 2007 to 76% and 75% for sections 1 and 2 respectively during spring 2008, to 84% during fall 2008 as shown in Figure 1. The increase may be due to the screencasts as 80% of the students who regularly viewed the screencasts reported turning in at least 90% of the homework compared with 71% of the students who never viewed the screencasts and 44% of the students who viewed 25% or fewer screencasts outside of class reported turning in at least 90% of the homework. Also, less class time was spent reviewing homework. More material was covered in the course during the fall 2008 than in prior semesters. Homework scores increased slightly.

Figure 1: Percentage of Homework Submitted

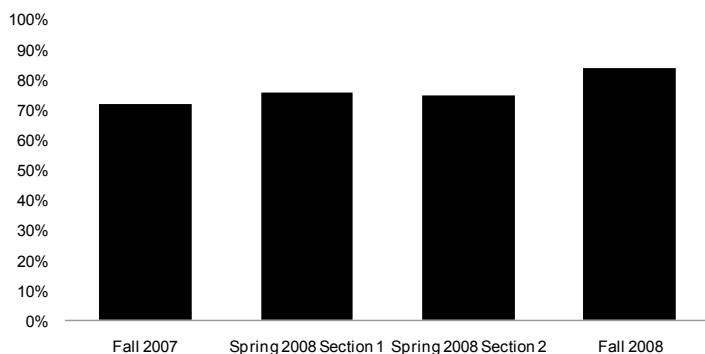


Figure 1 lists the percentage of homework assignments submitted during the fall 2007, spring 2008, and fall 2008 semesters for all students enrolled in the Quantitative Business Methods course. There were two sections of the course taught during spring 2008.

The homework assignments were assigned from the textbook used for the course. The textbook for the fall 2008 semester (Render, 2009) was a different book coauthored by the same authors as the book used during the previous year that was no longer in press for the fall semester (Balakrishnan, 2007). Since the new book used for the fall 2008 semester was written by the same authors some of the problems were identical to the problems used in the prior year’s book while other problems had similar concepts, but

different data. However, there was more supplemental Excel material in the textbook used during the 2007-2008 academic year. To compensate for the lack of Excel material in the new textbook, the professor included an Excel book as a course textbook for the fall 2008 semester.

The professor gave a similar number of assignments during all three semesters; however, the assignments were not identical. A supplemental Algebra review assignment was given during the beginning of all three semesters. There were supplemental introductory Excel assignments in the spring 2008 and fall 2008 semesters, but not the fall 2007 semester. The professor chose similar problems covering break even analysis, mathematical models, decision making, project management, and forecasting during all three semesters. The fall 2007 and fall 2008 semester class covered more linear programming topics than the spring 2008 semester.

The most notable increases in grades for assigned work was the project grades increased from an average of 79 to 87 from spring 2008 to fall 2008. The project was the same for the spring 2008 and fall 2008 semesters. The project grades account for 28% of the total grade.

Criteria 4: Number of Hits to Course Management Site

The professor calculated the average number of hits to files from the course management site to determine which resources the students were accessing the most. The average number of hits for PowerPoint files used for the lectures was 51, Excel files needed to do the homework assignments files was 43, the answers to homework problems was 32, and the screencasts was 19. The screencasts files had the lowest average access. The survey was anonymous; however, the course management system records gave the professor an indication of the percentage of students accessing the screencasts. The screencast files were being accessed in patterns that confirmed the results of the student survey about the percentage of students using the screencasts.

Technical difficulties were encountered downloading and viewing the screencasts by the students. The files had to be posted to the discussion section of the course management system instead of the course content section causing difficulty in locating the files. To further compound the access problem the students could not open the screencasts by clicking on the link. They had to save the file first and then open it. Since the files were windows media files students with Apple computers had to download the Windows Media player. To overcome technical difficulties encountered by using the course management system to post the screencasts students could be provided with a CD-ROM of the screencasts at the beginning of the course.

Criteria 5: Test Scores

The average test score for the first test was within 1% of the averages from prior semesters. The majority of the students that were regular viewers of the screencasts scored in the 80-89 range with one student failing the test and one student scoring above 90. The test followed a similar format having 20 multiple choice questions accounting for the 40% of the test followed by opened ended problems accounting for 60% of the test. The multiple choice questions were taken from the test bank provided by the publisher. The professor does not allow student to keep the tests. Open ended questions are reused on subsequent tests, but the tests are not identical. The professor has a bank of open ended question that have been adapted from the textbook and the test bank provided by the publisher. To prevent academic dishonesty, there are three different versions of the test given during a class period meaning that the tests given during the same class period are different for the open ended questions. The data is changed for the open ended problems keeping the concepts tested the same. The multiple choice questions and answers are scrambled. About 20% of the multiple choice questions are taken directly from the sample test. The open ended problems are similar to the sample test problems, but not identical.

CONCLUDING COMMENTS

Screencasts were rated by students as helpful for completing assignments and staying up to date with the course. Project grades and homework submissions grades increased from prior semesters; however average test scores on all three exams were similar to prior semesters. The improvement in student performance may be due to screencasts or other factors. Students who chose to view the screencasts are the students who self report lower Excel skill levels at the beginning of the course.

Technical difficulties were experienced most often by the students who viewed 0 to 25% of the screencasts. The most frustrating technical difficulty reported was not being able to open the screencasts. Further study of the effectiveness of the screencasts is suggested. To overcome technical difficulties encountered by using the course management system to post the screencasts students could be provided with a CD-ROM of the screencasts at the beginning of the course.

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