To Learn Or Not To Learn:
The Effect Of Educational Technology
On Learning In Accounting Courses

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ABSTRACT

Student preferences for interactive educational technology tools are explored in the context of accounting classes. A research study shows that students receive benefits from these active learning tools, and the tools can be used to enhance the educational experience of students while lessening the burden on instructors.

INTRODUCTION

Engaging students in the learning process can be a significant challenge, even when the subject matter is one that students care about. Combine that challenge with a rule-based, complex subject such as accounting and the task becomes even more daunting. It is not surprising, then, that accounting educators are seeking ways to use educational technology both in and out of the classroom to create an environment where active learning takes place. It's also not surprising that such resources are being developed and promoted by software companies and textbook publishers.

INTERACTIVE EDUCATIONAL TECHNOLOGY

The use of an interactive educational technology as a learning tool is supported by both behavioral and cognitive theory (Bryant & Hunton, 2000). Both theories support interaction as an important component of the learning process (Thompson et al. 1992). Behavioral theory suggests that timely feedback should contribute to learning, so educational technology that provides immediate feedback could enhance learning for accounting students. Cognitive theory suggests that active participation by the learner improves learning, so educational technology that engages the accounting student could also have a positive impact on learning.

However, Boyce (1999) cautions that while educational technology may be effective for learning basic procedural skills it may not help develop problem-solving and higher-order thinking skills. In addition, if students focus on the technology to the exclusion of other aspects of the course, they may sacrifice important learning opportunities. Where the technology frees time in the classroom, how this time is used can also affect learning. If the time is devoted to yet more content, where content is already overwhelming, even less learning may occur than before. However, deeper learning may occur if the time is used for reflection on existing content, and for analysis and critical thinking.

In fact, the success of educational technology as a pedagogical tool also depends upon the attributes of the learner, such as prior knowledge and motivation. More learning occurs when the student has prior knowledge of the subject being studied (Park and Hannafin, 1993), and when the student is highly motivated (Libby, 1995).

The results of existing research are mixed. Some studies find that educational technology has a positive impact on learning, while others find no effect (Bonham, Deardorff & Beichner 2002) or even a negative effect (Boyce, 1999).

ACCOUNTING APPLICATION

A specific web-based educational technology application was adopted for the fall semester in several introductory financial and managerial accounting classes, as well as some intermediate accounting classes, at a mid-sized private university. The application contains resources for both the instructor and the students. Instructor resources include tools to create classroom presentations and the ability to create assignments and quizzes for students that are accessed via the web. Student resources include access to these assignments and the entire text from any computer, as well as tutorials and quizzes that can be used for review. The assignments are graded by the application, and scores are posted to a gradebook. The instructor has options for each assignment, including the number of attempts students are allowed and the level of feedback provided during and after assignments are completed, such as links to the text or presentation of a correct solution.

In making the decision to adopt this technology, the faculty anticipated several benefits. Because students access the assignments using a unique ID and password, the assignments can be automatically graded, and points awarded for completion of homework. First, we expected this feature would encourage more students to complete assignments than if they were not graded – something instructors do not have time to do manually for each assignment in each class. Second, the students receive timely feedback about their performance on assignments – the assignment is immediately scored after each attempt, and answers that are correct are highlighted in green, while incorrect answers are shaded in gray. Multiple attempts allow the students to identify and correct errors right away, while a link to the text directs them to a discussion that can help clarify their understanding of a topic. Accounting students often become "stuck" when completing homework problems in the traditional paper and pencil way, and give up. Faculty believed that providing them with feedback while they are completing the homework, and allowing multiple attempts, would encourage them to finish more of the assignments. Third, because students are receiving feedback about assignments as they complete them, it would no longer be necessary to discuss and review each assignment during class, freeing class time for other learning opportunities. All of these factors could potentially enhance the learning process for students.

STUDY

A study was undertaken designed to evaluate whether students believe that this application enhanced their learning experience. Both qualitative (focus groups) and quantitative (surveys) were used to capture student impressions regarding the impact and use of the tool.

Focus Groups

Student focus groups with eight to ten students in each group (n=62) were conducted to establish the issues that would be explored in the survey. The groups were administered by graduate students, who initiated discussion of the application by asking the following open-ended questions.

1. What are the reasons why you like using the eGrade system?
2. What are the reasons why you dislike using the eGrade system?
3. Do you feel using a courseware tool like eGrade to complete accounting homework assignments enhances your learning experience?
4. Do you feel using a courseware tool like eGrade to complete accounting homework assignments detracts from your learning experience?
5. How do you complete homework assignments when using eGrade?
6. How comfortable do you feel using information technology to complete your homework?
7. Do you have any suggestions for your instructors regarding the user configurations for eGrade?
8. In the future, would you choose accounting courses that mandated the use of a courseware tool like eGrade?

The questions were successful in provoking students to answer with their opinions as they engaged in open conversations between the each other, which were continued throughout the sessions. Overall, the respondents provided mixed feelings regarding the effectiveness of eGrade and were largely indifferent to its use over the

conventional methods of completing homework assignments. This indifference, however, did not apply to the discussion of problems and frustrations (both real and imagined) experienced by students who are regular users of the tool. The "Suggestions for Improvement" portion of the session likewise enjoyed a great deal of discussion and very constructive input regarding tool configuration and functionality.

Themes common throughout the focus groups included:

Pros

- Convenience of eGrade (login anywhere to complete their assignments)
- Fast return of homework results
- Time savings resulting from research tools and homework templates
- More time to focus on other class requirements
- Experience using tools that may well be used in other classes

Cons

- Frequent system errors (incorrect solutions, faulty lookup features)
- Exacting format requirements for answer entry (missed credit for format issues)
- Data entry adds to homework burden
- Problems too long and complex
- Problems not representative of test questions
- Students "forced" to do more homework than they had anticipated

Course Administration

Many students volunteered the fact that they "cheat" by working in groups or having others do their work outright by giving them their password. Others didn't feel they were learning because they could guess at answer until they got it right. Students also stated that the tool did not prepare them for tests due to differences in format and response requirements (i.e. the necessity to fully develop answers versus just providing the response itself). Other students vocalized concerns about a "disconnect" between the tests and the homework.

Tool Configuration And Enhancement

Each instructor used the tool differently in determining homework value (as a function of their final grade) and user parameters (number of attempts to get a question right). Given these differences, students do not share common performance standards within the same course. There also seemed to more opportunity for students to cheat using the program, leaving those who honestly attempt to complete their homework at a disadvantage. In response to these issues, students made several suggestions that may (at least in part) provide some relief. These include the assignment of points commensurate with the amount of work necessary to complete the problem, adopt an electronic test format, and expand eGrade to include multi-media examples and tips on how to solve a particular problem.

Survey

Based on the results of the focus group, a web-based survey was created. The questionnaire was designed with the web environment in mind to encourage respondent participation. All responses were of the point-and-click variety. No free-text responses were used. On average, the survey took less than 4 minutes to complete, as verified in a pretest. The survey was distributed to the applicable accounting student population via email invitation containing a hyperlink to the website where the survey itself was hosted and conducted. A drawing for a $25 gift certificate to a local restaurant was used as an inducement to participate Approximately 471 invitations to participate were sent with a response rate of 103 (21.8%).

Results

The survey initially asked respondents several classification questions. Results show that 70% were using the tool because it was required in class; the other 30% had an option to use the system as their choice. Over one-third of respondents spent 4 or more hours online each week, but over half spent less than one hour each week on the eGrade system. A positive result showed that students who normally procrastinated, over half worked ahead of deadlines by using the system, and the majority were successful in completing assignments slightly ahead of time or right on time.

The second section of the survey covered the impact of using the online interactive technology tool on the students. Table 1 shows that the system scored best on accessibility and immediate feedback, but scored very poorly with professor interactivity. Other results are detailed below.

Table 1: Impact Of System

	Mean	Std. Deviation
eGrade allows for one-on-one time with professors	2.81	1.148
Easier to learn from online software	3.23	1.203
Few technical problems when using eGrade	3.36	1.354
Work ahead of the due dates	3.43	1.158
Link to the book is useful	3.45	1.393
I feel eGrade is valuable learning tool	3.58	1.211
Satisfied with amount of class time on homework	3.64	1.436
eGrade saves on homework time	3.65	1.256
Instructions on eGrade are clear	3.90	1.031
Work is graded correctly on eGrade	3.99	1.277
Beneficial to see the answers after submit	4.35	1.039
Important to access eGrade anytime	4.45	.961
5=Strongly Agree, 1=Strongly Disagree		

The second section of the survey asked students about their use of the system and their preferences. Although average answers tended to center around the midpoint of "3," students did feel that the system was effective in exam preparation and learning experiences. Table 2 details these results.

Table 2: Using The System

	Mean	Std. Deviation
I would rather take exams online	3.08	1.455
More likely to enroll in class with required eGrade	3.18	1.176
Exam questions are consistent with homework	3.43	1.412
eGrade is effective in preparing me or exams	3.60	1.288
eGrade is enhancing my learning experience	3.61	1.151
I like the current exam format	3.63	1.309
5=Strongly Agree, 1=Strongly Disagree		

The final section of the survey listed basic demographics. Slightly over half the respondents were female. Over one-third of respondents were freshmen, one quarter were sophomores, one quarter juniors, and the rest seniors. Most respondents were full-time, domestic students. The majority of respondents were business majors, but not necessarily accounting majors.

Significant Differences

Statistically significant differences among segments were tested using crosstabulations with the chi-square statistic for categorical data and independent samples t-tests (p < .01) for interval data. There were several gender differences. Females were more likely to do their homework first on paper, and then enter the information into the website, while males were more likely to enter information directly into the website. Males also reported cheating by having someone else log into the site for them, while females reported no such activity. Males were also more likely to work in groups and share answers with others.

Comparisons were also made between students who spent four hours or more a week online and those who spent less time online. Those who spent more time online were more likely to agree that the online instructions were clear, the system allowed more time with professors on other matters, it was easier to learn the concepts online, and they would register for future classes requiring the system. Students who more time online were more likely to disagree that the system saved time doing homework.

Students who share answers with others or cheat by letting someone else access the system for them were less likely to agree that the system enhanced their learning experience or made homework any easier. In addition, these students would be less likely to register for a future course requiring the system.

Comparisons were also made between students who were expecting high grades in their class and carried a high GPA versus those students who were performing less well. Good students were more likely to agree that the tool was effective in preparing them for exams, used to tool to work ahead and beat deadlines, and would enroll in a future course requiring the tool.

Interestingly, there were no statistically significant differences for whether the student was an accounting major or not. However, students who had outside jobs were more likely to use the system for more hours and spend more time online.

CONCLUSION

The research suggests that the majority of accounting students surveyed hold a generally favorable opinion of the interactive technology tool. In addition, many students surveyed found the functions of the tool an effective complement to their learning of accounting. These opinions transcended most demographics studied including gender, classification, and academic major. Students also indicated that they are somewhat more likely to enroll in classes that featured the use of eGrade vice classes that do not.

In addition to the positive opinions about the eGrade tool, there were also two disclosures about its use that were surprising. The first involves the amount of "guessing" employed when working homework problems. A majority of students outright guess on some portion of their homework questions instead of working the question through. While this tactic may lead to a correct response, many acknowledged that it does not prepare a student for examinations. The second disclosure involves group work. While most students indicated that they work alone when using eGrade, approximately one third works with others on occasion to complete their accounting homework.

Based on the results of the study, the following recommendations are suggested for courses that plan to adopt an interactive online technology tool:

- Standardize the implementation of software configurations across all participating classes so students in different classes with different instructors will have an equivalent experience
- Increase the maximum allowable attempts for homework questions and standardize this number across classes, with more guessing allowed for lower level courses and less guessing allowed for upper level courses
- Authorize the use of group work for homework problems; consider accepting hard-copy answer sheets (showing all work) for problems students get wrong to award partial credit

- Develop an online examination capability that mirrors the environment students experience while completing their homework; administer in-class quizzes to prepare students for examinations

Despite the challenges associated with adopting such systems across multiple courses and instructors, the overall results indicate that this application of interactive educational technology was effective in beginning and intermediate accounting courses for both majors and nonmajors. Further explorations are necessary to determine if more effective learning is actually taking place, and whether students using this technology are better prepared for future classes.

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