

# **Student Perceptions of Learning Technologies in Introductory Accounting Courses**

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## **Abstract**

The past two decades have seen a dramatic increase in the development and use of various classroom technologies purported to enhance student learning. Accompanying this has been a large volume of studies aimed at assessing the effectiveness of these technologies from a variety of disciplines. This study contributes to this discourse and the accounting education literature in particular by examining student perceptions of the effectiveness of multiple technologies used in an introductory management accounting course. Perceptions of the effectiveness of a traditional textbook were also collected. Students were then asked to compare their experience in this course to that of the prerequisite introductory financial accounting course where no learning technologies were used. This study shows that students perceive practice problems and problem-based lectures to be the most effective learning activities whether they are employed using technology or not. Two learning technologies to be particularly effective – online practice problems/quizzes and video lectures - but all learning technologies tended to support superficial rather than deep learning approaches.

Keywords: Introductory accounting courses; instructional technology; lectures; pedagogy.

## **Introduction**

Accounting education has been the subject of criticism for many years for focusing too much on the “nuts and bolts” of accounting (Pincus, 1995, p. 90) and employing pedagogical approaches that lack creativity (Albrecht & Sack, 2000) and promote superficial learning strategies (Gray et al., 1994, p. 51; see also Reckers, 2006). One approach to address these criticisms is to improve the learning environment through engaging pedagogies and practices such as high quality student-faculty interactions, active learning, meaningful peer interactions and rigorous levels of academic challenge (Kinzie, 2010). Increasing class sizes and decreasing resources, however, have presented educators with significant challenges with respect to student engagement (see, for example, Baldwin, 1993). To meet these challenges, many educators have employed the use of technology in course design and delivery (Mayer et al., 2009).

Two introductory courses at the University of X, financial accounting and management accounting, have adopted opposite approaches to the employment of learning technologies. The financial accounting course uses no technology outside of a course webpage containing course material in pdf files and a student discussion forum. Three technologies are used in the management accounting course: online quizzes using Lyryx, an in-class student response system (MonocleCAT, a type of “clicker”), and video recordings on in-class problems using Camtesia software.

Martin et al. (1995) reported that the use of videos increased the level of critical and reflective learning in a management accounting course. Online assessment technology has been linked to better performance in introductory accounting classes (Aisbitt & Sangster, 2005) and increases in student satisfaction (De Lang et al., 2003). Lusher et al. (2012) compared a “pen and paper” classroom to a “computerized” classroom, finding students using computers in the classroom scored higher on homework and tests, but not on in-class assignments or a group project. Moustafa and Aljifri (2009) compared a traditional learning approach, a cooperative learning approach, and a Laptop-Based Active Learning approach and found that students performed significantly better with the Laptop-Based Active Learning approach. Friedman et al. (2006) showed that students using an internet based learning tool offering unlimited feedback performed significantly better on the final exam. Theuri et al. (2011) found that student performance improved with a multimedia, video-based instructional supplement and resulted in enhanced understanding, applying, and analyzing cognitive skills. One textbook publisher reports that using their interactive technology, *WileyPLUS*, resulted in 88% of students responding that they understood the accounting material “better” and 70% said using it made learning more interesting (Kimmel et al., 2009). In a study on Group Response Systems (“clickers”), another interactive learning technology, however, Carnaghan and Webb (2007) found the use of clickers resulted in a decline in student engagement and that there was little evidence to support the claim that this technology improved learning.

The purpose of this study is to assess student perceptions of the efficacy of the three learning technologies used at the University of X relative to each other and to textbook reading. The study was motivated initially to inform the decision of whether or not to adopt learning technologies in the financial accounting course. Students, therefore, were also asked about the learning methods used in the financial accounting course and their perception of the usefulness of the three technologies in that class. This study contributes to the accounting education literature in three ways. First, by assessing multiple learning technologies simultaneously comparative results regarding their effectiveness according to students are collected. This will inform the decision-making process for educators considering adopting learning technologies. Secondly, by relating their perceived effectiveness to five learning conceptions insights are gained as to how these technologies can support deep or surface learning approaches by students. This study therefore informs our understanding of the role of learning technologies in promoting deep learning. Finally, by asking students to compare their perceptions of learning technology effectiveness with their experience in a course that does not employ these technologies, we are able to identify the underlying activities that students regard as the most effective for learning accounting at an introductory level.

### Learning Context

The Bachelor of Commerce degree at the University of X offers a variety of majors in areas such as Agricultural Business, Hotel and Food Administration, and Human Resource Management. Accounting was added as a major in 2010. Faculty have considerable flexibility in choosing their pedagogical approach and use of technology. The university is not AACSB accredited. Regardless of the major, all students in the Commerce program take a set of core courses which provides them with a broad business background. This paper focuses on two of these required core courses, financial accounting and management accounting.

Financial accounting is usually taken in the fall semester of the second year of studies and introduces students to the fundamental concepts of financial accounting. This includes preparing and analyzing financial statements as well as using financial accounting information to make decisions. The pedagogical approach of the course is a lecture- and problem-based, non-interactive traditional teaching style where, for the most part, the instructor works through textbook problems in class while the students follow along and take notes. Learning, therefore, is not necessarily

“active” since students are not required to solve any of the problems themselves. Laptop computers are not allowed in class. Students are assessed using three term exams and one final exam. The term exams are worth 15%, 25% and 25% of the student’s final grade respectively. The final exam is worth the remaining 35 % of their final grade. All exams are paper-based and done in class or in an exam room with the use of a basic calculator being the only aid permitted. The course is delivered in multiple sections with class sizes of 100 students.

Management accounting is typically taken in the winter semester of the second year of studies so most students take this course immediately after finishing financial accounting. In this course students learn how management accounting information is used by managers for various internal decisions such as product pricing, breakeven analysis, and performance evaluation. The course uses three instructional technologies. Lyryx is the textbook publisher’s interactive technology that allows students to complete quizzes online and receive immediate feedback. Students completed nine Lyryx quizzes during the 12 week course. These quizzes comprise 15% of the final mark. In addition to quizzes, this software also had a “Lab” section where students could practice problems. MonocleCAT is a Group Response System that is similar in most ways to clickers. The main difference is that students can respond to in-class questions posed by the instructor through texting with a laptop or cell phone. Thus, students can respond to questions requiring a written or calculated answer rather than being limited to selecting a response in a multiple choice format. This component is worth 10% of the final mark. Finally, lectures are recorded using Camtasia software and stored on the course website. These videos consist of the instructor working through problems while explaining the concepts used to solve them. This provides flexibility in the timing and frequency of review by students. No marks are allocated to this component and review of these recorded lectures is optional. Students are also assigned textbook readings. The course is offered in one large section, with approximately 600 students enrolled in the winter of 2012.

#### Research Motivation and Informing Literature

The primary aim of this study was to assess student perception of the usefulness of the three learning technologies used in management accounting. The usefulness of the textbook for learning was also assessed. A secondary aim was to assess student perception of the potential usefulness of these technologies in the financial accounting course, where no learning technologies were used. Students were also asked to provide feedback on the learning methods used in financial accounting (textbook reading, lectures, and practice problems). Student perception is important because it influences the approach taken to learning (Sharma, 1997; Duff, 2004) and course performance (Ferreira & Santoso, 2008). Student perception has been used to inform research on teaching effectiveness (Marsh & Hocevar, 1991; Marsh & Roche, 1993; Webster & Hackley, 1997), the use of case studies (Weil et al., 2001) and technology in accounting education (Bryant & Hunton, 2000; Wells et al., 2008; Concannon et al., 2005; Edmonds & Edmonds, 2010; Khanlarian et al., 2010).

Two types of student learning were identified in a study by Marton and Säljö (1976). The first type, surface learning, involves reproducing information or learning by rote memorization. The second approach, deep learning, leads to developing an understanding of information and seeking meaning. When adopted by students this deep learning approach is purported to result in a better achievement of a deeper understanding of a discipline (Booth et al., 1999) and a better ability to solve complex problems (Davidson, 2002). Hall et al. (2004) report that changes to the learning environment of an accounting course can be made to promote the adoption of a deep learning approach by students and argue that this deep learning approach improves the development of analytical and critical thinking skills. Hand et al. (1996) developed an assessment strategy that promotes deep learning approaches by accounting students. Similarly English et al. (2004) introduced an intervention in an introductory accounting course in an effort to promote a deep learning approach. Thus while student learning strategies remain the choice of students, course design and delivery can influence those choices. Early choices made by students may, however, be difficult to change by the latter years of their university studies (Ramsden, 1992; see also Vermetten et al., 1999). Since deep learning strategies promote the development of skills called for by the accounting profession, encouraging this approach early in a student’s university career is important.

Within the broad deep and surface learning classifications of student approaches to learning, five student learning conceptions have been identified (Säljö, 1979; see also Van Rossum et al., 1985):

1. Learning as memorization
2. Learning as acquiring knowledge
3. Learning as application of knowledge
4. Learning as making connections between parts of a subject and between subjects
5. Learning as interpreting and understanding reality

An important characteristic of this classification is that each higher order conception incorporates those of the lower orders. A “learning as acquiring knowledge” conception includes “learning as memorization”, for example. We view this hierarchy of learning conceptions as a continuum that spans deep and surface learning approaches, where “learning as memorization” employs a surface learning approach while “learning as interpreting” entails a deep approach to learning (see Figure 1). The spectrum of conceptions begins with rote memorizing and ends with internalizing and understanding the material. This is consistent with Ramsden (1992) who characterizes the first three conceptions as external to the student and the last two as emphasizing the personal aspect of learning. The upper conceptions of the hierarchy, therefore, entail a deeper, more meaningful understanding of a discipline. Arising out of this type of learning are the analytical and critical thinking skills demanded by the accounting profession (Gibbins, 2002; Springer & Borthick, 2004). Because of this, there have been calls in the accounting education literature for studies that examine deep and surface learning approaches (Davidson, 2002; Potter & Johnston, 2006).

#### Methodology

Data was gathered through the use of a survey instrument distributed to students in the introductory management accounting course at the second last class of the winter 2012 semester. The instrument was constructed with two parts. The first part collects information about the student’s background including when and at which institution they had taken the prerequisite introductory financial accounting. The second section employs a Likert Scale to capture student perception of the impact of the textbook and the three instructional technologies on their learning in the management accounting course. The student is first asked about the extent to which the textbook or technology was used. Only those surveys with higher usage rates were included in the results (i.e. if a student responded that they “sometimes”, “rarely” or “never used” the textbook or technology, then their responses to the subsequent questions were not included in the results). We were interested only in the perceptions of those students whose usage of the textbook or learning technology was sufficient to render an informed opinion. The usage rates themselves cannot be linked to student perceptions of learning effectiveness since two of the technologies (Lyryx and MonocleCAT) had marks assigned to them while the video recordings and textbook readings did not.

Questions were presented in the format of the five learning conceptions allowing us to map perceptions onto the learning continuum presented in Figure 1. Students were asked to identify particular learning conceptions with specific learning activities. For the textbook and for each learning technology the student was asked the extent to which:

- The textbook/learning technology helped them memorize the course material (*memorize*)
- The textbook/learning technology helped them acquire knowledge about accounting (*acquire knowledge*)
- The textbook/learning technology helped them apply their knowledge about accounting (*application of knowledge*)
- The textbook/learning technology helped them make connections between accounting and other courses they are taking or have taken (*making connections*)
- The textbook/learning technology helped them learn the material in a way that better their understanding of the business world (*interpreting and understanding*)

There is also a portion of the survey devoted to capturing the students' perception of the usefulness of these technologies for the financial accounting course. Only those students who had taken the financial accounting course at The University of X were included in the results. 193 surveys were distributed; one to each student in attendance on the day the survey was taken. 170 were returned with usable responses.

## Results

### *Textbook*

Of the 170 respondents 57 (33.5%) read the assigned readings before each class either all or most of the time. Table 1 summarizes the results. Based on the responses, students found the textbook to be most useful for acquiring and applying knowledge. 65% of students either agreed or strongly agreed that the textbook helped them acquire knowledge while 54% felt the same about applying knowledge. Each table, except Table 5, presents an average response number. The response "strongly agree" was assigned the numeric value of 1. The "agree" response was assigned a value of 2. "Somewhat agree", "disagree" and "strongly disagree" were assigned the values of 3, 4, and 5 respectively. An average of these values was calculated based on all usable responses. The lower the average, the more students agree with the statement. From the above table this average illustrates that students found the textbook to be most useful for acquiring and applying knowledge (the two lowest average scores).

### *MonocleCAT*

Of the 170 respondents 154 (90.5%) did most or all of the MonocleCAT quizzes during the course. Table 2 summarizes the results. Students found the in-class use of MonocleCAT to be most useful for applying knowledge followed by acquiring knowledge, based upon the average scores and based upon the responses in the "strongly agree" and "agree" categories.

### *Lyryx Quizzes*

Of the 170 respondents 159 (93.5%) used Lyryx and did most or all of the Lyryx quizzes during the course. Table 3 summarizes the results. The use of Lyryx was most effective for supporting the first three learning conceptions as indicated by both the average and the sum of the "strongly agree" and "agree" responses.

### *Camtasia Lecture Video Recording*

Of the 170 respondents 65 (38%) used the Camtasia videos "often" or "all the time". Table 4 summarizes the results. The video lectures also were seen to support the first three learning conceptions more than the latter two as seen in both the average and the "strongly agree" and "agree" responses.

### *Summary of Learning Conceptions*

The preceding section shows that students perceive each of the learning activities to support learning conceptions that reflect the superficial approach to learning with acquiring and applying knowledge to be the learning conceptions most supported. Each activity does not support learning conceptions to the same extent. For example, more students felt that the use of Lyryx supported understanding the material, a deep learning approach, more than MonocleCAT supported any of the learning conceptions, based upon the calculated average response. The textbook and three learning technologies can be compared to each other to provide insights into their relative effectiveness. To examine the relative effectiveness of the textbook and technologies to the five learning conceptions, responses of "strongly agree" and "agree" were tabulated and expressed as a percentage of total responses. For example, 5% and 35% of respondents strongly agreed or agreed that using the textbook helped them memorize course material (see table 1). We conclude, therefore, that 40% of respondents felt that the textbook was helpful for memorization. Following this methodology, Table 5 presents the results for each technology and the textbook.

These responses are represented graphically in Figure 2 and illustrate a ranking of the effectiveness of each learning tool. According to students, online quizzes and practice problems using Lyryx is the most effective method of

learning across all five learning conceptions. Camtasia is the next most effective method of learning followed by the textbook and MonocleCAT respectively. All four contributed more to memorization, acquisition of knowledge and its application than to connecting the material with other courses or to a student's understanding of the broader business world. In other words, these learning activities tended to support superficial rather than deep learning. The textbook, however, played a larger role in developing a student's understanding than in memorizing the material.

### ***Financial Accounting***

The secondary aim of the paper was to gauge student perceptions of the effectiveness of the learning activities used in the financial accounting course and determine which, if any, technologies students felt should be adopted for that course. Only students that had taken introductory financial accounting at the University of X were included in the survey data resulting in a response rate of 165 out of 170 (97%). Of these 23 were accounting majors (14%). Each student was asked if they believed that a particular learning technology (MonocleCAT, Lyryx, and Camtasia) would have helped their learning in the course. Only responses from students who had used these technologies "always" or "often" during the managerial accounting course were included in the data to ensure their familiarity with the technology. Table 6 summarizes the results. Lyryx and Camtasia received convincing support from students, MonocleCAT much less so.

These students were also asked the following questions:

1. Assigned textbook readings helped my learning in financial accounting
2. Attending lectures helped my learning in financial accounting
3. Doing practice problems helped my learning in financial accounting

Students found practicing problems to be the most effective method of learning for this course. Lectures, consisting mostly of working through problems in front of the class, also received considerable support from students as helpful to their learning. Table 7 summarizes these results.

### **Conclusion**

The results of this study show that students viewed online quizzes and practice problems using Lyryx as the most effective instructional technology in the management accounting course. In the financial accounting course, practice problems were viewed as the most effective learning method. Together, this suggests that "doing" accounting remains a preferred and effective method of learning whether it is technology-based or not. Camtasia videos of the instructor going through problems were also highly effective for most students across all learning conceptions with the exception of connecting the material with other courses. The great majority of students found the problem-based lectures for learning in the introductory financial accounting course to be the most effective learning method. Thus learning accounting by having an instructor work through problems also appears to be a highly effective learning approach, again whether technology is employed as in the use of videos or not.

While less effective than Lyryx or videos, the textbook did contribute to the acquiring, applying and understanding of material by the majority of students. MonocleCAT was the least effective, significantly, across all learning conceptions. Despite the increased capacity of this system to accommodate more than multiple choice responses, it was still considered the least effective learning activity by students. All four learning tools supported learning approaches towards the superficial end of the learning spectrum more than deep learning. Of the five learning conceptions used for this study, all four learning activities fared the worst at connecting the material to other courses. This, however, may reflect the introductory nature of the courses. It is an important reminder for educators using these learning activities in upper level courses to adapt them in a way that will promote deep level learning.

The study is limited to student perceptions of effectiveness. We cannot, therefore, comment on the effectiveness of the learning technologies or the textbook on performance in the course. This study was also limited by survey a single cohort of students, rather than multiple cohorts in a longitudinal study.

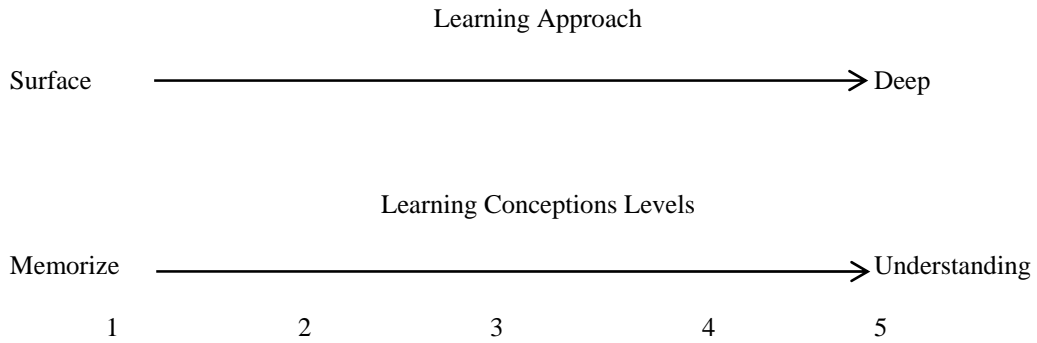
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**Figure 1**  
**Learning Conceptions Map**



**Figure 2**  
**Summary of Learning Conceptions**

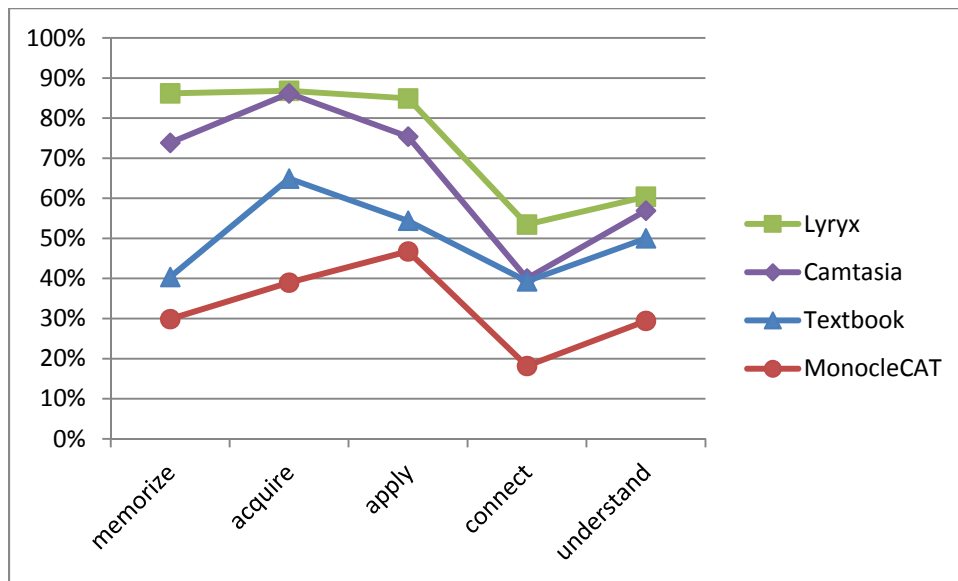


Table 1

## Student Responses to Textbook Effectiveness

Learning Conception	Strongly Agree	Agree	Somewhat Agree	Disagree	Strongly Disagree	Average	Standard Deviation
memorize	5%	35%	44%	14%	2%	2.719	.839949
acquire	14%	51%	26%	9%	0%	2.298	.822993
apply	7%	47%	37%	7%	2%	2.491	.804514
connect	4%	36%	43%	14%	4%	2.786	.867898
understand	7%	43%	39%	11%	0%	2.536	.785419

Table 2

## Student Responses to MonocleCAT Effectiveness

Learning Conception	Strongly Agree	Agree	Somewhat Agree	Disagree	Strongly Disagree	Average	Standard Deviation
memorize	2%	28%	33%	26%	11%	3.16	1.019232
acquire	3%	36%	32%	21%	8%	2.97	1.00942
apply	6%	41%	30%	16%	8%	2.786	1.035098
connect	2%	16%	29%	42%	12%	3.45	0.963668
understand	3%	27%	32%	27%	12%	3.16	1.069303

Table 3

## Student Responses to Lyryx Effectiveness

Learning Conception	Strongly Agree	Agree	Somewhat Agree	Disagree	Strongly Disagree	Average	Standard Deviation
memorize	38%	48%	13%	1%	0%	1.77	.710896
acquire	43%	43%	13%	1%	0%	1.70	.707585
apply	39%	46%	14%	1%	0%	1.77	.728485
connect	17%	36%	30%	14%	2%	2.48	.998965
understand	22%	38%	28%	11%	1%	2.30	.959659

**Table 4****Student Responses to Video Lecture Effectiveness**

<b>Learning Conception</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Somewhat Agree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>	<b>Average</b>	<b>Standard Deviation</b>
memorize	22%	52%	22%	5%	0%	2.09	.785077
acquire	23%	63%	11%	3%	0%	1.94	.681839
apply	26%	49%	18%	6%	0%	2.05	.837234
connect	18%	22%	42%	18%	0%	2.6	.99687
understand	20%	37%	35%	8%	0%	2.31	.882523

**Table 5****Summary of Student Responses as “Strongly Agree” and “Agree” Regarding Learning Effectiveness**

<b>Conception</b>	<b>Lyryx</b>	<b>Camtasia</b>	<b>Textbook</b>	<b>MonocleCAT</b>
memorize	86%	74%	40%	30%
acquire	87%	86%	65%	39%
apply	85%	75%	54%	47%
connect	53%	40%	39%	18%
understand	60%	57%	50%	29%

**Table 6****Student Perceptions of Effectiveness of Learning Technologies in Financial Accounting**

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Somewhat Agree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>	<b>n</b>	<b>Average</b>	<b>Standard Deviation</b>
MonocleCAT	11%	34%	19%	24%	12%	149	2.93	1.225263
Lyryx	40%	40%	10%	8%	3%	154	1.95	1.049998
Camtasia	39%	39%	11%	8%	3%	64	1.97	1.053622

Table 7

**Student Perceptions of Effectiveness of Financial Accounting Learning Activities**

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Somewhat Agree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>	<b>n</b>	<b>Average</b>	<b>Standard Deviation</b>
Textbook	16%	41%	24%	16%	1%	165	2.45	0.992321
Lectures	54%	31%	9%	4%	2%	165	1.69	0.934555
Practice Problems	71%	25%	3%	1%	0%	165	1.345	0.601366