Building student success using problem-based learning approach in the accounting classroom

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ABSTRACT

A major area of concern in academia is that of student retention at the university, college, and departmental levels. As academics, there is a considerable amount that we can do to improve student retention, and reduce the attrition rates in our departments. One way to solve this is to take an innovative approach in the classroom to enhance the learning experience of the student. This study discusses a Problem-Based Learning approach utilized in financial accounting courses at a public institution of higher education.

Keywords: retention, problem-based learning, learning experience

INTRODUCTION

Developing the curriculum in financial accounting courses can be a daunting task, especially when your class may include all non-accounting majors. The success of any academic institution depends on the ability to retain its students (Archer & Cooper, 1999). The success of a collegiate program is to be able to attract and retain quality students (Dodge, Mitchell & Mensch, 2009). Lack of motivation by these students may be caused by intimidating classroom environments and potentially low aptitudes of students (Wooten, 1996). To build motivation and aptitude of these non-accounting majors, and gain excitement among accounting majors, an innovative approach to the classroom environment may be implemented. It is our responsibility as academics to make such changes to the classroom experience to improve the attrition of students from accounting programs. Making such changes is a timely effort, but the positive classroom experience will have its' benefits for the students and faculty member alike.

With this, a Problem-Based Learning approach can be used to improve the classroom experience and improve performance of accounting and non-accounting students alike. In the following, this research will first define the Problem-Based Learning Approach (Barrows, 1996), and discuss how this approach is best utilized in financial accounting courses.

THEORETICAL FRAMEWORK

The problem-based learning model

Problem-Based Learning (PBL) evolved in the medical education field. The core model of the PBL approach, which was developed and utilized in a medical context at The McMaster University Faculty of Health Sciences, includes the following characteristics: 1) learning is student-centered; 2) learning occurs in small student groups; 3) teachers are facilitators or guides; 4) problems form the organizing focus and stimulus in learning; 5) problems are a vehicle for the development of clinical problem-solving skills; 6) new information is acquired through self-directed learning (Barrows, 1996).

Learning is student centered

This characteristic states that students should be responsible for their own learning. A student must be able to identify what they need to know to gain a better understanding of the materials at hand, and identify where they need to get the information to solve the problem at hand. In addition, faculty act as consultants in the preparation of the problem, and the utilization of a tutor serves as an additional resource to the student. (Barrows, 1996)

Learning occurs in small student groups

Groups are organized randomly and range from five to eight or nine students. This provides students with practice in working with different people from different backgrounds (Barrows, 1996).

Teachers are facilitators or guides

Using the problem-based learning approach, teachers do not spend much time lecturing or providing factual information. Nor do they tell the students if they are right or wrong, and do not tell them what to study or read. This method is also known as metacognitive communication. The tutor, or teacher, rather tells them where to focus their study efforts and guide them throughout the process of problem-solving (Barrows, 1988).

The process of facilitating may come in many modes or forms. Suggested by Heron (1989, 1993), there are three modes of facilitation that are useful for assisting beginning facilitators to understand how they operate:

1. *The hierarchical mode:* The role of the facilitator is to direct the learning process and apply their knowledge and power over it. The facilitator has total control over the teams and manages the team, and thus the classroom using a top-down approach.
2. *The co-operative mode:* The role of the facilitator is to work collectively with the teams in developing the learning process, sharing their knowledge, and allowing the team to be active participants in the facilitation of the learning process. The facilitator guides the teams in deciding how they are going to learn.
3. *The autonomous mode:* The facilitator allows the team to work independently on their own, bring totally responsible for their own learning process. The team directs their own learning and finds their own way in solving problems that are presented to them.

Problems form the organizing focus and stimulus for learning

Real-world problems are introduced to provide students with what they will be faced with in a professional environment that will provide motivation and relevance to learning. Students will understand what they will need to learn to solve the problem. From this, they will be able to focus their efforts accordingly, and help them build understandings of the application to recall it later in future problems (Barrows, 1996).

Problems are a vehicle for the development of clinical problem-solving skills

The problem must follow the process that the student will become accustomed to in a real-world situation (Barrows, 1996).

New information is acquired through self-directed learning

Students are expected to learn from the world's knowledge and accumulated expertise by virtue of their own study and research, just as real practitioners do. During this self-directed learning, students work together, discussing, comparing, reviewing, and debating what they have learned (Barrows, 1996).

APPLYLING THE THEORETICAL FRAMEWORK TO FINANCIAL ACCOUNTING

The characteristics of the theoretical framework have been outlined: 1) learning is student-centered; 2) learning occurs in small student groups; 3) teachers are facilitators or guides; 4) problems form the organizing focus and stimulus in learning; 5) problems are a vehicle for the development of clinical problem-solving skills; 6) new information is acquired through self-directed learning. Now a discussion will ensue on how to apply this theoretical framework to the financial accounting curriculum.

Learning is student-centered

In the financial accounting classroom, the students are empowered to become involved in the learning process. With this involvement, the faculty member provides problems to the students that relate directly to the learning objectives of the chapter. Once received, the student analyzes the problem to start building an understanding of what is being asked of them to complete.

Learning occurs in small students groups

In the financial accounting classroom, the students are organized in random groups of four or five students, depending on the class size. As the semester progresses, these groups are changed, causing students to be in groups with different students from diverse backgrounds and knowledge. Through visual analysis by the instructor, each group will include a student who has high leadership abilities and knowledge of the accounting theories presented. This will allow each group the ability to learn from each other, building a more effective learning environment.

Teachers are facilitators or guides

In the financial accounting course, students are provided with the information they need to know to solve the accounting problem. This information will include textbooks and online tools if available. At no time, shall the instructor direct them and provide answers, but rather think cognitively about the problem at hand, and be able to use the available resources to help them locate the process in which to solve the accounting problem. This will also strengthen student's abilities to use the available resources in their learning, and make students more responsible for their learning. Part of the learning process in any discipline is to make errors, and learn from those errors.

Problems form the organizing focus and stimulus for learning

In the financial accounting course, students are always provided with real-world information to understand when and where they will see this information throughout their professional and personal lives. The instructor always makes a point that as an accounting or non-accounting major, understanding accounting information and processes are relevant in effective management of their businesses. Accounting information and processes is also significant in their personal lives when it comes to managing money and being able to determine investment strategies, among other useful decision-making. All too often, the textbook

mediums only provided a limited view of the real-world of financial accounting. Through implementing a project that students can take the opportunity to analyze a real company, and make logical determinations of the company's financial performance will better prepare the student for future success.

Problems are the vehicle for the development of clinical problem-solving skills

In the financial accounting course, students must face problems that they will see in a real-world business and accounting environment. This allows the student to understand the true application of accounting procedures.

New information is acquired through self-directed learning

In a financial accounting course, it is important that students understand what resources to use to gain understanding of the accounting problem at hand. Through their personal and team research, they can build an understanding of the resources available, and become aware of new information that they may have not considered prior to researching the accounting topics.

The transition from a lecturer to a facilitator

As academics, we all have different interpretations of what makes us an academic in the classroom. Some believe that we are lecturers and that our role is to solely utilize our knowledge and convey theories to our students, leaving the hands-on training to self-directed learning, internships, and on-the-job training. Others believe that their role as an academic is to not only lecture, but be mentors and trainers to our future accountants and business professionals. Others may be a hybrid of the two methods.

In the field of accounting, many believe that due to its nature, accounting education is a problem-based discipline and that it may not be necessary to pursue alteration of present curriculum to problem-based learning approach. However, due to present attrition rates in colleges and universities, it may be necessary to make such changes. For instance, according to the U.S. News and World Report (2013) data, freshman retention rates are declining.

EDUCATIONAL OBJECTIVES POSSIBLE WITH A PROBLEM-BASED CURRICULUM

The acquisition of integrated knowledge base

In the medical field, problem-based learning must be integrated into all medical school disciplines basic to medical practice. By not including the PBL curriculum in all medical school disciplines, the risk of inhibiting the integration of those subjects in the students' understanding of a patient's problem, and forcing a student to move from a PBL approach, to other passive learning approaches may inhibit learning (Barrows, 1996).

In the financial accounting curriculum, consistency is important. By allowing students to immerse themselves into the learning experience, students have the ability to prescribe to the integrated knowledge base of financial accounting, and enhance their learning experiences inside and outside of the classroom.

The acquisition of a knowledge-base structured around the cues presented by patient problems

In the medical field, medical students have the ability to organize their knowledge around patient cues, enhancing the student's abilities to recall what they learned by applying it in clinical work. Within the PBL curriculum, students analyze and resolve the problem as far as possible before acquiring any information to further provide understanding to the problem (Barrows, 1996).

In the financial accounting curriculum, repetition is a key to the understanding of a particular financial accounting topic. In financial accounting, the PBL approach is to allow students to analyze and resolve a financial accounting problem as far as they possibly can without having to use reference materials to help them along the way. As they progress through the introductory financial accounting course, a student will extend their skills by continually solving financial accounting problems, learning something new each time they are faced with a similar problem.

The acquisition of a knowledge-base enmeshed with problem solving processes used in clinical medicine. The development of an effective clinical problem-solving process

In the medical field, solving problems successfully is integral to the success of the medical practice, thus it is important to immerse the student in real-world situations that will allow them to enhance their problem-solving skills. Some have stated that students in an undergraduate curriculum do not have the ability to immerse themselves in a physician's role, thus not having the same level of problem-solving skills than more seasoned students (Barrows, 1996).

In a financial accounting course, having students immerse themselves in real-world information is integral to the success in the classroom. Although many students in an introductory financial accounting course may not become accounting majors, it is important that they understand why accounting information presented is important, and how problem-solving can be greatly enhanced through a true understanding of the financial accounting curriculum. Through reviewing real-world information and applying this information to financial accounting problems, it allows the student to better understand the correct process when faced with a real-world financial accounting problem.

The development of effective self-directed learning skills. The development of team skills

In the medical field, these goals require that the PBL approach have a student-centered focus. Students must make every attempt to immerse themselves in the learning process, and determine what to learn and what resources, and attain guidance from the instructor. The PBL approach can be greatly weakened by the instructor who shows too much directive with students, and is too involved in the learning process. These items make students all too dependent on the faculty member, taking away from the true problem-based learning approach (Barrows, 1996).

These items, too, can be applied directly to a financial accounting course. Students must build an environment for learning where they are independent thinkers, where they can build the confidence to make decisions based on the problem that they are dealing with. Using the PBL approach in the classroom, it encourages this aspect of independent thinking, while working in

groups emphasizes team skills that provide the necessary skills required to be successful professionally.

AICPA CORE COMPETENCIES

Quality of instruction is a major factor in student learning according to the *AICPA Core Competency Framework*. Analyzing the AICPA Core Competencies (AICPA, 2013), the core competencies accomplished through a problem-based-learning approach in an accounting program and how they are accomplished are as follows in Exhibits 1-1 (Functional), 1-2 (Broad Business Perspective) and 1-3 (Personal):

Exhibit 1-1	
Functional Categories	
Measurement	Students are able to analyze and interpret business information and render judgment based on available business information.
Reporting	Students are able to communicate business information accurately through the preparation of the four primary financial statements: Income Statement, Statement of Retained Earnings, Balance Sheet, and Statement of Cash Flows (Indirect and Direct)
Risk Analysis	Through analysis of the financial information that is conveyed to users, students have the ability or render judgments basis on the available business information through performing financial statement analysis, measuring liquidity, solvency, and profitability.

Exhibit 1-2	
Broad Business Perspective Category	
Industry/Sector Perspective	Students have the ability to analyze and interpret business information and compare to other companies within the industry and sector. Each student is provided with a company that is represented on the Standard & Poor's 500 list, and are asked to analyze business information for their company, and compare performance results to other companies within the same industry and sector.
Strategic/Critical Thinking	Through the analysis of real business information, and the comparison with companies in a similar industry/sector, students have the ability to intelligently make assumptions about a company's future financial performance.

Exhibit 1-3	
Personal Category	
Communication and Problem-Solving/Decision-Making	Through the work that is required in this introductory financial course, students can now speak intelligently and logically about financial information and be able to enhance their chances of success throughout their curriculum. By understanding the business and accounting acumen that is presented within this course, students will have the ability to become effective business planners, decision-makers and investors.

HYPOTHESIS

Poor performance in the classroom can be frustrating from the student and faculty perspective. One reason for poor performance is that of potential anxiety when dealing with math-related problems (Hembree, 1990), and taking that anxiety into the math required in a financial accounting course (Stone, 1994; Stone et al., 1996, Garcia and Jenkins, 2002). In a study performed by Byrne and Flood (2005), it is estimated that nearly 25 percent of introductory accounting students are unsure of and lack confidence in their potential success in an introductory accounting course.

Given the conceptual nature of financial accounting, it is somewhat difficult for a student to understand financial accounting information. Prior research shows that students learn incrementally with learning tasks that break-down major ideas with smaller ideas (Smith et al., 1993; Sweller and Chandler, 1994; Mayer et al., 2002; Ayers, 2006). These ideas have been successful in teaching the accounting equation (Edmonds and Alford, 1989), among other accounting topics.

This research believes that these non-accounting majors will benefit the greatest from a problem-based learning approach.

Therefore, the following is hypothesized:

H1: Using a Problem-Based Learning approach in the classroom will result in a higher average grade on Exams in an introductory financial accounting course.

METHODOLOGY

This study explores the effect of a Problem-Based Learning approach in the financial accounting curriculum. This study compares results from one semester where a PBL approach was implemented and compares it to a control group where a PBL approach was not used.

Course administered

The course that was used in this study is an introductory financial accounting course that consists of only non-accounting majors. Majors in this course include Finance, Management, Marketing and those students who are undeclared majors. Historically, these students do not have a vested interest in the course, don't understand the importance of financial accounting, and many do the minimal amount of work resulting in low grades for the class.

Assessment utilized

Within the two semesters, the assessment of student understanding of the financial accounting materials includes three exams. Each exam includes multiple-choice and problem-solving. Exam 1 covers introductory topics, including an introduction to financial statements, the accounting information system, and accrual accounting concepts. Exam 2 covers all topics covered in Exam 1, in addition to information pertaining to merchandising companies, multi-step income statement development, reporting and analyzing inventory, fraud, internal controls, and cash controls, and reporting and analyzing receivables. Exam 3 is comprehensive, including content of Exams 1 and 2, in addition to reporting and analyzing long-live assets, liabilities, stockholders' equity, and the statement of cash flows. With each exam, it was a requirement of the students to complete a basic set of financial statements, and each subsequent exam become more complex in the solution.

A supplemental rubric or assessment instrument (based on AICPA Core Competencies) was used to assure that students came out of the course with a good solid foundation of financial accounting. As the instructor and facilitator, time was taken to analyze each student's understanding of the financial accounting materials, which was used for justification of the student's final grade in the introductory financial accounting course. An example of this rubric is included in Appendix.

Demographics of population

The sample size in this study is 136 freshmen business majors. The sample size in the control group and the PBL administered semesters are both 68. Demographics of the class in the non-PBL administered semester is 61.1% male, 38.9% female. Demographics of the class in the PBL administered semester is 67.7% male and 32.3% female. In the total sample, 64.2% were male, 35.8% were female.

Assessment results

The statistics from each exam are included in Table 1. For Exam 1, the control group resulted in a mean of 77%, with a standard deviation of 12.818. For Exam 1, using a PBL approach resulted in a mean of 77.6% with a standard deviation of 9.567. For Exam 1, there was less variability in results using a PBL approach to teaching financial accounting versus a non-PBL approach. However, the difference is not significant with a .780 significance level at a 95 confidence interval using the independent samples t-test.

For Exam 2, the control group resulted in a mean of 72.5%, with a standard deviation of 14.944. For Exam 2, using a PBL approach resulted in a mean of 73.9% with a standard deviation of 10.359. For Exam 2, as was the case for Exam 1, there was less variability in results using a PBL approach to teaching financial accounting vs. a non-PBL approach. However, the difference is not significant with a .685 significance level at a 95 confidence interval using the independent samples t-test.

For Exam 3, the control group resulted in a mean of 66.9%, with a standard deviation of 15.641. For Exam 3, using a PBL approach resulted in a mean of 74.3% with a standard deviation of 11.786. For Exam 3, as was the case for Exams 1 and 2, there was less variability in results using a PBL approach to teaching financial accounting versus a non-PBL approach. The

difference is significant with a .002 significance level at a 95 confidence interval using the independent samples t-test.

INSERT TABLE 1 FROM APPENDIX

Analysis of results

Analyzing the results further, certain assumptions can be made. Firstly, this introductory financial accounting course provides a student's first exposure to not only financial accounting, but also a Problem-Based Learning approach. The improvement in grades throughout the course of the semester show that students became more accustomed to this new innovative approach in the classroom where they can take control of and be responsible for their own learning. As the semester progressed, students became more aware of what resources to use to solve the problem at hand, and through experience with the assessments, and understanding of how they need to study to find success on the assessments.

The students were very receptive of the problem-based learning approach. Each semester, students are asked to evaluate faculty performance for the semester. The scale used is a 5-point Likert scale, with 5 – "almost always", 4 – "usually", 3 – "Sometimes", 2 – "almost never", and 1 – "never". In the control group, 65% of the respondents reported that the course "almost always" facilitated independent thinking and problem solving. In the group where problem-based learning was utilized, 80% of the respondents reported that the course "almost always" facilitated independent thinking and problem solving. Additionally, in the control group, 61% of the respondents reported that the course "almost always" encouraged students to be involved in the learning process. In the group where problem-based learning was utilized, 71% of the respondents reported that the course "almost always" encouraged students to be involved in the learning process. The results are outlined in Table 2.

INSERT TABLE 2 FROM APPENDIX

CONCLUSION

This paper explored an innovative approach in an introductory financial accounting course for business majors. A goal of the course is to build awareness within college-based students of the important role accounting information plays in society and the benefits that can be received from a strong foundation of accounting knowledge. Through the implementation of a problem-based learning approach, students have the ability to learn the financial accounting materials in a way that will most benefit each individual student. A problem-based learning approach assists students in developing and enhancing their communication, analytical, measurement, teambuilding, and critical thinking skills in a business environment.

The instructor involvement in the classroom is to act as a facilitator rather than a lecturer. The instructor in the problem-based learning approach provides the basic guidelines and instructions to the student, and provides the resources in which to solve the problem. The student is provided with the responsibility of solving the problem with the knowledge base they have gained, and utilize resources on when a point is reached where it is required. However, the

knowledge to know where to go to find a solution to a problem is integral to success in an introductory financial accounting course.

Some have said that a problem-based learning curriculum is what accounting curriculum always has been; a belief this study believes is not true. Problem-based learning empowers students to be more responsible for their own learning, and builds the confidence necessary to be successful in their academic, professional, and personal lives.

Limitations and the future of problem-based learning studies

As educators, we all need to find new and innovative ways to present financial accounting information in the classroom. This study only scratches the surface of ways to improve accounting curriculum and gain more interest of students in the field of accounting. An area to analyze would be to how to use the latest technologies in the classroom and how students can use those resources to enhance their learning experience in financial accounting inside and outside of the classroom.

Another area to analyze is what assessments can be used in replace of, or in addition to, just solely exams and student survey assessments. This research believes that some exam-types and student survey assessments don't effectively show what learning outcomes really are, but rather show how effectively a student can reiterate and memorize that accounting knowledge base. There is an opportunity here to rethink our assessments and provide a better understanding of a student's actual understanding of accounting and business.

This research will continue to strive to improve upon a problem-based learning curriculum in financial accounting courses to build awareness of the importance of financial accounting information among non-accounting majors.

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APPENDIX

TABLE 1				
		Exam 1	**Exam 2**	**Exam 3**
Non-PBL Approach	Mean	77.0%	72.5%	66.9%
	Std. Deviation	12.818	14.944	15.641
PBL Approach	Mean	77.6%	73.9%	74.3%
	Std. Deviation	9.567	10.359	11.786
Independent Samples Test	Significance (95 CI)	.780	.685	.002

TABLE 2 Respondents "Almost Always" Results		
This course…	Non-PBL	PBL
facilitated independent thinking and problem solving	65%	80%
encouraged students to be involved in the learning process	61%	71%

Rubric/Assessment Instrument of Student Learning

Functional Analysis		
Item	**Description**	**Instructor Grade/Comments Exceeds (E), Meets (M), Needs Improvement (NI)**
Measurement	Student has the ability to understand and analyze business information and able to make decisions based on the information.	
Reporting	Student is able to communicate intelligently about business information regarding four primary financial statements:	
	Income Statement	
	Statement of Retained Earnings	
	Balance Sheet	
	Statement of Cash Flows	
Risk Analysis	Student have the ability to render judgments about a company based on the available business information through performing financial statement analysis, measuring liquidity, solvency, and profitability	

Broad Business Perspective		
Item	**Description**	**Instructor Comments Exceeds (E), Meets (M), Needs Improvement (NI)**
Industry/Sector Perspective	Student has the ability analyze and interpret business information and compare to other companies within the industry and sector	
Strategic/Critical Thinking	Through the analysis of real-world business information, and the comparison with companies in a similar industry/sector, student has the ability to intelligently make assumptions about a company's future financial performance.	

Personal Growth		
Item	**Description**	**Instructor Comments Exceeds (E), Meets (M), Needs Improvement (NI)**
Communication	Student can now speak intelligently and logically about financial information and be able to enhance their chances of success throughout their curriculum.	
Problem-Solving/ Decision-Making	Students has the ability to become an effective business planner, decision-maker and investor.	