

UNIVERSITÉ DE SHERBROOKE

L'Intégration d'un Module d'Étude Internet Dans la Classe de Comptabilité:
Perceptions des Élèves et les Résultats Académiques
Integrating a Web-Enhanced Study Module into the Accounting Classroom:
Student Perceptions and Academic Results

par

Kevin C. Williams

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SUMMARY

Implemented in the context of Business Administration students enrolled in a college level three year technology program, this research investigated students' perceptions and academic results concurrent with the implementation of an online web module designed to facilitate student self-study.

The students involved in this research were enrolled in a program that, while offering a broad education in business disciplines, specialized in the field of accounting. As a result, students were enrolled in academically rigorous accounting courses in each of the six semesters of the program. The weighting of these accounting courses imposes a significant self-study component – typically matching or exceeding the time spent in class. In this context many of the students enrolled in the Business Administration Program have faced difficulties completing the self-study component of the course effectively as demonstrated in low homework completion rates, low homework grade averages and ultimately low success rates in the courses.

In an attempt to address this situation this research studied the implementation of a web-based self-study module. Through this module students could access a number of learning tools that were designed to facilitate the self-study process under the premise that more effective self-study learning tools will help remove obstacles and provide more timely confirmation of learning during student self-study efforts.

This research collected data from a single cohort of students drawn from the first three sequential accounting courses of the Business Administration Program. The web-based self-study module was implemented in the third of the three

sequential accounting courses. The first two of these courses implemented a traditional manual self-study environment. Data collected from the three accounting courses included homework completion rates, homework, exam and final grades for the respective courses. In addition the web-study module allowed the automatic reporting of student usage of a number of specific online learning tools. To complement the academic data, students were surveyed to gain insight into their perceptions of the effectiveness of the web-based system.

The research provided a number of interesting insights. First among these was a confirmation of the importance of the self-study process in the academic achievement of the learners. Regardless of the self-study environment, manual or web-enhanced, a significant positive correlation existed between the students' self-study results, demonstrated in both homework completion rates and homework averages and the corresponding final grades. These results confirm the importance of self-study found generally in the prevailing academic literature regarding students enrolled in higher education.

In addition, the web-enhanced learning environment implemented during the third accounting course coincided with significantly higher homework completion rates and corresponding homework averages: homework completion rates in particular increased from a combined average of 63% in the first two accounting courses to 93% in the web-enhanced context of the third accounting course. Moreover, the homework completion rates of the web-enhanced course were evenly distributed across the cohort of students.

A quartile-based analysis was subsequently completed. Quartiles were constructed by ranking the students according to their combined average homework completion rates from the first two manual self-study courses, Accounting I and II. The quartile-based homework completion rates for the manual self-study courses Accounting I and II were subsequently compared to the results these same quartiles of

students achieved in the web-based self-study within Accounting III. While the first two courses demonstrated significantly uneven homework completion rates across the quartiles ranging from 31% to 91% homework completion rates, the differences among the four quartiles within the web-enhanced module, with an average homework completion rate of 93%, were statistically insignificant. Congruent with the positive academic results observed in the third, web-enhanced course, through the corresponding survey, students expressed a strong attitude in favor of the online self-study environment.

This research was designed to add to the existing research that studies the implementation of learning in an online setting. Specifically, the research was designed to explore a middle ground of online learning – a web-enhanced course – a context that supplements the classroom experience rather than replacing it. The web-enhanced accounting course demonstrated impressive favorable results, both academically and in terms of students' perception of the system; these results suggest that a web-enhanced environment can provide learning tools that facilitate the self-study process while providing a structured learning environment that can help developing learners reach their potential.

RÉSUMÉ

L'engagement des élèves dans un cours est un précurseur important de la réussite scolaire. Dans la discipline de la comptabilité, la réussite de la composante d'auto-apprentissage du cours est un aspect critique de l'engagement et la réussite des élèves. Amélioration de l'apprentissage par Internet offre la possibilité de fournir un environnement d'apprentissage structuré avec un meilleur accès aux outils d'apprentissage et la rétroaction immédiate qui peuvent améliorer les taux d'achèvement des activités d'auto-apprentissage. Cette étude a évalué les perceptions des élèves et les résultats scolaires relatives à la mise en œuvre d'un module d'étude avec accès Internet à un cours d'introduction à la comptabilité dans le département d'administration des affaires au CÉGEP John Abbott. Les résultats de cette étude indiquent à la fois une perception des étudiants fortement favorable du module d'étude avec accès Internet ainsi que l'amélioration des taux d'achèvement des devoirs et des résultats scolaires en particulier chez les élèves qui avaient de mauvais résultats dans un cadre traditionnel, l'environnement d'étude non accès Internet.

ABSTRACT

Student engagement in a course is an important precursor of academic success. Within the discipline of accounting, successful completion of the self-study component of the course is a critical aspect of student engagement and success. Web-enhanced learning offers an opportunity to provide a structured learning environment with improved access to learning tools and immediate feedback that can improve completion rates of self-study activities. This study evaluated student perceptions and academic results relating to the implementation of a web-enhanced study module in an introductory accounting course in the Business Administration department at John Abbott College. The results of this study indicate both a strongly favourable student perception of the web-enhanced study module as well as improved homework completion rates and academic results, particularly among students that had previously performed poorly within a traditional, non web-enhanced self study environment.

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INTRODUCTION

1. THE BUSINESS ADMINISTRATION CONTEXT

The Business Administration Program currently offered at John Abbott College is a three year technical program specialized in Accounting and Management. Admission of new students into the Business Administration Program takes place in the fall semester and is limited to eighty students through an admissions quota. While the program routinely fills its quota, students will frequently double book acceptances in different institutions and make a final decision in the summer preceding their first semester. As a result, the first semester cohort is typically missing ten students on the first day of class and, on average, consists of seventy students or two sections in the first year cohort. Each new cohort consists of a diverse group of students.

Business Administration attracts students with a variety of abilities and interests. Business Administration is a broad umbrella of varied disciplines that form a continuum that ranges from marketing and human resource management on one extreme to accounting, finance and taxation on the other. The interests of respective students will often gravitate somewhere along this continuum. It is not uncommon for business students to break down into subgroups or cliques of marketing types and accounting/finance types, reflecting individual student bias towards qualitative versus quantitative analysis. In addition to the diversity of interests, first year cohorts arrive with a diversity of academic ability.

The primary tool used to evaluate students for admission to John Abbott College is the “code-final”. The code-final is a number assigned by the minister of education of Quebec that reflects academic results for each respective student. While the code-final is primarily influenced by the grades a student received in their senior

high school record, it is also influenced by the courses a student was enrolled in during senior high school. For example, a student successfully completing enriched math would have a higher code-final than students who complete regular math with a similar grade. The code-final plays an important role in the admission process for the Business Administration Program.

The Business Administration Program has lower admission requirements than most pre-university programs in John Abbott College. Students leaving high school with a lower code-final have a reduced number of college options to choose from, Business Administration being one of those possible choices. The code-final of the students that are admitted to the Business program varies widely; while many students have a code-final high enough that they would qualify for pre-university programs in Business or Science, there is a disproportionate number of students accepted into the program with a code-final that borders on the minimum limit. The courses in the Business program are generally designed to reflect this reality.

2. ACCOUNTING IN THE CONTEXT OF THE BUSINESS PROGRAM

As the Business Administration Program specializes in Accounting and Management, accounting courses permeate the Business Administration Program; the program plan includes at least one accounting course in each of the six semesters of the program. The accounting courses earlier in the program provide a foundation upon which subsequent courses in the program rely.

With an accounting course in each semester of the program students, arriving from high school, are immediately faced with these challenging courses – courses that establish the academic standard for the early part of the Business Administration Program. The general perception among the department faculty is that the early accounting courses represent a filter that acts as proxy to determine if a student is well suited for the rigor of the three year Business program.

Typically up to fifty of the initial eighty students successfully complete Accounting I in their first semester. Attrition in the Business Administration Program is highest in the first semester and generally levels off after the first year. At the beginning of the second year of study the student cohort is typically forty five students strong – the majority of whom will go on to complete the program. While some students will leave the program as a result of discovering greater interests elsewhere, many drop out as a result of lack of academic success with college in general and these early accounting courses in particular.

Early accounting courses in the program are designed to take into consideration the general abilities and limited accounting background of the students entering the program. In terms of Bloom's taxonomy of the cognitive domain, the Accounting I course emphasizes factual, conceptual and procedural knowledge. During the Accounting I course these types of knowledge are developed with an emphasis on the lower three levels of Bloom's categories of cognitive complexity – recollection, understanding and application – with relatively minimal emphasis at this stage given to the higher order categories of analysis, evaluation and synthesis (Bloom, 1956). Similarly, in terms of the classifications of knowledge set out by Smith and Ragan, the course emphasizes declarative, conceptual and procedural knowledge (Smith & Ragan, 1999). The primary challenge of the early accounting courses involves student mastery of the relevant declarative knowledge, concepts and procedures of accounting reinforced through independent study.

Success in the discipline of accounting in general requires a high degree of commitment from the students both in terms of effort within and outside the classroom. In addition to the sixty hours of class-time, students are expected to complete a further sixty hours of self-guided study. Typically the majority of this self-guided study time is devoted to completing homework activities.

To achieve the self-study objective students require the availability of effective learning tools, individual motivation and the ability to self-regulate their respective learning process. In the absence of effective tools to facilitate success for the self-guided study component of the course, student motivation and self-regulation of learning are adversely affected.

CHAPTER ONE

STATEMENT OF PROBLEM

1. STATEMENT OF PROBLEM

During class time students have immediate access to their instructor, classmates and other learning tools – all fundamental resources that facilitate student success. In the classroom, when the student identifies an obstacle to their learning the means are immediately available to overcome that obstacle and further the learning process.

Effective self-guided study time is both critical to student success and the most challenging component to achieve. Difficulty completing the sixty hour self-guided study component of accounting courses in the Business Administration Program has emerged as a trend among successive cohorts of the program. However, this phenomenon is not uniform within a typical cohort; instead, approximately half the cohort are succeeding in completing the self-study component while the other half are significantly less successful in this aspect of the course. The quantitative academic results produced in the course – typically bi-modal in nature – are strongly influenced by the net result of each individual student's success or lack thereof in the self-guided study component. Moreover, on an affective level, the degree of success or lack thereof in their early accounting courses subsequently influences the students' attitude towards accounting in particular and the Business Administration Program as a whole.

This situation represents an extended problem, both for the students involved and the department. Many students in their first semester of the program are not fully committed to the program and profession – certainly not to the same degree as second

and third year students. First year students are in a period of evaluation with regards to the direction of their respective professional careers. In many cases, students who are not successful in the first accounting course leave the program.

While one of the founding tenets of the CÉGEP system was to allow students to find their own areas of professional interest – to experiment with academic areas of specialization – it is not clear that students are leaving the Business program for the right reasons: that they have decided that they are not committed to the profession rather than leaving simply as a result of having been unsuccessful in a few or even a single course. More effective learning tools and greater academic success could improve this situation.

2. STATEMENT OF PURPOSE

The purpose of this research study is to evaluate the implementation of an online educational technology component to address the issues Business Administration students are facing in terms of the self-study component of the accounting courses within the program.

The high degree of saturation of personal computers and high-speed Internet access has resulted in new opportunities for developing educational technology online. Within the context of this research study, these new opportunities are leveraged by implementing a specialized website, available to the students, used primarily for the self-guided study component of the course. While completing the accounting exercises available on the website, students have immediate, automated access to learning resources to assist in the activity and feedback relating to the work completed. The whole process can be monitored and managed by the instructor remotely through administrator level access to the website application.

At the course level, this research may provide valuable insight into how to increase academic performance and help students develop a deeper understanding of the material at hand. Furthermore, it may provide an initial framework for a web-enhanced learning environment that integrates aspects of online educational technology as a supplement to in-class teaching and learning. As a template it may serve as a reference for application of similar technologies within other accounting courses in the program.

From a departmental perspective any improvements in the results of this early accounting course should have beneficial effects later in the program, providing a stronger foundation for the subsequent courses in the program. Moreover, positive affective development of the students should pay dividends both academically and in terms of student retention within the program – students who may have abandoned the program as a result of failing a few or even a single course may be motivated to continue in the profession and go on to discover a promising career.

Finally, this research may be beneficial to educators in general, filling a gap that exists in terms of elaborating on the implementation of a very specific online educational technology within the context of an introductory accounting course. This research may also help identify opportunities for the integration of online educational technology components in other courses and disciplines both within and outside of Business, particularly instances of disciplines that rely heavily on lower levels of declarative, conceptual and procedural knowledge.

CHAPTER TWO

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

1. CONCEPTUAL FRAMEWORK

This research study is informed by a conceptual framework that includes a recognition of the development of learners, constructivist learning theories and active learning, the role of homework in higher education, multiple intelligences and student learning styles.

1.1 Learner Development

Perry and Baxter-Magolda advocate models that highlight a two-plane progression of the development of learners: first, the transition from learner dependence to independence and, second, a transition from knowledge certainty towards a recognition of the multiplicity and ultimately a rejection of the notions of the certainty of knowledge (Perry, 1970; Baxter-Magolda, 1992; Felder & Brent 2005).

Baxter-Magolda's Model of Epistemological Development identifies a series of stages a student traverses from dependent to transitional, independent and contextual. Learner stage identification is achieved by measuring student attributes through the use of a standardized tool, the Measure of Epistemological Reflection (MER) – her specific research demonstrated that sixty-eight percent of freshmen, or first year college students, met the profile of dependent learners. By the time students reached their junior, or third year of college, the prevalence of dependent learners was too small to make possible the identification of themes for that category (Baxter-Magolda 1992).

Baxter Magolda's Model of Epistemological Development demonstrates that student satisfaction with the learning process is directly related to the confirmation of learning. The model indicates that confirmation, a sense of validation of individual knowledge, takes different forms for learners at different stages. Confirmation of learning in turn results in heightening students' interest in learning and strengthening their investment in that process.

1.2 Constructivism and Active Learning

With roots that reach back to the early twentieth century, constructivism and active learning are fundamental concepts of modern pedagogy. Active learning represents a paradigm shift away from the teacher centered, passive paradigm of learning by insertion or transmission – a view of learners as empty vessels into which knowledge is poured.

Active learning is generally associated with 'learning by doing' with an emphasis on the learner's active participation in the experience of learning. Drawing on the work of John Dewey, an active learning environment is an education of, by and for experience (Dewey, 1938). Research demonstrates advantages of active learning in terms of the strength of the intellectual schema developed through this type of learning which is described as producing deeper forms of knowledge compared to the more shallow understanding that results from passive learning. Deeper learning implies a multi-dimensional improvement in the knowledge of the learner – a more profound understanding both in terms of generalities and nuance that remains with the learner longer and, moreover, a flexible form of knowledge that can be adapted and transposed to ill-defined problems. The role of the instructor in an active learning setting is generally perceived along a continuum indicated by the level of guidance provided by the instructor. At the passive end of the active-learning continuum instructor guidance is complete; the instructor represents the absolute

authority of knowledge. From that extreme, the continuum moves through various degrees of scaffolded learning, to student-led inquiry and finally pure experiential learning characterized by the absence of instructor intervention (Mayer, 2004).

Seminally authored in the early twentieth century through the writings of Piaget and Vygotsky, constructivism is a term that has become fashionable in modern pedagogical literature. Constructivism is directly linked with the pedagogical notion of active learning. Constructivism, however, goes beyond the basic premise of active learning to recognize the significance of the role of the learning in actively organizing information into forms of knowledge (Piaget, 1932; Vygotsky, 1934). From a constructivist perspective, knowledge is treated as an individual's mapping of actions and conceptual operations that prove viable in experience – within this framework no two people produce the same mental constructs. Moreover, shared meaning between individuals is construed as a gradual process of accommodation that is achieved through a relative fit of individual meaning constructions. Constructivism shares with active learning an underlying premise that the less passive/more participatory stance that the learner takes in the learning process the stronger the schema of knowledge that results (Luppicini, 2003).

1.3 Self-Study: The Role of Homework in Higher Education

As the purpose of this research is to evaluate the implementation of an online educational technology component designed to address issues Business Administration students are facing in the self-study component of their accounting courses, a review of the role of homework in higher education is warranted.

A significant and varied body of research exists that considers the role of self-study and homework in education. Cooper defines homework as "a task assigned to students by school teachers to be carried out during non-class hours" (1989). The diverse topics undertaken in the study of homework in education include the role of

homework for the general student population and, in contrast, the role of homework among special needs students. Alternately, educational research has investigated the role and potential benefits of homework for students at different stages of their education – from grade school through to higher education.

The academic literature offers different perspectives on the advantages and disadvantages of homework. Proponents of student self-study in general and homework in particular believe that it improves academic achievement and student attitudes toward school, promotes proper study habits and encourages students to learn outside of the classroom (Alleman & Brophy, 1991; Cooper & Nye, 1994). Offsetting the potential benefits, concerns about the potential detrimental effects of homework include fostering academic burnout among students, promoting negative attitudes toward school, encouraging cheating, denying students access to leisure time, and increasing the differences between high- and low-achieving students (Alleman & Brophy, 1991; Bursuck, 1994; Cooper & Nye, 1994).

Moreover, the relative emphasis on homework has shifted several times in the last century. At the beginning of the 20th century, implementing a rote-oriented learning pedagogy, home work was emphasized. As the emphasis shifted to problem solving in the 1940's homework fell out of favour only to be re-emphasized again in the 1950's and then fall out of favour once again in the 1960's. Academic research in the last three decades has identified learning contexts that benefit from student homework.

One of the important themes that develops in the body of educational research as it relates to student homework involves distinguishing the merits of homework at different levels of education. In a meta-analytical research study, Cooper reviewed nearly 120 studies of homework effects. One of the key observations that results from that study was a recognition that the correlation of homework completion and academic results varied strongly as students progressed

through grade school to higher education. Specifically, while for students in primary school, a correlation between homework completion and academic results was approximately zero, senior high school students (grades 9-12) demonstrated a positive correlation of 0.25 between homework completion and academic results. As a result Cooper suggested that at higher levels of education homework plays an important role in the learning process.

A second important aspect of educational research regarding homework evaluates situations where the homework process breaks down. Typically this research compares the body of students who demonstrate a general ability to complete homework exercises effectively and on deadline with a second group, commonly described in the literature as low-achieving students or sometimes as students with mild learning disabilities – students who for a variety of reasons have difficulty completing homework assignments. Students in the latter group are typically characterized by poor organizational and time-management skills, an external locus of control, motivational and attention deficits, and negative attitudes toward homework and school (Epstein et al., 1993).

Academic research has identified a host of conditions and practices to address the difficulties confronting low achieving students. Structuring the homework process for low-achieving students has been one method implemented to increase students' homework completion rates. Salend and Schliff (1989) noted that teachers can increase their students' homework completion rates by providing students with frequent and immediate feedback concerning their homework. Moreover, creating homework tasks that reinforce in-class learning also resulted in increased homework completion rates.

1.4 Multiple Intelligence and Learning Styles

Recognition of the theories of multiple intelligence and student learning styles also serves as an underpinning of this research study. Theorists including Gardner, Kolb and Fleming have developed models that expand our conception of knowledge as well as the learner preferences for the acquisition of knowledge. Designing academic activities with these conceptions of knowledge and student learning styles in mind can potentially result in better academic performance within a group of students who possess a broad array of learning styles.

Howard Gardner's work in this field, generally referred to as the Theory of Multiple Intelligences (MI), identifies eight intelligence classifications arranged around the ability of an individual to understand others, themselves and the natural world (1984). Of Gardner's eight intelligences, linguistic, logical-mathematical, musical, bodily-kinaesthetic, spatial, intrapersonal, interpersonal and naturalist intelligence, only the first two, linguistic and logical-mathematical are primarily valued in a traditional academic setting.

Early work that documented the identification of learning styles included that of Jerome Kagen whose research in the 1960's categorized learning styles as reflective or impulsive (1964). Subsequently, a number of models have been developed that classify various approaches or ways of learning. One of the most widely-used categorizations of the various types of learning styles is Fleming's Visual, Auditory, Reading and Kinaesthetic (VARK) model which classifies individual learners within the categories of: visual learners, auditory learners, reading/writing-preference learners, or, kinaesthetic or tactile learners (2001). Facing a diversity of learning styles the VARK model advocates a corresponding use of a variety of teaching styles and materials to promote effective learning.

An alternative student learning styles model proposed by Kolb (1984), identifies four stages in any learning process: feeling (concrete experience), watching (reflective observation), thinking (abstract conceptualisation) and doing (active experimentation). Kolb asserts that a learner must pass through each of these stages to fully master a topic. While a learner can begin the process at any point, Kolb suggests that individual learners have preferred sequences through the learning process. Kolb identified four categories of learners' preferences including converger, assimilator, accommodator and diverger. Honey and Mumford (1992), who built upon these categories, used the terms pragmatist, theorist, activist and reflector which correspond to Kolb's categories respectively. According to this classification system the pragmatist prefers a learning sequence that begins with theory followed by individual doing, a theorist prefers a learning sequence that begins with theory followed by observation and reflection, an activist prefers to experience the topic followed by individual doing and finally a reflector prefers to experience the topic followed by observation and reflection. Similar to the primary implications of the VARK learning styles model, recognition of Kolb's learning style model suggests the use of a variety of teaching strategies and materials to promote effective learning as a means of adapting the learning environment to students' individual learning preferences.

One interesting overlap in the theoretical foundation of this research is the link between Kolb's learning styles and the contribution Piaget made to constructivism. Piaget viewed intelligence as a balance between assimilation, the process of fitting one's observations of the external world into one's world of existing concepts, and, accommodation, the process of adapting one's concepts to fit the external world. Kolb in turn implemented the concepts of assimilation and accommodation directly into his learning style's theory. At the intersection of these two models is a view of learners actively engaged in the construction of knowledge.

2. LITERATURE REVIEW OF DISTRIBUTED EDUCATION

The pedagogical literature in the field of distance education examines a number of different aspects including the rapid growth of distance education, comparisons of online versus traditional classroom learning effectiveness, limitations of online education and the implementation of hybrid and web-enhanced learning environments that integrate aspects of distance education within the context of a traditional face-to-face classroom

2.1 The Growth of Distance Education

Distance education has been a growing phenomenon in the twentieth and twenty-first centuries. Prior to the widespread implementation of computers and broad-band Internet access, distance education filled a specialized niche in the overall educational spectrum. The advent and widespread penetration of personal computers and broadband Internet access has subsequently resulted in significant growth in the field. Based upon the responses from more than 2,500 U.S. colleges and universities, the 2007 report by the Babson Research Survey Group found that online enrolments are increasing at an annual rate of 9.7% – far exceeding the 1.5% overall annual growth in total higher education student population. Moreover, nearly twenty percent of all U.S. higher education students were taking at least one online course in the fall 2006 semester (Allen & Seaman, 2007). While the survey highlighted the overall growth in distance education there was one interesting discrepancy: in 2007 the annual rate of growth of online courses was slower than the corresponding rates from previous years. If this trend continues it would seem to indicate that distance education, while still growing, has begun to approach its medium-term equilibrium within the educational sector.

2.2 Traditional Versus Online Learning

The pedagogical terminology associated with distance education has evolved significantly with the integration of computers and broadband Internet. Subsequent to the integration of these technologies, terms such as Online Learning, E-Learning, and Virtual Learning have evolved in the pedagogical literature to reflect the new context (Williams, 2002; Garrison & Anderson, 2003; Swan, 2001). Moreover, the new distance education context has affected the way in which educators discuss traditional classroom education with new emphasis placed on terms such as face-to-face learning, synchronous dialogue, asynchronous dialogue, hybrid and blended learning (Young, 2002; Meyer 2003).

Comparison of traditional versus online learning is a topic that has been and continues to be the focus of a significant amount of educational research effort. The results of this research have generally been mixed, both in terms of measured academic results and students' preference for either learning environment. Proponents of the online learning environment point to situations of academic success – situations where students do better or at least as well, in terms of academic results, as corresponding students in traditional classrooms (Russell, 1999). Continued increases in student enrolment in online courses indicate a degree of student preference for this type of learning environment in certain situations. A recent study designed to elaborate on the reasons why students participate in online courses surveyed 90 participants among students enrolled in a graduate program in education and found that the students' desire for flexibility outweighed the apparent need for instructor and peer interaction as one of the primary reasons motivating students to enrol in an online course (Braun, 2008).

2.3 Limitations of Online Education

While researchers have identified areas of success in online education, several limitations have been identified in this general learning environment. The lack of face-to-face interaction of the learners with their instructor and their peers has been identified by researchers as a critical limitation of online education. Online communication systems such as email and learning community message boards have been implemented to attempt to fill the gap. The loss of face-to-face interaction with the instructor and peers has resulted in pedagogical research on the effectiveness of asynchronous versus synchronous communications systems. Research has demonstrated that while asynchronous communication systems generally fall short of face-to-face synchronous communication, they have an important advantage: the time delay allowed in the response of asynchronous communication allows participants greater ability to express themselves more thoughtfully and thoroughly (Rovai, 2004).

Trends that emerge from the ongoing research in online education have identified characteristics of online learners. A learner preference for visual and tactile learning is one attribute that has been identified as generally corresponding to the profile of a typical online learner (Halsne & Gatta, 2002). This research however is limited somewhat by its comparison of an online learning environment with a classroom setting that is focused on a lecture style that appeals more to auditory learners.

A second trend that emerges in the research of online learner profile relates to the self-efficacy of the students involved therein. Self-efficacy, or the ability of students to be self-motivated and regulate their learning is seen as a requirement for online learning. Kim & Frick (2011) note that studies suggest a lack of time and motivation are primary causes of learner attrition in online learning environments. Students demonstrating low self-efficacy have demonstrated lower success rates, including increased dropout rates compared to traditional classrooms. Corresponding

to the theories of learner development such as those of Perry (1970) and Baxter-Magolda (1992), the largest population of online learners are among students enrolled in higher education (Allen & Seaman, 2007), a level of education where students typically demonstrate higher levels of self-efficacy and learner independence. Unstructured online courses have been demonstrated as an environment promoting academic procrastination for students with low self-efficacy, the results of which are detrimental to academic success (Senecal, Koestner & Vallerand, 1995). To address these limitations for students with lower degrees of self-efficacy, academic research has begun to focus on the need for improved scaffolding and structured approaches within the online environment (Bertin & Narcy-Combes, 2007; Sharma & Hannafin, 2007). The identification of these learner profiles along with a recognition of the limitations of full online learning environments has in turn led to an increase in interest on the part of educators towards blended and hybrid learning environments as a means to address these issues.

2.4 Blended and Web-Enhanced Learning Environments

Blended and hybrid learning environments seek to integrate aspects of online and traditional classroom learning environments. Rovai (2004) describes a continuum of educational technology-enhanced classrooms that includes web-enhanced, blended and online. While the online category is a fully educational technology-enhanced course, web-enhanced and blended involve some degree of integration of online and traditional classrooms. In this definition, the web-enhanced category describes what is primarily a traditional classroom supplemented by online components, often in the form of basic course management systems that provide basic email and document distribution services.

The blended or hybrid category involves a higher degree of technological integration, typically involving reducing the amount of time spent in a physical face-to-face setting, replacing that component with online content. While absent from

Rovai's model of the continuum of educational technology-enhanced classrooms, Young (2002) uses the term hybrid learning environment in a manner that generally corresponds to the definition Rovai assigns to blended learning. For the purposes of this research, the term hybrid was used to describe a learning environment where class time is reduced and replaced with online educational technology.

A number of researchers have reported increased academic success implementing web-enhanced or hybrid designs. Within the context of a web-enhanced finance course, research conducted by Biktimirov and Klassen (2008) investigated the relationship between the availability of course materials including PowerPoint lectures, sample tests and homework solutions through a course management system. In their research design, students' use of the available resources was measured by the students having accessed these resources through the academic institution's web portal. While the results of this research demonstrated no significant correlation between student use of the PowerPoint lectures, sample tests and academic results, a statistically significant relationship ($r=0.688$; $p<0.05$) was observed between students' use of homework solutions and academic results. In a separate research study that emphasized the importance of providing a structured learning environment for students with lower degrees of self-efficacy, Dobson (2008) evaluated the implementation of a hybrid design involving online quizzes and the resulting affect on overall success in the course. Dobson's results highlighted a positive relationship between the integration of the online quizzes and summative exam score. Moreover, while each of these studies was designed to evaluate the integration of a web-enhanced or hybrid design, their results support the value of homework in a higher education learning context.

2.5 Evolution of Online Learning Tools

Concurrent with the rapid development of computer and Internet technology, e-learning systems that leverage this progression of technology have proliferated. Diaz (2011) notes that e-learning opportunities have evolved in numerous directions including both institutional and publisher-based course management systems as well as through a host of alternative online learning systems commonly referred to as Web 2.0 tools.

Salyers, Carter, Barrett & Williams (2010) describe the role of the institutional course management systems such as Blackboard, Moodle or WebCT as traditionally involving hosting course materials, providing access to resources such as presentations and solutions, and academic record keeping. Diaz (2011) notes that while institutional course management systems are normally available to all students across an academic institution, they are typically general in nature and lack some of the rich features found in publisher-based systems and Web 2.0 tools. As a result, while institutional tools are popular and well entrenched, publisher-based and Web 2.0 tools are rapidly gaining usage among educators.

Web 2.0 and publisher based e-learning tools typically offer greater flexibility and depth to the online learning experience. Diaz (2011) describes Web 2.0 technologies or so called “cloud-based” learning tools as a variety of socially oriented, free or nearly free, web-based tools. She contends that these tools represent the leading edge of a transition from institutionally provided to freely available learning technology tools. By comparison publisher based web learning tools tend to be designed to meet the needs of specific academic disciplines. This class of web-based learning tools tends to offer rich discipline specific content including web-based tutorial, learning management and student self-assessment capabilities. Often in practice each of these systems, Web 2.0 and publisher based e-learning tools, are used to complement the more general features of the institutional course management systems.

2.6 Technology Enhanced Accounting Education

A small body of academic literature is specifically related to the offering of accounting education online. This literature generally focuses on a comparison of fully online versus a traditional face-to-face learning environment. Broad, Matthews, & McDonald (2004), in a study of second year undergraduate students enrolled in a BA (Honors) Accounting degree, suggested that the integration of a virtual learning environment could engender a move to more autonomous learning by students. However, in a study comparing live versus virtual delivery of classroom lectures, Vamosi, Pierce, & Slotkin (2004) found a lower relative level of satisfaction with the distance-learning component, as well as diminished effectiveness in mastering the distance-learning course material.

A review of the literature related to the integration of educational technology in accounting education online demonstrates that a gap exists in the academic literature. The majority of the existing research investigates fully online versus traditional accounting classrooms with very little educational research on the subject of sophisticated web-enhanced and/or hybrid type implementations within the accounting discipline. The literature that examines hybrid course designs in accounting education focus on measured website visit frequency, usefulness of each site features including PowerPoint lectures, homework solutions and practice tests (Comunale, Sexton, Voss, Pedagano; 2002) and the integration of an asynchronous collaborative message board used to post student questions and answers and reduce feedback redundancy in accounting distance learning (Halabi, Tuovinen, Smyrnios; 2000). The existing literature does not seem to investigate the implementation of an online educational technology study module in a web-enhanced learning environment that is the basis of this research.

CHAPTER THREE

METHODOLOGY

1. RESEARCH QUESTION

How does the integration of a web-enhanced exercise module affect the general perceptions and academic results of students in a third semester accounting course?

2. HYPOTHESES

The hypotheses of this research are built directly from the conceptual framework and literature review including the active learning perspective of Dewey and the constructivist principles of Piaget and Vygotsky, the Baxter-Magolda model of learner development, Senecal, Koestner & Vallerand's recognition of the need for a structured learning environment for students that otherwise demonstrate low self-efficacy and the varied learning opportunities suggested by Gardner's theory of Multiple Intelligences. The hypotheses serve in the process to operationalize the research, serving as a bridge between the research question and the measurements to be collected. This research is based on the following hypotheses:

Hypothesis One: Learning within the accounting discipline is strongly influenced by the degree to which students actively participate in the learning process, both in class and through the homework activities – stated simply, more effective learning results from greater student participation. To the extent that the web-enhanced self-study system results in increased student participation, particularly increased homework completion rates, the web-module offers the potential to improve student understanding and academic results.

Hypothesis Two: Learning tools and prompt feedback greatly improve the learning process. The integration of tools of this nature through web-enhanced media and oriented towards a self-directed homework study component of the course may result in more effective and efficient learning. Moreover, a successful learning environment can augment students' intrinsic motivation towards the subject.

Hypothesis Three: Using a variety of learning environments, including both face-to-face and interactive online content, offers the potential to stimulate students and, moreover, provide windows of opportunity for learners with different learning styles to successfully access the material.

Hypothesis Four: While one objective of a college education is to develop independent, self-regulated learners, the majority of students who enrol in the program remain dependent learners in the Baxter-Magolda framework; the process of transitioning to independent learners is not achieved all at once. In the absence of the intrinsic self-discipline of independent learners, the web-enhanced learning environment may offer a suitable structured learning environment within which students at this stage of development can be successful.

3. CONTEXT AND METHODOLOGY

The research takes place in the context of a third semester Business Administration cohort enrolled in an Introduction to Cost Accounting course. Introduction to Cost Accounting is the third accounting course in the Business Administration Program following the prerequisite courses Accounting I and Accounting II in the first and second semesters respectively. As a result of the sequential nature of these courses, for the purpose of this research, the third course in the sequence, Introduction to Cost Accounting, will simply be referred to as Accounting III. The first two courses in this sequence, Accounting I and II were

taught by a full time faculty member and colleague of the researcher. The third course, Accounting III, was taught by the researcher in this context.

The preliminary accounting courses, Accounting I and Accounting II, were taught in a traditional face-to-face setting without any significant web-enhanced learning component. The third course in the sequence, Accounting III, was taught with the integration of a web-enhanced self-study module. Through this web-based module students are able to complete homework, assignments, initiate self-study through separate study modules and assess their knowledge through integrated practice tests. The web-based self-study module used in this research was a publisher-based system offered through Pearson Education called My Accounting Lab and comes bundled with the textbook used in the Accounting III course. To access the online web-module, students use their individual access codes to log into the website found at <http://www.myaccountinglab.com>.

John Abbott College students enrolled in the web-enhanced Business Administration course Accounting III graciously supplied the data used as a basis for this research project. Informed of the nature of the research, students offered their perceptions of the online learning module and authorized the use of academic results from the current web-enhanced course, Accounting III, and also, retroactively, from the academic results this cohort had obtained in the prerequisite courses Accounting I and Accounting II.

While the details of the instruments and data collection process are defined in depth in the appropriate sections of this report, it is important to note that data used only for this research project, including the academic results from the previous accounting courses and the students' perceptions survey were not in the instructor/researcher's possession during the semester and up until the final grades for the Accounting III course were submitted to the college. Moreover, to protect the

privacy of the individual students involved, all unique identifiers associated with individual students were removed from the final report.

To help ensure a high degree ethical standard this research project was evaluated and approved by the John Abbott College Innovation, Research & Development Committee.

Using a primarily quantitative orientation, the research project includes an exploratory component collecting data related to students' perceptions regarding the web-enhanced learning module. The students' perception data, combined with the academic results of Accounting I, II and III were subsequently, using an ex post facto causal-comparative framework, studied to evaluate the impact of the web-based module implemented in Accounting III in comparison to the more traditional setting presented in Accounting I and II.

Combining these different research methodologies offered the potential advantage of providing various perspectives from which to evaluate research findings.

4. SAMPLE TYPE AND SAMPLE SIZE

This research was designed to be implemented using a convenience sample consisting of students enrolled within a course being taught by the researcher; by their proximity these students represented a readily available source of data. Furthermore, as a result of the non-random manner in which students were selected as research subjects, the sample can also be described as a non-probability sample. The limitations of selecting a non-probability, convenience sample include an inability to statistically extrapolate the results beyond the environment of an introductory CÉGEP accounting class. Moreover, as the proposed research context is fairly specialized,

the results of the research may be limited by the context-specific learning styles that are typically inherent in a technology program.

The sample size initially expected to be between thirty and thirty-five students, depending on the attendance, and response rate turned out to be thirty students.

5. INSTRUMENTS FOR COLLECTING DATA

5.1 Academic Results Data

A variety of data were collected from course grades and the web-enhanced online module. Course grade data was drawn from all three courses in the sequence, Accounting I, Accounting II and Accounting III. This data consisted of assignment results including completion rates and assignment grades as well as test results and final grades for each course.

Data was also collected from the online self-study module implemented during the Accounting III course, including homework completion rates and grades, study plan, practice test results and data related to student time-on-task, some generated from the website. The collection of this data is justified through the requirement in the research question to evaluate the impact on academic results of the web-enhanced module. Moreover, these academic results provide an objective reference point of evaluation against the students' perceived outcomes relating to the implementation of the web-enhanced module.

5.2 Survey Data

The second type of data collection consisted of a survey that sought to identify basic demographic data and students' perception of how the integration of

the web-enhanced study module affected their learning. A Likert scale format was implemented for the majority of the survey questions.

The collection of this data is justified through the requirement in the research question to identify students' general perceptions of the web-enhanced study module. Moreover, this data component includes independent variables that is used in the analysis component to subdivide the sample along demographic lines to look for more detailed relationships within the data.

The collection of data from a variety of instruments and from different perspectives was useful, providing an opportunity to triangulate results as well as provide evidence of internal consistency within the results. Moreover, the generous collection of data allowed for opportunities to discover relationships that were not immediately apparent at the outset of the research.

6. VARIABLE DATA COLLECTED

Table 1

Data Collected: Course Results, Web-Module and Survey Data

Academic Results	
Accounting I, Accounting II, & Accounting III	<ul style="list-style-type: none"> • Homework grades • Homework completion rates • Test grades • Final grades
Web Module Data	<ul style="list-style-type: none"> • Homework grades • Homework completion rates • Study module usage • Study module time-on-task data • Practice test usage
Survey Data	
Student Demographics	<ul style="list-style-type: none"> • Age • Gender • Mother tongue
Student Self- Reported	<ul style="list-style-type: none"> • General computer literacy • Perceptions of the ease-of-use of the web-enhanced interface • Web-module learning tools used • Web-module learning tool preferences • Extrinsic motivation resulting from instructor monitoring • Extrinsic motivation resulting from homework grading • Problem solving persistence resulting from extrinsic motivation • Preference for automated versus manual learning environment • Degree of material understanding: comparison web-enhanced versus manual learning environment • Grade impact comparison: web-enhanced versus manual learning environment

7. RESEARCH RELIABILITY AND VALIDITY

Reliability of research can be evaluated at a number of different levels including the reliability of research results as well as the reliability of the instrument used to arrive at said results. The reliability of research results describes the extent to which research results are consistent over time and an accurate representation of the total population under study. Furthermore, reliability of instruments implies that an instrument is considered to be reliable if the results of a study can be reproduced under a similar methodology.

To the extent that this research fills a gap in the existing research and the survey instrument in particular will be a new tool devised for this specific research implementation, instrument reliability will need to be implemented in a pro-forma manner – that is, based upon future implementations of the research within the Business Administration department. Making the survey instrument available to colleagues for this purpose will facilitate the process.

Validity is also evaluated as the extent to which research truly measures that which it was intended to measure – does the research instrument hit "the bull's eye" of the research objective. One important way to evaluate instrument validity is to incorporate redundant measuring techniques for a given construct; measuring a construct through different tools should produce similar results, providing confidence that the instrument measures with an acceptable degree of validity.

A second technique that is employed to evaluate instrument validity is the triangulation of research results from different sources. In this case data collected from academic results as well as time-on-task data are compared with the results of the student survey. Comparison of student perceptions captured in the survey with the objective academic results and time-on-task data has the potential to reinforce as

well as illustrate discrepancies in validity, which are important aspects of the data analysis.

8. CONTEXT AND PROCEDURES FOR DATA COLLECTION

The My Accounting Lab web-module had been implemented by the instructor researcher in a previous semester among students enrolled in an evening course offered by the continuing education department at John Abbott College. As a result of the very different academic context, the daytime students who form the basis of this research would have had no prior knowledge of the My Accounting Lab web-enhanced learning module. In the continuing education implementation both student and instructor reaction to the initial use of the My Accounting Lab web enhanced module had been generally favourable although the results of that previous implementations had not been the basis of any in-depth academic research.

As a result, while the cohort of daytime students that form the basis for this research viewed the implementation of the web-enhanced My Accounting Lab system as a new pedagogical approach to the process of learning accounting, they were not immediately aware that the academic results that they generated during the semester could become the basis of an academic research project.

Two groups of data were collected. The first included academic results from the courses Accounting I, II and III. In addition a student survey was administered to gather students' impressions of the web-enhanced module versus a more traditional manual homework environment. Academic data relating to the web-enhanced module were gathered and stored automatically on the server and were downloaded, in spreadsheet format, at the end of the semester. Detailed historical course grade data for Accounting I and II are stored in the instructor's records from previous semesters. The procedure for collecting survey data involved distributing surveys in the fifteenth week of the semester during the penultimate class of the course. In order

to correlate student perceptions with the grades collected within the web-enhanced module, a unique identifier was necessary.

Students whose data this research project is based upon, daytime students in the Business Administration program at John Abbott College, consented to the use of their academic results data for the three accounting courses while completing the My Accounting Lab student perceptions survey in the fifteenth week of the academic semester. By the fifteenth week all of the online learning activities for the semester had been completed. As a result of the timing of these events, while the survey data may potentially be influenced by the Hawthorne effect, the academic data from the three accounting courses should be free of any such effect.

9. JOHN ABBOTT COLLEGE'S INNOVATION, RESEARCH & DEVELOPMENT COMMITTEE

The Innovation, Research & Development Committee (IRDC) oversees the implementation of research at John Abbott College. A summary overview of this research proposal highlighting the purpose, sample, data collection methods and procedures were submitted to the John Abbott IRDC and met with their approval subject to the following provisions.

- A. A paragraph should be included in the survey cover page clearly stating that if the student completes the survey they are consenting that their data, from both the current and past Business Administration accounting courses be used for the purposes of this research.
- B. In order to consent students had to be of the age of majority (a minimum of eighteen years of age). Failing this condition the student's legal guardian would be required to provide consent.

Both of these requirements were integrated into the research data collection. Moreover, as the Accounting III course is in the second year of the Business Administration Program all the students were of the age of majority.

10. ETHICAL CONSIDERATIONS

Protecting students involved in this study was an important objective of this research and was integrated at various junctures into the research design. First, the existing literature suggests that the treatment to be undertaken, the implementation of a web-enhanced study module, offered the potential to improve student learning and that this improvement would subsequently be reflected in their academic results.

The data collection process was designed to protect the students in a number of ways. Student participation was voluntary and moreover, students had to be of legal age to consent to the research. To further protect the students during the data collection process, an individual, independent of the researcher, collected the surveys as they were completed by the students. From that point the surveys were sealed and stored out of the researcher's possession in the associate dean's office until after the final grades for the course were submitted to the college.

During the analysis and results phase of the research, student confidentiality was maintained; all identifiers unique to individual students were removed and names, to the extent that they were used in any reporting were replaced by pseudonyms to hide an individual's real identity.

11. DATA ANALYSIS

The data was analysed to look for relationships that speak to the hypotheses of the research project including:

- A. The importance of an active learning environment within the discipline of accounting;
- B. The value of learning tools and immediate feedback related to the problem solving process;
- C. Student perceptions of learning style preference comparing manual versus online learning environments;
- D. The impact of a structured learning environment established through the instructor monitoring and evaluation of all the homework completed by the students.

The focus of the data analysis of this research project involved addressing the different aspects of the research question, specifically the analysis of impact of the web-enhanced module on academic results as well as students' perceptions of the impact of the web-enhanced module with regards to their learning and their academic results. As a result of the diversity of the data collected, data analysis involved a multi-faceted approach.

The first branch of the research evaluated students' perceptions of the web-enhanced module compared to a traditional, non web-enhanced learning environment. This section of the research used data collected from the student survey to attempt to answer the following facets of the students' perceptions component of the research:

- A. Was the online module technically challenging to the students;
- B. Did the students find the support systems built into the system useful;
- C. Which online resources did the students find the most useful;
- D. Did grading of the online homework increase the amount of homework students completed;
- E. What preference did students have regarding manual versus online homework completion;
- F. Did the student feel that the use of the online system improved grades? Understanding?

The second component of the data analysis looked specifically at the academic results of the web-enhanced module implementation. This section of the research used data collected from within the online module, overall academic results and grades from prior accounting courses to attempt to answer the following facets of the academic results component of the research:

- A. How did homework completion correlate to grades;
- B. How did the time on task correlate to grades;
- C. Did the students show higher completion rates for the online homework;
- D. What was the correlation of homework grading and homework completion;
- E. How did the use of online practice tests correlate to grades;
- F. Was the effect of the online system uniform for all students or did some segments of students respond differently to the online system?

This part of the analysis relied on scatter diagrams, correlation analysis and analysis of variance while the last component relating to the uniformity of student benefit of the web-enhanced module was evaluated using an inter-quartile mean analysis.

CHAPTER FOUR

PRESENTATION OF FINDINGS

1. SURVEY FINDINGS

1.1 Survey Overview

The survey of student perceptions relating to the web-enhanced module consisted of two questions that identified demographic data of the sample, eleven groups of questions constructed generally in a three-option Likert scale format that measured students' perceptions of the web-enhanced module versus a more traditional manual environment, and, finally, two open-ended questions that allowed students an opportunity to express their opinions on the principle advantages and disadvantages of the web-enhanced system.

1.2 Demographic Data

The demographic data collected in the survey included the gender and first language or mother tongue of the survey participants. Students that enrol in the Business Administration come from a variety of backgrounds and the demographic data collected from this survey support this

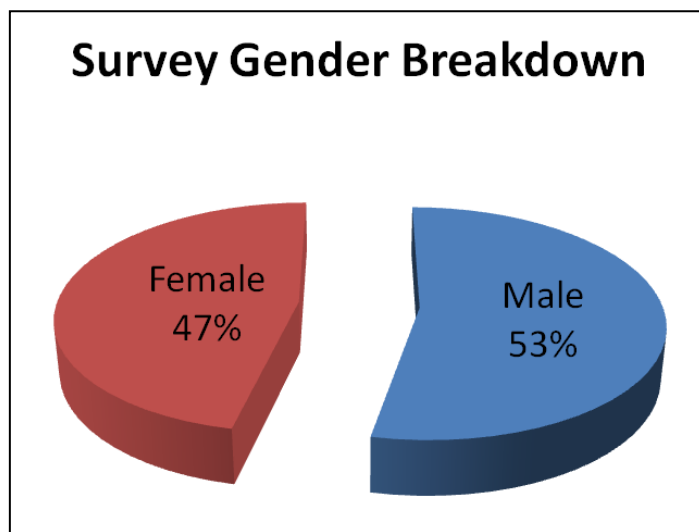
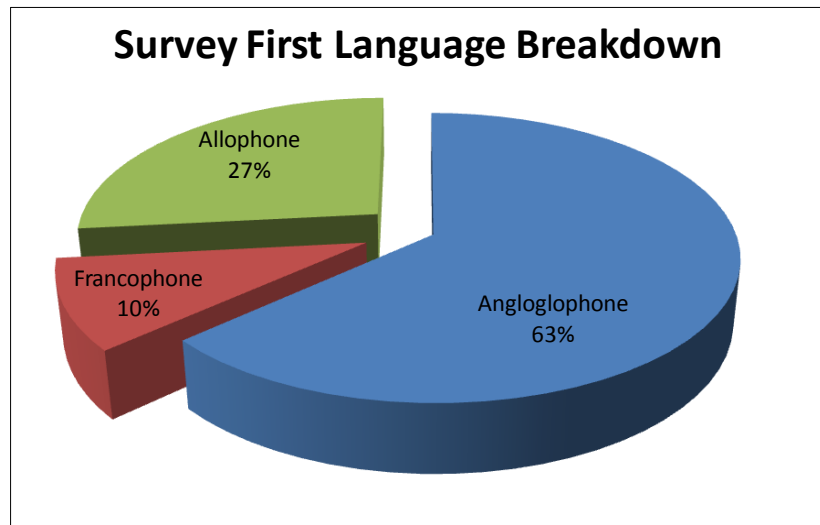


Figure 1. Gender Breakdown of Survey Respondents

view; of the 30 students surveyed 16 were male and 14 were female, illustrating the relatively gender neutral enrolment of the Business Administration department.

No attempt was made, in the course of this research, to systematically evaluate the level of English language proficiency of the students involved in the study. However,

even though a significant proportion (37%) of these students self-identified as non-English mother tongue, as the researcher in this study also



performed the role

Figure 2. First Language Breakdown of Survey Respondents

of the students' instructor for the semester, researcher observation and interaction with the students generally demonstrated that all of the students possessed at least a satisfactory command of the English language both verbally and through written communication. Self-reported mother tongue was classified into categories of Anglophone, Francophone and Allophone. Of the thirty students sampled, the data resulted in 19 Anglophones, 3 Francophones and 8 Allophones.

1.3 Likert Scale Survey Data

The second and largest section of the student survey consisted of eleven groups of questions constructed generally in a three-option Likert scale format. The questions covered topics including students' comfort levels with computers in general and the web-enhanced module in particular, their online learning tool usage, and

finally their self-perceptions of the web system's effectiveness in terms of their homework completion rates, grade results and course content comprehension.

Student responses to the Likert scale format questions were, on the whole, remarkably focused: for many of the questions a clear majority of the survey responses favoured a single choice. As these data are classified as nominal or ordinal in nature, the non-parametric chi-squared test was applied to these variables to identify situations of statistical significance. The standard assumption of a chi-squared test is that each response on the Likert scale has an equal possibility of being chosen, therefore, the strong grouping of responses of these survey questions resulted in a majority of these results demonstrating statistical significance.

1.3.1 Familiarity with Technology.

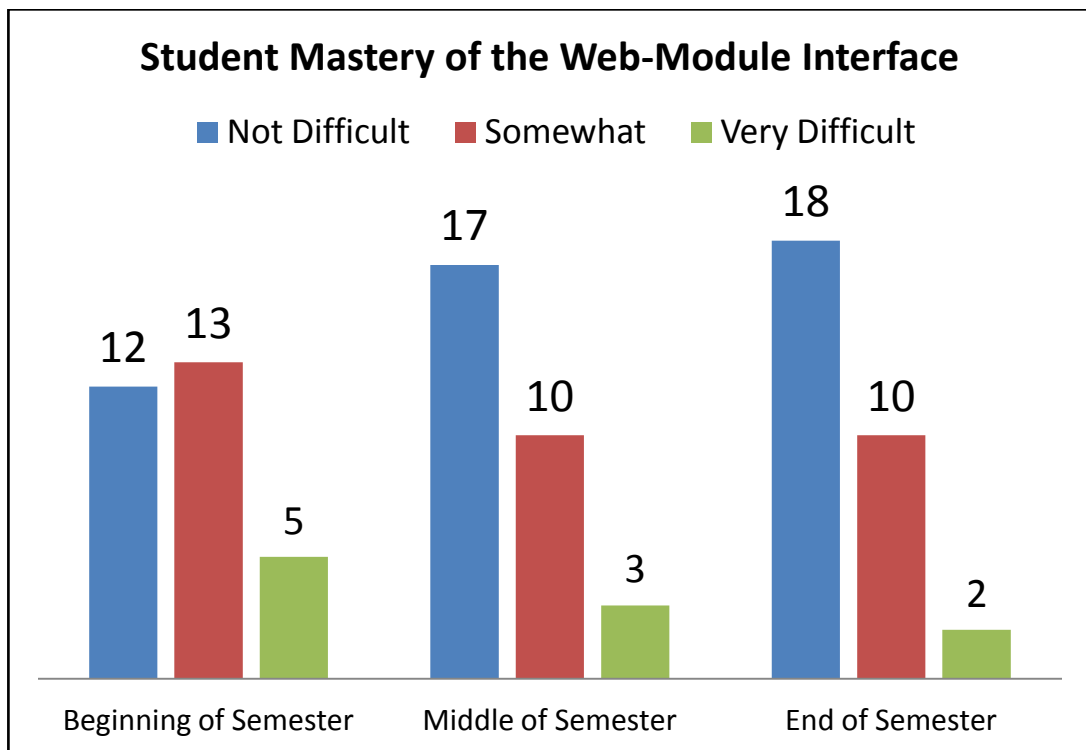


Figure 3. Survey Results: Student Mastery of the Web-Module Interface.

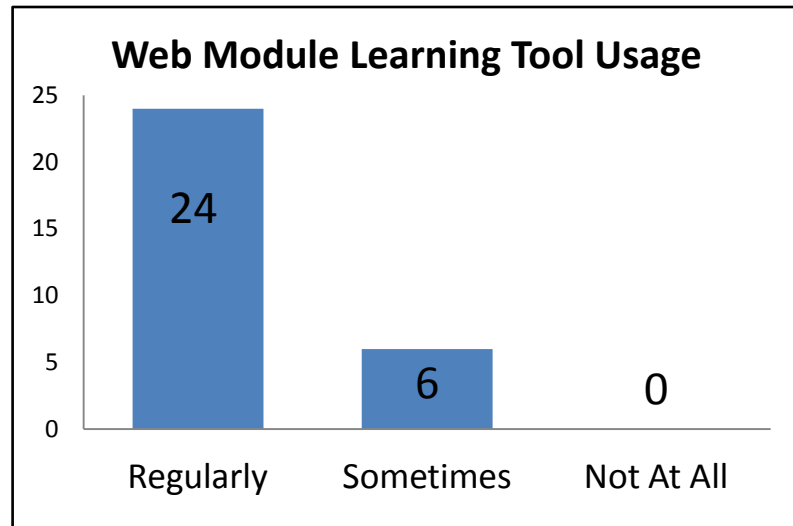
In order for the web-enhanced module to have a reasonable opportunity to be an effective supplementary learning tool, students needed to be relatively comfortable both with computers in general and the web-enhanced module in particular. The first group of Likert scale questions evaluated students' self-perceptions on these aspects.

The first question asked students to classify their general computer knowledge within the categories: beginner, intermediate and advanced. The survey results reported one beginner, 24 intermediate and five advanced users. Chi-squared indicated that these results were statistically significant $\chi^2 (2, N = 30) = 30.2, p = .001$. These results were not surprising given that this cohort of students, born *circa* 1990, have been exposed to personal computers both academically and in their daily activities for most of their lives.

The second set of questions in this group evaluated students' perceptions of the ease or difficulty of using the web-enhanced module interface. On a Likert scale categorizing the module interface as not difficult, somewhat difficult or very difficult, students were asked to provide their impressions of the module interface as they were at the beginning of the semester, at approximately the fifth week and finally at the end of the semester. The results of this group of questions, summarized in terms of frequency of responses in Figure 3, demonstrated that the students' perceptions of the difficulty of working with the web-module interface began the semester with 83% of the students reporting the interface was either not difficult or only somewhat difficult – while the beginning of semester results were not statistically significant, $\chi^2 (2, N = 30) = 3.8, p = .15$, the trend continued to improve during the semester as they became more familiar with the web-module interface. Student perceptions of the ease of the web-module interface showed statistically significant results for both the middle of the semester $\chi^2 (2, N = 30) = 9.8, p = .01$, and the end of semester $\chi^2 (2, N = 30) = 12.8, p = .001$. By the end of the semester 60% of the students found the web-module interface not difficult and 93% found it either not difficult or only somewhat difficult, a noticeable improvement from the beginning of the semester.

1.3.2 Web-Module Learning Tool Usage.

The online web module offered a variety of tools that facilitated the self-study portion of the course including: *Help Me Solve This*, *eText*, *Study Plan*, *Take Test* and *Chapter Resources*.



These tools represent the support resources

for the self-study component of the online activities; the effectiveness of these tools was ultimately at the core of the success or failure of the web module implementation as a whole.

The first question of the web-module learning tool usage section of the survey broadly asked students about the frequency of their web-module learning tool usage, including the response category options: regularly, sometimes and not at all. A statistically significant proportion of the students, 80% reported using the tools regularly, while 20% reported using them sometimes $\chi^2 (1, N = 30) = 10.8, p = .001$. Student usage of two of these tools, *Study Plan* and *Take Test* were tracked automatically by the online system and confirm the student reported results and eventually was used to test for internal validity within the research.

Help Me Solve This (HMST) is a context sensitive online tutorial system – as students work through homework activities they could access this tool to help them resolve issues they were having completing a specific homework exercise. Generally, *Help Me Solve This* opens an alternate version of the exercise at hand and walks the student through the solution process. As the exercises in Accounting are typically dependent on procedural knowledge similar to that described by Smith and Ragan (1999), understanding the correct procedure is often at the core of the difficulties students have solving Accounting-specific exercises. Reported by the students as the most frequently used of the online learning tools, a statistically significant 29 of the 30 students reported using this tool $\chi^2(1, N = 30) = 26.13, p = .001$.

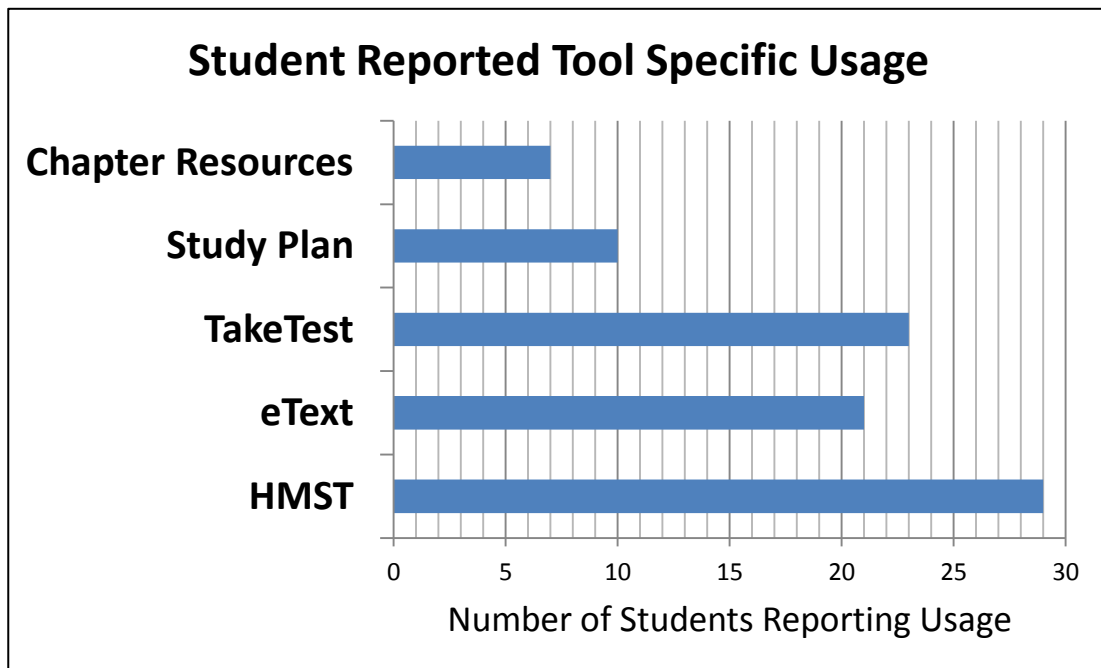


Figure 5. Survey Results: Specific Web-Module Tool Usage.

The *eText* learning tool, as the name implies, is an electronic textbook integrated in the online web-module. In addition to the convenience of an *eText* the online module offers the resource in a context sensitive manner – when a student is having difficulty on a specific exercise, accessing this tool opens the *eText* to the appropriate textbook section and page, improving the efficiency of the textbook

resource and reducing the risk that students cannot find the appropriate page(s) or skip the exercise out of frustration with regards to finding the solution. A statistically significant 21 of the 30 students reported using this tool $\chi^2 (1, N = 30) = 4.8, p = .03$.

The *Take Test* learning tool offers practice tests based on student-selected chapters, drawn from a non-test bank pool of questions. Reported as the second most frequently used online learning tool by 23 or 76.6% of the students – these usage results were statistically significant $\chi^2 (1, N = 30) = 8.53, p = .001$. Detailed student usage of the *Take Test* learning tool is tracked automatically by the online system. The system tracks data such as the number of attempts and the grade obtained on practice tests. In an attempt to test for internal validity Spearman's Rho was calculated to correlate the non-parametric student reported usage with the actual usage coded as one or zero, with no regard for level of practice test usage which varied widely among students. The Spearman's Rho reported a disappointing correlation of 0.176 with a p-value of 0.352. Detailed analysis of this data demonstrated both students who used *Take Test* according to the system but failed to report on the survey as well as the inverse, a few who did not use *Take Test* according to the system but reported usage. This discrepancy might be partially accounted for by the coding method, which assigned a usage value of one even for students who may have attempted only a single question – basically a superficial usage by the student who in turn did not report on the survey but according to the technical coding rule was included. Ironically, in total, the online system reported that more students actually used the *Take Test* feature than self-reported usage on the student survey. While these results do not question the overall significant usage of the *Take Test* learning tool, the weak correlation points to the general coding risk that can occur in educational research.

Study Plan is an online learning tool that provides an overall record of student progress, tracking all the problems a student has completed throughout the system, noting topics that the student has mastered and conversely topics that remain

incomplete. The *Study Plan*, like the *Take Test* is not a mandatory learning tool, nor immediately beneficial to the graded homework process – as such the usage of this tool begins to drop off considerably compared to the top three tools by usage. Self-reported student responses indicate that 10 of the 30 students used the *Study Plan* resulting in a statistically insignificant $\chi^2 (1, N = 30) = 3.33, p = .07$. However, *Study Plan* data is also tracked in detail through the online system and in this case the Spearman's Rho results in a significant positive correlation of 0.614 with a p-value of 0.001. Apparently the sampling error that plagued the *Take Test* question was less prevalent in the *Study Plan* question.

Chapter Resources, the fifth and final tool implemented in the online learning environment provides a diverse set of alternative online resources beyond those included in the textbook including access to content related PowerPoints, external accounting related web sites and assorted content from a multimedia library.

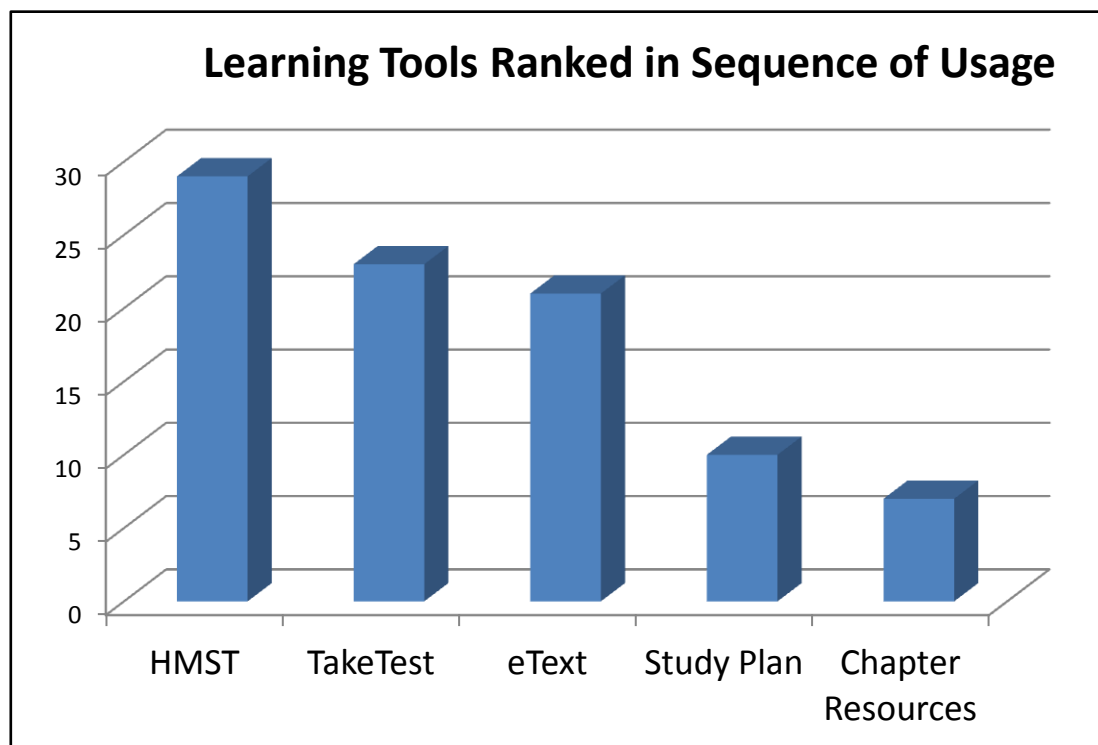


Figure 6. Survey Results: Web-Module Learning Tool Ranking.

Only 7 of the 30 students reported usage of the *Chapter Resources* learning tool resulting in a statically significant $\chi^2 (1, N = 30) = 8.53, p = .01$. The online system does not track user specific details for student usage of *Chapter Resources*.

Tool usage and tool preference are strong indicators of what features students perceive as making the online web-module effective. The last question in the online learning tool usage category asked students to rank the five web-module learning tools in terms of preference. Not surprisingly, tools that students reported using most frequently, ranked highest in the listing; 25 of 27 or 93% of the respondents ranked *Help Me Solve This* as the number one learning tool. Conversely, *Chapter Resources*, which only seven students reported actually using, tool ranked fifth among the five learning tools as selected by 12 of the 18 respondents. A summary of the ranking data along with statistical significance are reported in Figure 6 and Table 2. The results indicate a clear first and second choice in *Help Me Solve This* and *eText* respectively. Third and fourth ranking become somewhat murkier – the practice test *TakeTest* ranking slightly higher than *Study Plan*. The fifth ranking tool, *Chapter Resources* was not appreciated as valuable by the students in their learning process.

Table 2
Student Learning Tool Preferences

Rank	Tool Name	Statistical Significance
1	<i>Help Me Solve This</i>	$\chi^2 (2, N = 27) = 42.67, p = .01$
2	<i>eText</i>	$\chi^2 (3, N = 27) = 14.04, p = .01$
3	<i>TakeTest</i>	$\chi^2 (4, N = 26) = 9.38, p = .05$
4	<i>Study Plan</i>	$\chi^2 (3, N = 22) = 2.00, p = .57$
5	<i>Chapter Resources</i>	$\chi^2 (1, N = 30) = 18.00, p = .01$

1.3.3 Student Perceptions of Web-Module Effectiveness.

The measure of effectiveness of the learning tools included in the online web-module is central to this research. While academic results provide a more concrete measure of success, student self-perceptions of the web-system's effectiveness can potentially provide support for academic results and moreover may offer a glimpse into the interpretation of changes in academic results.

The questions in this section of the research survey were once again constructed using a three category option Likert scale format. This section began with a pair of questions that assume an external locus of motivation congruent with the attributes of students who occupy Baxter-Magolda's stage of dependent learners (1992). The first question posited that, knowing that the instructor was monitoring the details of their homework progress, students were more motivated to complete homework assignments. The second question in this section posited that, knowing that the online homework assignments would count towards their final grade, students were more motivated to complete their homework assignments.

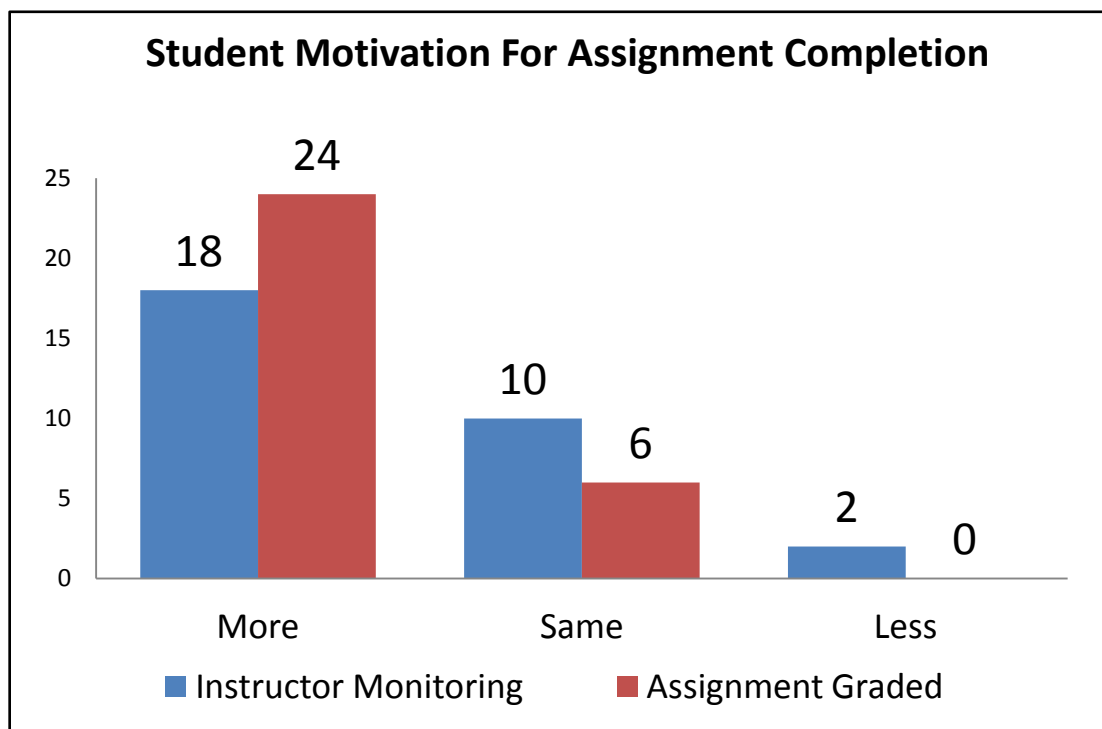


Figure 7. Survey Results: Student Reported Motivators For Assignment Completion.

As Baxter-Magolda's model suggests, many of these students were characterized by attributes that correspond to those of dependent learners – learners who are primarily motivated externally – in this case by an awareness of instructor supervision of the homework process and the knowledge that online homework assignments would factor into their final grades. While both instructor monitoring and assignment grading were statistically significant sources of motivation with corresponding chi-squared of $\chi^2 (2, N = 30) = 12.80, p = .01$ and $\chi^2 (1, N = 30) = 10.80, p = .01$ respectively, assignment grading appears to have been the dominant motivating factor for homework completion.

The next question in this section sought to determine how students responded to challenging homework assignment problems – whether they were more, similarly or less inclined to complete these problems in the online setting versus a manual problem-solving environment. The response breakdown: (22) more inclined, (7) similarly, (1) less inclined was statistically significant $\chi^2 (2, N = 30) = 23.40, p = .01$ and a positive endorsement of the web-module system. The finding that *Help Me*

Solve This, a tool the primary purpose of which is to facilitate this specific situation, was reported as both preferred and most frequently used, supports the assertion that students were more likely to persist in the face of challenging problems.

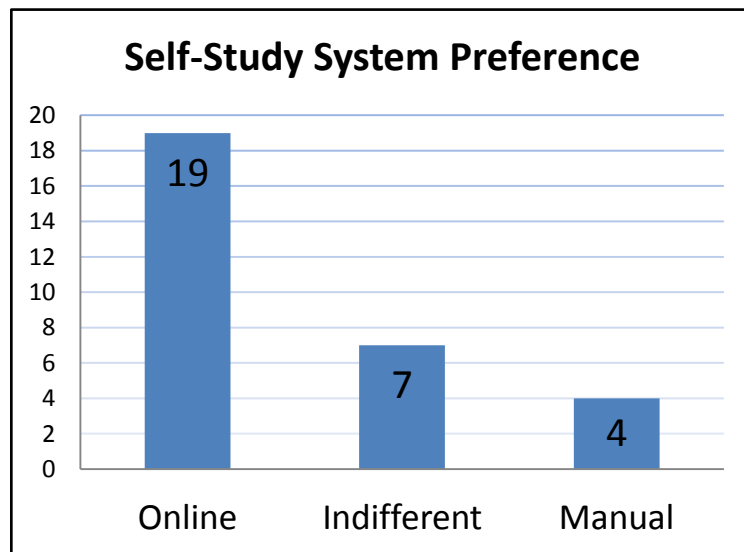


Figure 8. Survey Results: Student Self Study Preference.

The final three Likert scale questions survey students' perceptions of their overall experience with the self-study web-module. These included their self-study

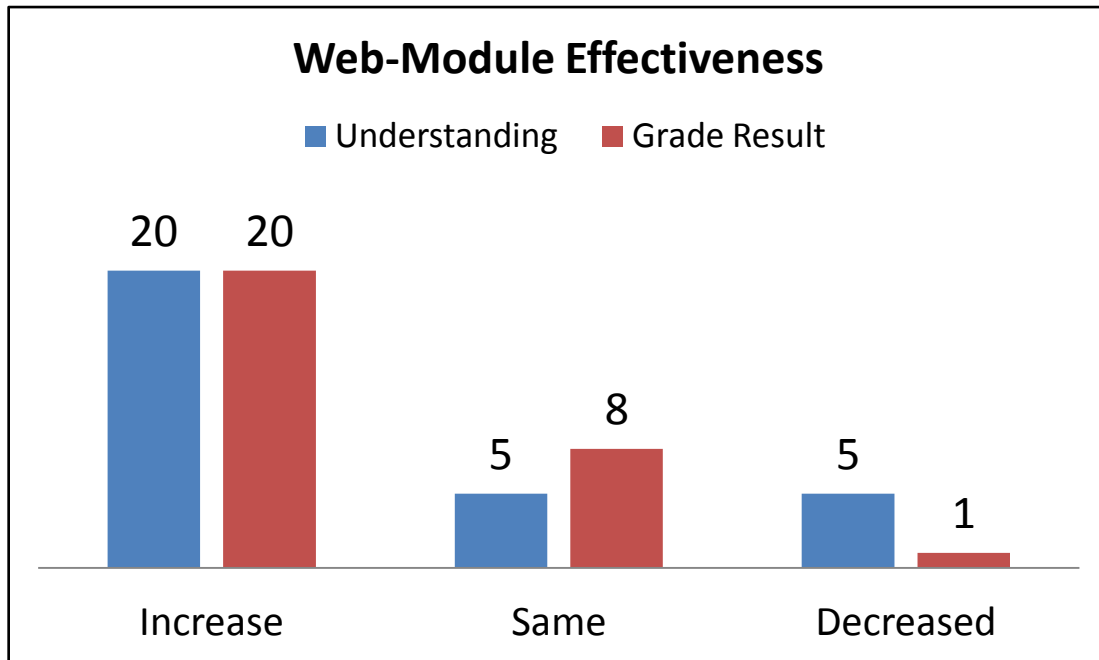


Figure 9. Survey Results: Student Perceptions of Web-Module Effectiveness.

system preference (online, indifferent or manual), self-perceptions of their level of course content understanding (increase, same or decrease) and the effect the web-module had on their final grade (increase, same or decrease).

All three of these questions produced significant results including a preference for the online system, $\chi^2 (2, N = 30) = 12.60, p = .01$, increased content understanding, $\chi^2 (2, N = 30) = 15.00, p = .01$, and improved final grade, $\chi^2 (2, N = 30) = 16.80, p = .01$. In their overall evaluation of the self-study web-module, student responses pointed strongly to a perception that the online system had been of benefit to them both in terms of material content understanding and impact on final grades.

The next step in this research was to evaluate, based on academic results, whether these student perceptions could be substantiated through analysis of student performance both through data generated by the online system and the grades data collected from the three accounting courses.

2. PERFORMANCE DATA AND ACADEMIC RESULTS

2.1 Course Context for Data Collection

The data used to evaluate student performance and academic results are drawn from three courses: Accounting I & II which were taught in a traditional manual environment and Accounting III which integrated the self-study web module. For each of these courses data collected included homework assignment results, test results and final grades. In addition to this data, the online web module automatically tracks student usage of the supplemental learning tools *Take Test*, offering online practice tests and *Study Plan*, a feature that tracks student progress and offers extra exercises to improve deficiencies identified by the online system. While supplemental tool usage was considered in this research its use was voluntary on the part of the students and was not factored into the course grade.

Coincidentally, each of the three courses, Accounting I, II and III, included seven homework assignments that were graded and contributed to the students' final grade of the respective course. In Accounting I and II these homework assignments were completed manually while in Accounting III these homework assignments were completed within the online module. Near the end of the semester, after the web-module assignments were completed, an eighth homework assignment, completed manually, was offered to the students as a supplemental assignment for Accounting III. The eighth assignment resulted in a best seven of eight assignments counting towards the final grade. Students had no knowledge of the supplemental assignment before the first seven online assignments were completed. Unless otherwise stated, in this analysis all of the comparison statistics evaluate the seven homework assignments from Accounting I and II respectively in contrast to the first seven web-module homework assignments of Accounting III.

2.2 Homework Completion and Test Results Correlations

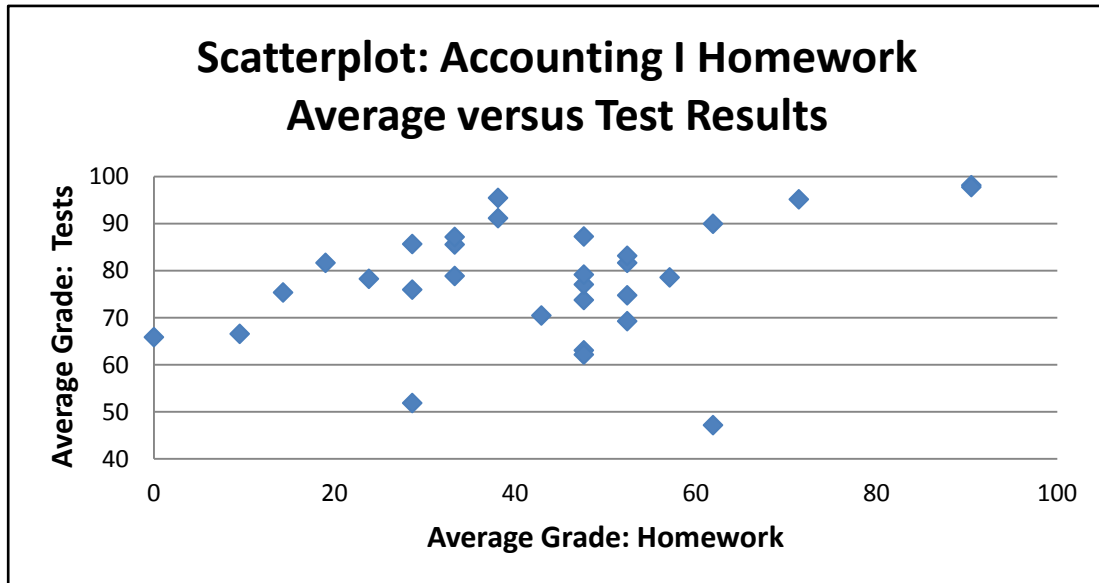


Figure 10. Scatter plot of Accounting I Homework Average versus Test Results.

The academic research regarding the benefits of homework, while somewhat mixed at lower levels of education, tend to illustrate a strong relationship at higher levels of education. Moreover, traditional practice in the instruction of accounting

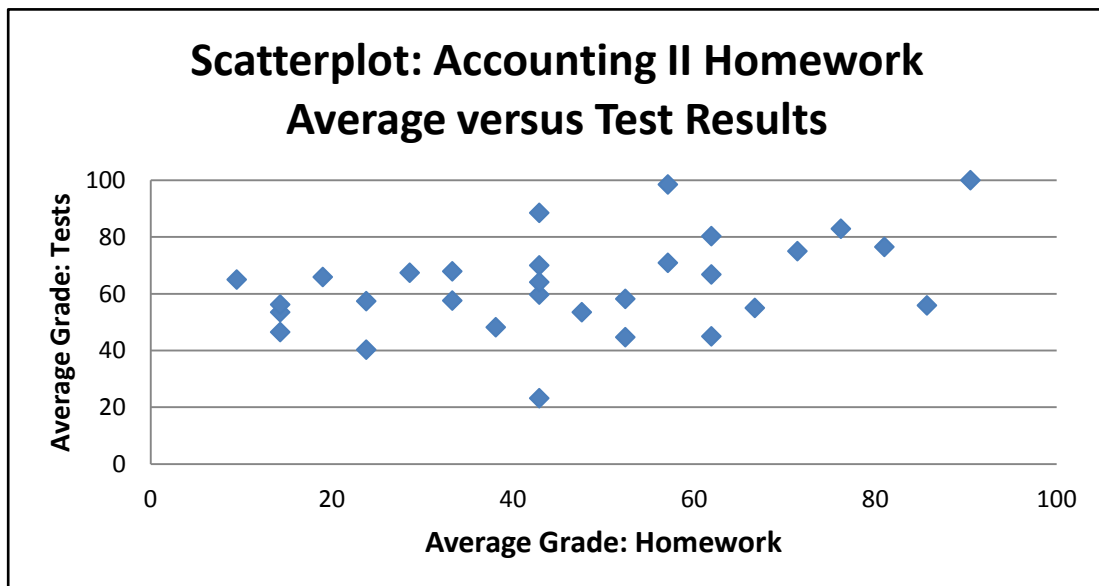


Figure 11. Scatter plot of Accounting II Homework Average versus Test Results.

has tended to rely upon homework as an important means of reinforcing the material covered in class time. In terms of course weighting, each of the three courses considered in this research indicate a matching sixty hours of self-study and homework to correspond with the sixty hours of class time.

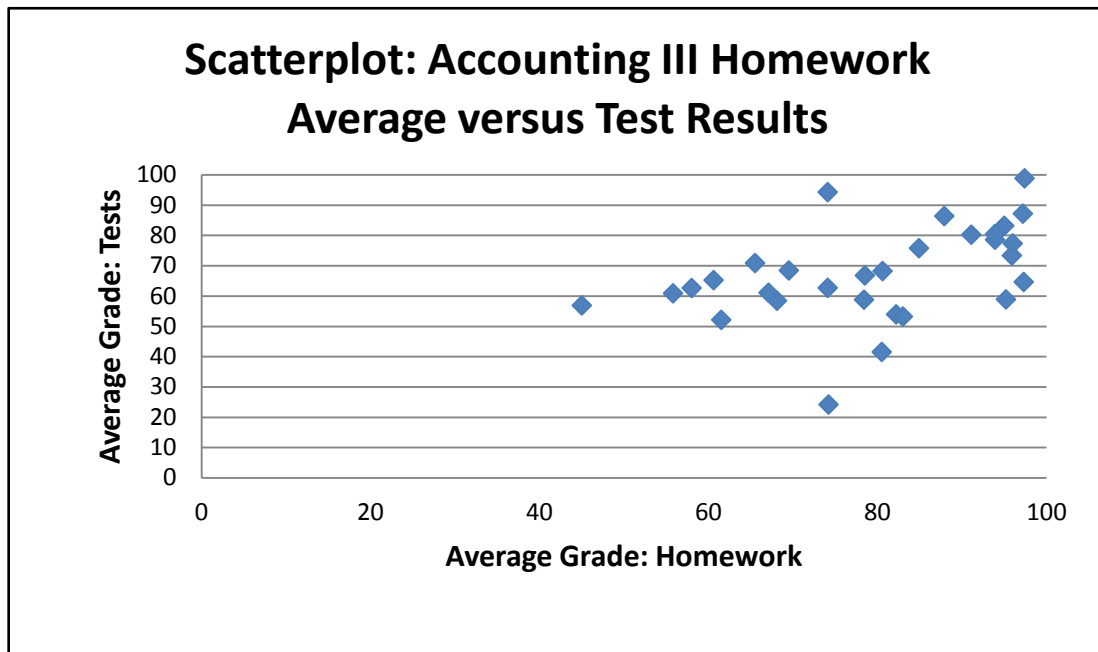


Figure 12. Scatter plot of Accounting I Homework Average versus Test Results.

The traditional practice of assigning significant quantities of homework suggests that effective use of self-study time should result in higher levels of student understanding and ultimately lead to higher test results. To test this traditional assumption, homework completion rates and overall homework averages were correlated to test results for each of the three courses, Accounting I, II and III. Scatter plots for each of the three courses (Figures 10, 11 and 12 respectively) indicate that the traditional assumption of a correlation between homework and test results shows promise; with a minimal number of outliers, the shape of the scatter plot for each of the courses suggests that a positive linear relationship exists between the two variables.

Pearson's correlation was applied to the data from two perspectives, homework averages (HW Average) versus test results and homework completion rates (HWCR) versus test results. The results are summarized in Table 3.

Table 3
Summary of Correlation Data: Homework Average and
Homework Completion Rate versus Test Results

	HW Average vs. Test Results	HWCR vs. Test Results
Accounting I	$r(28) = .35, p < .05$	$r(28) = .20, p < .29$
Accounting II	$r(28) = .41, p < .02$	$r(28) = .36, p < .05$
Accounting III	$r(28) = .40, p < .03$	$r(28) = .51, p < .01$

While the resulting significant correlations were generally moderate to borderline strong, ranging from $r(28) = .35, p < .05$ to $r(28) = .51, p < .01$ they are consistently positive and, with the exception of homework completion rates versus test results for Accounting I, each is statistically significant. Moreover, the highest correlations were those found in the web-enhanced Accounting III course. Overall these results tend to confirm the general view of the benefit of homework for students at this level of education found both in academic literature and the traditional approach to teaching this material.

2.3 Homework Assignment Data Findings

2.3.1 *Homework Averages and Completion Rates.*

A central component of this research was the hypothesis that improved self-study tools would lead to an improvement of self-study results. These results should be manifested, among other findings, in homework completion rates and homework grades. The data collected in this survey seems to bear this assertion out.

Both of the first two courses, Accounting I and II, taught in a manual self-study environment, demonstrated what can only be described as very low homework completion rates and by extension low homework averages, in spite of the fact that all the homework was evaluated and contributed to the students' final grades. By comparison Accounting III, implementing the online self-study system, produced very high homework completion rates. Based upon the null hypothesis that the mean results for these variables, homework completion rate and homework average should be the same respectively among the three courses, Accounting I, II and III, a one-way

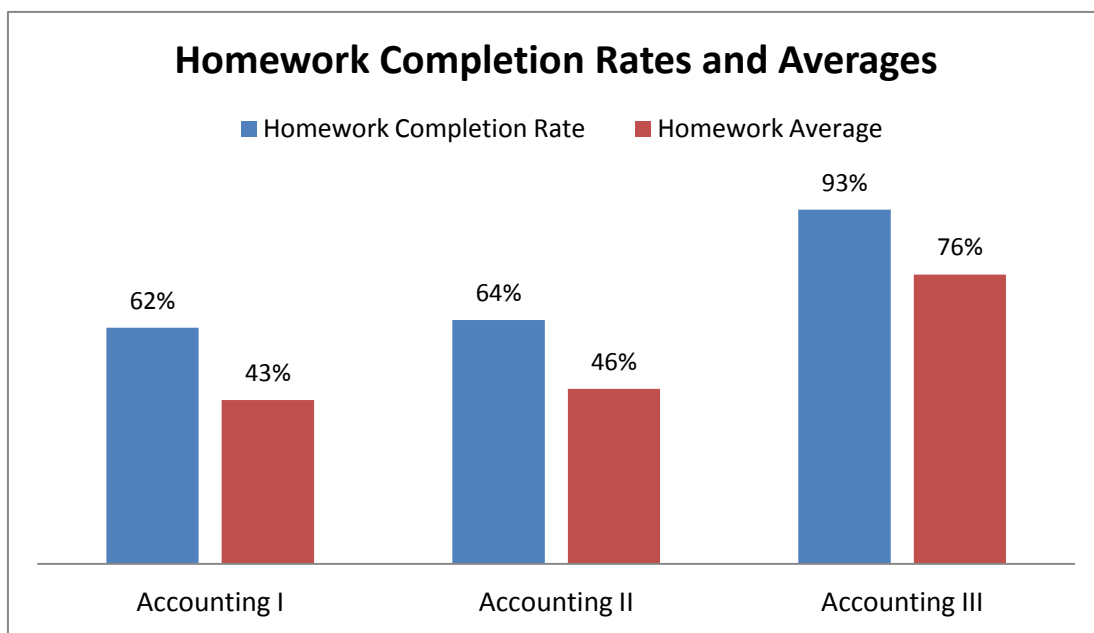


Figure 13. Homework Completion Rates and Homework Averages Across Accounting I, II & III.

ANOVA was applied. The resulting analysis indicated a significant difference between the mean homework completion rates of Accounting I versus Accounting III and Accounting II versus Accounting III of $F(2, 87) = 18.31, p = .001$ and $F(2, 87) = 25.12, p = .001$ respectively.

Post hoc comparisons of homework completion rates using Tukey's Honestly Significant Difference (commonly referred to as Tukey's HSD) test indicated that the mean score of the homework completion rate for Accounting III (M

= 0.933, SD = 0.11) was significantly different than the homework completion rate for Accounting I (M = 0.619, SD = 0.26) as well as the homework completion rate for Accounting II (M = 0.643, SD = 0.27). However, the homework completion rate for Accounting I did not significantly differ from the homework completion rate for Accounting II.

A similar post hoc comparison of homework averages using the Tukey's HSD yielded similar results – the mean score of homework averages for Accounting III (M = 0.759, SD = 0.15) was significantly higher than the homework averages for Accounting I (M = 0.433, SD = 0.21) as well as the homework averages for Accounting II (M = 0.643, SD = 0.27). In contrast, the homework averages for Accounting I did not significantly differ from the homework averages for Accounting II.

2.3.2 Inter-Quartile Analysis.

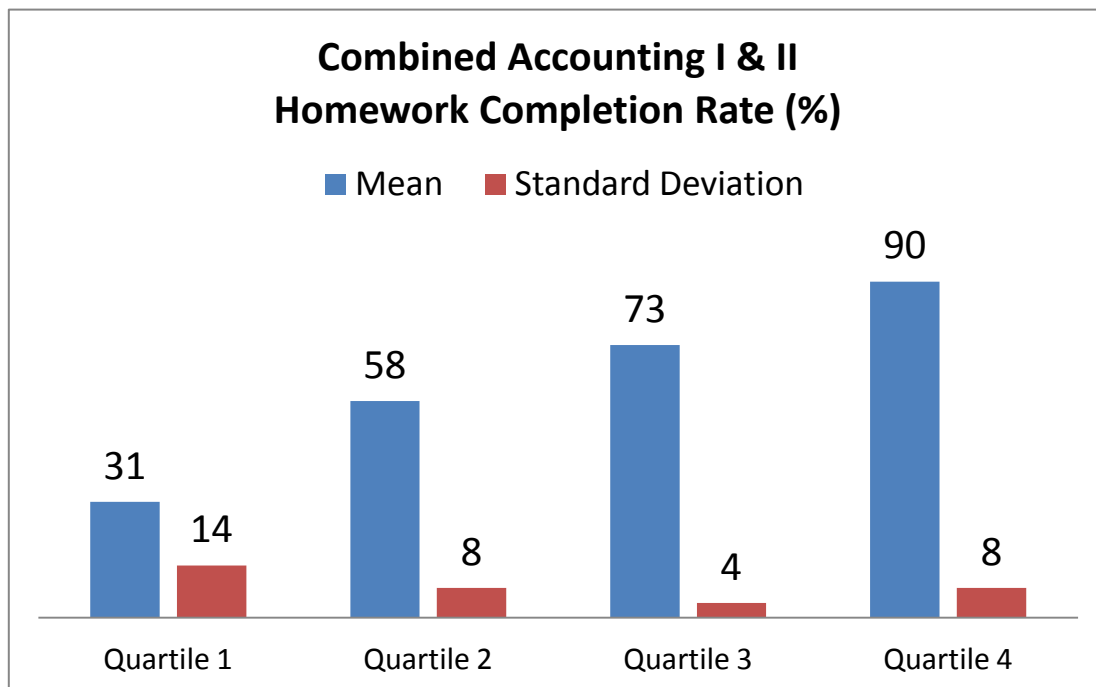


Figure 14. Quartile Based Analysis: Combined Accounting I & II Homework Completion Rate.

In an attempt to have a better understanding of students' response to the online self-study module, an inter-quartile analysis was performed. The homework completion rates for Accounting I and II were fairly stable at 62% and 64% respectively. As a result the quartiles were constructed by ranking the students according to their combined average homework completion rates from the first two manual self-study courses, Accounting I and II. The quartile based homework completion rates for the manual self-study courses Accounting I and II were subsequently compared to the results these same quartiles of students achieved in the web-based self-study within Accounting III.

The quartile data for the combined Accounting I & II homework completion rate illustrated in Figure 14 highlights a large discrepancy between the respective quartiles – homework completion rates varied from a low of 31% for the lowest achieving quartile of students to 90% for the highest achieving quartile of students. A one-way ANOVA applied between the quartiles indicates a statistically significant difference $F(2, 87) = 18.31, p = .001$ between the mean values of the respective

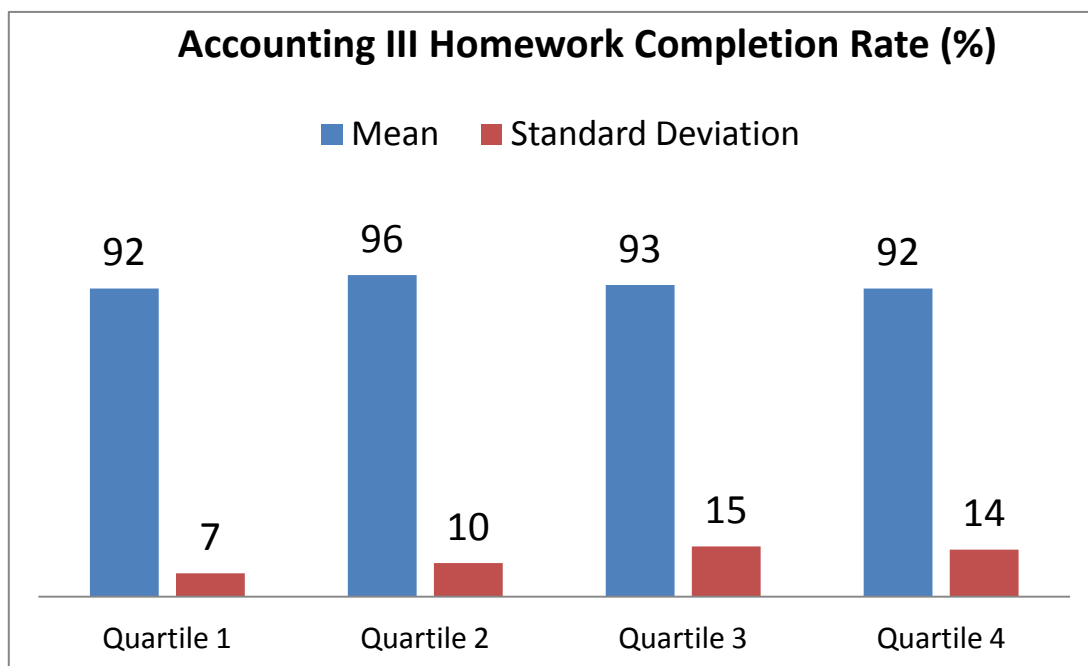


Figure 15. Quartile Based Analysis: Combined Accounting III Homework Completion Rate.

quartiles. Post hoc comparisons of the combined Accounting I and II homework completion rate quartiles using the Tukey's HSD test indicated that all possible combinations of differences between the means scores was statistically significant at $p < .01$.

The next procedure applied to the inter-quartile data involved a comparison of the inter-quartile means of the combined Accounting I & II data with the corresponding homework completion rate these students achieved in the web-module based self-study component of Accounting III. Accounting III homework completion rates overall were, as previously noted, very high and significantly higher than those of Accounting I ($F(2, 87) = 18.31, p = .001$) and Accounting II ($F(2, 87) = 25.12, p = .001$). While a one-way Anova analysis of the Accounting III quartile homework completion rates showed no significant difference between the quartile means ($p=.87$), it was interesting to note that in fact quartile two, the group of students that had the second lowest homework completion rate combined across Accounting I & II of 58% turned in the highest homework completion rate, 96% for Accounting III.

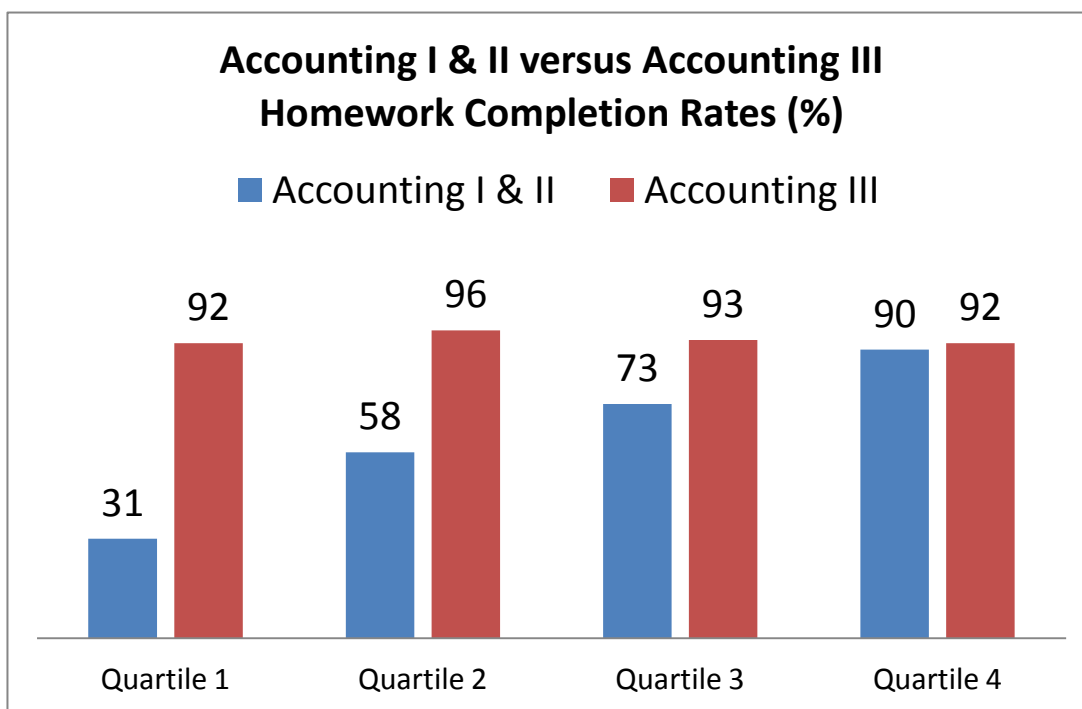


Figure 16. Quartile Based Analysis: Accounting I & II Combined Average Homework Completion Rates versus Accounting III Homework Completion Rates

A comparison of the combined Accounting I & II versus Accounting III inter-quartile homework completion rate data produced some striking results; not only had the average homework completion rate increased from 63% combined average in Accounting I & II to 93% in Accounting III, but each of the four quartiles had virtually the same mean value homework completion rate. One-way Anova analysis of the change in homework completion rates by quartile demonstrated a statistically significant change ($F(7, 52) = 34.11, p = .001$).

A post hoc comparison of homework averages using Tukey's HSD demonstrated a significant increase in mean homework completion rates for quartiles one, two and three at a significance $p < .01$. Quartile four, representing a group of students who completed virtually all of their homework in the manual environment of Accounting I and II turned in similar results in the web-enhanced environment.

2.4 Supplementary Online Learning Tools

The self-study web module contains a number of learning tools including *Help Me Solve This*, *Take Test* and *Study Plan*. *Help Me Solve This* is primarily used

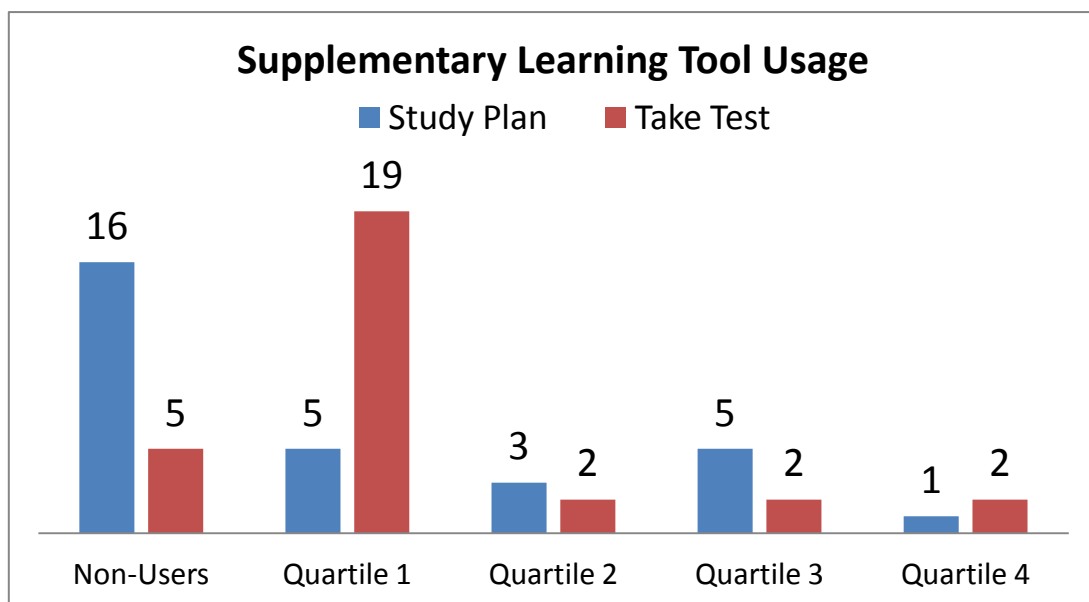


Figure 17. Accounting III Supplementary Learning Tool Usage Categorized As Users And Non-Users. Users Are Classified Into Quartiles Of Usage.

in the homework completion process, and, as the homework assignments were all graded, the students were directly incentivized to use this tool. While student responses through the student survey indicated *Help Me Solve This* as their most used and preferred online learning tool, the online system does not track its usage.

In contrast, the usage of *Take Test*, the online practice test module, and *Study Plan*, a learner self-monitoring and supplementary exercise module, are not directly incentivized through grades and as such are completed as supplementary, non-credit academic undertakings. Moreover, the online system keeps detailed records of student utilization of these tools including frequency of usage, textbook chapter source and number of exercises/test questions attempted and completed correctly.

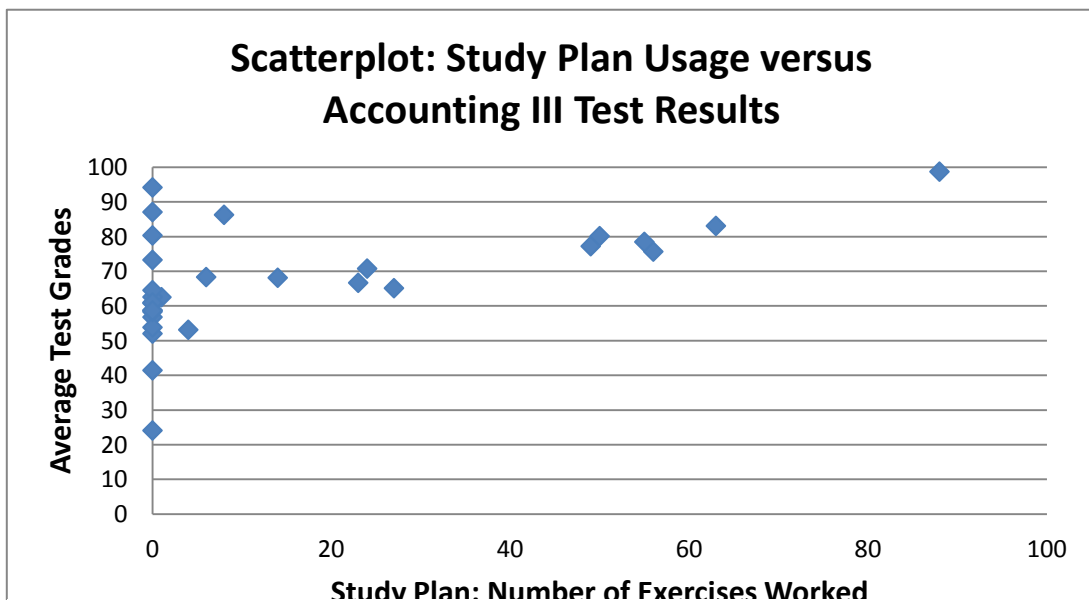


Figure 18. Scatter Plot of Student *Study Plan* Usage Versus Accounting III Test Results.

The usage profile for the learning tools *Take Test* and *Study Plan* likely reflects their supplementary nature as only a fraction of the total student sample made considerable use of these tools. In an attempt to quantify student usage of these tools, quartiles were established of the non-zero usage data. For the *Study Plan* learning tool the variable *Number of Study Plan Exercises Worked* was used as the basis and

for *Take Test*, the corresponding variable used was *Total Number of Take Test Attempts*. The results of the comparison show that *Take Test*, with over 83%, had a significantly higher overall usage rate than the Study Module with fewer than 47% of the students making some use these online learning tools $t(58) = 3.17, p = 0.003$.

In addition to the quartile analysis three sets of correlations were undertaken to try to establish who was making use of these learning tools: first to determine if generally the students who made the greatest and least use of *Take Test* were the same students who were making the greatest and least use of the *Study Plan* respectively. A second set of correlations was evaluated between *Take Test* and *Study Plan* usage and the Accounting I & II homework completion rates to determine if the inter-quartile breakdown had carried over into the supplementary learning tools of Accounting III. Finally, a pair of correlations was calculated to determine the relationship of the usage of these tools with Accounting III test grades.

Scatter plots for these five correlations are somewhat distorted as a result of the large numbers of students who did not make any use of the *Study Plan* and *Take Test* learning tools. Figure 18, the scatter plot for *Study Plan* usage versus average Accounting III test results, is provided as an illustration of this phenomenon; while 16 of the 30 data points demonstrate no usage of the *Study Plan* learning tool, the remainder of these students highlight a fairly clear positive linear correlation between student *Study Plan* usage and average Accounting III test results. This observation is confirmed by Pearson's correlation $r(28) = .55, p < .001$. A summary of the statistical results of these correlations is included in Table 4 below.

Table 4
Summary of Correlation Data: Supplementary Tool Usage

<i>Take Test vs. Study Plan</i>	$r(28) = .57, p < .001$
<i>Take Test vs. Accounting I & II HWCR</i>	$r(28) = .37, p < .04$
<i>Study Plan vs. Accounting I & II HWCR</i>	$r(28) = .37, p < .04$
<i>Take Test vs. Accounting III test results</i>	$r(28) = .53, p < .001$
<i>Study Plan vs. Accounting III test results</i>	$r(28) = .55, p < .001$

As the results table indicates, all five of the correlations produced significant positive correlations. The correlation that compared *Take Test* and *Study Plan* results demonstrated the strongest correlation ($r = .57$), indicating that many of the students using *Take Test* were also taking advantage of the *Study Plan* learning tool.

Comparison of the *Study Plan* and *Take Test* learning tools usage with Accounting I & II homework completion rates, while remaining statistically significant, produced the lowest correlations of the set at $r=.37$ each. These results indicated that some divergence had occurred between the students' profile in the interim of the first two Accounting courses and Accounting III. Based upon the dramatic increase in homework completion rates in Accounting III over Accounting I & II it is possible that some of those improved study habits have spilled over into the supplementary learning tools as well.

Comparison of the learning tools *Take Test* and *Study Plan* with the Accounting III test results returns a pair of significant, moderately strong positive correlations of $r=.53$ and $r=.55$ respectively. These results are consistent with the results that were produced in the correlation of Accounting III homework completion rates and Accounting III test results $r(28) = .51, p < .01$, once again reinforcing the importance of self-study at higher levels of education.

2.5 Demographic Segmentation

2.5.1 *Methods of Demographic Segmentation.*

One of the student survey questions asked students to identify their first language, the data from which was classified for analysis purposes into the categories: Anglophone, Francophone and Allophone. The first language variable, combined with the students' gender data, formed the basis of the demographic analysis.

Student first language and gender data were used in two-way chi-squared analysis across the student survey in an attempt to identify significant, demographically based, differences in the survey results. Spanning the general survey categories of computer knowledge, learning tool usage and overall perceptions of the online system cross-tabulated by each demographic category resulted in only two statistically significant results. These results related to student reported usage of the *Study Plan* learning tool once segmented by first language and a secondly by gender.

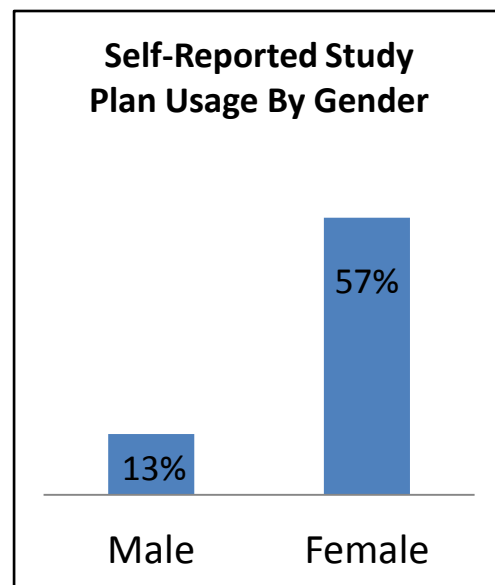


Figure 19. Self-Reported Percentages of Students Using *Study Plan* by Gender

2.5.2 *Demographic Segmentation of Study Plan Usage.*

Segmentation of the self-reported survey data by gender demonstrated that while 57% of the females reported using the *Study Plan* learning tool, only 13% of the male students reported use the same facilities. The two-way chi squared analysis indicated statistical significance of these results $\chi^2 (1, N = 30) = 6.70, p = .01$. As the

web module automatically tracks student usage of the *Study Plan* learning tool these student reported results were compared with the actual usage by gender. The variable *Study Plan Number Worked*, measuring the quantity of problems students completed in the *Study Plan* module, provided some support for the assertion that females made greater use ($M = 23.29$, $SD = 25.49$) than males ($M = 8.88$, $SD = 22.55$) of the *Study Plan*. It is worth noting however that, while the chi squared found significant difference in the self-reported data, a one way ANOVA applied to the system-generated variable *Study Plan Number Worked* fell somewhat short of statistical significance $F(1, 28) = 2.70$, $p = .11$.

A similar analysis was applied to the usage of the *Study Plan* web module and student first language. The student breakdown of self-reported usage of the *Study Plan* by first language indicates a preference for the tool among students classified as Francophone and Allophone versus those classified as Anglophone.

Students self-reported data once again indicated a statistically significant two-way chi squared of $\chi^2(2, N = 30) = 7.19$, $p = .03$. However, once again the system generated variable *Study Plan Number Worked* fell somewhat short of statistical significance $F(2, 27) = 3.01$, $p = .07$.

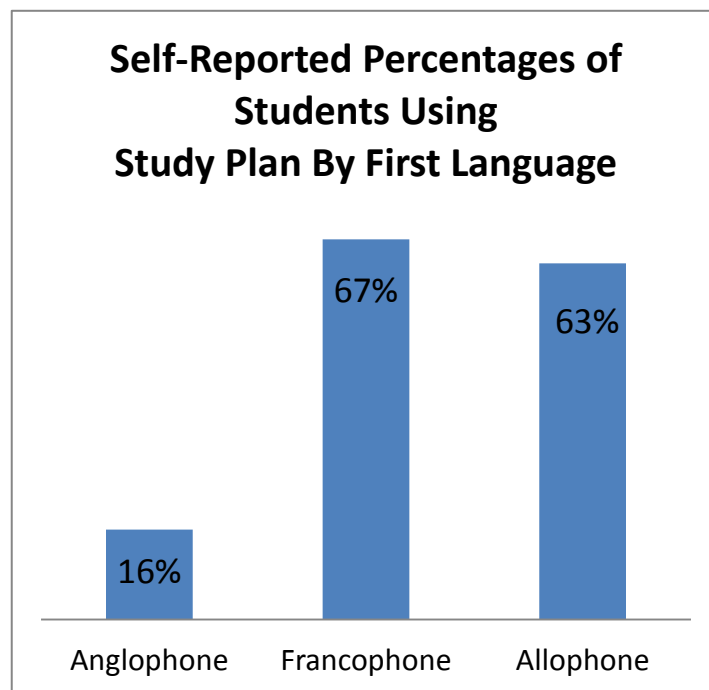


Figure 20. Self-Reported Percentages of Students Using *Study Plan* By First Language.

2.5.3 Segmentation of Homework Completion Rates.

Shifting from the voluntary student usage of the *Study Plan* learning tool, a demographic segmentation of the grades-incentivized homework assignments was subsequently completed. The shift from voluntary to directly grade-incentivized learning tools resulted in a diminishment of the *Study Plan* differences observed between the demographic groups. However, while these differences were reduced, the same basic trends reappeared in the homework completion rates, demographically segmented across Accounting I, II and III.

An analysis of homework completion rates across Accounting I, II and III found results congruent with the *Study Plan* findings, specifically the possibility of gender based differences in online learning tool usage. While the homework completion

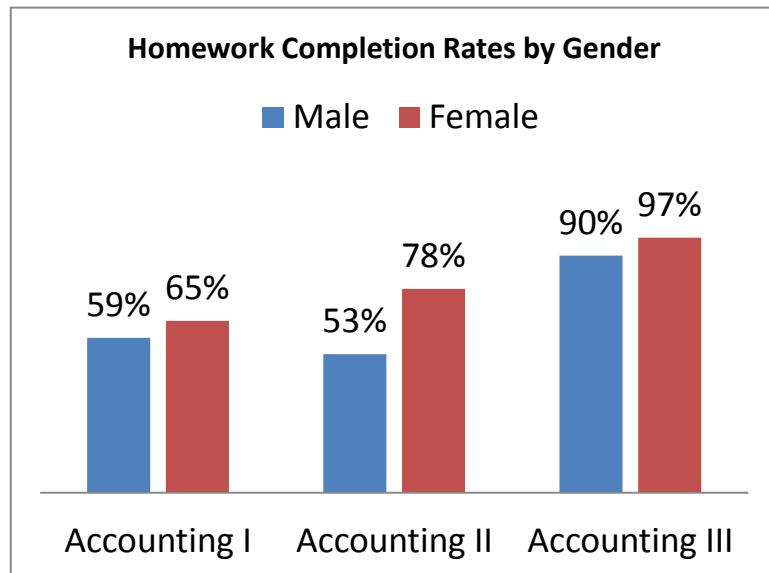


Figure 21. Homework Completion Rates by Gender.

rates, with the exception of the slight dip from Accounting I and Accounting II for male students, generally increased from Accounting I, II and III, the female students consistently produced higher homework completion rates than their male counterparts. Table 5 below summarizes these results.

Table 5
Homework Completion Rates by Gender

	<i>Males</i>		<i>Females</i>	
	Mean	Standard Deviation	Mean	Standard Deviation
Accounting I	56.4%	26.7	65.3%	27.3
Accounting II	57.1%	28.6	77.6%	19.2
Accounting III	76.8%	17.0	96.9%	8.3

In spite of the consistently higher results posted by females in terms of homework completion rates, only Accounting II, a course where the male results fell sequentially from Accounting I while the female results rose in comparison with Accounting I, produced a statistically significant difference in the mean homework completion rate segmented by gender $F(1, 28) = 8.04, p = .01$.

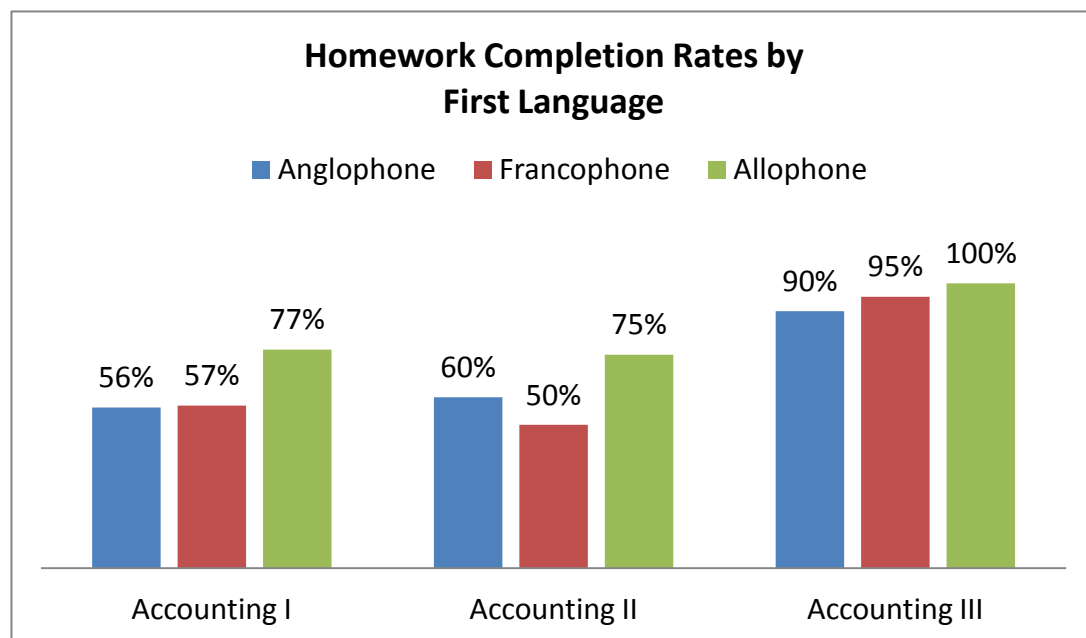


Figure 22. Homework Completion Rates by First Language.

Turning to homework completion rates by first language reinforced the perception that Allophone students made greater use of the online learning tools than their Anglophone counterparts. Homework completion rates were similar, by first language category, between Accounting I and II, the Accounting III homework completion rates increased across all three categories. While the overall increase in homework completion rates was statistically significant – Accounting I compared to Accounting III and Accounting II compared to Accounting III produced results of $F(2, 87) = 18.31, p = .001$ and $F(2, 87) = 25.12, p = .001$ respectively – an analysis of homework completion rates by first language fell somewhat short of statistical significance for each of the three accounting courses producing results of $F(2, 27) = 1.98, p = .157$, $F(2, 27) = 1.78, p = .188$, and $F(2, 27) = 2.15, p = .136$ for Accounting I, Accounting II and Accounting III respectively.

CHAPTER FIVE

DISCUSSION AND CONCLUSION

1. ACADEMIC RESULTS

One of the initial areas of inquiry involved evaluating the importance of the traditional role that self-study and homework in particular plays in the academic success students achieve in the accounting discipline. Both homework averages and homework completion rates were correlated with test results. While both homework averages and homework completion rates demonstrated important correlations to test results, homework completion rate demonstrated the strongest correlation to test results, specifically in the web-enhanced Accounting III course. These results confirm the value placed within academic research on self-study and homework both generally for students in higher education as well as traditionally within the discipline of accounting. Moreover, the homework completion rates in the earlier accounting courses served to emphasize the difficulties students are facing in successfully completing the self-study portion of these early accounting courses.

This research was primarily focused on learning tools that could improve the self-study component of business accounting courses. To that end, the web-module learning tools were remarkably successful both in terms of homework completion rates and averages. These results were exemplified in the increase in homework completion rates from 63% for the combined Accounting I and II course results to 93% for Accounting III. The corresponding increase in homework grade averages improved an equally impressive amount, from 45% to 76% for the combined Accounting I and II course results compared with Accounting III respectively. In large part these dramatically improved results stemmed from the improved success

rates among students who fit the profile of low-achievers with regards to the self-study components of the first two accounting courses.

In addition to the overall improvement in self-study results was the impressive uniformity of these results across the different academic performance levels within the cohort of students. The inter-quartile comparison of homework completion rates between the combined Accounting I and II course results and the corresponding results for Accounting III, highlighted an equalization of the completion rates – from a 59% to 0% discrepancy between the homework completion rates of the first and fourth quartiles respectively. Students who had achieved poorly within the manual self-study learning environment of the two previous accounting courses, excelled in the web-enhanced environment.

While the overall difference between homework completion rates for the third accounting course were statistically insignificant between the quartiles, an interesting shift was observed among the quartiles; quartile two – the second lowest achieving group in terms of the combined homework completion rates for Accounting I & II, produced the highest homework completion rate in Accounting III – no small accomplishment for that segment of the cohort. Moreover, while the equalization of the results among the quartiles points to the overall success of the online web-module, the value of the online tools as a self-study enabler is probably best exemplified in the student survey question that addressed the issue of student motivation in the face of challenging homework exercises wherein 73% of the respondents indicated that they were more inclined to complete exercises in the web-enhanced environment compared to a corresponding manual environment.

In this setting the web-enhanced system seems to have addressed one of the criticisms levied against homework and self-study in the academic literature, specifically that it serves to further stratify the student body into high and low achievers. In the academic literature Epstein (1993) suggests that, with regards to

homework, students often break down into groups of high-achievers, who demonstrate a general ability to complete homework exercises effectively and on deadline and a second group of low-achieving students who exhibit deficiencies achieving these self-study tasks. Students in the latter group are typically characterized by poor organizational and time-management skills, an external locus of control, motivational and attention deficits, and negative attitudes toward homework and school (1993). The equitable nature of the homework completion rate results in this context suggests that having the necessary tools available during the self-study process plays an important role in the potential success of otherwise low-achieving student segments.

The results also illustrate that online learning tool usage was not uniform among the students. The online learning tools can be categorized as those that are directly incentivized by grade results such as *Help Me Solve This* and other tools that contribute to learning but are only indirectly incentivized by grade results such as *Take Test* and *Study Plan*. The ability of the online system to automatically log student activity of the indirectly incentivized learning tools allowed for a detailed analysis of their usage. Congruent with the categorization of many of these students as dependent learners within the Baxter-Magolda learner development framework, varying degrees of usage were observed in this group of online tools. While 83% of the students made some use of the *Take Test* study tool, only 46% of the students made any use of the *Study Plan* learning tool. The stratification of results that had previously existed in homework completion rates for Accounting I and II seem to have reappeared in the usage of the indirectly incentivized learning tools such as *Take Test* and *Study Plan*. In spite of the diverse range of usage found in the students' study habits with regards to these tools, a strong positive correlation exists between their usage and the test results achieved in Accounting III. These results suggest an opportunity for many of these students to continue to develop as self-regulated learners.

Finally, although a demographic analysis was applied to the data, both in terms of student gender and by first language, the generally equitable nature of the results made it difficult to identify statistically significant demographically based results. Two exceptions that showed promise were homework completion rates across the three courses by student gender and first language. The trends in the data indicate consistently higher homework completion rates for females versus males and allophones versus Anglophones and Francophones. While these results generally fell below the level of statistical significance it is possible that a larger sample size may have been able to confirm these results in a more concrete manner.

2. STUDENT PERCEPTIONS OF THE WEB-ENHANCED MODULE

Congruent with the improved academic results, students' perceptions of the web-enhanced module were almost overwhelmingly favorable and statistically significant. The survey highlighted the observation that student acceptance of the web-module system was built upon a strong student familiarity and understanding of computers and technology in general. This observation was exemplified both in terms of the students' self reported familiarity with technology in general as well as the rapid acceptance of the new and unfamiliar web module.

A number of survey questions explored student web module learning tool usage and preference. The results indicated an overwhelming preference for the online tutoring tool *Help Me Solve This*. The popularity of this learning tool, used primarily during the homework completion process, is in turn congruent with the significant increase in homework completion rates and homework grade averages the students achieved in the Accounting III course. Furthermore, the success the students achieved in the self-study component of the course was illustrated in the students overall perceptions of the self-study module, as a significant majority of the students felt that the web-module improved both their understanding of the course material and their overall grade.

3. EXPLAINING THE IMPROVED RESULTS: A CONFLUENCE OF FACTORS

The results of this research point to a confluence of factors that seem to have contributed to the improvement in the students' self-study results – factors that support the improved results in terms of a self-study learning environment that better suits students' learning styles as well as providing the learning tools and confirmation of learning that students need to succeed.

3.1 Active Learning, Constructivism and Student Learning Styles

Active learning, constructivism and students' learning styles are important theories that serve as cornerstones of current educational thinking. Applications of each of these theories are present in the implementation of this web-study module. Together they provide an understanding of the success of the web-based self-study module as an effective learning environment.

Active learning, a term that generally describes student engagement in the learning process, while common in modern pedagogical literature, can be traced back in history for decades and even millennia. Confucius, in the fifth century BC signified the importance of active learning in the aphorism "I hear and I forget. I see and I remember. I do and I understand." Similarly, Dewey, in 1938 described education as being ideally by, of and for experience. The web-study module is very much a student centered active learning environment – an environment where students use the available tools to learn by doing. The degree to which the students used these tools, measured both automatically through the system and from the student survey, the academic success they achieved as well as their overall satisfaction with the online system, supports the assertion that the active engagement on the students' part made a positive contribution to the benefits observed in their academic results.

Moreover, the results of this research concur with those of other contemporary researchers in terms of the importance of student engagement and active learning in an online environment. Research by Sansone, Fraughton, Zachary, Butner & Heiner (2011) evaluated the importance of student interest versus active engagement on academic results. Their research found that while academic results improved in situations where students demonstrated interest in the subject content, the dominant variable that correlated with improved academic results was in fact student engagement or actively participating in the learning process. While the present research was not focused specifically on student interest in the subject matter, the results correspond with that of Sansone et al. with regard to the positive impact of student engagement and active learning.

Constructivism emphasizes the role of the learner in assimilating the mental schema involved in the learning process. Vygotsky in particular identified the importance of the role of the more knowledgeable other in the learning process. Described as the zone of proximal development, Vygotsky suggested that with the help of the more knowledgeable other the student could learn both more effectively and more efficiently. In academic literature Vygotsky's constructivist theory of zone of proximal development reemerged as an emphasis on the need for a structured learning environment that supported learners through scaffolded learning experiences.

While Vygotsky's work generally identified the more knowledgeable other as a senior individual tutoring a more junior learner, it is plausible to suggest that the web-module learning tools partially fill this role during the self-study component of the course. The online tutor, *Help Me Solve This*, seems particularly designed for this role, providing the scaffolding that allows students to develop their knowledge. Once again, students' preference for the *Help Me Solve This* learning tool, combined with the overwhelming affirmative response to the student survey question that addressed the issue of student motivation in the face of challenging homework exercises,

directly supports the contribution of elements of the web-module with regards to providing a scaffolded learning environment.

Again, these results correspond to those of other contemporary researchers. Azevedo (2005) conducted one such research study within the context of students learning complex science topics – topics that share some attributes with the theory-driven quantitative learning environment of the discipline of accounting. In his research Azevedo concluded that learners who demonstrate limited metacognitive and self-regulatory skills have difficulty learning from open-ended learning environments without the implementation of scaffolded learning tools to facilitate the learning process. While emphasizing the importance of scaffolding, Azevedo suggested that opportunities exist for the implementation of more sophisticated web-based adaptive scaffolding that responds according to the needs of the individual learner.

The improved academic results may also be attributed to a learning environment which better accommodates a variety of student learning styles. Fleming's VARK learning styles model suggests that learners exhibit individual learning preferences for learning environments that emphasize visual, auditory, reading/writing and kinesthetic experiences (2001). Providing learning environments that appeal to a variety of learning styles has been shown to be beneficial to address the various learning styles of students. The web-module self-study environment offers a more varied learning environment in terms of Fleming's VARK learning model, with a stronger emphasis on the visual learning than is typically found in a manual self-study environment. Moreover, the varied nature of the online environment potentially complements the more traditional auditory classroom setting. A learner preference for visual and tactile learning is one attribute that has been identified as generally corresponding to the profile of a typical online learner (Halsne & Gatta, 2002)

3.2 Digital Intelligence

Research has shown that acceptance of technology by students within the domain of education is an important aspect of the success or lack thereof in a given academic context. A technology acceptance model put forward by Venkatesh & Davis (2000) suggests that the primary determinants of whether or not a technology will be adopted are beliefs and attitudes on the part of students toward that online system. In a web-enhanced learning environment, this model suggests that perceived usefulness and the ease of use of the online system enhance students' satisfaction with their online course experience. The results of this research correspond to the Venkatesh & Davis technology acceptance model, suggesting that the students' acceptance of the online system was driven by their view that the system was both easy to use and improved their academic results.

Approaching student acceptance of the online learning environment from a different perspective one can consider the application of Gardner's Theory of Multiple Intelligence to the online learning context. Complementing Fleming's VARK learning styles model, Gardner's Theory of Multiple Intelligence suggests that human intelligence spans a variety of categories arranged around the ability of an individual to understand others, themselves and the natural world. The survey research results that emphasize student preference for the online web-learning environment suggest a development among the students of Gardner's intrapersonal intelligence; an ability on the part of students to identify personal strengths and weaknesses and reflect and monitor their own progress within a given context.

In the initial formulation of the model Gardner identified six intelligence categories; linguistic, logical-mathematical, musical, bodily-kinaesthetic, spatial and personal intelligence including intrapersonal and interpersonal components. In a subsequent review of the model Gardner included naturalist intelligence as a seventh

intelligence category. Debate continues within academic circles regarding the number and types of intelligence categories. One of the suggestions for inclusion that has not yet been officially added to the model but merits note in this context is the idea of the existence of a category that could be described as “digital intelligence”. The suggestion put forward by authors such as Adams (2004) posits that as our current society and everyday lives become increasingly permeated with and by technology, the ability to navigate and use technology effectively, a so called “digital intelligence”, is rapidly becoming a necessity of everyday life.

Concordant with the views of Adams, the current generation of students seem imbued with this digital intelligence, a generation of students for whom the use of technology seems second nature. Students’ self-reported comfort level with technology and the degree to which students embraced the online system suggests that at least part of the overall success of the web-module can be attributed to this “digital intelligence”.

3.3 Student Motivation and Confirmation of Learning

The survey implemented in this research was not designed to provide an in-depth measure of student motivation with regard to the self-study process. In spite of this a few observations can be made from the results regarding the student motivation on the whole.

It is possible to view the results of this research from the perspective of the developmental learner with an external locus of control. Extrinsically motivated, the students strategically invested their academic effort into activities that were rewarded through the course grading process. This perspective is reinforced two fold; first through the student preference for the *Help Me Solve This* learning tool, the most directly grade-incentivized learning tool over the less directly grade-incentivized *Take Test* and *Study Plan* learning tools and second through the survey results in

which the students indicated an increased motivation as a result of homework grading and instructor monitoring.

However, grade-reinforced extrinsic motivation, while certainly present among the students, cannot singularly account for the improved self-study results. The contradiction lies in the observation that Accounting I and II, which also featured significant quantities of graded homework exercises, produced such comparatively low homework completion rates and corresponding homework averages. The results suggest that the students, similarly extrinsically motivated, lacked the learning tools and associated confirmation of learning in Accounting I and III to achieve their desired results.

Baxter-Magolda's theory of the developmental learner highlights the relationship between confirmation of learning and student satisfaction with the learning process; Baxter-Magolda suggests that successful confirmation of learning in turn results in heightening students' interest in learning and strengthening their investment in that endeavor. The web-study module, particularly the *Help Me Solve This* learning tool fills this role, allowing students the means to confirm their knowledge in real time during the self-study process rather than having to wait for this confirmation. That the students overwhelmingly identified *Help Me Solve This* as their most frequently used study tool reinforces this view of the importance of the confirmation of learning.

4. LIMITATIONS AND FURTHER RESEARCH

4.1 Hawthorne and Novelty Effects

A primary concern of this research is the possibility that these findings may be influenced by either the Hawthorn and/or novelty effect resulting from the

implementation of the web-enhanced self-study module. The Hawthorn effect highlights the possibility that improved academic results identified within the context of the My Accounting Lab web-enhanced module might have occurred as a result of students' recognition that their efforts were the basis of a research study. In addition, the novelty effect suggests that the observed improvement of academic results identified within the context of the web-enhanced module might stem from the novelty of the new technology and with time these benefits may diminish or cease altogether.

To mitigate these limitations the students whose data this research project is based upon consented to participate in this research while completing the students' perceptions survey in the fifteenth week of the academic semester. At that point in the semester all of the online homework activities for the term had been completed. Strategically implementing the survey in the fifteenth week of the semester allowed the students a more thorough understanding of the online system and presumably in a more accurate assessment of the system. Simultaneously the timing of the survey implementation reduced the exposure of the homework submissions to the Hawthorne effect.

However, the survey data itself, having been collected subsequent to the students' recognition of the research process, may have been subject to the influence of the Hawthorne effect. To test for the existence of this effect correlations were completed comparing survey responses with the academic data collected from Accounting I, II and through My Accounting Lab for Accounting III. As the results of the analysis indicated, survey responses corresponded positively with student actions within the online learning module. While these observations suggest a diminished impact of the Hawthorne effect on the survey results it cannot be completely ruled out.

The research design decision implemented to mitigate the novelty effect was the continuous use of the online web-module for the duration of the fifteen week semester. To the extent that the novelty of the online learning module might have diminished during that fifteen week period there was no material change in homework completion rates during that period. This suggests that either the novelty effect was not a primary cause of the increased performance or that the novelty effect persisted throughout the fifteen week semester and would become more evident over the process of a multiple semester implementation.

The possibility that both the data and results of this research may be subject to either the Hawthorn and/or novelty effects points to the need for further research in this domain.

4.2 Instructor Research

The principles of no harm and voluntary informed consent were central to the ethical decisions that went into the development and implementation of this research project. To this end students were informed of the research project and voluntarily completed the survey with the instructor absent from the premises. Data from the survey was held by the associate dean until after the grades were submitted by the instructor and any unique student identifiers were omitted from the research report. Moreover, the research proposal and these procedures were submitted for review and accepted by the John Abbott College Innovation, Research & Development Committee.

In spite of these safeguards instructor research introduces certain limitations to the research process. While every effort was made to limit these effects it is possible for the survey data or student usage of the web-enhanced module to be influenced by the interaction between the students and the instructor researcher.

Further research would be helpful to determine the extent to which these results are affected by the dual role of the instructor researcher.

4.3 Research Context and Parameters

A survey method was used to collect data regarding students' attitudes. While adequate for the purposes of this study, further research could implement a more in-depth method such as focus groups and interviews as a method of gathering student perceptions of the online system. Of particular interest might be a segmentation of students either demographically or using a quartile-based analysis of low versus high homework achievers. This more in-depth analysis could potentially provide greater insight to student study habits, motivations and the impact of a web-enhanced self-study module versus a manual self-study environment.

To have significant amounts of homework graded can be effective for learning accounting but may be counterproductive with regards to learner development towards the goal of developing independent learners. Further research could relax this homework grading scenario and explore the impact on student motivation and academic results.

The use of a convenience sample and specialized nature of technology students enrolled in a business administration program make it difficult to generalize these results to broader groups. Further research could expand the scope of this sample to compare results with those of other disciplines both within and outside the domain of technology students enrolled in a business administration program. It is certainly conceivable that the results could be materially different in other contexts, particularly those that explore less quantitative subject matter or cohorts where fewer students exhibit low-achieving self-study skills.

Continuing on the theme of exploring further implementations of a web-based self-study module, further research could be implemented within the context of technology students enrolled in accounting courses. More specifically, while these results were obtained in the third of three sequential Accounting courses, the issues relating to low-achieving self-study skills begin early in the program and are certainly observable in the first semester during the course Accounting I. An important limitation of this research relates to the fact that it is drawn from data for students that are enrolled in Accounting III and, as such, have successfully completed the “gateway” courses that are Accounting I and II. Excluded implicitly from this research are the students that were not successful in either of the prerequisite accounting courses early in the program – many students who are not successful in the earlier accounting courses, particularly Accounting I, often leave the Business Administration Program before reaching Accounting III. Further research could evaluate the implementation of a web-enhanced study module earlier in the program’s accounting discipline learning cycle to evaluate how students would react to such a system in the first and second semesters of their program with a particular focus on the results of these “at risk” students.

5. CONCLUSION

The objective of this research was to investigate student perceptions and academic results related to the implementation of a web-based self-study module for students enrolled in a college level third semester accounting course. The results of this research indicate that a web-enhanced learning environment can be successfully implemented and have a positive impact on both the learning process and outcomes. These results were supported through the analysis of both a student survey and academic results data from the first three sequential accounting courses in the Business Administration Program.

Students reacted favorably to the web-based self-study module, in this case a publisher based system known as MyAccountingLab. Several statistically significant observations were derived from the student survey data; prominent among these was a preference for the web-based versus a manual self-study format, as well as a strong perception among students that the web-based self-study module had increased their understanding of the course content and their corresponding grade result.

Concurrent with the positive student perception of the software were the improved academic results. As the web-based self-study module is very much a homework and self-study tool, homework averages and homework completion rates were central to the analysis of this research. Homework averages increased to 78% from 45% and homework completion rates increased to 93% from 63% in the web-enhanced Accounting III course compared to the traditional, manual homework settings of Accounting I & II.

In addition to the general conclusions this research provided a number of other interesting insights. First among these was a confirmation of the importance of the self-study process in the academic achievement of the learners. Regardless of the self-study environment, manual or web-enhanced, a significant positive correlation was found to exist between the students' self-study results, both demonstrated in homework completion rates and homework averages and their corresponding test grades. These results confirmed the importance of self-study generally found in the prevailing academic literature regarding students enrolled in higher education. Moreover, the observed positive correlation supports the first hypothesis of this research, that active learning plays an important role in student success – stated simply, more effective learning results from greater student participation.

In an effort to achieve a more detailed understanding of students' homework completion effectiveness a quartile based analysis was implemented. Quartiles were constructed by ranking the students according to their combined average homework

completion rates from the first two manual self-study courses, Accounting I and II. The quartile based homework completion rates for the manual self-study courses Accounting I and II were subsequently compared to the homework completion rates these same quartiles of students achieved in the web-based self-study activities of Accounting III. While the first two courses demonstrated significantly uneven homework completion rates across the quartiles, ranging from 31% to 91% homework completed, the diversity of homework completion rates diminished substantially within the web-enhanced Accounting III course, producing an average homework completion rate of 93% and ranging from 92% to 96% for the four quartiles of students. The difference between the homework completion rates for each of the four quartiles in the web-enhanced Accounting III was so small as to be statistically insignificant. The quartile analysis in particular supports the second hypothesis of this research that effective learning tools and prompt feedback would result in an improved learning process. Students that had previously been low-achievers with regards to homework completion achieved the greatest benefit from these improved web-based learning tools – the first quartile of students, the group with the lowest homework completion rate in the manual course format increased their homework completion rates from 31% to 92% in the transition to the web-based self-study format. At the other end of the spectrum, high-achievers who already completed 90% of their homework in the manual setting of Accounting I & II produced only a small, statistically insignificant increase in their homework completion rate.

The third hypothesis of this research suggests that using a variety of learning environments including both face-to-face and interactive online content offers the potential to stimulate students and, moreover, provides windows of opportunity for learners with different learning styles to successfully access the material. The research supports this hypothesis indirectly through both the positive attitude that students expressed towards the software and the improved academic results. The view that Gardner's multiple intelligence model might be allowed to expand to

include a so called digital intelligence gains some traction in this research – the seemingly effortless manner in which the students adopted the online system suggests that multiple learning platforms and in particular the inclusion of a digital platform for learning is virtually second nature for the current generation of students.

The fourth hypothesis of this research suggests that while one objective of a CÉGEP education is to develop independent, self-regulated learners, the majority of students that enroll in the Business Administration Program remain dependent learners in the Baxter-Magolda framework and, moreover, the process of transitioning to independent learners is achieved gradually over time. As the role of online education has expanded tremendously in the past decade its growth has not been without drawbacks. Research has demonstrated that while mature, independent students have benefited from the context and flexibility that the online educational experience provides, students that exhibit attributes associated with less mature, less self-regulated learners have faced greater difficulty succeeding within similar fully web-based learning environments. CÉGEP students, particularly those involved in technology programs such as Business Administration, seem to occupy a space between high school and university, to which many of these students aspire; in spite of their progression towards maturity many continue to exhibit the attributes of dependent learners. In this context taking a balanced approach to the implementation of online learning has proven to be a beneficial course of action in terms of the development of the learner. Integrating a web-based self-study module approach has the potential to provide the tools, scaffolding techniques and learning environment that leverage the possibilities of an online system while maintaining the human interaction and structured environment provided by the classroom experience. Achieving this balance offers the potential to provide a learning framework that simultaneously supports students academically while offering increased opportunities for individual responsibility and autonomy – providing an educational context where students can continue to develop and mature, as both learners and individuals.

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Appendix A

Student Survey

Evaluation of Online Learning

This survey is designed to evaluate your impressions of the MyAccountingLab online learning system implemented during the semester. Your evaluation of this system will be helpful in the process of refining the online learning environment for future students in the course.

Your participation in the survey is voluntary. All data collected will remain strictly confidential. All personal identifiers including name and student ID number will be strictly removed from the final data. The data collected in this survey will not be reviewed for analysis before the final grades for this course are submitted to the college.

One aspect of the research involves identifying trends and/or variances in the accounting grades students have received throughout the program. These accounting grades included Accounting 1, Accounting 2 and Computerized Accounting. In order that a student may consent they must be at least eighteen (18) years of age - for that purpose, the survey will ask your month and year of birth. By participating in this survey you consent to the data gathered therein and the results of your previous accounting courses be used for research purposes.

Thank you for your time and consideration.

Online Learning Survey

Student ID number: _____

Birthday (Month and Year only): Month: _____, Year: _____.

Sex

- Female
 Male

Mother Tongue

- English
 French
 Other (specify): _____

I would rate my general knowledge and familiarity with computers as:

- Beginner
 Intermediate
 Advanced

The following questions relate to the challenges of using the MyAccountingLab learning environment, not the challenges of the accounting material being learned.

At the beginning of the course I found using the online module technically challenging.

- Not at all Somewhat Very much so

By approximately the 5th week of the course I found using the online module technically challenging.

- Not at all Somewhat Very much so

At the end of the course I found using the online module technically challenging.

- Not at all Somewhat Very much so

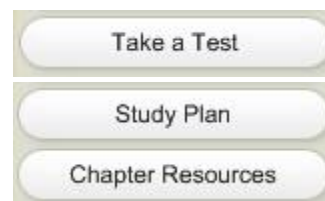
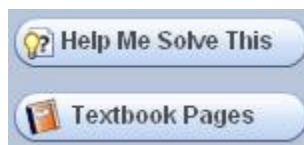
The following questions relate to your use of the online support materials.

How frequently did you use the support materials provided in the online system?

- Not at all Sometimes Regularly

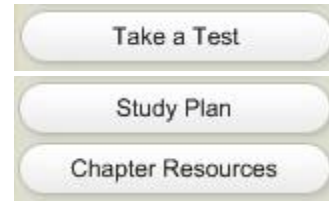
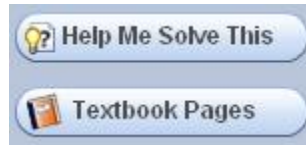
Tick off the supporting materials that you made use of during the semester.

<input type="checkbox"/> Help Me Solve This	<input type="checkbox"/> Study Plan
<input type="checkbox"/> Textbook pages	<input type="checkbox"/> Chapter Resources
<input type="checkbox"/> Take a Test	
Other (specify): _____	



Rank the supporting materials you used during the semester from most(1) to least(5) frequently used. Omit from the list any supporting materials you did not make use of.

1. _____
2. _____
3. _____
4. _____
5. _____



In the absence of an online study module, most homework would have been unmonitored and without an associated grade. The online study module allowed the instructor to both monitor homework completion and count the homework towards the final grade. In the following questions evaluate the online (monitored and graded) system versus a manual (unmonitored/no grade) learning setting.

Did the fact that the homework was being monitored by the instructor change the amount of homework you completed?

- I completed more homework as a result of the instructor supervision.
 About the same amount as I would have without instructor supervision.
 I completed less homework as a result of the instructor supervision.

Did the fact that the homework counted towards the final grade change the amount of homework you completed?

- I completed more homework as a result of the grading of the homework.
 About the same as I would have if the homework was ungraded.
 I completed less homework as a result of the grading of the homework.

Facing a challenging homework problem, did the instructor monitoring/grade incentive, affect your persistence towards solving the problem?

- I was more likely to try and solve the problem as a result of the instructor monitoring/grade incentive.
 About the same as I would have without the monitoring/grade incentive.
 I was less likely to try and solve the problem as a result of the instructor monitoring/grade incentive.

Excluding the external motivators (instructor supervision/homework grading), how do you feel about completing the homework exercises online versus manually?

- I prefer using the online system.
 I am indifferent between the online system and a manual setting.
 I would prefer doing the homework manually.

How do you think using the online module affected your understanding of the material?

- The online module improved my understanding of the material.
- My understanding is about the same as if the course were completed manually
- The online module diminished my understanding of the material.

How do you think using the online module affected your final grade in the course?

- The online module improved my final grade.
- About the same as if the course were completed manually
- The online module diminished my final grade.

What are the principal advantages you perceive in the online system?

What are the principal limitations or weaknesses you perceive in the online system?

Thank you for participating in this survey.

Have a great holiday!