ATHABASCA UNIVERSITY

EXPERIENCE FACTORS RELATED TO STUDENTS' PERCEPTIONS OF ETEXTS: EXTENDING THE TECHNOLOGY ACCEPTANCE MODEL

BY

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The future of learning.

Approval of Thesis

The undersigned certify that they have read the thesis entitled

"Experience Factors Related to Students' Perceptions of eTexts: Extending the Technology Acceptance Model"

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Dedication

I would like to dedicate this study to my mother, MaryLou McClenaghan, and my two wonderful children Elliott (7), and Quinn (3).

Acknowledgements

I would like to express deep and sincere gratitude to all those who have supported the completion of this research project. Dr. Martha Cleveland-Innes and Dr. Cindy Ives have provided their valuable time and offered professional guidance that has demonstrated a passion for the growth and enhancement of distance learning. It has been a great privilege to have two advisors of such caliber and I can only aspire to one day be held in the same high regard as either of them. I would also like to thank Dr. Agnieszka Palalas for giving her time and expertise to be an external reviewer, and offering insight and advice to help shape my report.

Along the way, I have met colleagues, who have offered words of wisdom, anecdotes of similar research experiences, and a level of genuine support that I have held dear in times of challenge. The community of learners that I have had access to as a student of Athabasca University has been diverse and it has provided enriching dialogue that has influenced personal philosophies on education and distance learning. These interactions have sparked personal growth during what I consider still very early stages of my personal lifelong journey of learning.

Abstract

In this exploratory study, quantitative statistics are used to: describe the student experience with etextbooks (etexts); identify how students perceive etexts; explore relationships between etext experience factors and perceptions of etexts; and, to consider the Technology Acceptance Model (TAM) as a tool to measure acceptance of etexts. The population for this study is 4230 undergraduate students at a Canadian open university who were part of an institutional shift to etexts. Results are based on a convenience sample of 458 respondents, a response rate of 11 percent. Students find etexts easy to use, but not useful. Specific demographic and experience variables describe student etext users and the etext experience. If given the choice, respondents do not intend to use etexts in the future. As intention to use is associated with perceived ease of use but not perceived usefulness, the TAM may not be a suitable model of measuring acceptance of etexts.

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Chapter 1: Introduction

The etext is a tool that brings new, innovative capabilities that may improve the financial and learning outcomes of the overall post-secondary system. The printed textbook has been an important part of the post-secondary course experience of students for centuries, but new electronic versions, complemented by dynamic, interactive extra learning resources, are providing a different, rich experience for course participants. Etexts are emerging as innovative tools that not only contain course-related content, but that also create opportunities for social interaction and shape the learning environment. In September 2013, one western Canadian open university, began implementing Phase One of a three year, system-wide transition to etexts. This two-part quantitative study aims to 1) describe the etext use characteristics of the post-secondary students at an open university in western Canada, and 2) measure student perceptions about the usefulness and ease of use of etexts, 3) measure relationships between etext use characteristics and students' perceived usefulness and perceived ease of use; and in turn, students' behavioural intention to use etexts. For this study, and as in the original Technology Acceptance Model (TAM), behavioural intention to use is considered the primary indicator of overall acceptance of a new technology (Davis, 1989).

The Research Problem

The mission statement for the Canadian open university involved in this study, states that the institution is dedicated to "the removal of barriers that restrict access to and success in university-level study and to increasing equality of educational opportunity for adult learners worldwide." In keeping with this mission, and moving forward with a 2002 decision to go fully online, an advisory group was formed to consult on plans to phase in etexts starting in September 2013. *Lack of acceptance by students, tutors, and staff* was identified by the advisory committee

as a risk with a probability ranking of three on a scale of one to five where one means low probability. Lack of acceptance by students, tutors and staff can have important impacts on the institution, and on all those who create, buy, and use etextbooks including institutional administrators, support service personnel, faculty, students, textbook publishers, and retail textbook sellers. Each stakeholder group has specific expectations in a transition to etexts.

For this study, the focus was on exploring how students used and perceived etexts. Students were selected because they are the end-users. Understanding student perceptions about the etext experience can place the institution in a position that will allow it to better control and confirm the outcomes associated with the student etext experience. Faculty, support services staff, institutional administrators, and textbook publishers can all benefit from knowing how to best use and develop etexts to meet the needs of students.

Each of these stakeholder groups can develop a better ability to meet student needs, but only if those needs have been explicitly researched and verified. Faculty behaviours related to the etext may affect student levels of perceived usefulness in that students might find a textbook more useful if the professor or tutor mentions the textbook frequently, appears to feel comfortable using the etext, or appears to be connected to etext support services. Better support services can be developed to improve stakeholder satisfaction with etexts. Student satisfaction with etexts may be affected by type and/or quality of support received from departments responsible for information technologies, or by the responses from front-line student support workers when contacted about an etext issue. If costs are incurred to access an etext, the financial aid department may be able to find ways to help students alleviate their financial burden by offering device rental or bursaries associated with using the new textbook format. The institutional benefits of a student being satisfied with their overall learning experience, of which

the textbook plays a small role, can lead to students: choosing to stay in a course; realizing improved performance on course learning objectives, choosing to take additional courses at the same institution, and/or expressing positive public relations.

If a modified TAM is a valid model for measuring student intention to use etexts, then future research can use the TAM to assess change in perceptions over time.

Therefore, this study can both add to the body of research about etexts and also help administrators develop policies that will result in better student services and higher quality of training programs for all stakeholder groups.

Purpose of the Study

The purpose of this exploratory, quantitative survey is to examine the relationship between specific student etext experience indicators: perceived ease of use, perceived usefulness, and behavioural intention to use etexts in the future. First, descriptive statistics area used to describe trends in demographic and etext experience indicators for the survey sample. The demographic variables include: gender, age, student type, faculty of study, location of residence, and number of courses completed at the institution prior to the most recent course using an etext. Descriptive statistics are also used to determine trends in the student etext use experience.

After descriptive statistics have been run, inferential statistics are used to examine levels of association between seven etext experience indicators and perceived ease of use and usefulness. The seven etext experience indicators are considered independent variables for this study: primary textbook format, primary location of learning, prior etext experience, primary device type, number of devices, prior online learning experience, and financial expenses incurred. Intervening variables include *perceived ease of use* and perceived usefulness. Perceived ease of use is defined as the extent to which a user finds a new system or technology

to be free of effort. Davis (1998) found that perceived ease of use works through perceived usefulness. The variable *perceived usefulness* is defined as the extent to which students find the etext will help them perform their learning tasks better. The dependent variable, *behavioural intention to use*, is a function of perceived usefulness and perceived ease of use, and is defined for this study as the likelihood that a person would choose to use etexts in future courses of study.

According to the TAM (Davis, 1989), if students find the etexts easy to use and useful, then the risk of lack of acceptance will be reduced. If students do not find the etext useful or easy to use, then institutional administrators can take action to better meet the needs of students. Active steps to improve the overall student perceptions of etexts could include: advocacy (for an improved product), improved student services, or public relations about the benefits and features of etexts. Furthermore, this study is a preliminary study that may guide future studies to better understand why students have certain attitudes about the usefulness or ease of use of etexts.

Theoretical perspective

The Technology Acceptance Model (TAM), depicted in Figure 1 (Davis, 1989), was slightly modified and used as a framework for this quantitative study. The TAM was originally developed in a 1986 dissertation by Fred Davis to measure user acceptance of computer programs in a work setting. In an extended version of the TAM, Davis (1989) eliminated attitude as a consequence of *perceived usefulness* and *perceived ease of use*. Davis (1989) determined that behavioural intention to use was a better predictor, than attitude, of actual system use. The TAM suggests that external variables affect perceived usefulness and perceived ease of use and that if a new technology is useful and easy to use, the user will intend to the use the technology in the future.

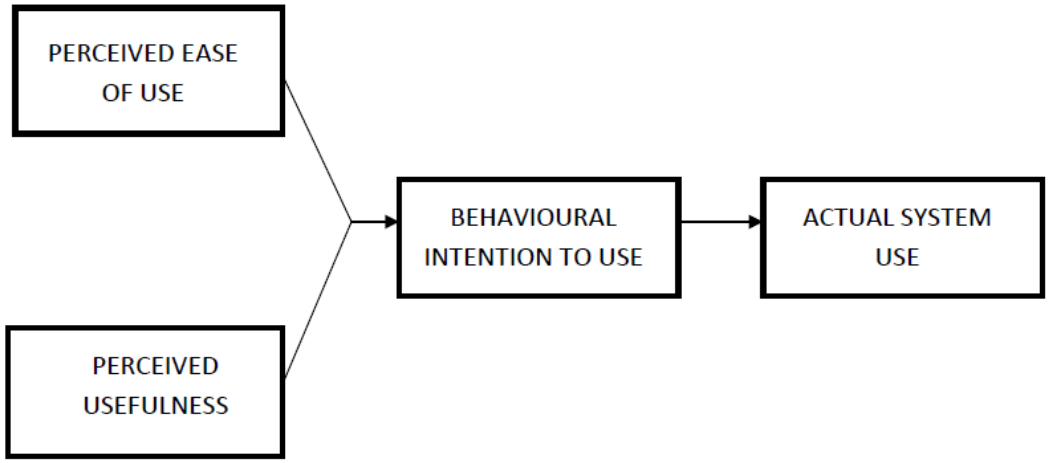

Figure 1. Technology Acceptance Model (Davis, 1989)

Since, 1989, the TAM has been widely referenced and validated by several studies in a variety of business contexts (Adams, Nelson, & Todd, 1992; Davis, 1989; Davis, Bagozzi, & Warshaw, 1989; Hendrickson, Massey & Cronan 1993; Park, Nam, & Cha, 2012; Samah, Shaffril, Hassan, & D'Silva, 2011; Segars & Grover, 1993; Shroff, Deneen, & Ng, 2011). Several studies have also attempted to extend the model by examining exogenous variables that may affect perceptions about ease of use or usefulness, and also by attempting to offer better predictors of actual system use (Pesico, Manca, & Francesca, 2013; Porter & Donthu, 2006; Teo, Lee, & Chai, 2007; Venkatesh, 1996). More recently, researchers have confirmed the validity of using the TAM to measure student attitudes towards specific educational technology systems such as elearning, mobile learning, and eportfolios (Adewole-Odeshi, 2014; Park, Nam, & Cha, 2012; Shroff, Deneen, & Eugenia, 2011). Figure 2 outlines the theoretical framework that used in part two of this study.

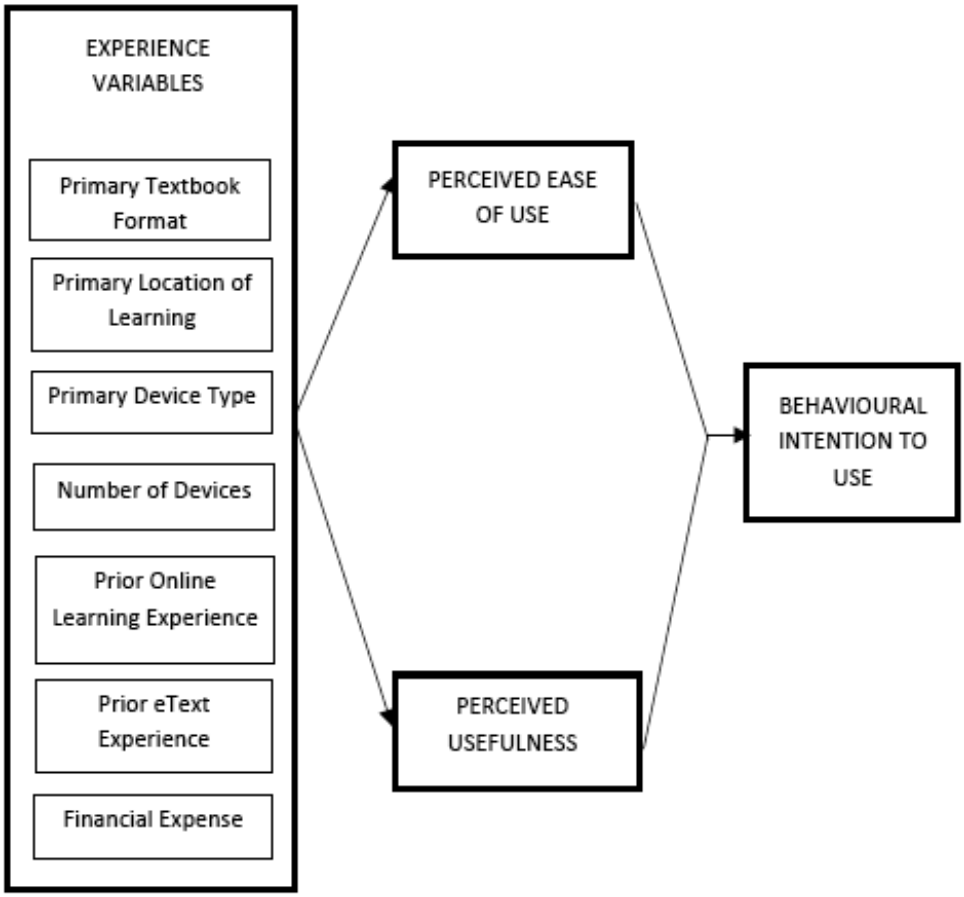

Figure 2. Proposed theoretical model

After reviewing literature and considering all aspects of the student etext experience, variables were selected as representative of the student textbook experience. Variables related specifically to use of the electronic textbook through Vital Source™, such as highlighting or interaction with other students, were not considered in this study. The experience variables that were tested in this study, as outlined in *Figure 2*. Proposed theoretical model, include seven specific indicators related to the individual student etext experience including: primary textbook format (online, offline, printed copy, purchased hard copy), primary location of etext use (home, en route, school, work, other), prior etext experience (scale of 1-10 where 1 is none and 10 is extensive), primary device type (desktop, laptop, ereader, tablet, smartphone, other), number of

devices (none, one - only to print, one – electronic, multiple), prior online learning experience (scale of 1-10 where 1 is none and 10 is extensive), financial expense (none incurred, acceptable level, unacceptable level). These seven experience variables were considered independent variables for this study. Perceived ease of use and perceived usefulness are considered intervening variables and behavioural intention to use is the dependent variable. According to Davis et al. (1989), *behavioural intention to use* is an indicator of overall acceptance of etexts and actual system usage represents acceptance.

Research Questions

The survey instrument, included in Appendix A, included questions that measure specific demographic and etext use characteristics. The survey instrument also included questions related to how students used etexts, whether students found etexts easy to use, whether students found etexts useful, and whether students would use etexts if given the option in future courses. The constructs for perceive ease of use and perceived usefulness were slightly modified from those developed by Davis (1989). Behavioural intention to use was measured using one question on a scale of one through seven, where one means extremely unlikely and seven meant extremely likely. The guiding research questions for this study are:

1. How do students use etexts (device type, learning location, online/offline, number of devices)?
2. How do students perceive etexts (Do students find etexts useful and easy to use)?
3. Which specific etext experience factors are related to students' perceptions of usefulness and/or ease of use, and behavioural intention to use etexts in future learning?

4. Is a slightly modified TAM a valid model for predicting student intention to use etexts?

As this is an exploratory study, and the level of measurement for the experience variables did not meet necessary criteria to measure correlation, eight predicting statements were used to focus analysis.

P1: Specific demographic and experience variables can describe students and the student etext experience at a Canadian distance university.

P2: Canadian, undergraduate distance students find etexts useful.

P3: Canadian, undergraduate distance students find etexts easy to use.

P4: Canadian, undergraduate distance students intend to use etexts in the future.

P5: Specific etext experience variables are related to perceived ease of use.

P6: Specific etext experience variables are related to perceived usefulness.

P7: Perceived ease of use is related to behavioural intention to use.

P8: Perceived usefulness is related to behavioural intention to use.

Statistical analysis was used to 1) describe the group of students who choose to use etexts, 2) describe the etext experience of students; 3) measure levels of association between each experience variable and the two intervening variables, perceived ease of use and perceived usefulness; and 4) validate or reject the TAM model in the context of etexts at an open university in Canada.

Limitations and Delimitations

A delimitation is a factor that affects the study and is under the control of the researcher (Mauch & Park, 2003). A delimitation of this study is the choice to carry out the study using a quantitative survey method. A survey method was chosen due to the effectiveness of a survey to efficiently gather and analyze results from a larger number of respondents. This study is also

delimited to student participants in courses involved in Phase One of a system-wide transition to etexts at one open-university in western Canada. Other participant groups in Phase One, such as faculty, tutors, student services personnel, or administrators, may have had different levels of acceptance with etexts. The geographic location of the chosen institution may also create a unique set of data that is not generalizable to a broader population.

Another delimitation is the decision to use a convenience sample rather than a random sample for the findings of this study. Since the enrolment of the three faculties involved in this study is different and the enrolment in each course is different, the results may be skewed. Students in one particular faculty or course may have been more or less likely to participate in this study. This study does not account for the external factors beyond the student interaction with the etext. Students in certain courses or faculties may have been exposed to positive or negative word of mouth about etext, which may or may not affect perceptions about etexts and may affect a student's openness to trying to use the electronic versions of the textbook.

This study is limited in scope in that it does not focus on the specific details of why students perceive etexts to be useful or easy to use. Specific design features of etexts were not measured. It is possible that demographic factors or personality traits play a role in a student's overall acceptance of a new technology. Furthermore, this study focuses on students who identified a primary device type for accessing the etext. Although students who used more than one format or device to access etexts are included in the descriptive statistics describing the student etext experience, measures of association were not calculated for students who were unable to select a primary device type.

Time is a limiting factor in this study because the popularity of etexts is growing. With a growth in popularity comes an increase in research and frequent changes in the etext experience.

For this reason, the trends in the etext experiences of students at the time of this study may not represent actual experiences of students for a long period of time. This research could become quickly outdated.

Definition of Terms

Acceptance is a state of having a positive attitude towards and the intention to use a technology or system.

Attitude is an individual's positive or negative evaluation of a technology or system.

Behavioural intention to use is the degree to which the user is likely to use etexts in the future.

Compatibility is the degree to which an innovation is compatible with the beliefs, prior experience, and needs of an individual. Compatibility is one of five attributes of an innovation outlined in the diffusion of innovation theory proposed by E. Rogers (1962).

Complexity is the degree to which an innovation is easy to use. Complexity is one of five attributes of innovations proposed by E. Rogers (1962) in his diffusion of innovations theory.

Continuance intention is the likelihood that a user will use a new technology in the future. For this study, continuance intention is synonymous with behavioural intention to use.

Device type is the primary device that the student uses to access the etext.

Diffusion of innovation theory is a theory developed in 1962 by Everett Rogers that describes universal aspects of the processes involved in new innovations being accepted by individuals within a group or social system.

Digital textbook is one of several terms used for an etext. It is synonymous with, etext, e-textbook, and electronic textbook.

Ebook refers to a fiction or non-fiction book that can be read in a digital format.

Etext is the term used throughout this paper for a textbook in a digital format.

Financial expense is a cost incurred to a student as a result of the institutional switch to etexts.

Instructor mention/use is the respondent's perception of the frequency with which the instructor/tutors referred to or made use of the etext during the course.

Observability is the degree to which an innovation can be seen by or described to people. Observability is one of five attributes of an innovation outlined in the diffusion of innovation theory proposed by Rogers (1962).

Perceived usefulness is one of two variables in the TAM (Davis, 1982) that is related to acceptance of a new technology. Usefulness is related to the role the new technology has in helping the user improve performance.

Perceived ease of use is one of two variables in the TAM (Davis, 1982) that is related to acceptance of a new technology. Ease of use is how easy or hard a new technology is to operate.

Primary textbook format is the main format of the textbook the student chose to use during an eText Initiative course. Students may primarily use the online etext via Vital Source™, offline (downloaded version), printed hard copy, or paid bound copy.

Relative advantage is the degree to which a new technology is better than the technology it is replacing. Relative advantage is one of five attributes of an innovation outlined in the diffusion of innovation theory proposed by E. Rogers (1962).

Technology Acceptance Model (TAM) is a model developed in 1989 by Fred Davis linking acceptance of a new technology with perceived usefulness and perceived ease of use.

Trialability is the degree to which an innovation may be experimented with prior to adoption. Trialability is one of five attributes of an innovation outlined in the diffusion of innovation theory proposed by E. Rogers (1962).

User is a student who used a textbook in an electronic format either as a downloaded .pdf or via Vital Source™.

Vital Source™ is the online platform through which etexts are delivered at some institutions, and through which etexts are delivered at the institution involved in this study.

Chapter 2: Literature Review

It is reported that the first patent of an electronic book occurred in Spain in 1948, when a teacher wanted to reduce the amount of textbooks her students carried to school (Moran, 2013). Michael Hart started Project Gutenberg in 1971 when he created an electronic version of the Declaration of Independence and sent it out to everyone on the network that became the Internet (Hart, 1992). In the early 1990s, new file formats for electronic books were developed so that books could be read on a variety of devices. Since 2005, electronic readers have shown steady growth in distribution (Comacho, 2013). Consumers enjoy the convenience of electronic reading devices and ebooks. Development in the field of electronic book publishing has created an opportunity for post-secondary education institutions to reduce costs associated with printed textbooks and also to search for new pedagogical ideas that might better meet the needs of faculty and students. Institutions with forward thinking leaders are not only looking for ways to reduce costs, but also to lead the way in shaping the future of learning resources for its students, faculty, support staff, and administration.

The eText Initiative is a three phase, three year, institution-wide shift to etexts. The institution is a leader in open and distance learning and has approximately forty thousand students, with most students studying on a part-time basis. Phase One of the eText Initiative began in September 2013. In an effort to manage the change, administrators at the university sent out a request for further research on the topic of etexts and on aspects related to the etext initiative.

Findings of the literature review are grouped into four categories related to the variables in this study: acceptance (attitude and behavioural intention to use), experience factors, perceived ease of use, and perceived usefulness.

Acceptance of Innovations

Fred Davis (1986, 1989) proposed the TAM, a measurement scale for assessing user acceptance of a new technology. He found that two variables, *usefulness* and *ease of use*, most closely related to user acceptance of a new technology. In the development of the TAM scale, Davis considered self-efficacy theory (Bandura, 1982), cost-benefit paradigm (Beach & Mitchell, 1978; Johnson & Payne, 1985; Payne 1982), adoption of innovations (Tornatzky & Klein, 1982), and the channel disposition model (Swanson 1982, 1987). Davis (1989) found that "users are driven to adopt an application primarily because of the functions it performs for them, and secondarily for how easy or hard it is to get the system to perform those functions" (p. 333). This suggests that users are willing to endure a certain level of difficulty in the use of a new technology, but are unwilling to accept an innovation that does not perform a useful function.

Stone and Baker-Eveleth (2013) studied students' continuance intentions and used the expectation-confirmation model to measure how confirmation of pre and post use expectations relates to student satisfaction and continuance intentions. They used a modified Technology Acceptance Model scale for perceived usefulness and defined perceived usefulness as having the ability to help the student do better in class, improved quality of academic work, help the student be more successful in class, and improve the academic performance of the student.

Porter and Donthue (2006) used a modified TAM to determine which consumer beliefs predict attitude towards usage of the Internet. Porter and Donthue (2006) found that, although access barriers such as age, education level, income level, and membership in a minority group, influence consumer attitudes about Internet usage, perceived usefulness and perceived ease of use were stronger predictors of attitude.

Although several researchers have attempted to modify the original TAM, the simplicity of the TAM – including the attitude variable - lends itself well to a study that will gather preliminary results about perceptions of a new technology in an educational setting. Furthermore, "the widespread use of the TAM also suggests it is applicable to many areas of use, such as education and social applications of technology." (Edmonds, Thorpe, & Conole, 2012)

Experience Factors

With printed texts, students are assigned chunks of reading. They use the textbook to carry out learning tasks, and make use of text features for personal study strategies. Since the widespread use of etexts is still developing, the explanation of how students use etexts is also developing. Students have more choices and more opportunities to ensure a positive interaction with their textbook. For example, students can choose device type, whether to access the textbook online/offline and which features best suit their learning needs. Mobile devices allow students to learn anywhere at any time. More research in learning about the patterns of how students choose to use all textbooks can benefit institutions and textbook publishers. For example, if the institution and publisher aim is to have students use etexts in a fully online way, yet students do not find the fully online version to be the best format for learning, then publishers have work to do in terms of marketing and product development.

Primary textbook format. Primary textbook format refers to the main format of textbook the student uses for learning during an eText Initiative Phase One course. Students may primarily use the etext through the online learning platform Vital Source™, an offline electronic version, a self-printed copy, or a new or used paid bound copy. Differences in online/offline/printed experience may be significantly related to perceptions of usefulness, perceptions of ease of use, or behavioural intention to use. Rickman, Von Holzen, Klute, and

Tobin (2009) studied five hundred students at Northwest Missouri State University (NMSU) and found distinct learning differences related to the format of text used. Sixty percent of students reported that they read more with a physical, bound-copy of the text versus with an etext. However, 56 percent of NMSU students reported etexts to be more convenient than using a printed, hard copy text. In a 2013 study, Daniel and Woody found that reading time for similar content was significantly higher for electronic text when compared with the same content in print format. Daniel and Woody (2013) argue for deeper investigation into the student-textbook interaction, suggesting that a better understanding of the student etext experience could influence design and development of better etexts.

Primary location of learning. The increase in popularity of electronic books and mobile devices has led to a need for learning materials that can meet the needs of an increasingly mobile culture (Feugen, 2012). It is expected that primary location of learning is strongly linked to primary device type and primary format. Being mobile may mean that etexts must be designed to function fully on smaller screens. If students prefer to learn from home or work, less attention by etext developers may be needed regarding mobile compatibility of etexts. Mobile learning (mlearning) can increase student-content, student-student, and student-professor interactions (Feugen, 2012). Battery life, software limitations, network dependence, limitations of physical location of learning (i.e. weather), and weight of mobile devices have also been noted as negative aspects of mobile learning (Feugen, 2012; Park, 2011). To maximize the user experience with etexts, researchers must continue to uncover details about the number of users who learn en route, why they are choosing to learn en route, and trends in how these users access their etexts.

Prior etext experience. Venkatesh and Davis (1996) carried out three experiments to examine antecedents of perceived ease of use. The study involved one hundred and eight

subjects and six different technology systems in a work setting. Venkatesh and Davis (1996) found that prior experience results in a higher self-efficacy with a technology and in turn, alters perceptions about ease of use. If direct experience with etexts leads to increased perceptions of ease of use, then administrators may be able to ensure that new users of etexts have opportunities to access e-text training materials and to try out the etext prior to using it for course-related tasks.

A prior negative experience may also affect the way a student interacts with a new technology. Rickman, Von Holzen, Klute and Tobin (2009) found, in a pilot study at Northwest Missouri State University, that enthusiasm for ereaders was quickly altered if the ereaders did not have user-desired features. J. Sheppard, Grace and Koch (2008) examined introductory psychology students who had a choice of a hard copy of the textbook or an electronic version of the textbook. Of the students who had purchased an etext for a prior course, none chose the etext option in the Sheppard et al. (2008) study. This suggests that prior experience can influence behavioural intention to use.

Primary device type. Access to content and quality of the etext experience may both be affected by choice of device. Choice of device in turn, may affect perceived ease of use and perceived usefulness. A better student experience on one specific device, can guide the institution in promoting those devices to etext users and in advocating for a more even learning experience across devices. Rickman et al. (2009) found that ereaders provide a much different experience than laptop computers. The ereaders could not provide online content that the laptop could, and in turn, fewer features were available to supplement student learning on the ereaders. The ereaders in the Rickman et al. (2009) study offered a straight electronic version of the old printed textbook. Students liked the convenience and portability of using the etext on a device rather than carrying around a number of large, heavy textbooks (Rickman et al., 2009). Using a

mobile device could suggest that an individual is often mobile and would find electronic learning materials to be more useful than a printed copy of the text or a version of the etext that is best suited to a device without a wireless Internet connection.

Prior Online Learning Experience. Prior online learning experience may affect perceptions about ease of use and usefulness. If the choice to use a printed copy or to pay for a hard copy exists, students who are comfortable with the hard copy may choose not to fully embrace the new etext format. In the Unified Theory of Acceptance and Use of Technology Model, Venkatesh, Morris and Davis (2003) suggested that experience directly affects expectations of a new technology and indirectly affects behavioural intention to use. Prior online learning experience in this study is self-reported by survey participants on a scale of one to ten where one is none and ten is extensive.

Financial Expense. In an etext pilot study carried out by five American higher-education institutions, students had the option of using an etext or paying for a hard copy of the textbook. Only 12 percent elected to purchase the hard copy and the key advantage of etexts was found to be financial savings to the user (Internet2, 2012). The institution rather than the student, in this study, will see the financial savings resulting from the eText Initiative. Students will continue to pay the same learning resources fee that they did with printed course materials and the university will continue to negotiate contracts with textbook providers. Offering the option to pay for a printed copy may be a permanent or a transitional service that allows students to feel more comfortable in exploring etexts without being forced to only use this new format. This is congruent with diffusion of innovation research theory that states that group members who feel empowered during the decision to use and accept a new technology may be more likely to accept the new technology (Rogers, 1962). Students may also consider the etext financially limiting in

that a student can no longer sell a textbook for profit when finished with a course (Baek & Monoghan, 2013).

Ease of Use

Ease of use is defined by Davis (1989) as the degree to which a person believes that using a particular system would be free of effort. Davis developed and validated content of the six-item scale outlined in *Figure 3*. Six-item perceived ease of use scale, to measure perceived ease of use of software applications. Davis found that ease of use may be an antecedent to perceived usefulness rather than being an independent determinant of usage (Davis, 1989).

Perceived Ease of Use

	Learning to operate CHART-MASTER would be easy for me.							
likely								unlikely
	extremely	quite	slightly	neither	slightly	quite	extremely	
	I would find it easy to get CHART-MASTER to do what I want it to do.							
likely								unlikely
	extremely	quite	slightly	neither	slightly	quite	extremely	
	My interaction with CHART-MASTER would be clear and understandable.							
likely								unlikely
	extremely	quite	slightly	neither	slightly	quite	extremely	
	I would find CHART-MASTER to be flexible to interact with.							
likely								unlikely
	extremely	quite	slightly	neither	slightly	quite	extremely	
	It would be easy for me to become skillful at using CHART-MASTER.							
likely								unlikely
	extremely	quite	slightly	neither	slightly	quite	extremely	
	I would find CHART-MASTER easy to use.							
likely								unlikely
	extremely	quite	slightly	neither	slightly	quite	extremely	

Figure 3. Six-item perceived ease of use scale (Davis, 1989)

Venkatesh and Davis (1996) attempted to refine the original Technology Acceptance Model (Davis, 1989), and found that perceptions of ease of use of a new technology are affected by self-efficacy and direct experience. They also removed the attitude construct from the original

TAM model, suggesting that behavioural intention to use is a more reliable predictor of actual system use. After experience with a new technology, perceptions of ease of use become altered to reflect specific characteristics of the system. For this exploratory study, if prior online learning experience and prior etext experience are found to be associated with perceived usefulness and perceived ease of use, it would suggest that future research should look more closely at the relationships between experience, self-efficacy and student perceptions about etexts.

Ease of use as a predictor of acceptance was also validated in a 2013 study by Eun-Ok Baek and James Monoghan. Baek and Monoghan (2013) surveyed 615 undergraduate students at five state universities and found that ease of use was in fact a key factor in overall student satisfaction with an etext.

Petrides et al. (2011) used interviews, focus groups, and survey methods, to examine faculty and student perceptions of open textbooks. Ease of use was determined to be an important factor in faculty adoption of open textbooks, which have some similar use characteristics as etexts. Faculty specifically liked the portability of open textbooks, and the ability to integrate content from open textbooks into their existing course material. Sixty-five percent of student participants in the study by Petrides et al. (2011) said they preferred to use open textbooks in the future, because they were easy to use; specifically, etexts were portable and accessible from anywhere. This demonstrates a link between ease of use and behavioural intention to use.

Usefulness

Perceived usefulness was originally defined by Davis (1989) as the degree to which a person believes a new system will improve job performance. Davis developed and validated the six item scale outlined in *Figure 4.* Six-item Perceived Usefulness Scale, to measure employees'

perceptions about the usefulness of new software applications. Perceived usefulness has been compared to the relative advantage construct in the Diffusion of Innovation Theory (Rogers, 1962). Perceived Usefulness is also similar to Performance Expectancy, studied by Venkatesh, Morris, Davis and Davis (2003) as a construct in the Unified Theory of Acceptance and Use of Technology (UTAUT). In the UTAUT, Venkatesh et al. define performance expectancy as the degree to which an individual believes that using a new system will improve job performance.

Perceived Usefulness

Using CHART-MASTER in my job would enable me to accomplish tasks more quickly.								
likely								unlikely
	extremely	quite	slightly	neither	slightly	quite	extremely	
Using CHART-MASTER would improve my job performance.								
likely								unlikely
	extremely	quite	slightly	neither	slightly	quite	extremely	
Using CHART-MASTER in my job would increase my productivity.								
likely								unlikely
	extremely	quite	slightly	neither	slightly	quite	extremely	
Using CHART-MASTER would enhance my effectiveness on the job.								
likely								unlikely
	extremely	quite	slightly	neither	slightly	quite	extremely	
Using CHART-MASTER would make it easier to do my job.								
likely								unlikely
	extremely	quite	slightly	neither	slightly	quite	extremely	
I could find CHART-MASTER useful in my job.								
likely								unlikely
	extremely	quite	slightly	neither	slightly	quite	extremely	

Figure 4. Six-item perceived usefulness scale (Davis, 1989)

Research Gaps

Much more research is needed to fully understand the etext experience for all user groups. The Technology Acceptance model has not been used to measure undergraduate

perceptions of etexts. Furthermore, identifying initial connections between specific experience variables and their perceptions of usefulness and ease of use, will guide research to focus on the specific etext and learning platform features that best help students learn. More research is needed regarding how students become aware of etexts, how students address their own learning needs when beginning to use etexts, and defining user-group roles in the etext use process. Furthermore, there appears to be a gap in research around the content and quality of social interactions when using etexts. Stone and Baker-Eveleth (2013) imply that better understanding user experiences and continuance intentions can help etext designers and those who select etexts for courses to ensure that etexts possess characteristics that produce perceptions of usefulness and meet student expectations. This would result in better student satisfaction with etexts. Further studies about how to make etexts more useful and more easy to use for distance learners can better ensure widespread acceptance of etexts. This exploratory study examines specific experience characteristics and their relationship to perceived ease of use, perceived usefulness, and in turn, behavioural intention to use.

Much research about etexts has focused on comparing the e-book experience with print-based books. Studies have also focused on the financial savings to students that etexts might bring, but students at the particular institution being studied pay a course materials fee that will not be affected due to the transition to etexts. Little research has been done that focuses on a Canadian university undertaking a system-wide transition to etexts. Furthermore, little research was found that related to a primarily distance university. The institution-wide shift at this school, provided the opportunity to gather empirical evidence about promising practices and pedagogical issues in the use of etexts.

It is time to move away from comparing early etext experiences with centuries old printed textbook habits. One Canadian open institution has made the innovative decision to go fully online, and research must be done to measure and theorize about the pedagogical issues and experiences of all stakeholder groups. Comparisons to the way it has been are beneficial and provide a strong foundation for directions in future research, but "in order to effectively support students' learning, it is important to comprehend students' experiences using etexts" (Baek & Monoghan, 2013).

Models to predict user acceptance of new technologies include Diffusion of Innovation Theory (Rogers, 1962), Technology Acceptance Model (Davis et al., 1989), and the Unified Theory of Acceptance and Use of Technology (Venkatesh, Morris, & Davis 2003). Although several studies exist to test these models on new technologies, these models are quite general and most relevant to new technologies in society or in the workplace. Little research exists that examine specific facets of student experiences with new technologies, including etexts.

Chapter 3: Methodology

In this exploratory survey study, deductive logic is used to make some initial conclusions about the student etext experience. This study attempted to validate eight predicting statements related to: 1) how students use etexts, 2) student perceptions of etexts, 3) experience factors related to perceptions about etexts, and 4) validation or rejection of the TAM in the context of etexts. The results of this study provide future researchers the opportunity to narrow in on specific indicators that may affect student perceptions about electronic textbooks. This methodology section includes a rationale for choosing a survey design for this study, a description of the population, a description and justification of the sampling procedure, a detailed explanation of the survey instrument including operational definitions for each variable, an outline of how validity and reliability are addressed, an explanation of data collection procedures, a discussion of ethical considerations, the step by step data preparation procedure, and the procedure for testing each of the predictive statements.

Survey Research Rationale

In this quantitative study, a survey was used as the data collection instrument. The purpose of survey research is to "gather information on the backgrounds, behaviors, beliefs or attitudes of a large number of people" (Neuman, 2006, p. 43). Researchers use a survey to "ask a large number of people dozens of questions in a short time frame" (p. 43). In this study, survey research was used: to describe the sample, to describe specific characteristics of the etext experience for eText Initiative Phase One students; to identify how specific aspects of the etext experience are related to perceived ease of use, perceived usefulness, and behavioural intention to use; and to evaluate the suitability of a modified TAM in the context of student acceptance of etexts.

There are three reasons a survey method has been selected for this study: economy of design, quick turnaround time, and the ability to use results to identify the attributes of a large population from a sample of individuals. A survey method allows the researcher to use only what is necessary to achieve a questionnaire that will elicit responses that answer the research questions. It allows the researcher to remain relatively objective and to gather information from a large number of individuals, in this case eText Initiative Phase One students, in a short amount of time. Once designed, a survey can be completed by as many individuals as necessary.

Secondly, the researcher can set limits on the amount of time the survey is available to ensure that respondents complete the survey at their convenience within the selected timeframe. After the survey is closed, results may be tabulated immediately. Finally, a survey allows the researcher to measure respondent attitudes about similar questions, and to make generalizations about the larger university student population. Although there is a lack of depth in the questions in this survey research, this study lays the groundwork for further studies using a variety of qualitative or quantitative methods about issues such as motivation, reasoning, and expectations throughout the life of an electronic textbook. This survey provides a glimpse of levels of association between several variables, which in turn may be further examined for correlation.

The survey instrument includes closed ended questions, with the exception of a final question that allows respondents to share any other comments they feel are important regarding the etext experience. This final question provides the opportunity for an unlimited number of possible ideas to be shared, and in turn, may help the researcher uncover unanticipated relationships or rationale for association between variables. Neuman (2006) suggests that open-ended questions allow respondents freedom of expression and an opportunity to answer in detail or clarify responses.

Population

The population for this study included four thousand, two hundred thirty undergraduate students at a Canadian open university who were enrolled by April 1, 2014, in phase one of the eText Initiative. Access to students was granted by the institution and contact information for students, was provided by the computing services department. Students invited to participate in the study were enrolled in one of three faculties with undergraduate students involved in eText Phase One: Faculty of Business, Faculty of Humanities and Social Sciences, and Faculty of Science and Technology. A list of eligible students was provided by the computer services department for all students who had been registered in a phase one course. An electronic invitation and survey link was sent to the entire group. A reminder email with the survey link was sent out one week later and the survey was left open for a total of four weeks.

Sample

Due to timing of the initial email invitation and a potentially low response rate, a convenience sample was used for this study. The initial electronic invitation was sent during the final week of the term, and also, respondents may have finished a course months earlier. When the final reminder was sent, several students may not have been regularly checking the email address they use most as a student of the institution. After online surveys were completed, results were exported from Lime Survey to a Microsoft Excel file where results were sorted to ensure only those students who had completed survey and who met the enrolment date criteria were counted as valid responses and included in data analysis. 458 results were considered valid and used as the sample for this study; a response rate of 11 percent. Since a convenience sample was used, it is improbable that the results of this study are generalizable to the broader population.

Instrumentation and Definition of Variables

The survey instrument was created using a web-based survey program called Lime Survey. A print version of the survey can be found in Appendix A. Questions on the survey relate to demographics, etext use characteristics, perceived ease of use (PEU) of etexts, perceived usefulness (PU) of etexts, and behavioural intention to use (IU) etexts in future studies.

Demographic variables on the survey are used to describe the survey participants' gender, age, geographic location, urban vs. rural location, student status, faculty, and program of study.

Specific characteristics of the student etext experience outlined on the survey instrument include: primary textbook format used (s), primary device type (must select one), number of devices used, primary location of learning (home, work, en route, school, other), prior experience with etexts (scale of one to ten, where one is none and ten is extensive), prior online learning experience (scale of one to ten, where one is none and ten is extensive), and level of financial expense incurred due to etext (none, acceptable, unacceptable).

Primary textbook format (PTF) is the format that the student uses most from: online, offline electronic, printed copy (personally printed), and paid hardcopy text. It is expected that primary textbook format is associated with primary device type and primary location of learning.

Primary location of learning (PLL) is a nominal-level variable, defined as the main physical location where the student interacts with the textbook. Primary location of learning is the location where the student most often interacts with the textbook: en route, home, work, school, or other. It is expected that primary location of learning is associated with other experience characteristic variables including primary textbook format, and primary device type.

Prior etext experience (PEE) is an ordinal level variable and measures the respondent's perception of his or her prior experience with etexts. Respondents rank their perceived etext experience on a scale of one to ten, where one is none and ten is extensive. It is expected that prior etext experience is associated with prior online learning experience.

Primary device type (PDT) is a nominal-level variable that measures the main type of device the respondent uses for interacting with their textbook. The options allow for students to select "no device". Options for primary device type include: ereader, tablet, smartphone, laptop, desktop computer, no device (printed format). It is expected that primary device type is associated with other experience characteristic variables such as primary textbook format and primary location of learning.

Prior online learning experience is an ordinal level variable with a scale similar to prior etext experience. Perceived level of experience with online learning is ranked on a scale of one to ten, where one is none and ten is extensive. It is expected that prior online experience is related to prior etext experience and perceived ease of use.

Financial expense incurred measures whether students incurred a financial expense as a result of the institution-wide shift to etexts and if that expense is perceived by the student to be acceptable or unacceptable.

Scale items from the widely validated TAM were slightly modified to suit the context of this study for PEU and PU (Davis, 1989) since the original constructs in the Technology Acceptance Model were used to measure technology at work rather than in an educational setting.

In order to provide an opportunity for respondents to offer comments that were felt to be relevant to the questions in this study about etexts, one final qualitative, open-ended question

was included in the survey instrument asking students provide any other comments they would like to share regarding their experience with the electronic textbook.

Validity and Reliability

Reliability is the concept that a research study can be replicated and attain the same results (Neuman, 2006). In order to improve reliability for this study, each construct was clearly defined to eliminate distracting information. The level of each variable was considered and an attempt was made to increase the level of measurement when suitable. When a nominal variable was used, choices were made clear and when an "other" option was a part of a question, a blank text box was included so that respondents could clarify a response. To increase the specificity of responses, each of the ordinal variables used multi-item scales, rather than just a few categorical responses. For example, prior etext experience and prior online experience were reported based on a scale of one to ten. Each PU and PEU item was scored on a seven-point scale. Behavioural intention to use was reported using a scale of one to seven. Seven points have been chosen because a higher number of precise levels results in a higher level of scale reliability (Neuman, 2006).

To ensure internal reliability of the perceived usefulness (PU) construct and the perceived ease of use (PEU) construct, six indicators were to measure each. Using multiple indicators of a variable provides a more consistent reading than variables with just one indicator (Neuman, 2006). Cronbach alpha was used to determine whether each scale item accurately measured what it was intended to measure: PU or PEU. Next, an inter-item correlation matrix was used for the PU and PEU constructs, to ensure that each item in the scale measured the same characteristic. As a result of the inter-item correlation matrix, one item was dropped from both the PU and PEU

construct before data were analyzed. Further detail about inter-item correlation measurements is included in the data analysis section of this report.

Finally, to test the survey instrument, one eText Initiative phase one course was selected and invitations were sent to each participant in the course. The pilot group had forty-nine valid responses and was conducted to test the semantics of the survey. At the end of the survey, respondents were asked an open-ended question to explore any issues they felt needed to be addressed in the survey. Full data analysis was not undertaken for this group. Based on feedback from participants, minor adjustments in the wording and settings of the survey instrument were made. Once the survey was revised, the full study was initiated.

Data Collection

Four thousand, two hundred thirty potential respondents were emailed a request for participation in the study (Appendix B) along with the link to the web survey. The survey platform, Lime Survey was used to send invitation emails, collect responses, and send follow up requests for participation emails as needed. Respondents completed the survey and results were recorded within the survey platform.

Ethical Considerations

Application was made to the university's institutional research ethics board in order to ensure this study was following a methodology congruent with the ethical standards of institution. Once approved, institutional approval was applied for. Upon receipt of institutional approval, the survey was ready to be administered in the pilot study.

Data Preparation

In order to prepare data for the statistical procedures involved in this study, data were exported to a Microsoft Excel file format. Data were examined to eliminate any incomplete

surveys, were then imported into the statistical management software SPSS18.0, where accuracy of all data was verified. All categorical variables were recoded into a grouped variable before data analysis. One new variable was created from the responses to preferred textbook format. This new variable was entitled "user vs. non-user" of the textbook in an electronic format. A summated scale variable was created for perceived ease of use and perceived usefulness. After each recode, the new variable was verified for accuracy based on the raw data for 10 different respondents. For example, when a summated perceived usefulness variable was created, the researcher opened the original Microsoft Excel spreadsheet, exported directly from Lime Survey, and manually calculated the summated score for 10 different respondents and cross-checked it with the recoded variable in SPSS.

Statistical Procedures to Address Research Questions

Survey responses were compiled in the Lime Survey platform, exported to Microsoft Excel, and then imported into the statistical analysis program SPSS 18.0. Descriptive statistics were run on the demographic variables in order to use measures of central tendency to describe the group of students who participated in the study.

During the first phase of data analysis, univariate descriptive statistics were run for each variable to note trends in experience characteristics, perceptions of usefulness, perceptions of ease of use, and behavioural intention to use.

In part two of data analysis, level of association between experience characteristics were measured, as outlined in Table 1: Measures of association part one. The level of measurement for each experience variable was considered. Of the seven experience characteristic variables, five are nominal: primary textbook format, primary location of learning, primary device type, number of devices, and financial expense. The other two experience characteristic variables,

prior etext experience, and prior online learning experience, are ordinal level variables. Lambda–value was used to measure association between nominal variables, and between nominal and ordinal variables. Gamma value was used to measure association between ordinal level experience variables.

In the next step of data analysis the level of association between each experience variable and the two intervening variables, perceived usefulness and perceived ease of use was measured.

Table 1

Measures of Association Part One

	Primary textbook format	Primary device type	Number of devices	Primary location of learning	Prior online learning experience	Prior etext experience	Financial expense
Primary textbook format (Categorical) self-printed/purchased new or use bound copy/offline electronic/ online with Vital Source		1	2	3	4	5	6
Primary device type (Categorical) desktop/laptop/ereader/tablet/ smartphone/other	7		8	9	10	11	12
Number of devices (Categorical) zero/one/multiple	13	14		15	16	17	18
Primary location of learning (Categorical) home/work/work/ en route/other	19	20	21		22	23	24
Prior online learning experience (Ordinal) 1-10 scale	25	26	27	28		29	30
Prior etext experience (Ordinal) 1-10 scale	31	32	33	34	35		36
Financial expense (Categorical) N/A / acceptable / unacceptable	37	38	39	40	41	42	

Level of association was used based on the level of measurement for most of the experience variables. Most experience variables were categorical, and correlations cannot be accurately calculated for categorical variables. Therefore, no direction of relationship can be measured. It can simply be said that knowing the value of one variable can help predict the value of a second variable. A summated, averaged scale variable was created for PU and PEU. The measurement used for each relationship tested was chosen based on the variable with lowest level of measurement. Since each experience variable is either nominal or ordinal, lambda or gamma

Table 2

Measures of Association Parts Two and Three

	Perceived ease of use (ordinal)	Perceived usefulness (ordinal)	Intention to use (ordinal)
Primary textbook format (categorical)	x	x	
Primary device type (categorical)	x	x	
Number of devices (categorical)	x	x	
Primary location of learning (categorical)	x	x	
Prior online learning experience (ordinal)	x	x	
Prior etext experience (ordinal)	x	x	
Financial expense (categorical)	x	x	
Perceived ease of use (ordinal)		x	x
Perceived usefulness (ordinal)	x		x

values were used to determine level of association. These measures of association are depicted in Table 2. Measures of association parts two and three. The strength of any significant associations is discussed later in the findings section of this report.

Finally, Davis' TAM is tested as a valid measurement tool for this etext context. The following three relationships, as depicted in Table 2*:* Measures of association parts two and three, were examined for significant association: perceived ease of use-perceived usefulness, perceived usefulness-behavioural intention to use, and perceived ease of use –behavioural intention to use.

Chapter 4: Findings

Data Analysis

All data from completed surveys were exported to a Microsoft Excel file format. The results were sorted to include surveys that were completed by students who had been enrolled in an eText Phase One course with a start date up to April 2014. 458 results were considered valid and used as the sample for this study. The data in the spreadsheet were entered into a statistical management software, SPSS18.0, for analysis.

Descriptive statistics were run on the demographic variables in order to use measures of central tendency to describe the group of students who participate in the study.

Sample Demographics

Of the four thousand two hundred and thirty potential unique participants in an eText Phase one course, 458 provided complete survey responses. Thus, the response rate for this study is 11 percent.

The average respondent for this survey was female, between the ages of twenty-five and forty, studying in the Faculty of Business, living in an urban location in western Canada. Table 3. Age and gender frequencies displays the gender and ages of the respondents: 66% (302) of respondents were female and 34% (154) were male; 56% (258) of respondents were aged 25-40;

Table 3

Age and Gender Frequencies

Variable	Category	%
Gender	Female	66%
	Male	34%
Age	18-24	20%
	25-32	33%
	33-40	23%
	41-48	14%
	49-56	7%
	57-64	1%

33% (151) of respondents were aged 25-32. All except four respondents were between the ages of 18 and 65.

The geography of respondents, as outlined in Table 4. Geography frequencies, shows that most students lived in Canada and studied in either Alberta or Ontario. Only 9 of 458

Table 4.

Geography Frequencies

Variable	Category	%
Province of Residence	Alberta	44%
	Ontario	35%
	British Columbia	7%
	Saskatchewan	4%
	Manitoba	3%
	New Brunswick	2%
	Nova Scotia	2%
	Quebec	2%
	Northwest Territories	1%
	Newfoundland	0%
	Prince Edward Island	0%
	Yukon	0%
	Outside Canada	2%

respondents lived outside of Canada. 6.6% of respondents were from BC; 43.7% (200) from Alberta; 2.6% (12) from Manitoba; 1.5% (7) from New Brunswick; 34.9% (160) from Ontario; 3.7% (17) from Saskatchewan.

To better describe the characteristics of the sample, respondents were asked about their faculty of study and their program status. Students were asked to choose between the three faculties that were a part of the first phase of the etext program for undergraduate students: Faculty of Business, Faculty of Humanities and Social Sciences, and Faculty of Science and Technology. Students selected one of three choices regarding student status: program, non-program, or visiting student. The results are displayed in Table 5. Faculty of study and type of

student. 44% (201) of respondents were members of the Faculty of Business. 33 % were part of the Faculty of Humanities and Social Sciences (151) and 23% (106) were in the Faculty of

Table 5

Faculty of Study and Type of Student Frequencies

Variable	Category	%
Faculty of Study	Faculty of Business	44%
	Faculty of Humanities and Social Sciences	33%
	Faculty of Science and Technology	23%
Type of Student	Program	73.0
	Non-Program	24.0
	Visiting	3.0

Science and Technology. If a respondent selected "other", the faculty that the etext course was in was selected as said student's faculty.

eText Usage Variable Frequencies

The next part of the data analysis was designed to develop an understanding of how students used etexts. This part of the survey instrument asked about seven indicators of the student etext experience: 1) primary textbook format, 2) primary location of etext usage, 3) number of devices, 4) financial expense incurred, 5) primary device type, 6) prior online learning experience, and 7) prior etext experience. Results for this part of the study, unless specified otherwise, include results for all respondents; not just those students who used the textbook in an electronic format.

Primary Textbook Format. Primary textbook format frequencies are summarized in Table 6: Primary textbook format frequency table. Fifty-four percent (247) of respondents used a new or used bound copy of the textbook and 9 percent (43) of students used a self-printed

copy. Thirty-six percent (163) of respondents used an electronic version of the textbook with 21 percent (98) using the fully functional, online etext through the Vital Source™ platform. When combining self-printed copy with new or used bound copy, approximately 6 percent (290) of students were still using a non-electronic version of the textbook. Of the 458 respondents, only163 were users of the textbook in an electronic way. This may suggest a reluctance on students' part to try the new electronic version.

Table 6.

Primary Textbook Format Frequency Table

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Self-printed Copy	43	9.4	9.4	9.4
	New or Used Purchased Copy	247	53.9	53.9	63.3
	Offline, downloaded electronic version	65	14.2	14.2	77.5
	Online through Vital Source	98	21.4	21.4	98.9
	Other	5	1.1	1.1	100.0
	Total	458	100.0	100.0	

After reviewing the results of the preferred textbook format variable, the researcher added a grouped preferred textbook format. This variable was named user vs. non-user, where a user included a respondent who used the textbook in an electronic way either as an offline, downloaded version, or online through Vital Source™. This new variable was used to measure levels of association in later parts of data analysis. The frequencies for the etext user or non-user variable are displayed in *Figure 5.* eText user vs. non-user frequency graph. One hundred and sixty-three, or 36 percent of, respondents preferred to use the textbook in an electronic format.

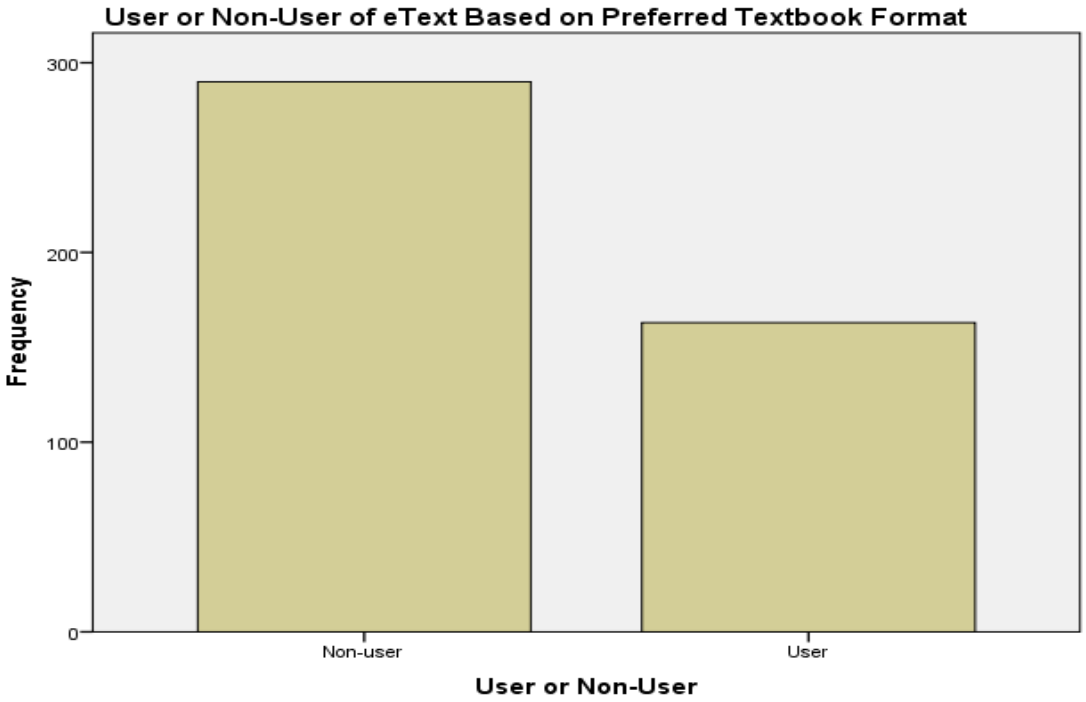

Figure 5. eText user vs. non-user frequency graph

Location of eText Use (Primary Location of Learning): Students were asked to select where within their environment, use of the etext occurs. The options were: home, school, work,

Table 7

Primary Location of eText Usage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	en route	15	3.3	3.3	3.3
	home	393	85.8	85.8	89.1
	other	10	2.2	2.2	91.3
	school	12	2.6	2.6	93.9
	Work	28	6.1	6.1	100.0
	Total	458	100.0	100.0	

en route, other. Results are displayed in Table 7. 85% of respondents primarily accessed the textbook at home. 6 % selected work as the primary location of learning. 3% chose en route and 3% chose school as the primary location of learning. Of the ten respondents who selected other as a primary location of learning, seven of those were at a stationary spot outside the home such as a library, coffee shop, or while at their children's' activities. In future studies, at term for this type of mobile location should be included as an option in the question.

Number of Devices. The number of devices students used to access the etext are outlined in Table 8. Forty percent (183) of respondents used more than one device to access the etext.

Table 8

Number of Devices Frequency Table

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Used only to print a copy	65	14.2	14.2	14.2
	Accessed etextbook using more than one device.	183	40.0	40.0	54.1
	Accessed etextbook Using only one device.	190	41.5	41.5	95.6
	did not use	20	4.4	4.4	100.0
	Total	458	100.0	100.0	

Forty-two percent (190) of respondents accessed the etextbook using only one device. Eighty-two percent of (373) students accessed their textbook in an electronic format for a purpose other than to print a hard copy.

Financial Expense. Frequency results for the financial expense variable are displayed in Table 9. Sixty percent (275) of respondents say they did not incur added financial expense as a result of being a part of an etext course. Forty percent (183) of students did incur added financial expense as a result of the use of an electronic textbook in the course. Twenty-eight percent (126) of total respondents indicated that this expense is unacceptable. Out of the 40 percent of students, a total of 183 respondents who indicated incurring added financial expense, 69 percent valued this expense as unacceptable.

Table 9

Financial Expense Frequency Table

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Acceptable	57	12.4	12.4	12.4
	N/A	275	60.0	60.0	72.5
	Unacceptable	126	27.5	27.5	100.0
	Total	458	100.0	100.0	

Table 10

Primary Device Type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	desktop	96	21.0	21.0	21.0
	ereader	1	.2	.2	21.2
	laptop	265	57.9	57.9	79.0
	other	7	1.5	1.5	80.6
	smartphone	8	1.7	1.7	82.3
	tablet	81	17.7	17.7	100.0
	Total	458	100.0	100.0	

Primary Device Type. 58% of respondents chose laptop as their primary device type, as outlined in Table 10. Surprisingly, only one respondent preferred to use an ereader. Furthermore, less than 2 percent of respondents chose smartphone as their preferred device type. 18% of respondents did select tablet as a preferred device type and 21% chose desktop.

Prior Online Learning Experience. On a scale of one to ten, where one was none and ten was extensive, approximately 56% of respondents ranked their experience as a seven or higher, suggesting that most students had some experience with online learning. Results are displayed in Table 11: Prior online learning experience. Only 8 percent of respondents ranked their prior online learning experience as a one. Twenty-seven percent of respondents ranked their experience as less than a five.

Table 11

Prior Online Learning Experience Frequency Table

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.0	37	8.1	8.1	8.1
	2.0	24	5.2	5.2	13.3
	3.0	36	7.9	7.9	21.2
	4.0	27	5.9	5.9	27.1
	5.0	39	8.5	8.5	35.6
	6.0	36	7.9	7.9	43.4
	7.0	**64**	**14.0**	**14.0**	**57.4**
	8.0	**84**	**18.3**	**18.3**	**75.8**
	9.0	**36**	**7.9**	**7.9**	**83.6**
	10.0	**75**	**16.4**	**16.4**	**100.0**
	Total	458	100.0	100.0	

Prior Etext Experience. Respondents reported less prior experience with electronic textbooks than with online learning. Results are displayed in Table 12. The average level of

prior etext experience reported was 4, where one is no prior experience and ten is extensive. Twenty-five percent (113) of respondents reported zero prior experience with electronic

Table 12

Prior eText Experience Frequency Table

		Frequency	Percent	Valid percent	Cumulative percent
Valid	1.0	113	24.7	24.7	24.7
	2.0	67	14.6	14.6	39.3
	3.0	49	10.7	10.7	50.0
	4.0	35	7.6	7.6	57.6
	5.0	59	12.9	12.9	70.5
	6.0	30	6.6	6.6	77.1
	7.0	39	8.5	8.5	85.6
	8.0	38	8.3	8.3	93.9
	9.0	12	2.6	2.6	96.5
	10.0	16	3.5	3.5	100.0
	Total	458	100.0	100.0	

textbooks and nearly fifty-eight (264) percent ranked their prior etext experience as less than five.

Level of Association Among eText Usage Variables

The next part of data analysis involved determining and interpreting the levels of association (if any) between any two etext usage variables. Each of twenty-eight levels of association measured is represented by a line in Table 13.

For this step, the level of association for each variable was considered and cross

Table 13

Levels of Association Among eText Experience Variables.

	Primary Device Type	Number of Devices	Primary Location of Learning	Prior Online Learning Experience	Prior eText Experience	Financial Expense	**User vs. Non-User**
Primary Textbook Format (Categorical)	1	2	3	4	5	6	***7***
Primary Device Type (Categorical)		8	9	10	11	12	***13***
Number of Devices (Categorical)			14	15	16	17	18
Primary Location of Learning (Categorical)				19	20	21	22
Prior Online Learning Experience (Ordinal)					23	24	***25***
Prior eText Experience (Ordinal)						26	***27***
Financial Expense (Ordinal)							***28***

tabulation was used to measure if there was any significant level of association between etext usage variables. When at least one of the two variables was nominal, lambda value and Cramer's V were used to measure association. When both variables were ordinal, gamma value was used to measure association. In this step, fifty-six relationships were examined, included relationships between each of the etext experience variables including and added user/non-user of etexts variable. Of the fifty-six levels of association measured, only one level of association measured showed a strong association. Whether a respondent was a user or non-user of etexts (based on

preferred textbook format), had a strong level of association with number of devices used. It is logical that respondent who preferred to use the text in a printed format, in this case called a non-user, would have selected one or no devices used. Six relationships showed a moderate level of association. Number of devices had a moderate level of association with both preferred textbook format and financial expense incurred.

With a Cramer's V value of .279, preferred textbook format was moderately associated with number of devices. It makes sense that students who used a self-printed copy or a purchased copy used one or no devices to access the electronic textbook. Those who selected one device may have only accessed the etext in order to print a hard copy, or they did not access the etext at all.

For this reason, data for preferred textbook format was then converted into a new, binomial variable which included two categories of etext user-types: users and non-users. This variable was used to measure level of association between textbook format and other user experience variables (financial expense, number of devices, primary device type, prior online learning experience, and prior online etext experience).

Technology Acceptance Model Variable Frequencies

Perceived Usefulness – Frequencies. Student perceptions of perceived usefulness were measured using six items, with each item measured on a seven point scale from extremely disagree to extremely agree. When asked if using etexts in a course enable a student to complete course-related tasks more quickly, only 28 percent (127) agreed in some way. About fifty-six percent (254) of respondents disagreed that etexts enabled quicker completion of course-related tasks, with one hundred and twenty respondents strongly disagreeing.

Fifty-five percent (252) of students disagreed that etexts improve learning performance. Twenty-two percent (96) of students agreed with the statement that etexts improve learning performance. Twenty-three percent (107) of respondents neither agreed nor disagreed.

Fifty-nine percent (270) of respondents did not agree that using etexts in a course increases productivity. Twenty-six percent (120) of respondents felt that using an etext does increase productivity. Fifteen percent (68) of respondents neither agreed nor disagreed that using an etext increases productivity.

When presented with the statement "using an etext makes me a more effective learner", 60 percent (275) disagreed in some way and 19 percent (89) agreed in some way. About 21 percent (94) of respondents neither agreed nor disagreed.

Fifty-seven percent of respondents disagreed that etexts make it easier to accomplish learning tasks in a course. Twenty-six percent of respondents agreed that etexts make accomplishing learning tasks in a course easier. Seventeen percent were neutral.

About forty-five percent (261) of respondents disagreed, and about forty-one percent (121) of respondents agreed that etexts are useful in an academic course.

To better quantify the student perceptions about the usefulness of etexts, each of the six perceived usefulness indicators were grouped and averaged into a perceived usefulness mean variable where one represented low perceived usefulness and seven represented high perceived usefulness. The mean level of perceived usefulness of etexts was 3.23. Overall, it appears that students do not find etexts useful. Further research would be helpful to examine how student perceptions of usefulness can be changed.

Perceived Ease of Use – Frequencies. Student perceptions about how easy etexts are to use were examined using six items. Students were presented with a statement and then asked to

rank the item on a seven point scale, from extremely disagree to extremely agree. The six items were: 1) learning to use an etext is easy for me; 2) I find it easy to get an etextbook to do what I want it to do; 3) my interaction with an etextbook is clear and understandable; 4) I find etextbooks flexible to interact with; 5) It is easy for me to become skillful at using an etextbook; 6) I find etextbooks easy to use.

When asked to rank their level of agreement on the statement, "learning to use an etextbook is easy for me," 70 percent (321) of respondents agreed in some way. Fifty-five percent (253) of respondents agreed or strongly agreed that etexts are easy to learn to use.

Fifty-four percent of students, 71 respondents slightly agreed, 123 respondents agreed, and 55 respondents strongly agreed, that they find it easy to get an etextbook to do what they want it to do. Thirty-nine percent (177) of respondents disagreed that they find it easy to get an etextbook to do what they want it to do.

Two hundred eighty-two students, or sixty-two percent, agreed that their interaction with an etextbook was clear and understandable. Thirty-one percent (140) disagreed in some way that their interaction with an etext was clear and understandable. Eight percent (36) of respondents neither agreed nor disagreed.

When presented with the statement "I find etextbooks flexible to interact with," 49 percent (223) of respondents agreed in some way, while forty-four percent (200) disagreed.

About 61 percent of respondents (277) agreed in some way with the statement, "it is easy for me to become skillful at using an etextbook." Thirty percent (136) of respondents disagreed.

Fifty-four percent (247) of students agreed with the statement "I find etextbooks easy to use", while 38 percent (175) disagreed.

A grouped, averaged perceived ease of use variable was created in order to quantify the average overall perceived ease of use. The average perceived ease of use score, where one is extremely difficult and seven is extremely easy to use, was 4.53.

Behavioural Intention to Use – Frequencies. The results of the behavioural intention to use variable are displayed in *Figure 6.* Behavioural intention to use frequency graph. Of the 458 respondents, 121 said they were extremely unlikely to use etexts in the future. Fifty-one percent (234) of respondents ranked their behavioural intention to use as slightly unlikely, unlikely, or extremely unlikely. Forty-two percent (193) ranked their intention to use as slightly likely, likely, or extremely likely and 7 percent (31) describe their intention to use as neither likely nor unlikely. Students' behavioural intention to use etexts should be studied over time to measure the

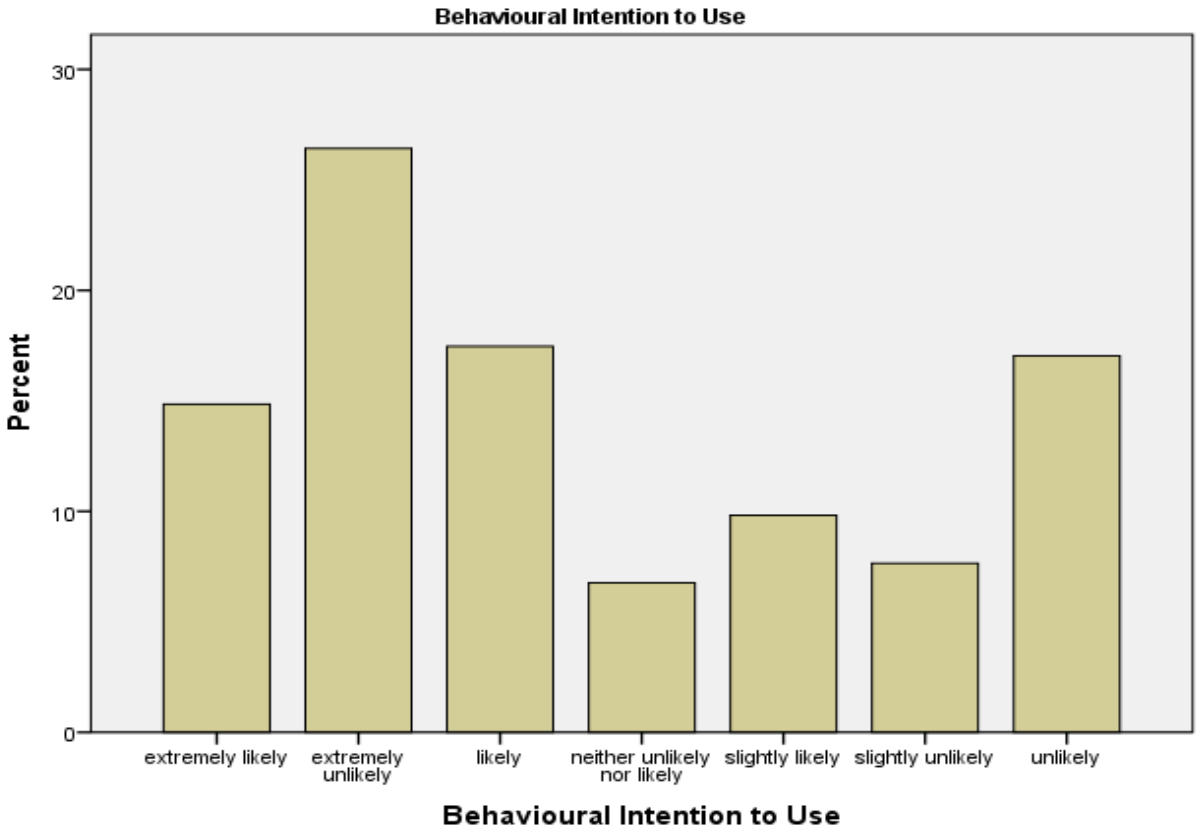

Figure 6. Behavioural intention to use frequency graph

diffusion of the technology of electronic textbooks to North American distance post-secondary institutions. Similarly, research should focus on longitudinal studies to examine intention to use as related to the enhancement of etext features, institutional marketing strategies, and etext student services efforts. As a group, the students in this study do not intend to use etexts in the future.

Internal Reliability – Perceived Usefulness Construct

For further data analysis, each of the six perceived usefulness items were transformed into one summated scale variable in SPSS and Cronbach Alpha was used to check the reliability

Table 14

Item Total Statistics for the Perceived Usefulness Construct.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
[PU1] Using e-textbooks in a course enables me to complete course-related tasks more quickly.	16.15	76.205	.879	.793	.966
[PU2] Using e-textbooks improves my learning performance.	16.25	77.625	.916	.857	.963
[PU3] Using e-textbooks in a course increases my productivity.	16.24	74.421	.943	.895	.960
[PU4] Using e-textbooks in a course makes me a more effective learner.	16.38	77.628	.915	.867	.963
[PU5] Using e-textbooks makes it easier for me to accomplish learning tasks in a course.	16.23	75.811	.925	.860	.962
[PU6] I find e-textbooks useful in an academic course.	15.69	74.808	.847	.727	.971

of the perceived usefulness construct. With a Cronbach Alpha value of .971, this six-item scale was determined to be highly reliable. Furthermore, the inter-item correlation values were

examined to ensure that each item was measuring the same characteristic, usefulness. Each item had a positive inter-item correlation value. This suggests that each item in the construct measures the same usefulness characteristic. Table 14 displays the scale mean if each item were deleted, variance if each item were deleted, the corrected item total correlation, squared multiple correlation, and Cronbach Alpha if item deleted. Since deleting PU6 would result in a slightly higher overall Cronbach Alpha value, PU6 was deleted from the scale, making the Perceived Usefulness construct a five-item scale for all relationships tested in this study.

Internal Reliability – Perceived Ease of Use

Cronbach Alpha was used to measure the reliability of the six-item perceived ease of use construct. With a Cronbach alpha value of .947, this scale is considered to be highly reliable in the context of this study. Reliability statistics for the perceived ease of use construct, the internal reliability of the six-item construct is excellent. Next the Inter-item correlations for each scale item were measured, as outlined in Table 15. The results are displayed in Table 15, the inter-item correlation matrix for perceived ease of use construct. Since each inter-item correlation value is positive, each of the six-items is measuring the same characteristic; in this case, perceived ease of use.

Table 15.

Inter-item Correlation Matrix for the Perceived Ease of Use Construct

	PEU1	PEU2	PEU3	PEU4	PEU5	PEU6
PEU1	1.000	.682	.704	.613	.688	.690
PEU2	.682	1.000	.818	.806	.769	.796
PEU3	.704	.818	1.000	.777	.769	.768
PEU4	.613	.806	.777	1.000	.756	.816
PEU5	.688	.769	.769	.756	1.000	.826
PEU6	.690	.796	.768	.816	.826	1.000

Each item was then further analyzed to determine its suitability in the Perceived Ease of Use construct. Table 16 outlines the scale mean if each item deleted, variance if each item were deleted, the corrected item total correlation, squared multiple correlation, and Cronbach Alpha if item deleted. Since the deletion of the first Perceived of Use item (*Learning to use an etextbook is easy for me*) would increase the Cronbach Alpha value, this item was dropped from further analysis. So the resulting Perceived Ease of Use Construct is a five-item scale.

Table 16

Item-total Statistics for the Perceived Ease of Use Construct

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PEU1	22.15	79.591	.739	.572	.949
PEU2	22.83	75.609	.869	.769	.934
PEU3	22.45	77.990	.860	.751	.936
PEU4	23.07	75.220	.843	.750	.937
PEU5	22.46	77.220	.853	.743	.936
PEU6	22.80	73.640	.877	.788	.933

Experience Factors and the Three TAM Constructs

The next step of data analysis involved measuring association between each experience variable and the two intervening variables, perceived usefulness and perceived ease of use. Direct levels of association were also measured between each etext experience variable and Behavioural Intention to Use. Since both PU and PEU were ordinal level variables, lambda or gamma values were used to determine association for each experience variable. These measures of association are depicted in Table 17.

Twenty-four levels of association were calculated and examined in this phase of analysis. This includes the addition of a modified preferred textbook format variable that grouped

respondents into either a user or non-user of the textbook in an electronic format. Cramer's V

Table 17

Measures of Association Parts Two and Three

	Perceived ease of Use (ordinal)	Perceived usefulness (ordinal)	Intention to use (ordinal)
Primary textbook format (categorical)	moderate	strong	very weak
Primary device type (categorical)	moderate	strong	very weak
Number of Devices (categorical)	moderate	strong	weak
Primary location of learning (categorical)	moderate	moderate	very weak
Prior online learning Experience (ordinal)	no relationship	no relationship	no relationship
Prior etext experience (ordinal)	no realationship	no relationship	no relationship
Financial expense (categorical)	moderate	strong	weak
Perceived ease of use (ordinal)		x	x
Perceived usefulness (ordinal)	x		x

Notes: Cramer's V value for categorical levels of association. Less than + or - 0.10: very weak; + or -0.10 to 0.19: weak; + or - 0.20 to 0.29: moderate; + or - 0.30 or above: strong. Gamma value for ordinal levels of association. 0-.24 no relationship, .25-.49 weak relationships, .50-.74 moderate, .75-1.0 strong

was used as a measure of association between variables where the lowest level of measurement was nominal and gamma value was used to measure association between variables where the lowest level of measurement was ordinal.

Perceived ease of use had a moderate level of association with each etext experience variable except prior online learning experience and prior etext experience. More specifically, perceived ease of use had a moderate level of association with preferred textbook format (.282), number of devices (.26), financial expense incurred (.239), primary device type (.238), primary

location of learning (.223). The average perceived ease of use score for those who used Vital Source™ was slightly lower than perceptions of ease of use for all other textbook formats. This suggests that knowing a respondent's preferred textbook format, whether a financial expense was incurred, primary device type, or primary location of learning, might help researchers better predict a respondent's perceptions about the ease of use of etexts. Those who did not use a device to access their textbook, or those who used a bound version of the textbook, ranked etext ease of use perceptions as a 3.4 on a scale of one through seven. Those who accessed the etext to print, or who accessed the etext using one or more devices had an average perceived ease of use score of between 4.4 and 4.5. Those students who rated an incurred financial expense as unacceptable, also had a slightly lower average perceived ease of use. Notably, the one respondent who used an ereader, had a much lower average level of perceived ease of use. This may reflect the limitations that would be experienced by the user due to the incompatibility of Vital Source™ on most ereaders. The only ereader that has full compatibility with Vital Source™ is the Kindle Fire. The smartphone users reported higher levels of perceived ease of use than all other device-type users. Students who accessed the etext at school reported higher ease of use perceptions compared to all other locations of learning.

Perceived usefulness had a strong level of association with preferred textbook format (.319), number of devices (.318), financial expense incurred (.344), primary device type (.319), and user vs. non-user of etext (.468). Students who used an offline, downloaded copy of the textbook and those who used Vital Source™, ranked etexts as more useful than those who used a bound or printed hardcopy. Also, perceived usefulness was higher for those students who accessed the etext using more than one device. This suggests that the ability to use the etext on more than one device makes the user felt that the etext is more useful. Those who ranked

financial expense incurred as unacceptable had an average perceived usefulness lower than those who did not incur an expense or who considered the expense at an acceptable level. Users of the textbook in an electronic format had a mean perceived usefulness score of 4.0, compared to a 2.6 for non-users.

Interestingly, there was no single etext experience variable that had at least a moderate level of association with behavioural intention to use.

The Validity of a Modified TAM

Finally, Davis' TAM was rejected for the context of undergraduate acceptance of etextbooks. The following three relationships, as depicted in Table 17: Measures of association parts two and three, were examined for significant levels of association: perceived ease of use-perceived usefulness, perceived usefulness-behavioural intention to use, and perceived ease of use –behavioural intention to use.

It was anticipated that perceived usefulness would be associated with both perceived ease of use and behavioural intention to use. Since this is not the case in the context of students using etextbooks in this study, further research should explore what other factors besides ease of use affect student acceptance of etexts. It may be that an institutional decision to move forward with a new initiative such as a new textbook format is accepted by students because they feel there is no alternative. Perhaps students adapt to new policies according to only ease of use perceptions. Since perceived ease of use did not work through usefulness, ease of use must become paramount in the development of etexts for student users. Students access etexts on a variety of device types and in a number of locations. Institutions and professors should find ways to ensure that students continue to find etexts easy to use. Etext features, student etext orientation, and access to help when needed may play a role in perceptions about ease of use.

Level of Association between Perceived Ease of Use and Perceived Usefulness

An averaged, scale variable for both Perceived of Use and Perceived Usefulness were created. The resulting scale variables were then examined to determine if there was a significant level of association. Since both variables were ordinal and the distributions were skewed, gamma value was used to measure association. Since the gamma value was extremely low at .035, no significant relationship exists between perceived ease of use and perceived usefulness.

Relationship between Perceived Ease of Use and Perceived Usefulness on Use Intentions

With a gamma value of .062, there also appeared to be no significant level of association between perceived usefulness and behavioural intention to use. For this reason, it is concluded that the modified Technology Acceptance model may not be an ideal measurement of students' intention to use. Considering the strong relationship between Perceived Ease of Use and Behavioural Intention to Use, further research should be done in order to better define what students interpret as ease of use.

Chapter 5: Discussion, Conclusion and Recommendations

The final section of this report includes a candid discussion of significant findings during data analysis, conclusions based on the predicting statements and guiding research questions, and recommendations for future research.

Discussion

Better understanding the demographics of etext users can help institutions and etext developers. Continuous longitudinal research could be completed to measure the rate at which online learning and etext usage is growing across Canada. It may be that local issues and culture in different provinces play a role in student attitudes about etexts. Etexts may be at a different stage of acceptance in different provinces, which can result in the need for development of support services, student efficacy, and overall awareness of online learning and etexts. This is demonstrated by noticeably higher institutional enrolment numbers in Alberta and Ontario. Higher levels of acceptance of etexts in specific geographic areas may explain why there is such high percentage of student enrolment, and in turn, respondents of this study, from Ontario and Alberta compared to other large Canadian provinces such as British Columbia and Quebec. The lack of respondents from Quebec, Canada's second most populous province, is likely due to a lack of French programs offered at the institution under study.

Interestingly, a higher percentage of male respondents used the textbook in an electronic fashion. Sixty-three out of 153 male respondents, or 41 percent of male respondents used an etext as a primary textbook format. Only 33 percent, or 100 out of 301, female respondents used an electronic version of the textbook. This suggests that there may be a difference in the acceptance of etexts between male and female users. This could be due to differing gender roles

which result in different ways of using etexts or in differing attitudes about trying new technology in general.

Differences in level of participation between faculty suggests that students in certain faculties have a higher use rates of etexts, have stronger opinions and are more likely to respond to the research, or were more aware of the study than students in other faculties. As expected, the faculty with the highest number of respondents was the Faculty of Business. The overall percentage of student etext use within each faculty was not assessed for this study.

Of the 40 percent (183) of students who reported to have incurred a financial expense, 69 percent (126) said the level of expense is unacceptable. This could be a major concern for the institution. Further research should measure student levels of dissatisfaction and what consequences dissatisfaction might have for the institution. A continuum of reactions by students might exist, where some students react to added expense with negative thoughts and others may react by dropping a course or leaving an institution. It is important to get a sense of just how important textbook format is to students in deciding whether to choose or stay at an institution.

Users of etexts find etexts more useful that students as a whole group. This suggests that either students see the etext as useful and they then choose to use the etext, or that use of the etext helps users see the usefulness of etexts in achieving course-related tasks. It would be beneficial for the growth of etexts if etext experience resulted in higher perceptions about etext usefulness, since usefulness may relate to more positive word-of-mouth about the use of etexts.

The fact that students do not find etexts useful and that usefulness does not play a role in intention to use may be related to the fact that students do not feel that they have control over the format of their textbook. In the past there has been only one option for textbook format and students simply used whatever was sent to them. The fact that students did not really have a

choice going forward regarding the format of the textbook may play a role in the rate at which students accept etexts. Diffusion of Innovation Theory suggests that there are three types of decisions that affect the rate of adoption on new technologies. Institutions may be able to mitigate the effect of students' sense of oppression regarding the choice to use etexts. Knowing that intention to use may be more affected by perceptions about ease of use suggests that institutions can provide opportunities for better training regarding use of etexts and perhaps training faculty to better promote the use of etexts by directing students to training opportunities. Institutions can also advocate for development of features that enhance student perceptions about etexts.

It was expected that prior online learning experience and prior etext experience would be associated with perceptions about ease of use and usefulness. In fact, no relationship was found between prior online or etext experience and PU and PEU. Since etexts are still in an early stage of development, it is possible that each experience with etexts is different and therefore students do not find that prior experience has resulted in higher or lower perceptions of ease of use. Skills learned during past etext experiences may have changed with the introduction of a new or different online learning platform. Alternatively, past problems experience with etexts may have been further developed or adjusted by developers to ensure a more positive experience with etexts.

Primary location of learning was only weakly associated with primary device type and primary format. Knowing where a student prefers to access the textbook does not help predict which device type the student uses and knowing device-type does not help predict primary location of learning. Students are most often not mobile when accessing the textbook. Most students prefer to use a laptop and study in their home. This may be due to habit, convenience or

quality of the experience in the home and with a laptop. Students may be used to studying at home, and may have long-standing methods of studying and using a textbook that are difficult to change. Students may find it more convenient to study at home, due to the physical environment or access to items that may make the learning experience more effective. Students may also feel that they are able to learn better at home or using a laptop. There may be fewer distractions at home and students may be able to have better focus in a familiar, controlled environment rather than in changing, mobile environment. A laptop may provide a larger screen, or features such as a keyboard that help the student have a higher quality learning experience. The fact that students are not overwhelmingly using etexts in a mobile way sends a message to developers that either more development and marketing need to occur in order to recruit users into trying mobile etext use, or that students need electronic features on a laptop to be improved and developers should focus development in the area of non-mobile etext use.

Thirty-six percent (164) of respondents used an electronic version of the textbook with twenty-one percent (98) using the fully functional, online etext through the Vital Source™ platform. Although this number is less than a majority of users, ninety-eight out of one hundred sixty-three etext users used the fully online version of the etext. It may be that the number is steadily increasing over time. Longitudinal studies should be undertaken to track usage rates of online learning platforms that accompany etexts, while also tracking usage rates of offline electronic versions of textbooks. Furthermore, cost-benefit analyses can help institutional administrators determine whether the cost associated with purchasing access to the online platform is effective considering trends in usage rates. A growth in online etext users suggests that research must continue to explain why users choose to start and continue using etexts, which features help and hinder users, and how to maximize the learning experience for all users.

Regarding how experience variables are associate with perceived ease of use, students who used smartphones to access the etext had higher levels of perceived ease of use that students who used other types of devices. Since the number of respondents who used a smartphone to access the etext was small, this statistic could be unreliable. However, studies specifically relating to mobile learning and etexts would provide insight into the unique experience of mobile etext users.

Perceived usefulness is associated with number of devices and level of financial expense. This suggests that students who can access etexts on more than one device find etexts more useful. This may be due to increased access time and location, or the convenience of remote access and portability.

The association between perceived usefulness and level of financial expense suggest that students may find financial expense an indicator of usefulness. Student who do not see a significant improvement in the learning experience based on textbook format may be influenced by cost-savings or added expense.

Conclusions

Four guiding questions were examined through the process of this exploratory quantitative study: *how do students use etexts (device type, learning location, online/offline, number of devices), how do students perceive etexts (Do students find etexts useful and easy to use), which specific etext experience factors are related to students' perceptions of usefulness and/or ease of use, and behavioural intention to use etexts in future learning, and is a slightly modified TAM a valid model for predicting student intention to use etexts?*

Specific demographic and experience variables can describe students and the student etext experience at a Canadian distance university. The first predicting statement

guided creation and analysis of demographic variables. There are specific demographic variables that can be used to describe student etext users at a Canadian distance university. Student users of etext at a western-Canadian open university are mostly female who live in an urban setting. An average student lives in Alberta or Ontario and is between the ages of twenty-five and forty. Furthermore, the typical etext user is a program student in the Faculty of Business.

The undergraduate distance learner has a self-reported medium to high level of online learning experience and a low level of etext experience. The undergraduate distance learner has still not fully accepted etexts. Most students, when given a choice, still choose to use bound or printed copies of a textbook. However, of those who prefer to use an electronic version of the text, 60 percent use the fully functional online version of the etext through Vital Source™ Vital Source™. Students overwhelmingly access the etext at home and an approximately equal number of students access the etexts using only one device as do students who access etexts using more than one device. More than half of respondents prefer to use a laptop to access the etext. A desktop computer and tablet are the other main device types used to access the etext. Only one respondent used an ereader and less than ten respondents use a smartphone to access the etext. Of the 183 students who incurred a financial expense to access the etext, one hundred and twenty-six, or 69 percent, found the expense to be unacceptable.

Canadian undergraduate distance learners do not find etexts useful. Students do not find etexts useful. Students do not feel that etexts help them achieve course-related tasks in a quicker, more-effective way. Etexts are not perceived to increase learning performance or productivity.

Canadian undergraduate distance students find etexts easy to use. Students do find etexts to be easy to use. Each of six perceived usefulness items resulted in more students who

agreed than disagreed with the ease of use indicator. Students feel that they can easily get an etext to perform desired tasks and that etexts are somewhat clear and understandable. Students also feel that etexts are flexible to interact with.

Canadian undergraduate distance learners do not intend to use etexts in the future. With 51 percent (234) of respondents categorizing their intention to use as unlikely (slightly unlikely, likely, or extremely unlikely), it is concluded that post-secondary students do not intend to use etexts in the future and therefore have not yet accepted etexts as a new technology. This number may be growing and longitudinal studies would help etext stakeholders' measure growth in level of acceptance and change in attitudes about etext use over a longer period of time.

Specific etext experience variables are associated with perceived ease of use. Perceived ease of use has a moderate level of association with preferred textbook format (.282), number of devices (.26), financial expense incurred (.239), primary device type (.238), primary location of learning (.223). This suggests that specific aspects of the etext experience influence a user's perceptions about how easy etext are to use.

Specific etext experience factors are also associated with perceived usefulness. It was found that perceived usefulness has a strong level of association with preferred textbook format (.319), number of devices (.318), financial expense incurred (.344), primary device type (.319), and user vs. non-user of etext (.468). Knowing a respondent's answer to one of these experience variables can help predict said respondent's level of perceived usefulness.

Perceived ease of use is associated with behavioural intention to use. Ease of use was found to be strongly associated with behavioural intention to use. When comparing the behavioural intention to use score with the seven categories in the perceived ease of use scale, those who rated behavioural intention to use as extremely unlike, had an average perceived ease

of use score of 2.9 (1-7 scale). Those who said they were extremely likely to use an etext in the future had an average perceived ease of use score of 6.26. This suggests that if students find an etext easy to use, they are more likely to intend to use etextbooks in the future.

Perceived usefulness is not associated with behavioural intention to use. It was found that perceived usefulness is not associated with behavioural intention to use. This could indicate students are willing to use whatever form of textbook an institution asks them to use; regardless of whether students find the textbook format useful. So, even though students do not find etexts useful, usefulness is not considered an indicator of whether a student will use the etext in the future.

The Technology Acceptance Model is not a valid tool in the context of etexts. Since perceived ease of use was not significantly associated with perceived usefulness and since perceived usefulness was not related to behavioural intention to use, it is concluded that the modified TAM is not a valid indicator of overall student acceptance of etexts.

Recommendations

Other acceptance models, such as the diffusion of innovations theory and the unified model of technology acceptance, should be examined for validity in measuring student acceptance of etextbooks. Alternatively, future research could focus on building a new model that specifically examines variables that influence student acceptance of etexts.

Since ease of use was the primary indicator of behavioural intention to use, it is recommended that research explore what constitutes ease of use. Student perceptions about ease of use may be altered depending on innovative features, being surrounded by others using etexts in a way that seems easy, regular practice and use, or access to quality support services.

Research could be done examining the marketing campaigns of etext providers, so that media can be more targeted to a specific group and in turn, help students learn about etext features, training opportunities, and research.

Longitudinal research measuring overall rate of acceptance by students and other etext user-groups would significantly add to the body of knowledge about etext acceptance. Since the amount of research available on etext usage and acceptance is still low compared to other technologies that have been around for much longer, summarizing use rates in existing studies could provide an initial benchmark for comparison regarding whether or not acceptance of etexts is growing or dwindling. Knowing how and why usage is growing or dwindling can help institutions make budgetary and support service decisions that will guide the future of etexts.

Since students appear to be beginning to try out the etext using the online learning platform, Vital Source™, it is essential that students continue to voice their opinions and ideas about how to improve the online etext experience. Institutional administrators must take inventory of the learning needs that all staff and faculty need in order to use and promote the costly, online version of textbooks. EText developers must find ways to collect data and solve problems in order to continually improve the quality of the etext user experience.

Mobile learning is an area of study that should be closely monitored and studied. Mobile learners may have textbook needs that are unique. Smaller screen size, device specific input and output features, and twenty-four, seven access to information is changing the way some students learn. Etext and online learning platform developers must continue to maintain pace with new technology in order to recruit students to try new etext technologies, and also to keep students using etexts in the best way possible.

Best practices for transitioning from traditional to etexts should be developed in a collaborative and standardized way. Different stakeholder groups have a variety of needs related to effective use of etexts. Using proven strategies to help stakeholder group transition to etexts may encourage user "buy-in" and help new users see the advantages of using the online learning platform.

In conclusion, etext usage does appear to be growing, and some students are choosing to use the fully online Vital Source™ platform. It is essential that a collaborative effort be undertaken to study the acceptance of etexts in a systematic way that allows input from all those affected by the quality of etexts. Although students were the target population for this study, several user groups have distinct needs that should be studied and addressed. Only with a collective attitude that embraces change for the betterment of education will etexts continue to gain momentum that will change the future of education.

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APPENDIX A: Survey Instrument

An Evaluation of Student Acceptance of Electronic Textbooks

Thank you for choosing to participate in this study about student experiences with electronic textbooks and perceptions about usefulness, ease of use, and intention to use etextbooks in the future.

Consent

INVITATION TO PARTICIPATE IN RESEARCH STUDY

Study Title: eTextbook Experience Factors that Relate to Perceptions about Usefulness, Ease of Use, and Intention to Use.

Dear Student,

My name is Vanessa Clarke. I am an Athabasca University graduate student conducting a research study as part of the requirements of my Master of Education Specializing in Distance Education degree, and I would like to invite you to participate in the pilot study for this research.

I am studying the relationships between specific characteristics of the e-textbook experience and how they relate to student perceptions about the ease of use and usefulness of electronic textbooks, and whether or not students who use electronic textbooks at XXXXX University are likely to use electronic textbooks in the future.

If you decide to participate, you will be asked to answer the questions in a web-based survey (link below) and to write any comments you have about the clarity of wording or issues that come up during the survey. This is a minimal risk study, which means that the probability and magnitude of possible harms implied by participation are no greater than those you would encounter in your everyday life as a student. I am the only person who will access the direct results of the survey. Participation is confidential. Study information will be kept in a secure location and all personally identifiable information will be kept confidential.

Taking part in the pilot study is your decision. You may quit the survey at any time before you have submitted the final question. You may also decide not to answer any question you are not comfortable answering. Participation or non-participation will not affect your grades or standing within your course or program in any way.

I will be happy to answer any questions you have about the study. You may contact me at XXXX or my thesis supervisor XXXXX, at XXXXX if you have study related questions or problems.

This study has been reviewed by the XXXXX XXXXX Research Ethics Board. Should you have any comments or concerns regarding your treatment as a participant in this study, please contact the Office of Research Ethics at X-XXX-XXX-XXXX ext. XXXX or by e-mail to XXXXX.

Thank you for your consideration. If you would like to participate, please agree to these terms and you will be directed to the first survey question.

Sincerely,

Vanessa Clarke
EMAIL
PHONE

□ Yes, I understand the conditions set forth above and provide consent to participate in this study.

Eligibility

Are you a XXXXX student who is currently enrolled in or recently completed a course for which an electronic textbook was an option?
Please choose **only one** of the following:

○ Yes

○ No

Is this your first time completing this survey?
Please choose **only one** of the following:

○ Yes

○ No

Perceived Ease of Use

2 [PEU]Perceived Ease of Use. Please rate your level of agreement with each of the following statements. *

Please choose the appropriate response for each item:

	strongly agree	agree	slightly agree	neither agree nor disagree	slightly disagree	disagree	strongly disagree
Learning to Use an e-textbook is easy for me.	○	○	○	○	○	○	○
I find it easy to get an e-textbook to do what I want it to do.	○	○	○	○	○	○	○
My interaction with an e-textbook is clear and understandable.	○	○	○	○	○	○	○
I find e-textbooks flexible to interact with.	○	○	○	○	○	○	○
It is easy for me to become skillful at using an e-textbook.	○	○	○	○	○	○	○
I find e-textbooks easy to use.	○	○	○	○	○	○	○

Perceived Usefulness

3 [PU]Perceived Usefulness. Please rate your level of agreement for each of the following statements. *

Please choose the appropriate response for each item:

	strongly agree	agree	slightly agree	neither agree nor disagree	slightly disagree	disagree	strongly disagree
Using e-textbooks in a course enables me to complete course-related tasks more quickly.	○	○	○	○	○	○	○
Using e-textbooks improves my learning performance.	○	○	○	○	○	○	○
Using e-textbooks in a course increases my productivity.	○	○	○	○	○	○	○
Using e-textbooks in a course makes me a more effective learner.	○	○	○	○	○	○	○
Using e-textbooks makes it easier for me to accomplish learning tasks in a course.	○	○	○	○	○	○	○
I find e-textbooks useful in an academic course.	○	○	○	○	○	○	○

Student Characteristics

4. Gender. Please select your gender.
Please choose only one of the following.
- ○ Female
- ○ Male
- ○ Other

5. What is your age? Please select the most appropriate category.
- ○ Less than 18 years
- ○ 18-24
- ○ 25-32
- ○ 33-40
- ○ 41-48
- ○ 49-56

- 57-64
- 65+

6. Location of residence. Please select at most 1 answer.
- British Columbia
- Alberta
- Manitoba
- New Brunswick
- Newfoundland
- Northwest Territories
- Nova Scotia
- Nunavut
- Ontario
- Prince Edward Island
- Quebec
- Saskatchewan
- Yukon
- Outside of Canada

7. I would best describe my location of residence as:
Please select at most 1 answer.
- Urban
- Rural
- Unsure/neither

8. What is your student status with XXXXX?
Please select from the dropdown menu.
- Program
- Non-program
- Visiting
- Other

9. How many courses have you completed with XXXXX?
Please select at most 1 answer(s).
- This is my first course with XXXXX.
- I have completed two to five courses with XXXXX.
- I have completed more than 5 courses with XXXXX.

10. How much time has passed since you completed your first course with XXXXX?
Please select at most 1 answer(s).
- This is my first course with XXXXX.
- Less than one year has passed since I first began a course with XXXXX.
- The first course I completed with XXXXX began between one and three years ago.
- The first course I completed with XXXXX began more than 3 years ago.

11. What is your faculty of studies with this course?
Please select at most 1 answer(s).
- Faculty of Business
- Faculty of Humanities and Social Sciences
- Faculty of Science and Technology
- Other: _____

12. What type of program are you enrolled in at XXXXX?
Please choose one of the following.
- Bacheclor degree
- Certificate program
- Diploma program
- Post-baccalaureate
- Other: _____

Student Controlled eText Experience Characteristics

13. Please select the format of the textbook that you use most.
Select 1.
- Offline printed or purchased hard copy
- Offline, downloaded electronic version
- Online electronic version through VitalSources
- Other:_____

14. Please choose the device-type you use(d) MOST when accessing your electronic textbook.
- Desktop
- Laptop
- ereader
- tablet
- smartphone
- Other:_____

15. Number of devices. Please select the statement that most represents the number of devices you used to access your electronic textbook in your most recent course. *
Please choose only one of the following:
- I never accessed the electronic textbook. I used only a new or used bound copy.
- I accessed the electronic textbook only to print out a hard copy. I did not read the textbook electronically
- I used one device to access and use my textbook in an electronic format
- I used multiple devices to access and use my textbook in an electronic format.

Please select ALL the types of devices you used during this course to access your electronic textbook.
- Laptop
- Smartphone
- Tablet
- Ereader
- Desktop
- Other: _____

17. How would you best describe your primary location of learning when using your electronic textbook?

- Home
- En route
- School
- Work
- Other: _____

18 [POE]Please rate your level of prior online learning experience where 1 is NONE and 10 is EXTENSIVE. *

Please choose the appropriate response for each item:

	1	2	3	4	5	6	7	8	9	10
Please rate your level of prior online learning experience.	○	○	○	○	○	○	○	○	○	○

19 [PEE]

Please rate your level of experience with electronic textbooks. 1 is NONE and 10 is EXTENSIVE.

*

Please choose the appropriate response for each item:

	1	2	3	4	5	6	7	8	9	10
Please rate your level of experience with electronic textbooks.	○	○	○	○	○	○	○	○	○	○

20 [Financial Expense]

Do you find the added financial expense, beyond the AU learning materials fee, that you incurred due to the use of electronic textbooks in this course to be at an acceptable or unacceptable level?

*

Please select at most fixnum(1) answer(s)

Please choose **all** that apply:

- ☐ I did not incur any added financial expense as a result of using an electronic textbook.
- ☐ I found the expense incurred as a result of using an electronic textbook to be at an acceptable level.
- ☐ I found the expense incurred as a result of using an electronic textbook to be at an unacceptable level.

Behavioural Intention to Use

Assuming future courses I take would have etexts available, I predict that I will use it on a regular basis. Unlikely/Likely.

21 [BIU]Assuming future coures I take would have etexts available, I predict that I will use the textbook in an electronic format on a regular basis. *

Please choose the appropriate response for each item:

	extremely unlikely	unlikely	slightly unlikely	neither unlikely nor likely	slightly likely	likely	extremely likely
Assuming future courses I take would have electronic textbooks available, I predict that I will use the textbook in an electronic format on a regular basis.	○	○	○	○	○	○	○

Other comments.

22 [Other Comments]Please provide any other comments you would like to share about your experience using electronic textbooks at Athabasca University?

Please write your answer here:

APPENDIX B: Invitation to Participate in Web Survey

INVITATION TO PARTICIPATE IN RESEARCH STUDY

Study Title: eTextbook Experience Factors that relate to Perceptions about Usefulness, Ease of Use, and Intention to Use.

Dear Student,

My name is Vanessa Clarke. I am conducting a research study as part of the requirements of my Master of Education Specializing in Distance Education degree, and I would like to invite you to participate.

I am studying the relationships between specific characteristics of the e-textbook experience and how they relate to student perceptions about the ease of use and usefulness of etextbooks, and whether or not students who use etextbooks at XXXXX XXXXX are likely to use etextbooks in the future.

If you decide to participate, you will be asked to answer the questions in a web-based survey (link below). Direct results of the survey will only be accessed by myself during data analysis. Participation is confidential. Study information will be kept in a secure location and participation is anonymous.

Taking part in the study is your decision. You may also quit the survey at any time or decide not to answer any question you are not comfortable answering. Participation, non-participation will not affect your grades in any way.

I will be happy to answer any questions you have about the study. You may contact me at XXXXX or my faculty advisor XXXXX, if you have study related questions or problems. If you have any questions about your rights as a research participant, you may contact the XXXXX Research Centre at XXX-XXXX or XXX-XXXX ext. XXXX (Canada and U.S.).

Thank you for your consideration. If you would like to participate, please click on the web survey link below and follow the prompts to complete the survey.

https://rsurvey.XXXXXXXX.ca/limesurvey/index.php?sid=73117&lang=en

Sincerely,
Vanessa Clarke
Email address
XXX-XXXX (phone number)

APPENDIX C: Ethics Approval

Athabasca University
CENTRE FOR DISTANCE EDUCATION

Focused on the future of learning.

Memorandum

DATE:	April 1, 2014
TO:	Ms. Vanessa Clarke
COPY:	Dr. Martha Cleveland-Innes, Dr. Cindy Ives (Research Supervisors) Gail Leicht, Research Ethics Officer, Athabasca University Research Ethics Board Dr. Vive Kumar, Chair, Athabasca University Research Ethics Board
FROM:	Dr. Marguerite Koole, Chair, CDE Research Ethics Review Committee
SUBJECT:	**Ethics Proposal #CDE-14-03: "Experience Factors Related to Perceptions about Usefulness, Ease of Use and Future Use Intentions of Electronic Textbooks"**

Thank you for providing the revised application requested by the Centre for Distance Education (CDE) Research Ethics Review Committee.

I am pleased to advise that this project has now been awarded **APPROVAL TO PROCEED**.

You may begin your research immediately.

This approval of your application will be reported to the Athabasca University Research Ethics Board (REB) at their next monthly meeting. The REB retains the right to request further information, or to revoke the interim approval, at any time.

The approval for the study "as presented" is valid for a period of one year from the date of this memo. If required, an extension must be sought in writing prior to the expiry of the existing approval. **A Final Report is to be submitted when the research project is completed.** The reporting form can be found online at http://www.athabascau.ca/research/ethics/ .

As implementation of the proposal progresses, if you need to make any significant changes or modifications, please forward this information immediately to the CDE Research Ethics Review Committee via rebsec@athabascau.ca for further review.

If you have any questions, please do not hesitate to contact the Committee Chair (above), or the Research Ethics Administrator at rebsec@athabascau.ca .

Sincerely,

Marguerite Koole, PhD

Centre for Distance Education, Research Ethics Review Committee
(A Sub-Committee of the Athabasca University Research Ethics Board)
1 University Drive, Athabasca, AB, T9S 3A3 Canada
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