_____

Influence of Students' Characteristics on E-textbook Experiences: The Moderating Effects of Technology Savvy and Gender

Jun Sun
jsun@utpa.edu

Javier Flores
jflores6@utpa.edu

Computer Information Systems Dept.
University of Texas-Pan American
Edinburg, TX 78539, U.S.A.

Abstract

The adoption of electronic textbooks in universities by the majority of students has yet to materialize, requiring a better understanding of the differences among individual users to customize its design and support. The main focus of this study is to examine the role of technology savvy in terms of the experiences, skills and self-efficacy of students in using information technologies. It is hypothesized that technology savvy moderates the relationships among E-textbook Helpfulness, Student Involvement and Learning Outcome. Based on the data gathered through a survey, the results suggest that the e-textbook experiences of students vary significant across technology veterans and novices. In particular, the mediating relationship between E-textbook Helpfulness and Learning Outcome through Student Involvement is stronger for users with higher technology savvy. An additional comparison based on gender is performed to find out whether the gender stereotyping regarding technology preference holds true for the new generation of students impacting the relationship between technology savvy and e-textbook preferences. The results show that gender does not fully account for the differences in technology savvy, and its moderating effects on E-textbook experiences are quite different from those of technology savvy.

Keywords: e-textbook experiences, technology savvy, gender differences, IT experiences, IT self-efficacy, IT skills

1. INTRODUCTION

In the educational settings, the use of electronic books (e-books) as teaching tools lead to the transition from traditional paper textbooks to paperless electronic textbooks (e-textbooks). E-textbooks have a stronger presence every year with a higher potential to influence the learning process for students. This trend accompanies the emergence of new mobile devices such as iPods, smartphones, tablets that provide flexible

learning environments to students (Al-khamayseh, Zmijewska, Lawrence, & Culjak, 2007; Mellow, 2005).

Compared with paper textbooks, e-textbooks provide additional functionalities like searches within the text, hyperlinks to related topics, case examples and even videos to facilitate the content understanding (McGowan, Stephen, & Bradley, 2009). Economic situations also provide incentives for students to adopt e-

_____

textbooks. The cost of textbooks have risen two times faster than the inflation rate in recent years, reaching up to $898 per year for an average college student (Singletary, 2006). Meanwhile, the market share of e-textbooks will increase from 3% of total textbooks sold in 2010 to 10-15% by 2012, according to the National Association of College Stores (Foderaro, 2010).

Despite the fast growth, the penetration of e-textbooks has still a long way to go. In addition, the actual use of e-textbooks does not automatically come with the purchase of e-textbooks. For instance, the libraries of high education institutions include more and more e-book titles, but most of the students still prefer the websites on the Internet (e.g. Wikipedia) to e-books as their main sources of information (Sutton, 2003; Jamali, Nicholas, & Rowlands, 2009). If students do not actually use e-textbooks to enhance their learning, it is meaningless to push the diffusion of e-textbooks. In this sense, student adoption of e-textbooks is not just the acquiring of digital copies but the actual use of them that result in different e-textbook experiences.

In the diffusion of this new innovation, some students are quicker to adopt e-textbooks than others. Using Everett Rogers' (1962) terminology, they can be labeled as innovators, early adopters, early majority, late majority, and laggards depending on how soon they switch to e-textbooks once they become available. This study focuses on the individual factors that contribute to the differences across students in their adoption of e-textbooks. In particular, it examines how prepared students are to use this IT innovation in terms of technology savvy, and its moderating effects on their e-textbook experiences. To find out whether such differences are mainly due to gender or not, this study also compare e-textbook experiences between males and females.

The understandings obtained may provide important guidelines on how educators engage students of different technology backgrounds in learning using e-textbooks. Practitioners can also customize e-textbook features and adapt relevant trainings to user characteristics. For policy makers and administrators, they can gain insights on how to promote e-textbook adoption and usage among university students in a more effective way.

2. CONCEPTUAL FRAMEWORK

In his Innovation Diffusion Theory, Rogers (1962) used the S-shaped curve to describe different stages of adoption and user categories. The presumption is that people vary in their innovativeness regarding the use of new technologies. For instance, innovators and early adopters are generally information seekers and risk takers and they like to try new things (Rogers, 1995). Researchers of IT adoption have examined how technology innovativeness may affect people's adoptions of new applications.

In particular, Agarwal and Prasad (1998) developed the construct and measure of personal innovativeness in information technology (PIIT), defined as the willingness of an individual to try out any new information technology. However, the empirical studies using PIIT to predict how likely individuals are to adopt new applications have yielded inconsistent results (Lu, Yao & Yu, 2005). A close look at Agarwal and Prasad's (1998) definition and measurement items suggests that PITT is a single-dimensional construct that indicates the tendency to try out new technology. It may be over-simplified to conceptualize technology innovativeness as a single-dimension construct.
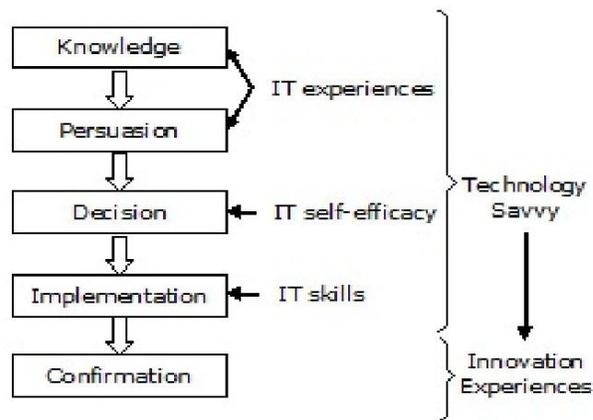

Figure 1. Innovation Adoption Factors

According to Rogers (1995), individual decision-making regarding whether to adopt an innovation involves five stages: knowledge, persuasion, decision, implementation, and confirmation (Figure 1). They describe the process that an individual first gets exposed to the innovation (stage 1) and becomes interested (stage 2), evaluates the advantages and disadvantages (stage 3), tries the innovation

_____

_____

(stage 4) and adopts the innovation if the experiences are positive (stage 5). Thus, decision-making on innovation adoption is not simple but a multi-faceted phenomenon.

Among the five stages, the first two are related to a person's indirect experiences with the innovation such as the word of mouth and the experiences with other related technologies. Experienced users that are familiar with different kinds of IT applications are more likely to know and pay attention to new technologies than inexperienced users (Raymond, 1985; Bhattacherjee, 2001). Thus, the general "IT experiences" of an individual are closely related to the knowledge and persuasion stages of decision-making.

The third stage of decision-making involves the comparison between the pros and cons of using an innovation. In the adoption of IT applications, they typically take the forms of Perceived Usefulness and Perceived Ease-of-use as in the technology acceptance model (Davis, 1989). Whereas the actual use of an IT application may not be needed for the perception of usefulness (e.g. an individual reads the description of functions), it is generally required for the perception of ease-of-use. At this stage of decision-making, however, an individual has not tried the innovation yet. Rather, the concept of Self-efficacy is more appropriate here as it is related to the expectation of control for an upcoming task (Bandura, 1997). In IT adoption research, Compeau and Higgins (1995) defined Computer Self-efficacy as "a judgment of one's capability to use a computer" (p. 192). For an IT application like e-textbook, therefore, the "IT self-efficacy" of an individual is closely related to the stage of decision. If a person is not comfortable to use IT applications, the individual is not likely to adopt the e-textbook technology.

The implementation stage requires a person to actually use an innovation. Particular skills are needed for the use of IT applications (Nelson, 1991). For a student to use an e-textbook, the individual must have some basic skills, such as how to browse the Internet (e.g. publishers' websites) and download files. Thus, the "IT skills" of an individual is closely related to the stage of implementation. If a person does not have the basic skills related to the use of a new technology, the individual is not likely to try the innovation.

Differences in technology preference have been studied with later findings showed in recent studies, indicating no gaps between male and females in the computer use and computer literacy (Alshare, Grandon, & Miller, 2004). In the same path, studies on new generations are been studied to confirm any differences on technology use and efficacy presenting no significant difference in the use and knowledge of applications supporting business activities (Sherry & Fielden, 2005).

Finally, whether a person decides to adopt an innovation depends on his/her actual experiences with it. At this stage, the individual has already used the innovation. Thus, it is not a stage that is pertinent to how innovative the person is. Rather, IT experiences, IT self-efficacy and IT skills that are closely related to the previous stages largely determine whether or not an individual is likely to try the innovation out. The aggregation of these three aspects of personal characteristics, therefore, can be denoted as "technology savvy". It is somewhat similar to PITT, but it is a multi-dimensional construct related to different stages of decision-making before adopting an innovation.

3. RESEARCH HYPOTHESES

As the earlier stages influence the later stages in the innovation adoption decision-making process, people's technology savvy is likely to influence their actual experiences in using an innovation. In the context of e-textbook adoption, students who are technology savvy are likely to have more positive experiences than those who are not. Cope & Ward (2002) revealed very different perceptions between experienced and inexperienced users of e-books in that those who preferred technology also perceived e-books as a key element of learning technologies. Bennett & Landoni (2005) also mention the positive view of e-text books by librarians, authors, publishers and readers when they know about them, versus other users who were unaware of e-textbooks.

Students who have positive experiences, in turn, are more likely to adopt the e-textbook technology than those who have negative experiences. Black and Toner (2009) found that students who use online textbooks (a form of e-textbook) were significantly more satisfied and more open to continue using online textbooks than those who did not. In the same vein, McGowan et al. (2009) found that the majority

_____

_____

of students prefer paper textbooks, although those who liked e-textbooks found their features more helpful for their learning process.

This study uses a recent model of e-textbook experiences (Sun, Flores & Tanguma, 2012) as the core of the research model shown in Figure 2. The model suggests that students have three aspects of e-textbook experiences: e-textbook helpfulness, student involvement, and learning outcome. There is a partial mediating relationship between e-textbook helpfulness and learning outcome through student involvement. Whereas e-textbook helpfulness may have some positive direct effect on learning outcome, most of its effect on learning outcome is mediated through student involvement due to the use of e-textbooks. That is, if a student perceives the e-textbook helpful, the person is likely to get involved in the learning activities facilitated by it, which enhances the outcome of learning.
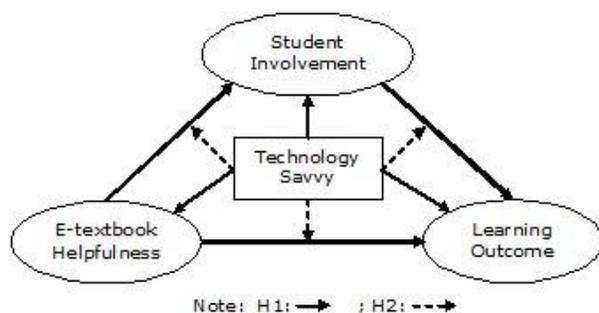

Figure 2. Technology Savvy and E-textbook Experiences

Lying on the baseline model, this study posits the following two research hypotheses:

H1: Students' technology savvy has positive linear relationships with their e-textbook experiences in terms of e-textbook helpfulness, student involvement, and learning outcome.

H2: Students' technology savvy moderates the relationships among e-textbook helpfulness, student involvement, and learning outcome.

Researchers have also found information technology user behavior vary across males and females (Janssen Reinen & Plomp, 1997). In this study, we want to test the effects of gender on e-textbook experiences. Like technology savvy, gender has two possible routes of influence on e-textbook experiences. First, it may have direct impact on e-textbook helpfulness, student involvement, and learning

outcome. Previous studies suggested that males have more positive perceptions and attitudes related to information technologies than females (Broos, 2005). Thus, male students are likely to have more positive e-textbook experiences than females, as suggested in hypothesis 3. Second, gender may moderate the relationships among e-textbook helpfulness, student involvement, and learning outcome, as suggested in hypothesis 4.

H3: Students' gender makes differences on their e-textbook experiences in terms of e-textbook helpfulness, student involvement, and learning outcome.

H4: Students' gender moderates the relationships among e-textbook helpfulness, student involvement, and learning outcome.

Because gender plays the same roles as technology savvy in statistical modeling, their effects are directly comparable. As the effect of gender is well-established, it provides a benchmark for the evaluation of technology savvy in terms of its effects. Compared with gender differences, technology savvy is more closely related to how prepared each individual is to use the e-textbook innovation. Thus, it is expected that the direct effects of technology savvy on e-textbook experiences as well as its moderating effects on their relationships are stronger than those of gender differences.

4. METHODOLOGY

Procedure

A questionnaire was developed to measure the variables in the research model, and assess the hypotheses established. It was administered to a student population taking statistical classes using electronic book. Data was later cleaned and statistically analyzed, and hypotheses were assessed.

The survey was administered electronically using an online questionnaire created and made available on a website. Emails with the link to the questionnaire were sent to the students at the beginning of the semester. Once the student logged in they could answer the questions by selecting the level of agreement/disagreement accordingly to the Likert-type items. The amount of time to complete the questionnaire usually did not exceed 10 minutes. No additional data regarding the students were provided for the

_____

_____

study to conduct statistical analysis. In consequence, results from the study cannot be linked to any particular student.

Measurement

The items that measure e-textbook experiences in terms of e-textbook helpfulness, student involvement, and learning outcome were adapted from Sun and associates' (2012) study that validated the instrument. Among different aspects of technology savvy, IT experiences were measured with six items that indicate how often that students use common information technologies (e.g. email). IT skills were measured with six items that indicate how capable the students are to use various information technologies (e.g. anti-virus software). IT self-efficacy was measured with four items that indicate how comfortable and confident the students are to use IT applications in general.

Subjects

Students participating in the survey were taken an undergraduate statistic class at a southern university in USA. Their majors were in business or psychology, and they used the same e-book accessed on the Internet through computers. There were a total of 108 usable responses out of 170 students surveyed.

Statistical Analyses

To test the convergent and discriminant validity of technology savvy instrument, a factor analysis was conducted on all the items. Index scores of IT experiences, IT skills and IT self-efficacy were calculated by taking the averages of their item scores.

A k-means cluster analysis was performed to classify students into technology veteran and novice groups based on their scores of IT experiences, IT skills and IT self-efficacy. The means of cluster centers were compared and the significance of each of the three cluster variables was examined.

Next, a t-test was conducted to compare the e-textbook experiences in terms of e-textbook helpfulness, student involvement, and learning outcome between technology veterans and technology novices. This tested the first research hypothesis (H1). Also, a multi-group structural equation modeling (SEM) analysis was

conducted to compare the structural paths among e-textbook experiences across both groups. This tested the second research hypothesis (H2).

Moreover, to compare these results against previous results divided by students' gender, a t-test was conducted to contrast e-textbook experiences in terms of e-textbook helpfulness, student involvement, and learning outcome between males and females. With these results, the third hypothesis (H3) was tested. In addition, a multi-group SEM analysis was performed to compare the statistical relationships among e-textbook experiences across both groups. With this, the fourth hypothesis (H4) was tested.

5. RESULTS

The factor analysis extracted 3 factors using the latent root criteria (i.e. eigen value>1), and 64.32% total variance was extracted. The rotated solution using Promax method (Table 1) shows that each item was loaded to its own factor without any cross-loadings. All the standardized loadings were above 0.5. Thus, the convergent and discriminant validity of technology savvy measures were supported.

Table 1. Pattern Matrix

Item	IT experiences	IT self-efficacy	IT skills
EX1	0.784		
EX2	0.609		
EX3	0.621		
EX4	0.756		
EX5	0.849		
EX6	0.588		
SE1		0.649	
SE2		0.850	
SE3		0.742	
SE4		0.777	
SK1			0.565
SK2			0.786
SK3			0.764
SK4			0.799
SK5			0.615
SK6			0.585

Note: Extraction Method: Principal Component Analysis. Rotation Method: Promax with Kaiser Normalization. Factor loading below 0.5 were suppressed.

_____

_____

Table 2 shows the final cluster centers from the k-means cluster analysis. There are two clusters and the first cluster have much higher average scores on IT experiences, IT skills and IT self-efficacy than the second cluster. Thus, the first group of participants can be labeled technology veterans and the second group can be labeled technology novices. There were 59 participants in the veteran group and 49 participants in the novice group.

Table 2. Final Cluster Centers

	Veteran	Novice
IT Experiences	4.84	4.17
IT Self-efficacy	4.78	3.72
IT Skills	4.25	3.21

Table 3 reports the comparison between veteran and novice groups on e-textbook experiences. The veteran group had consistently higher average scores on e-textbook helpfulness, student involvement, and learning outcome than the novice group. The differences were significant for e-textbook helpfulness and learning outcome, and marginally significant for student involvement. This provides supporting evidence to the first hypothesis (H1). That is, students with higher level of technology savvy are likely to have more positive e-textbook experiences.

Table 3. Direct Effects of Technology Savvy

E-textbook Experiences	Technology Savvy		t-test	
	Veteran	Novice	t	sig.
E-textbook Helpfulness	3.54 (.85)	3.25 (.76)	1.90	.03
Student Involvement	3.66 (1.03)	3.44 (.77)	1.23	.10
Learning Outcome	3.49 (.95)	3.23 (.75)	1.59	.05

Note: Standard deviations are shown in parentheses; observed significance levels (sig.) were based on one-tailed t tests.

Table 4 reports the structural path estimates from the multi-group SEM analysis. The relationships among e-textbook helpfulness, student involvement, and learning outcome vary across both groups. Additionally, the relationship between e-textbook helpfulness and learning outcome is not significant for either group at level 0.1, suggesting that both groups divided by technology savvy show a full mediation by student involvement. In particular, the mediating path through student involvement is

much stronger for the veteran group than for the novice group. In the veteran group, the total effect of E-textbook Helpfulness on Learning Outcome was: 0.25 + 0.89*0.83 = 0.986, and in the novice group, it was: 0.18 + 0.54*0.89 = 0.664. The total effect of the novice group is 67% of that of the veteran group. The results suggest that technology savvy does moderate the relationships among e-textbook helpfulness, student involvement, and learning outcome. Thus, the second hypothesis (H2) is supported.

Table 4. Moderating Effects of Technology Savvy

	Veteran	Novice
E-textbook Helpfulness --> Learning Outcome	0.25	0.18
E-book Helpfulness --> Student Involvement	0.89**	0.54**
Student Involvement --> Learning Outcome	0.83**	0.89**

Note: **-significant at 0.01 level; *-significant at 0.05 level.

Table 5 presents the comparison between the two gender groups on e-textbook experiences. Males had consistently higher mean responses on all aspects of e-textbook experiences than females. However, the gender differences were not significant except for e-textbook helpfulness for which the difference was marginally significant. Therefore, the third hypothesis (H3) is partially supported.

Table 5. Direct Effects of Gender

E-textbook Experiences	Gender		t-test	
	Male	Female	t	sig.
E-textbook Helpfulness	3.54 (.78)	3.31 (.85)	1.43	.08
Student Involvement	3.61 (.89)	3.52 (.97)	.53	.30
Learning Outcome	3.43 (.86)	3.33 (.89)	.56	.29

Note: Standard deviations are shown in parentheses; observed significance levels (sig.) were based on one-tailed t tests.

Among the e-textbook experiences, e-textbook helpfulness is related to user perception and attitude, whereas student involvement and learning outcome is related to the actual behavior and behavioral consequences. Most of previous studies focus on gender differences in user perceptions and attitudes related to information technologies, but not many

_____

_____

addresses those in the actual behavior and behavioral consequences. The results of this study seems to suggest that though males have somewhat more positive perceptions related to e-textbook helpfulness than females, they are not much different in student involvement and learning outcome.

Table 6 presents the statistical relationships from the multi-group SEM analysis. The structural path estimates among e-textbook helpfulness, student involvement, and learning outcome vary across both groups alternating the highest values. The mediating relationships through student involvement were significant for both groups. The direct relationship between e-textbook helpfulness and learning outcome was significant for the male group, showing a partial mediation (i.e. both direct and mediating relationships were significant). The same relationship was insignificant for the female group, showing a full mediation (i.e. only the mediating relationships were significant). In the male group, the total effect of e-textbook helpfulness on learning outcome was: $0.31 + 0.68*0.83 = 0.874$, and in the female group, it was: $0.14 + 0.89*0.88 = 0.923$. The total effect of the male group is 95% of that of the female group. The results suggest that gender moderated the relationships among e-textbook helpfulness, student involvement, and learning outcome to some extent but not very strongly. Consequently, the fourth hypothesis (H4) is partially supported.

Table 6. Moderating Effects of Gender

	Male	Female
E-textbook Helpfulness --> Learning Outcome	0.31*	0.14
E-book Helpfulness --> Student Involvement	0.68**	0.89**
Student Involvement --> Learning Outcome	0.83**	0.88**

Note: **-significant at 0.01 level; *-significant at 0.05 level.

Regarding the values for groups divided by gender, there is no difference in the significance of the three relationships linked to e-textbook experiences. For both groups of students the model is partially mediated by Student Involvement. This shows that the difference found in groups divided by technology savvy is not biased by students' gender, indicating that there is no significant difference in the preference for technology by women compared to men.

This study found that the total effect of e-textbook helpfulness on learning outcome is higher for female than does males, even though the direct effect is the opposite. The mediating path through student involvement is much stronger for females than form males. This suggests that once females decide to use e-textbooks, they get more engaged obtaining a better outcome; in contrast to males who tend to use more the technology, but get less involved in the learning process, resulting in a poorer result.

6. IMPLICATIONS AND CONCLUSION

This study examines the relationship between technology savvy and e-textbook experiences. Based on innovation diffusion theory, it develops the multi-dimension technology savvy construct and measures. The analyses of the observation collected from a survey suggest that technology savvy does influence students' e-textbook experiences. In particular, technology savvy has some positive effects on e-textbook helpfulness, student involvement and learning outcome. Also, it moderates the relationships among these e-textbook experiences. Compared with the novice group, veteran group exhibits a stronger mediating relationship through student involvement.

In the same vein, the sample was tested for groups divided by gender, having male students versus female students, who according to the literature show a difference for technology preference. Results indicated that gender did not make much difference in the e-textbook experiences themselves, but did moderate the relationships among them to some extent. This result is somewhat aligned with findings by Alshare and associates (2004) that the gap between males and females regarding technology use and technology efficacy has been shrinking. Nevertheless, they exhibit different behavioral patterns: e-textbook helpfulness has a more direct impact on learning outcome for male students, but student involvement plays a more salient mediating role for female students.

Furthermore, results suggest that adoption of e-books in courses influences the learning experiences of college students in two related but separate ways. For students technology-savvy, and technology-novice, the impact is

_____

_____

indirect being fully mediated by student involvement, and leaving the relationship between e-book helpfulness and learning outcome with a non-significant value. In contrast, the groups divided by gender presented no significant difference showing a partial mediated model in both cases, implying that differences found by groups divided by technology savvy, is not biased by gender differences.

Though the results seem convincing, this study has its limitations. Most importantly, the scope of this study is relatively narrow. The participants were elicited from only statistics courses in one institution, both using the e-textbooks of the same title and version. The lack of variations in the course subjects as well as e-book contents and formats makes the generalizability of the results in question. Additionally, responses were taken from the participants in terms of their relatively general perceptions regarding their learning experiences associated with e-books. That is, the survey did not ask questions about specific e-book features but how the platform may influence their learning experiences. Nevertheless, the relationships among the constructs may vary more or less across different subjects and e-books. This suggests that future research should collect data from different courses adopting different e-books in multiple institutions.

Despite the limitations, this study has some important implications. The results provide practical guidance on how to make the adoption of e-books successful according to the user characteristics. Compared with students with high level of technology savvy, students with low level of technology savvy are at the disadvantage. They are less likely to get involved in learning activities facilitated by the e-textbooks. Instructors and publishers should work together closely on providing customized training and guidance to such students. As previous studies indicated, higher education institutions and publishers introduce e-books to the classrooms for considerations such as costs and logistics. From the student perspective, however, it is very important to find out how such a technology may impact the learning experiences. Learning is not just knowledge absorbing but rather a dynamic process. The results of this study suggest that e-books are not simply the electronic version of paper books, but they provide the platform for students to engage themselves in learning. This confirms

Arend (2004) and Astin's (1999) theory that the student engagement plays an important role in learning as an experience booster. Enabled by the advance in information and communication technology (ICT), therefore, e-books facilitate student involvement and enhance the learning experiences. In this sense, e-books have great potentials as the tools for innovative learning.

The results also provide practical guidance on how to make the adoption of e-books successful accordingly to the users characteristics. Nevertheless, students' gender does not make any difference in technology preference. Regarding the technology-savvy and technology-novice the model is fully mediated although still exists a difference in the perception on the usefulness of e-Book Helpfulness. This can support better an initiative to adapt e-books in the future. Also, it is important to let students use the e-book platform to collaborate with each other. For example, the e-books may provide discussion board for students to exchange views on group discussion questions.

In conclusion, e-books not only include the same content as the paper books, but they also provide a platform for initiative and collaborative learning for students. They may enhance the engagement of students and promote their learning experiences. Every time the e-book, as a tool, promotes the student inclusion in their learning process, the possibility for the student to succeed in their learning increases. This innovative learning process, however, requires close interactions among publishers, educational institutions, instructors and students.

7. REFERENCES

Agarwal,R. & Prasad, J. (1998). A conceptual and operational definition of personal innovativeness in the domain of information technology. *Information Systems Research, 9* (2), 204–215.

Al-khamayseh, S., Zmijewska, A., Lawrence, E., & Culjak, G. (2007). Mobile learning systems for digital natives. *Proceedings of the sixth conference on IASTED International Conference Web-Based Education, 2*, pp. 252-257.

Alshare, K., Grandon, E., & Miller, D. (2004). Antecedents of computer technology usage: considerations of technology acceptance in the academic environment. *Journal of*

_____

Computer Sciences in Colleges, 19(4), pp. 164-180

Arend, B.D. (2004). New patterns of student engagement. About Campus, 9(3), 30-32.

Astin, A.W. (1999). Student Involvement: A Developmental Theory for Higher Education. *Journal of College Student Development, 40*(5), 518-529.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W.H. Freeman.

Bhattacherjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. *MIS quarterly*, *25* (3), 351–370.

Bennett, L. & Landoni, M. (2005). E-books in academic libraries. *The Electronic Library, 23*(1), pp. 9-16.

Black, R. & Toner, M. (2009). Embedded Digital Textbooks in Online Courses: Data Driven Study for Improving the Online Learning Experience. In T. Bastiaens et al. (Eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2009* (pp. 164-169). Chesapeake, VA: AACE.

Broos, A. (2005). Gender and information and communication technologies (ICT) anxiety: male self-assurance and female hesitation. *CyperPsychology and Behavior, 8*, 21–31.

Compeau, D. R. & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly, 19*(2), pp. 189-211.

Cope, C. & Ward, P. (2002). Integrating learning technology into classrooms: The importance of teachers' perceptions. *Educational Technology & Society, 5*(1). ISSN 1436-4522

Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340.

Foderaro, L. W. (2010, October 19). In a digital age, students still cling to paper textbooks. *The New York Times*. Retrieved from http://www.nytimes.com/2010/10/20/nyregi on/20textbooks.html?hpw=&pagewanted=print

Jamali, H.R., Nicholas, D., & Rowlands, I. (2009). Scholarly e-books: the views of 16,000 academics. *Aslib Proceedings: New Information Perspectives, 61*(1), pp. 33-47.

Janssen Reinen, I. & Plomp, T. (1997). Information technology and gender equality: A contradiction in terminis? *Computers in Education, 28*(2), pp. 65-78.

Lu, J., Yao, J. E., & Yu, C. S. (2005). Personal innovativeness, social influences and adoption of wireless Internet services via mobile technology. *The Journal of Strategic Information Systems, 14*(3), 245–268.

McGowan, M.K., Stephen, P.R., & Bradley, C.W. (2009). Student perceptions of electronic textbooks. *Issues in Information Systems, 10*(2), 459-465.

Mellow, P. (2005). The media generation: Maximise learning by getting mobile. *Proceedings of Ascilite 2005: Balance, Fidelity, Mobility: maintaining the momentum? Volume 2*, pp. 469-476.

Nelson, R. R. (1991). Educational needs as perceived by IS and end-user personnel: A survey of knowledge and skill requirements. Mis Quarterly, 503–525Mikk, J., & Luik, P. (2005). Do girls and boys need different electronic books? *Innovations in Education and Teaching International, 42*(2), pp. 167-180.

Raymond, L. (1985). Organizational characteristics and MIS success in the context of small business. *MIS Quarterly, 9*(1), pp. 37-52.

Rogers, E. M. (1962). *Diffusion of Innovations*. New York, NY: The Free Press.

Rogers, E.M. (1995). *Diffusion of Innovations (4th ed.).* New York, NY: Free Press.

Sherry, C. & Fielden, K. (2005) The millennials: Computer savvy (or not?), in *Higher education in a changing world, Proceedings of the 28th HERDSA Annual Conference* (Sydney, 3-6 July 2005), pp. 489 - 499.

_____

Singletary, M. (2006, July 16). Combat the rising price of textbooks. *The Boston Globe*. Retrieved from http://www.boston.com/business/personalfinance/articles/2006/07/16/combat_the_rising_price_of_textbooks/

Sun, J., Flores, J., & Tanguma, J. (2012). E-Textbooks and Students' Learning Experiences. *Decision Sciences Journal of Innovative Education, 10*(1), 63–77.

Sutton, L. (2003). Collaborating with our patrons: letting the users select, *Proceedings of ACRL 11th National Conference* (Charlotte, NC, April 2003), pp. 211-215.

_____

_____

APPENDIX
Technology Savvy Measures

IT Experiences (EX):
EX1: I have at least a computer.
EX2: I regularly download files from the Internet.
EX3: I check email at least once every day.
EX4: I use online messaging services to communicate with others.
EX5: I often use the Internet for research purposes.
EX6: I solve all kinds of problems using the Internet.

IT Skills (SK):
SK1: How would you rate your level of computer skills in general?
SK2: I know how to test my computer for the presence of malware.
SK3: If my computer became infected with a virus, I would know how to get rid of it.
SK4: I can usually sort out any Internet access problems I may encounter.
SK5: I know how to deal with annoying advertisements while I'm using the Internet.
SK6: I usually find it easy to learn how to use a new software application.

IT Self-Efficacy (SE):
SE1: I am comfortable working with computers.
SE2: Computers make me much more productive.
SE3: I am confident in my abilities to make use of computers.
SE4: I can solve a problem by searching online.

_____