

E-book Acceptance by Undergraduate Students: Do Gender Differences really exist?

Refereed Research Paper

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Students' Track

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Abstract

This paper explores e-book acceptance among undergraduate students. It further examines gender differences by focusing on the moderating effect gender on e-book acceptance. The technology acceptance model (TAM) is used to demonstrate user acceptance of the e-book. A survey of 70-male and 88-female undergraduate students was conducted using a 13-item survey instrument. The results demonstrated that the original TAM constructs and relationships were reliable, supported, and applicable in the measurement of e-book acceptance. Additionally, results suggested that gender was a significant moderator in the overall model. Not enough evidence was found for significant gender differences in the interrelationships of the constructs. These research findings seem to suggest that though gender differences have both been theorized and tested with some level of empirical support, a cautious generalization of gender studies across technologies must be maintained.

Keywords: technology acceptance model; gender differences; e-book learning systems; theory of reasoned action; e-book technology; user acceptance

Introduction

Research on gender in information systems (IS) has been garnering concern in the last few years. Some have argued that the gender is less studied and under-theorized (Adam, Howcroft & Richardson, 2004). Adam and associates (2004) further argue that gender must be taken into account if the IS field will accomplish the goal of studying the development use and impact of information technology. Over the last decade, gender differences have been studied in the areas of technology acceptance, adoption and even in career choice considerations (Joshi & Kuhn, 2001; Slyke, Comunale & Belanger, 2002; Igbaria & Baroudi, 1995; Venkatesh, Morris and

Ackerman, 2000; Gefen & Straub, 1997). In the area of technology acceptance and more specifically e-learning, the concept of gender difference research is yet to be fully explored. Since the implementation of e-book technology, very little research has focused on its acceptance, let alone, gender differences. E-book has been defined as any piece of electronic text, excluding journal publications, regardless of size or composition, made available electronically for any device that includes a screen (Armstrong, Edwards & Londale, 2002 p. 217). The idea of the e-book was first defined by Bush (1945) when he conceptualized the hypertext engine, Memex. However, it was Alan Kay who in 1968 (Kay, 2000) proposed the idea of Dynabooks—a device that could provide connections to online libraries—enabling both the search and reading of books. The 1971 start of Project Gutenberg (Hart, 1992) became a major achievement in this regard delivering electronic texts and other forms to the public for free consumption.

Since this humble beginning, e-book ideology and technology have grown to become common place element in library collections today (Hernon, Hopper, Leach, Saunders, & Zhang, 2006). Libraries across the world continue to amass large volumes of online book resources especially in the academia. Given, the enormous resources that are being pumped into acquiring e-books for academic use, some researchers have begun to investigate as to the actual use of e-books (Chu, 2003; Ismail & Zainab, 2005). If not for anything else, evidence is needed for the justification of expenditures by academic institutions to this end (Hernon et al., 2006) or for the increasing use of e-book learning approach in universities across the United States of America, for example. E-book acquisition and usage seems to be increasing especially in higher education (Chu, 2003; Hernon, Hopper, Leach, Saunders, & Zhang, 2006). The increase in e-book usage as an instructional and learning tool necessitates its examination for its general acceptance, and more specifically in the gender differences that may exist.

The Technology Acceptance Model (TAM) has been used to predict user acceptance of technology in different IS studies (Venkatesh & Davis, 2000; Mathieson, 1991; Selim, 2003; Adams, Nelson & Todd, 1992). The TAM, first proposed by Davis (1989) from the theory of Reasoned Action (Fishbein & Ajzen, 1975; Ajzen & Fishbein 1980) has become a generally accepted model for examining technology acceptance. Because of the failure of user technology acceptance (Kiel, 1995), organizations as well as technology manufacturers must consider the crucial subject of user acceptance. This study uses the technology acceptance model: first, to examine e-book acceptance among undergraduate students in a university in the Southern region of the United States of America, and additionally to study gender variations. This model would be useful in predicting how learner attitudes towards e-book learning systems affect use intention of the technology.

Literature Review

It was Fred Davis in his doctoral thesis published in 1986 that first brought to light the “technology acceptance model for empirically testing new end-user information systems” (Davis, 1986). In his original work, he introduced a quite parsimonious model that highlighted perceived usefulness (PU), perceived ease of use (PEOU), and user acceptance in information technology. Basically, Davis (1989) hypothesized that technology acceptance was a function of perceived usefulness and perceived ease of use. The technology under study was electronic email. Perceived usefulness was defined as “the degree to which a person believes that using a particular system would enhance his or her job performance”, while perceived ease of use was seen to be “the degree to which a person believes that using a particular system would be free of effort.” Drawing from previous research on self-efficacy, cost-benefit paradigm, adoption of innovations, the channel disposition model, and non-MIS studies, he established that there existed a convergence of findings: namely that PU and EOU were both fundamental and distinct

constructs in determining decision-making in information technology (Davis, 1989). He concluded that these two constructs both played determinant roles in computer use.

Since then, numerous studies have been carried out using different technologies, in different countries: cross-sectionally and longitudinally. A continuous stream of research continues to examine possible antecedents of the original TAM constructs (Venkatesh & Davis, 2000; Venkatesh, Morris & Ackerman, 2000; Gefen & Straub, 1997; Venkatesh, 2000; Yi & Hwang, 2003; Lee, Yoon & Lee, 2009; Duan, He, Feng, Li & Fu, 2010). With several technologies having been studied, increasing concern has centered on possible gender differences. Some have argued profusely that the subject of gender in the IS in general has been under-theorized (Adam, Howcroft & Richardson, 2004). However, there is evidence from literature that research on gender considerations are gaining ground (e.g. Igarria & Baroudi, 1995; Gefen & Straub, 1997; Venkatesh & Morris, 2000; Ong & Lai, 2006). Previous research has examined gender differences in perceptions of e-learning, job performance, email usage, and career choice (Ong & Lai, 2006; Igarria & Baroudi, 1995; Joshi & Kuhn, 2001). In spite of the growing stream of research in gender considerations in the IS field in general, and in technology acceptance in particular, e-book acceptance has not been examined yet. Few researchers have looked into e-book use and user perceptions (e.g. Hernon et al., 2006; Chu, 2003) albeit few and only recently. This research focuses on e-book acceptance in general, and more specifically on gender difference considerations. Based on previous research, hypothesis are proposed and tested.

Theory Development and Hypotheses

The proposed research model is as indicated in Figure 1 below. The model predicts that gender will have effects on subjective norms (SN), perceived ease of use (EOU), perceived usefulness

(PU) and behavioral intention to use (BI) e-book technology. Also, gender will mediate the interrelationships between these constructs.

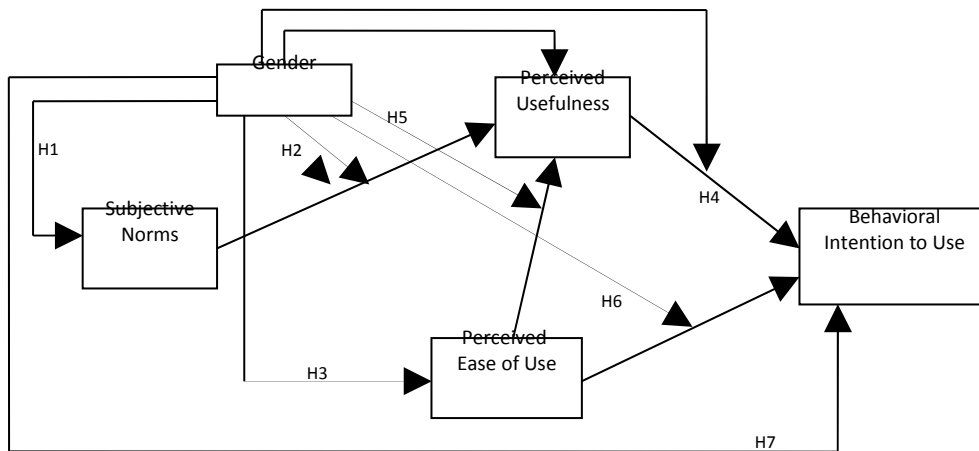


Figure 1: Research model

Subjective norms

The “perceived social pressure to perform or not perform a behavior” (Ajzen, 1991, p. 188) is called the subjective norm. In business organizations, though the use of technology might be considered voluntary, the reward systems and the desire for promotion can cause employees to want to comply by especially superiors (Taylor & Todd, 1995). Here, influence is accepted to gain a favorable response from a person or group (Venkatesh & Davis, 2000). In an academic milieu, the desire for students to use a system through the influence from teachers or peers in order to succeed is very possible. Hence, we can reasonably expect that gender will affect subjective norm to the extent that male and female students can be influenced by others. Also, research shows that men and women may be influenced differently (Becker, 1986); and some studies reveal that women are more influenced by subjective norms than men (Barnett & Karson, 1989; Venkatesh, Morris & Ackerman, 1991). In e-book learning, perceived usefulness refers to the belief that a person has about the outcome of using the e-book. The relationship between subjective norm and perceived usefulness was proposed by Venkatesh and Davis (2000) who further argued that women are more motivated by process and social factors

than men. In this case, where students relate with an instructor as an “important other”, it can be expected that subjective norm will have an effect on perceived usefulness of the e-book. It can be hypothesized then, that:

H1. Women will be more influenced by subjective norms than men in the way they perceive e-book.

H2. Subjective norms will influence perceived usefulness more strongly for women than for men

Perceived usefulness

In the e-book learning context, perceived usefulness refers to the belief by an individual that the e-book is useful in order to enhance their performance (c.f. Davis, 1989). There exists some general consensus in literature that perceived technology usefulness is greater for men than for women (Ong & Lai, 2006; Venkatesh & Morris, 2000). One of the principal factors while this is argued to be possible, is because of the fact that men are motivated by achievement needs more than women. Also, men tend to be more individualistic than women (Venkatesh & Morris, 2000). We therefore expect that the perceived usefulness of the e-book will be greater for males than for females. It must be noted here that some have found the reverse to be true for other technologies (e.g. Slyke, Comunale & Belanger, 2002; on perceived usefulness of web-based shopping). It has also long been established in literature that there exists a relationship between perceived usefulness and the behavioral intention to use a system (Davis, 1989; Venkatesh and Morris, 2000; Venkatesh & Davis, 2000). Furthermore, it has been argued that perceived usefulness is more important for men than women in determining the behavioral intention to use a system (Venkatesh & Morris, 2000). Thus, it is hypothesized:

H3. The influence of perceived usefulness on behavioral intention to use a system will be more for men than for women.

Perceived Ease of Use

Defined as the belief that a use of a particular technology is free of effort (Davis, 1989), literature seems to point to the end that perceived ease of use is will both affect perceived usefulness and behavioral intention to use a system (Davis, 1989; Venkatesh & Morris, 2000; Venkatesh & Davis, 2000). However, these relationships have been studied to be significantly moderated by gender (Venkatesh and Morris, 2000) to the extent that these influences are stronger for women than men. Therefore, it is proposed:

H4. The influence of perceived ease of use on perceived usefulness of e-book technology will be greater for women than for men.

H5. The influence of perceived ease of use on behavioral intention to use e-book technology will be greater for women than for men.

Behavioral Intention to Use

The use of a system has been long hypothesized to be dependent on behavioral intention to use (Davis, 1989). Since intention is predicted by attitude towards an act (Ajzen, 1975; 1991), it is reasonable to predict that favorable attitudes will lead to a favorable behavior. However, men and women have been known to exhibit a difference in attitude towards computer technologies. A measure like self-efficacy which determines the extent to which an individual rates their computer abilities have been found to be lower for women than for men (Ong & Lai, 2006). We would expect therefore that men's perception of behaviors towards the use of computer technologies will be higher than that of women. Hence:

H7. The influence on behavioral intention to use e-book technology will be greater for men than for women.

Methodology

Sample

Previous research has pointed to undergraduate students as regular users of e-book (Hernon et al., 2006). The sample frame from which the sample was drawn for this research was undergraduate students—the frequent users. The sample for this research was drawn from a group of undergraduate students using e-book technology for instruction in a university in Southern Region of the United States of America. The drawn sample of 158 undergraduate students from an e-book statistic course comprised 70-male and 88-female business students each having a higher educational computer experience of at least 3 years. The number of survey questionnaires collected totaled 158 from a distributed total of 167 questionnaires, from five sections of an upper-level undergraduate business statistics course. The response rate from the 13-item questionnaire was 94.6%. The original survey was pretested with on some undergraduate students to check for clarity of items and feedback. These students were asked to check the response that best described their level of agreeableness to each item on the survey. Three sections of this course, totaling 77 students were undergoing a complete e-book learning implementation program. Full implementation of this program meant that the students' learning, assignments, examinations and feedback were completely supported online i.e. paperless. For the remaining 81 students drawn from and additional three sections of the course, e-book learning implementation was partial: students studied online, but carried out assignments and testing in a pen-and-paper fashion, analogous to a regular traditional learning style. The ratio of full-to-partial implementation was 1:1.1. These students were asked to check the response that best described their level of agreeableness to each five-item answer choice on the survey. Overall the male-to-female ratio was nearly even; 1:1.3. A summary of the descriptive statistics are included in Tables 1a and 1b.

Table 1a. Descriptive statistics: implementation-type

	Full (n = 77)		Partial (n = 81)	
	Mean	SD	Mean	SD
SN	3.97	0.05	3.85	0.07
PU	4.16	0.14	4.16	0.16
EOU	3.45	0.06	3.37	0.05
BI	3.86	0.14	3.83	0.07

Descriptive statistics: gender and ANOVA results

	Male (n = 70)		Female (n = 88)		Significance of difference between women and men (<i>F</i> ratios)
	Mean	SD	Mean	SD	
SN	3.44	0.04	3.39	0.06	.683 ^{n.s.}
PU	3.96	0.08	3.88	0.04	.507 ^{n.s.}
EOU	4.15	0.11	4.18	0.17	.091 ^{n.s.}
BI	3.84	0.14	3.85	0.09	4.788*

n.s., not significant

* $p < 0.05$

Measures

The survey items were implemented through a five-point Likert scale measure, and scales used were adopted from validated scales of the previous studies of (Davis 1989; Venkatesh & Davis, 2000; and Taylor & Todd, 1995). All scales were adapted to fit the e-book context of study.

Consistent with social research, demographic variables were also collected especially gender. The fully itemized questionnaire is provided in the Appendix section.

Data analysis and Results

Collected data was assessed for missing or incomplete values and imputational methods used as recommended by Hair, Black, Babin and Handerson (2009; pp. 42-64). Using the SPSS software, reliability measures were computed for all items. Using Crombach's α as the unit of measurement, the reliability of each construct was measured. As can be seen from Table 2 below; all the reliability test results were above the .7 threshold recommended by most research standards (Nunnally, 1978; Hair et al., 2009). Table 2 contains the summary of the standardized regression weights from which the discriminant and convergent validity measures were calculated. Factor loadings all constructs were greater than the 0.5 threshold level; the variances extracted were also all greater than the 0.5 recommended levels (actual values were SN: 0.74; PU: 0.77; EOU: 0.63; BI: 0.83) and construct reliability measurements were all higher than the 0.7 level; hence, convergent validity was ascertained. Discriminant validity is attained when the variance extracted for each factor is greater than all the squared inter-factor correlations associated with that factor (Hair et al., 2009). Variances extracted all exceeded the inter-factor correlations and therefore confirmed discriminant validity. Analysis of variance (ANOVA) tests were also conducted to check differences mean differences between males and females for each construct. All of the TAM relationships except for subjective norms were strong and significant. However, except for behavioral intention to use, all the individual constructs did not show any differences based on gender. Results are summarized in Table 1b above.

Confirmatory factor analysis (CFA) and structural equation modeling (SEM) technique were conducted using AMOS statistical software. Both CFA and SEM have been used extensively in information systems related research (Compeau & Higgins, 1995; Venkatesh &

Morris, 2000; Chin & Todd, 1995). CFA was conducted instead of exploratory factor analysis because the model had already been validated through previous research. Through CFA it was hoped that the items will load highly on TAM constructs with an adequate model fit. Also, with an adequate CFA model fit, SEM technique could then be used to estimate the model. The standardized regression weight estimates from the CFA analysis are included in Table 2.

Table 2: Standardized regression weights (CFA), and reliability tests.

Item	PU	BI	EOU	SN
1	.930	.916	.828	.833
2	.922	.946	.826	.905
3	.768	.870	.713	.848
Reliability(Standardized Crombach's α)	.90	.93	.83	.90

The CFA model was further assessed for model fit. Typically, there is no one index that can solely determine fitness. Consequently, different fit indices must be considered to capture the fitness as recommended by most researchers (Hair et al., 2009; pp. 670). In Table 4, the results of fit indices are displayed alongside recommended values and a comment on their fit. Two of the three major fit index categories are represented namely: absolute indices (chi-square statistic and GFI); incremental indices (NFI, TLI) and parsimony indices were used. While some indices were less than adequate, most indices were acceptable, hence confirming the validity of model.

Using the SEM technique the proposed model was then ran. First, a check was done to see if the items of the constructs loaded significantly; also, another check was conducted to verify that the original TAM relationships would be significant as proposed in the proposed

model. All the items were found to load to their corresponding factors in a significant way. Additionally, the TAM relationships were highly validated with significant relationships at over 99% confidence interval. With the relationships confirmed, the effect gender in moderating these relationships was then verified.

Table 3: Goodness-of-fit Indices

Goodness-of-fit measure	Recommended value	Entire sample	Comment
Chi-square/df	≤ 3.00	2.85	Adequate
Goodness-of-fit (GFI)	≥ 0.9	.88	Marginally adequate
Adjusted GFI	≥ 0.8	.81	Adequate
Normed fit Index (NFI)	≥ 0.9	.91	Adequate
Comparative Fit Index (CFI)	≥ 0.9	.94	Adequate
Tucker-Lewis Index (TLI)	≤ 0.08	.92	Adequate

Discussion of Findings

The results of this study reveal that the original TAM relationships were clearly supported. The TAM relationships were highly validated with significant relationships at over 99% confidence interval. Additionally, the relationship of subjective norms to the TAM constructs was also supported by data. This implies that the TAM constructs are quite reliable as could be evidenced from the reliability estimates; model fit estimates of CFA, and the construct validity values (see Table 2 and Table 3).

The ANOVA results revealed no major gender differences between students. All the TAM relationships were found to be positive and strongly significant for the most part. The notable difference was in the relationship between PU and BI where a significant difference

between men and women was found. More specifically, the data supported H5 which suggested that women will influence the relationship between PU and BI more than men.

The means of PU were generally higher than those of other constructs in both types of implementation programs. In contrast, when the sample was split according to gender, the EOU constructs had the highest mean values. Additionally the results showed that females rated EOU of the e-book higher than men. The proposed hypotheses testing results are presented in Table 5 below.

Table 5. Summary of hypotheses testing results

Relationship		Hypothesis	Result
H1	SN	Women > men	Not supported
H2	SN-PU	Women > men	Not Supported
H3	SN-PU	Men > women	Not Supported
H4	SN-BI	Men > women	Not supported
H5	PU-BI	Women > men	Not Supported
H6	EOU-PU	Women > men	Supported
H7	EOU-BI	Men > women	Not supported
Overall	Moderating effects of gender	moderating effect	Marginally Supported

The overall moderating effect of gender was computed through a model comparison function on AMOS. Results revealed only a marginal moderating effect. Though results were expected to be different, the data did not support this. Possible reasons are that these male and female students all had a similar exposure to the technology (more than three years of higher education) and probably the same levels of self-efficacy to the extent that the genders did not contribute significantly to their perceptions.

Limitations, Conclusions and Implications

Limitations

This research had some limitations. First, the choice of undergraduate students for the sample means that the results should be interpreted with caution. Again, given the fact that these students had already had some level of exposure to online learning environment before, their perceptions could have been influenced by this initial exposure especially in the area of ease of use of e-book. Hence, because the research was carried out in a particular setting and context, all results must be interpreted accordingly.

Conclusions

This research showed that e-book acceptance can be explained adequately by the enhanced technology acceptance model. All the relationships of the extended TAM were tested and validated through this study. The proposed hypothesized moderating relationship of gender was supported though the individual interrelationships were not supported.

Implications

These findings have practical implications to pedagogues and instructional methodologists who must leverage both the advantage of new learning technologies to the reality student perceptions and use. The e-book industry would find these results helpful in understanding what factors make for e-book acceptance among collegians, arguably the greatest users of e-book learning (Hernon et al., 2006).

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Appendix

Questionnaire items

Subjective Norms

SN1 People important to me support my use of the e-book.

SN2 People who influence me think that I should use the e-book.

SN3 People whose opinions I value prefer that I should use the e-book.

Perceived Usefulness

PU1 Using e-book can improve my learning performance.

PU2 Using e-book can increase my learning effectiveness.

PU3 I find e-book to be useful to me.

Perceived Ease of Use

EOU1 Learning to use the e-book is easy for me.

EOU2 It is easy for me to become skillful at using the e-book.

EOU3 Overall, the e-book is easy to use.

Behavioral Intention to Use

BI1 I will use e-books for other classes.

BI2 I will continue using e-books in the future.

BI3 I will strongly recommend that others use e-books.

University students have about gender differences in linguistic usage. More specifically, it aims to discover, firstly, if the stereotypes are present among students and, secondly, whether male and female students significantly differ in terms of their conformation to common stereotypes about the way women and men use language. Literature Review.Â Sixty-nine undergraduate level students studying in different study years at the Department of English Language and Literature at a private university in Bosnia and Herzegovina participated in the study. The language of instruction at this institution is English. All the participants were non-native speakers of the English language coming from different cultural backgrounds. Gender-based Differences in Complimenting Behaviour: A Critical Literature Review. face is helpful in analysing compliment response behaviour as the complimentee is expected to choose his or her compliment response carefully, without appealing to the complimenterâ€™s negative face. Hence the politeness theory framework is useful in evaluating compliments as politeness strategies.Â It follows that there exists a widespread agreement on the primary function of a compliment â€” to negotiate or increase solidarity (Wolfson, 1983; Holmes, 1988, 1995; Herbert, 1990).Â This text taken from The ANU Undergraduate Research Journal Volume Five 2013, published 2014 by ANU Press, The Australian National University, Canberra, Australia. Undergraduate education is education conducted after secondary education and prior to postgraduate education. It typically includes all postsecondary programs up to the level of a bachelor's degree. For example, in the United States, an entry-level university student is known as an undergraduate, while students of higher degrees are known as graduate students. In some other educational systems, undergraduate education is postsecondary education up to the level of a master's degree; this is the case