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External Variables as Antecedents of Users Perception in Virtual Library Usage

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Abstract

Several studies extended the Technology Acceptance Model (TAM) by examining the antecedents of perceived usefulness and perceived ease of use; the present study looks at demographic aspect of external variables in virtual library use among undergraduate students. The purpose of this study is to identify the demographic factors sex, level of study, cumulative grade point average, and computer knowledge that act as external factors that are antecedents of perceived usefulness and perceived ease of use. The university management makes a large investment in the provision of a virtual library; investigation of the virtual library acceptance by students is important. TAM and theory of reasoned action (TRA) are utilised to theoretically test a model for the extension and to predict virtual library acceptance and usage. In a survey study, data was collected by using a structured questionnaire given to 394 randomly selected participants in a private university. Data were analysed by Pearson product moment correlation, multiple and hierarchical regression. The result of the study is consistent with TAM factors examined for explaining virtual library usage. The extension model accounts for 2.5% variance in perceived usefulness, 2.1% in perceived ease of use, 11.7% - 15.2% on intention to use and 7.2% on actual use of virtual library. Implications of the findings of the study on user's virtual library training are discussed.

Keywords: Technology acceptance model, Theory of reasoned action, demographic variables, users' perception, virtual library usage

Introduction

The Technology Acceptance Model developed by Davis (1989) is to provide a basis for tracing the impact of external variables on internal beliefs, attitudes, and intentions. Davis originated technology acceptance model to find out what factors cause people to accept or reject an information technology. Davis suggested that the two most important individual belief constructs towards acceptance of information technology are perceived usefulness and perceived ease of use. Perceived usefulness is the degree to which a person believes that using a particular system would

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enhance his or her job performance while perceived ease of use is the degree to which a person believes that using a particular system would be free of effort. The technology acceptance model suggests that perceived usefulness and perceived ease of use are beliefs about a new technology that influence attitude toward using that technology (Davis, Bagozzi, & Warshaw, 1989). Attitude toward using technology refers to an

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individual's overall affective reaction to using a system (Venkatesh, Morris, Davis, & Davis, 2003).

Generally, the technology acceptance model purports to offer clarification on determinants of computer acceptance and specifically to explain user behaviour across user population that is theory based. The technology acceptance model, therefore, is to make available a basis for outlining the importance of external factors on internal beliefs, attitudes, and intentions. Some extensions of the technology acceptance model examined the antecedents of perceived usefulness and perceived ease of use. Some researchers introduce external variables such as personality traits and demographic characteristics (Gefen & Straub, 1997; Venkatesh, 2000; Venkatesh & Morris, 2000; Venkatesh et al., 2003) as antecedents for perceived usefulness and perceived ease of use.

Theory of Reasoned Action

The technology acceptance model originated from theory of reasoned action proposed by Fishbein and Ajzen (1975). The theory of reasoned action proposes that individuals make reasonable choices in decision making by calculating and evaluating relevant beliefs in the process of forming their attitude toward behaviour. A person's attitude toward behaviour is determined by beliefs that the behaviour will lead to favourable or unfavourable outcomes. A personal belief about the behaviour is a person's expectations and evaluation of outcome of performing the behaviour. It is expedient therefore to identify the beliefs that underline the behaviour.

Theory reasoned action asserts that any other factors that influence behaviour do so only indirectly by influencing attitude and subjective norms. Subjective norm is the individual's motivation to comply with social convention such as computer. Attitude toward the behaviour predicts intention. Intentions are shaped by one's attitude toward the behaviour as well as subjective norm. A person's intention to act is the immediate determinant of behaviour.

The basic assumptions of the theory of reasoned action is that people are rational, thoughtful but not automatic. People's behaviour are based on their beliefs about the consequences of the behaviour and what the other people want them to do; therefore behaviour is rational and social. The theory of reasoned action illustrates the link between attitudes and behaviour which proffers that the theory of reasoned action purportedly results in attitude change. Theory of reasoned action is used to predict behaviour only in a real voluntary situation; moreover behaviour is preceded by behavioural intentions.

The Research Model and Hypotheses

The technology acceptance model is widely supported; some researchers (Dishaw & Strong, 1999; Venkatesh, 2000; Venkatesh & Brown, 2001) call for other studies to investigate whether the technology acceptance model's belief variables, which are perceived usefulness and perceived ease of use, are mediators of the effect of external variables and, if so, which external variables are important. Demographic variable are associated differently with certain beliefs about internet and these beliefs, which are perceived usefulness and perceived ease of use, mediate attitude towards using and ultimate use of internet. The present study therefore explored four demographic constructs as external variables to the technology acceptance model.

Sex, a demographic variable, is opined to differently affect cognitive ability. Males are presumed to be better in mathematics and spatial skills (Neisser et al., 1996) and females are better in verbal ability (Halpen, 1997). Social cognitive theorists purport differences between male and female (Maccoby & Jacklin, 1974) in the use of technology, system or internet (His - Chi Hsiao, Yuh - Rong Lin, & Ya - Ling Tu; 2010). The difference in cognitive ability due to sex may have implications for education. Education is looked at from three demographic variables, which are level of study, computer knowledge, and cumulative grade point average.

Level of study is the level of educational attainment. The level of study may affect use of the internet (Jaruwachirathanakul & Fink, 2005; Kolodinsky, Hogarth, & Hilgert, 2009). Computer knowledge is the amount of understanding and awareness one has regarding how to use technology, information systems, or the internet (National Telecommunications and Information Administration [NTIA], 2006; Porter & Donthu, 2006; Rogers, 1995). Users may rely on their internet knowledge or literacy in order to adapt to information systems such as digital libraries (Razilan, Safawi, Mohd, Fadhilnor, & Zahari, 2014). Cumulative grade point average is the rating of academic performance. Students' grade point averages may affect academic performance in online courses and metacognitive self-regulation (Colorado & Eberle, 2010). The demographic variables may bring out difference among users in usage of information systems such as virtual libraries.

In Information Systems, researchers extensively use the technology acceptance model to study the usage and acceptance of various information technologies, e.g., e-mail (Gefen & Straub, 1999); electronic courseware (Park, Lee, & Cheong, 2007); spreadsheet packages (Mathieson, 1991); computing resource centre (Taylor & Todd, 1995); netscape, a worldwide web browsing tool (Morris & Dillion, 1997). The present study uses the technology acceptance model to study usage of a virtual library because the virtual library is used for academic work only.

The virtual library is an e-resource library in which collections are stored in digital formats not print, microform, or other media. The National Universities Commission (NUC) (2008), the regulatory agency for all universities in Nigeria, endorsed virtual library use for teaching, research, and learning. It is essential that students have access to publications in all fields to facilitate learning and research. With large investments in information technology, investigation of virtual library acceptance by student is important.

In the present study the virtual library is provided by the university management for academic purpose and not for social media. Students have free access and make voluntary use of the virtual library. The cost implication for installing and maintenance of the virtual library is enormous. There is a gap between provision or availability of the virtual library and usage of the virtual library by the students. Technology acceptance model and theory of reasoned action are therefore important to understand acceptance and usage by the students.

The purpose of the present study is to identify the demographic factors sex (S), level of study (LS), cumulative grade point average (CGPA), and computer knowledge (CK) as antecedents of perceived usefulness (PU) and perceived ease of use (PEOU) and to predict attitude towards (A) virtual library acceptance, behavioural intention to use (ITU) and actual usage (USE) by utilising technology acceptance model (TAM) and theory of reasoned action (TRA) as framework to theoretically test a model for extension.

The theoretical model is shown in Figure 1.

Based on this model, descriptions of the technology acceptance model and theory of reasoned action, the hypotheses below were developed and tested with support from previous studies.

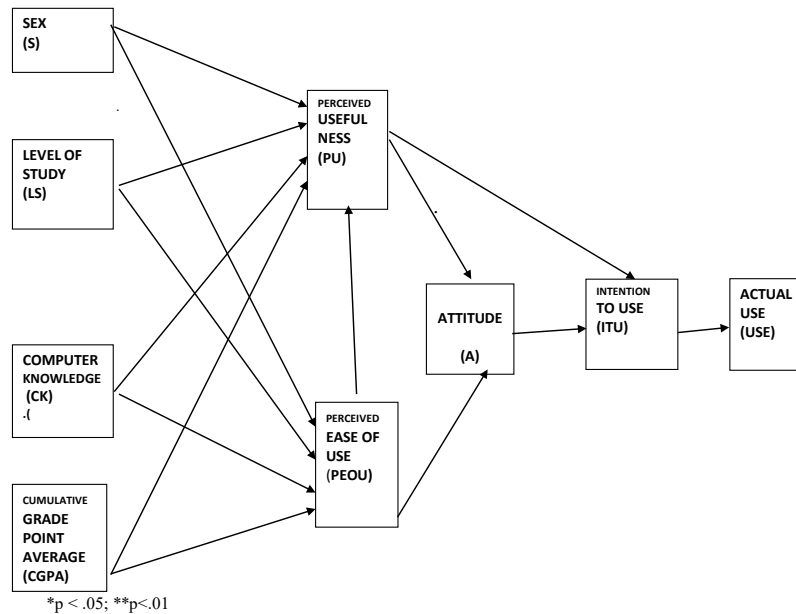
Previous studies on external variables, such as demographic variables, indicate that sex has influence on perceived ease of use (Ma, 2003). Level of study has influence on perceived ease of use (Agarwal & Prasad, 1999). Computer knowledge has influence on perceived ease of use (Hong, Thong, Wong, & Tam, 2002; Ramayah, 2006; Rogers, 1995, Thong, Hong, & Tam, 2004). Education has influence on perceived usefulness (Porter & Donthu, 2006); education has influence on perceived ease of use (Benbasat & Zmud, 2003; Taylor & Todd, 1995). Demographic variables are associated differently with beliefs. Thus hypotheses 1-8:

H1: Sex has significant influence on perceived usefulness.

H2: Level of study has significant positive influence on perceived usefulness.

H3: Computer knowledge has significant positive influence on perceived usefulness.

- H4: Cumulative grade point average has significant positive influence on perceived usefulness.
- H5: Sex has significant influence on perceived ease of use.
- H6: Level of study has significant positive influence on perceived ease of use.
- H7: Computer knowledge has significant positive influence on perceived ease of use.
- H8: Cumulative grade point average has significant positive influence on perceived ease of use.



**Figure 1. Proposed Research model
(Path Analyses tested in this study are indicated by the arrows.)**

Perceived ease of use has direct effect on perceived usefulness (Davis, 1989; Hong et al., 2002; Mathieson, 1991; Moore & Benbasat, 1991; Thong et al., 2004; Yusoff, Muhammad, Zahari, Pasah, & Robert, 2009). Perceived ease of use is an antecedent of perceived usefulness. Thus the hypothesis below:

H9: Perceived ease of use has positive influence on perceived usefulness.

Perceived usefulness as belief is presumed to influence attitude toward using new technology (Hu, Chau, Sheng, & Tam, 1999; Venkatesh, 1999) and mediate the relationship between external variable and attitude (Davis et al., 1989). Perceived usefulness has a stronger direct effect on attitude than perceived ease of use on attitude. Thus the hypothesis below:

H10: Perceived usefulness has positive influence on attitude toward using.

Perceived ease of use has positive influence on attitude toward using (Davis, 1989; Mathieson, 1991; Moore & Benbasat, 1991). Thus the hypothesis below:

H11: Perceived ease of use has positive influence on attitude towards using.

Perceived usefulness influences behavioural intention to use (Davis, 1989; Venkatesh & Davis, 2000; Venkatesh et al., 2003). Thus the hypothesis below:

H12: Perceived usefulness has positive influence on behavioural intention to use

Attitude toward using has significant positive influence on behavioural intention to use (Agarwal & Karahanna, 2000; Venkatesh & Morris, 2000). Thus the hypothesis below:

H13: Attitude toward using has positive influence on behavioural intention to use.

Behavioural intention to use determines actual use (Davis, 1989; Taylor & Todd 1995). Thus the hypothesis below:

H14: Behavioural intention to use has positive influence on actual use of virtual library.

Method

A questionnaire survey study was conducted in April 2013 for data collection in order to test the model depicted in Figure 1. Participants were assured of their confidentiality and they voluntarily took part in the study.

Participants

Participants who respond to the survey based on sex are 136 (34.5%) male and 258 (65.5%) female. Participants based on level of study are 88 (22.3%) fresh students in 100Level only and 306 (77.7%) older students in 200Level and above. Participants based on cumulative grade point average are (0.3%) poor, 17 (3.2%) fair, 62 (15.2%) average, 124 (31.8%) good, 179 (46.5%) very good and 11 (2.9%) excellent. All students are resident on campus and have free access to use the virtual library 7 days a week during opening hours.

Instrument

A questionnaire made up of two sections was used for data collection. Demographic data are in the first section of the questionnaire; these are sex, level of study, cumulative grade point average, and computer knowledge.

The second section comprised of instrumental scales constructed by other researchers to measure specific factors, namely, perceived usefulness, perceived ease of use, behavioural intention to use, attitude toward using, and actual use of virtual library.

The technology acceptance model multi-item scales by Davis (1989), modified by Ma (2003), and adopted to suit the present study consist of five items for perceived usefulness (PU), five items for perceived ease of use (PEOU) and two items for behavioural intention to use (ITU). Technology acceptance model existing scale is validated and is used for this study. Ma (2003) modified Davis (1989) scales perceived usefulness (PU), perceived ease of use (PEOU) and behavioural intention to use (ITU) reported Cronbach reliability of 0.87, 0.86, and 0.85 respectively. The present study reports Cronbach reliability of 0.91, 0.88 and 0.79 respectively; and eigen values of 3.31, 2.85 and 1.17 respectively.

Attitude toward using virtual library (A) is 17 items adaption of 20 items attitude to computer scale by Nickell and Pinto (1986). The word “computer” is replaced with “virtual library” throughout the scale. Sam, Othman, and Nordin (2005) report Cronbach reliability of .72, the authors report normative data average score of 73.96 and standard deviation of 8.8 The present study reports Cronbach reliability of 0.67 and eigen value of 3.60

All items of technology acceptance model and attitude (A) are measured by a 5-point Likert scale with (1) as strongly disagree and (5) as strongly agree.

Actual use of the virtual library (USE) is measured and operationalised as self-reported frequency of use of virtual library measured in a 5-point Likert scale, e.g., with 1 as “less than or equal to 4 hours” and 5 as “20 hours”. Porter and Donthu (2006) recognise the limitations associated with self-report measures of usage. However, as indicated by Davis et al. (1989) self-reported usage measures have often been used in IS research to operationalise system usage, particularly when objective usage entries are not available. Ma (2003) also uses self-reported scale for usage. Dura-

tion of use is measured in hours and is coded into 7 categories with 1 as “less than or equal to 4 hours” and 7 as “20 hours”. The degree of current usage of computer is measured in a 7 point Likert scale with 1 as daily and 7 as weekly.

The scales used in this study are factor analysed. An item in each scale that has above 0.34 for item-total correlation (Rust & Golombok, 1995) is used, while each scale had acceptable Cronbach values (Nunnally, 1967) See the appendix for results of the factor and reliability analysis.

Procedure

Students who take a course in Computer Application to Psychology hand deliver the survey as part of class assignment to 410 randomly selected undergraduate students of a private university in south-western Nigeria. In all, 394 of total questionnaires distributed are completed, returned, validated, and analysed, yielding a response rate of 96%. The age range of the undergraduate student population is 15 to 29; therefore age was not used as a variable. The undergraduate student total enrolment in the university for 2012/2013 session is 2606. The undergraduate student enrolment based on sex is 1173 (45%) male and 1433 (55%) female. The undergraduate student enrolment based on level study of is 868 (33%) in 100 level and 1734 (67%) in 200 level and above (RUN, 2013). Stratified sampling is used to get an appropriate number and fraction of participants among undergraduates students based on level of study. There are two strata: the first stratum is 100Level which are the freshman students and the second stratum is 200Level and above which are the older students. In general the size of the students in each stratum is taken in proportion to the size of the stratum. The participants are assured of their confidential and they voluntarily take part in the study.

Statistical Analysis

Confirmatory factor analysis and item-total correlation are used to determine construct validity for the scales in the study. Reliability is measured for scales assessment. Multiple and hierarchical regression are used in testing the hypotheses to calculate and estimate the overall model and the impact of each variable in determining actual use of virtual library. Pearson moment coefficient correlation is used to establish relationships among variables in the model. This allows for examination of unique contribution made by each individual variable and statistical control for the influences of other variables in the model. Statistical package for social sciences (SPSS) is used in running the analyses.

Result

The Hypotheses (H1, H2, H3 and H4) state that sex, level of study (LS), computer knowledge (CK) and cumulative grade point average (CGPA) have significant influence on perceived usefulness (PU) respectively. Each of these hypotheses contains the same dependent variable, and therefore the same regression model is used to evaluate each hypothesis. Specifically, the hypotheses are tested by regressing sex (H1), level of study (H2), computer knowledge (H3) and cumulative grade point average (H4) on perceived usefulness. Results summarised in Table I reveal that sex (H1) ($\beta = -0.16, P < .01$) has influence on perceived usefulness.

The Hypotheses (H5, H6, H7 and H8) state that sex, level of study (LS), computer knowledge (CK) and cumulative grade point average (CGPA) have significant influence on perceived ease of use (PEOU) respectively. Each of these hypotheses contains the same dependent variable, and therefore the same regression model is used to evaluate each hypothesis. Specifically, the hypotheses are tested by regressing sex (H5), level of study (H6), computer knowledge (H7) and cumu-

lative grade point average (H8) on perceived ease of use. The result summarised in Table I reveals that only sex H5 ($\beta = -0.11, P < .05$) has influence on perceived ease of use.

The hypothesis H9 states that perceived ease of use (PEOU) has positive influence on perceived usefulness (PU). Perceived ease of use is regressed on perceived useful. The result summarised in Table 1 reveals that perceived ease of use H9 ($\beta = 0.62, P < .01$) has influence on perceived usefulness.

Table 1: Multiple Regression Results for Sex, Level of Study, Computer Knowledge and Cumulative Grade Point Average

VARIABLE	D V	β	STD. ERROR	t	P	R ²
Perceived Usefulness						
Sex		-0.16	0.12	-2.98	p < .01	.025
Level of Study		-0.11	0.03	-.21	p > .05	
Computer Knowledge		-0.02	0.07	-.41	p > .05	
Cumulative Grade Point Average		0.69	0.62	1.27	p > .05	
Perceived Ease of Use						
Sex		-0.11	0.10	-1.98	p < .05	0.021
Level of Study		-0.05	0.03	-0.95	p > .05	
Computer Knowledge		0.08	0.07	1.55	p > .05	
Cumulative Grade Point Average		0.05	0.05	0.83	p > .05	

β = Beta; t = t test; R² = variance; **P < 0.01; *P < 0.05; DV = dependent variable

Hypotheses H10 and H11 state that perceived usefulness (PU) and perceived ease of use (PEOU) each has positive influence on attitude toward using (A) respectively. The hypotheses are tested by regressing both perceived usefulness (H10) and perceived ease of use (H11) on attitude toward using. The result in Table 2 reveals that perceived usefulness H10 ($\beta = 0.18, P < .01$) has positive influence on attitude.

Table 2: Multiple Regression Results for Perceived Usefulness and Perceived Ease of Use

VARIABLE	D V	β	STD. ERROR	t	P	R ²
Perceived Usefulness						
Perceived ease of use		0.62	0.43	15.15	P < .01	0.384
Attitude						
Perceived Usefulness		0.18	0.04	2.89	p < .01	0.034
Perceived Ease of Use		0.00	0.04	0.00	p > .05	

β = Beta; t = t test; R² = variance; **P < 0.01; *P < 0.05; DV = Dependent variable

The Hypotheses H12 and H13 state that perceived usefulness (PU) and attitude toward using (A) each has a positive influence on behavioural intention to use (ITU). However, because perceived usefulness is modelled as having a direct influence on attitude toward using (as evaluated in hypothesis 10), it is important to statistically control for the direct influence of perceived usefulness on behavioural intention to use before evaluating the independent contribution of attitude toward using. Thus, perceived usefulness (H12) is entered into the regression model during step one, with attitude toward using (H13) being entered in a second step. This allows the researchers to tease out the influence of perceived usefulness before considering attitude toward using. The result in Table 3 indicates that both perceived usefulness and attitude toward using exhibit significant influences on behavioural intention to use.

Table 3: Hierarchical Regression Result for Perceived Usefulness and Attitude on Behavioural Intention to Use

	MODEL I		MODEL II	
Variable	β	t	β	t
Step 1				
Perceived Usefulness	0.34**	7.14**	0.31**	6.41**
Step 2				
Attitude			0.19**	3.99**
	$R^2 = .117$		$R^2 = .152$	
	Std. Err. = .88		Std. Err. = .86	

The Hypothesis H14 state that behavioural intention to use (ITU) has positive influence on actual use of virtual library (USE). Behavioural intention to use is regressed on actual use of virtual library. The regression result in Table 4 reveals that behavioural intention to use (ITU) has no influence on actual use of virtual library (USE).

Table 4: Regression Results for Behavioural Intention on Actual Use of Virtual Library

VARIABLE	β	STD. ERROR	t	P	R^2
Behavioural Intention to Use	0.07	0.15	0.49	P > .05	0.072

β = Beta; t = t test; R^2 = variance; **P < 0.01; *P < 0.05

The Structural Model Result

In the structural model result evaluation, the data obtained are used to test the fourteen hypotheses of this study. Figure 2 shows the path analysis and path coefficients representing regression weight or coefficients of correlation between two variables. (r) is a number between -1.00 and 1.00 that indicates both the direction and the strength of the linear relationship between two variables. The lower limit of substantive regression coefficients is 0.05 (Compeau & Higgins, 1995). The R^2 values show strong support for the model and represent the percent of the variance of the particular dependent variable that is explained by the antecedent variables, Specifically, 2.5% variance is explained by perceived usefulness, 2.1% by perceived ease of use, 38.4% of perceived ease of use on perceived usefulness, 3.4% for attitude toward using and 11.7% - 15.2% on behavioural intention to use, 7.2% for actual use of virtual library.

Table 5: Summary of Hypotheses Testing (*p <.05; **p<.01)

Hypotheses	Hypothesised Relationship	Supported
Hypothesis (H1)	Sex on Perceived Usefulness	Yes**
Hypothesis (H2)	Level of Study on Perceived Usefulness	No*
Hypothesis (H3)	Computer Knowledge on Perceived Usefulness	No*
Hypothesis (H4)	Cumulative Grade Point Average on Perceived Usefulness	No*
Hypothesis (H5)	Sex on Perceived Ease of Use	No*
Hypothesis (H6)	Level of Study on Perceived Ease of Use	No*
Hypothesis (H7)	Computer knowledge on Perceived Ease of Use	Yes*
Hypothesis (H8)	Cumulative Grade Point Average on Perceived Ease of Use	No*
Hypothesis (H9)	Perceived Ease of Use on Perceived Usefulness	Yes**
Hypothesis (H10)	Perceived Usefulness on Attitude	Yes**
Hypothesis (H11)	Perceived Ease of Use on Attitude	Yes*
Hypothesis (H12)	Perceived Usefulness on Behavioural Intention to Use	Yes**
Hypothesis (H13)	Attitude on Behavioural Intention to Use	Yes**
Hypothesis (H14)	Behavioural Intention to Use on actual use of virtual library.	No*

7 of the 14 hypotheses derived from the model were supported as shown in Figure 2.

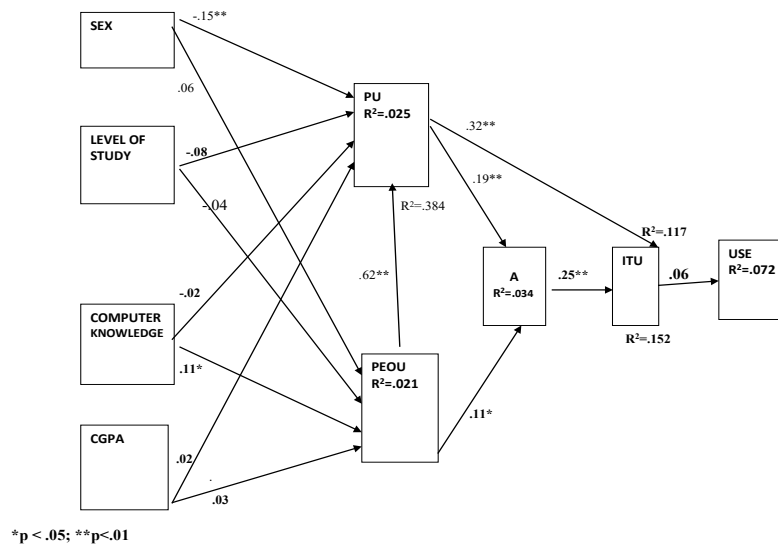


Figure 2. Research model with correlation coefficients and squared regressions (Hypotheses tested in this study are indicated by the arrows.)

Discussion

The findings of the 14 hypotheses in this study contribute variance to actual use and corroborate the technology acceptance model of Davis (1989) and theory of reason action of Fishbein and Ajzen (1975).

The findings that sex has significant influence on perceived usefulness and perceived ease of use supported Ma (2003). Perceived usefulness and perceived ease of use mediate the influence of sex on attitude. Male and female differ in their beliefs that using the virtual library would enhance their academic work and that using the virtual library would be without effort. This finding corroborates social cognitive theory that there is difference between male and female (Maccoby & Jacklin, 1974) in the use of systems (His - Chi Hsiao et al., 2010) such as a virtual library. Computer knowledge is another demographic factor which has a positive relationship with perceived ease of use substantiating the findings of (Rogers, 1995). Students that are familiar and knowledgeable with computer rely on this knowledge; therefore they believe that using the virtual library would be free of effort.

The findings that perceived ease of use has positive influence on perceived usefulness corroborate earlier research (Davis, 1989; Davis et. al., 1989; Jackson, Chow, & Leitch, 1997; Mathieson, 1991; Moore & Benbasat, 1991; Thong et al., 2004; Yusoff et. al 2009). The findings reveal that participants accept the use of the virtual library not because of its known benefits but because it is practical and efficient. This indicates that there is a link between students' belief that using virtual library enhances their academic work and student's belief that using the virtual library is without effort.

The findings that perceived usefulness has a positive influence on attitude toward using virtual library supports Davis et al. (1989), Hu et al. (1999), and Venkatesh (1999). Perceived usefulness was significant while the effect of perceived ease of use was not significant supporting Hu et al. (1999), Davis (1989), and Ma, 2003). Perceived usefulness has a stronger direct effect on attitude than perceived ease of use on attitude. The ease of use of the virtual library operates through usefulness of the virtual library to the participants. Low perceived ease of use means the user perceives the system to be difficult to use and will not favourably evaluate virtual library.

The findings that perceived usefulness has positive influence on behavioural intention to use confirms Davis (1989), Venkatesh and Davis (2000), and Venkatesh et al. (2003) that perceived usefulness is the strongest predictor of an individual's intention to use an information system. Participants plan to utilise a virtual library because they perceive that it will help them very much in their academic work.

Furthermore, findings in this study indicate perceived usefulness has a significant influence on attitude as well as behavioural intention to use and actual use, supporting Davis et al. (1989), Hu et al. (1999), and Venkatesh (1999). Students believe the virtual library is useful. The findings that attitude towards using has significant positive influence on behavioural intention to use substantiates Agarwal and Karahanna (2000) and Venkatesh and Morris (2000). Students are favourably disposed to virtual library with the aim of using virtual library.

The findings that behavioural intention to use has positive influence on actual use of virtual library supports Davis (1989) that behavioural intention to use determines actual usage. Behavioural intention to use is the strongest determinant of actual use (Taylor & Todd 1995). In the present study participants intention to use a virtual library in the future is not strong. Students' intention to use the virtual library is weak; this is likely due to availability of other technology such as Local Area wireless Computer network (Wi-Fi) on various locations on campus that allows electronic devices to connect to the network. The students that participated in the study are youths and are assumed not to want to use a virtual library that is restricted to academic work mainly without the social media and social networking. This assumption is yet to be tested.

Implication and Recommendation

The findings have implications for students' willingness to use a virtual library. The university management should provide computer training for students, especially male students, to improve

computer knowledge and enhance perceived ease of use of the virtual library for increased willingness towards actual use of virtual library. Intervention is necessary to enhance factors that make students believe that the virtual library will benefit them academically and cognitively. The result of the present study is consistent with technology acceptance model factors examined for predicting and explaining virtual library usage. The limitation of the study is that students from only one private university are used as participants; students from other universities should be used in future studies. Further studies should measure users' satisfaction of technology acceptance and usage.

Conclusion

The results of this study indicate that demographic variables as external variables are antecedents of perceived usefulness and perceived ease of use in actual use of virtual library. The demographic variables bring out difference among users in usage of the virtual library. The female students discern the virtual library is more useful and easier to use than the male students. Students' knowledge of computers increases their view that a virtual library is easy to use. Students use the virtual library more than others forms of resources, such as books, in the library. In addition, the study provides support for TAM and TRA as useful framework to explain factors that affect students' virtual library acceptance and usage.

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Appendix: Factor and Reliability Analysis

	QUESTIONNAIRES ITEMS	FACTOR LOADINGS	ITEM-TOTAL CORRELATION
Factor 1:	Perceived Usefulness (PU) Eigen value = 3.31; Cronbach alpha = 0.91		
PU 1	Using the Virtual Library (VL) improves my academic performance	0.81	0.89
PU 2	Using VL enables me to complete my class assignments more quickly	0.75	0.86
PU 3	Using the VL enhances my contribution to class discussions	0.51	0.72
PU 4	Using the VL increases my access to current information in my course	0.70	0.83
PU 5	Overall, I find the VL is useful to my studentship	0.54	0.74

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Factor 2: Perceived Ease of Use (PEOU) Eigen value = 2.85;

Cronbach alpha = 0.88

PEOU 1	Learning to use the VL resources is easy for me	0.43	0.67
PEOU 2	It is easy for me to become skilful in using the VL facilities	0.64	0.80
PEOU 3	VL services are flexible to deal with	0.49	0.71
PEOU 4	My interaction with the VL resources is enjoyable and worthwhile	0.64	0.79
PEOU 5	Overall I find the VL easy to use	0.66	0.81

Factor: 3 Intention to Use (ITU) Eigen value = 1.17; Cronbach alpha = 0.79

ITU 1	I would have used the VL but it is always too busy	0.76	0.79
ITU 2	I will use the VL when I need it	0.76	0.73

Factor 4: Attitude towards using Virtual Library (A) Eigen value = 3.60; Cronbach alpha = 0.67

*A 1	VL will never replace print resources	0.64	0.24
A 2	VL make me uncomfortable because I don't understand how to use them	0.68	0.69
A 3	Students are becoming slaves to VL	0.63	0.38
A 4	VL are responsible for many good research findings	0.64	0.67
A 5	Soon our libraries will manage only VL	0.69	0.58
*A 6	There are unlimited possibilities of VL that have not been thought of yet	0.69	0.17
A 7	The over use of VL may harm and compromise scholarship	0.69	0.46
*A 8	VL makes students lazy	0.59	0.20
*A 9	VL can eliminate a lot of stress in scholarship	0.53	0.28
A 10	The use of VL is enhancing academic and research standards	0.77	0.47
*A 11	VL is a fast and efficient means of sourcing information	0.78	0.31
*A 12	The complexity of VL intimidates	0.81	0.30
A 13	VL will replace print resources	0.61	0.37
A 14	VL is bringing us into a bright new era	0.71	0.35
*A 15	Research and scholarship will be easier and faster with VL	0.64	0.17
A 16	VL is difficult to use and frustrating to search	0.56	0.50
A 17	Soon, academia world would be controlled by Virtual Library	0.59	0.60

*Items with less than 0.34 item-total correlation were not used in the survey

Biographies



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