An Investigation Of Factors Impacting The Use Of Technology In A Home School Environment

Ted Neil, University of Mary Hardin-Baylor (UMHB), USA
Nancy Bonner, University of Mary Hardin-Baylor (UMHB), USA
David Bonner, University of Mary Hardin-Baylor (UMHB), USA

ABSTRACT

Home school populations have been studied for socialization and academic preparedness, but there are few studies on the use of technology among home schooled families. One researcher, in studying technology use among home school families in the greater Albany, New York area, found that the use of technology had a positive influence on the decision to home school and to allow home school families to create and maintain groups of like-minded home schoolers in their quest to educate their children.

The objectives of this study are to understand what technologies are being used by home school families and about perception of technology in four areas of technology usage: 1) to build social networks, 2) acquire and share knowledge, 3) administrative actions and 4) instructional activities. This research shows that when technology is perceived as easier to use, it will lead to perceived usefulness, at a higher significance than leading to actual use. Further, it was surprising that the models did not show perceived usefulness leading to actual use, which is indicated in the literature.

Keywords: Technology; Home Schooling; Computers; Education; Usage; Perceptions

INTRODUCTION

The education of students is critical to the success of any nation. The Carnegie Foundation for the Advancement of Teaching has been working to bring educational excellence to students across the nation ("Five Foundations Fund Initiative," 2010). The need to provide a college-trained work force in our technology-savvy economy has become acute. One option in the education of students is home schooling - the education of students, parent-directed, at home.

Technology has influenced all kinds of education, home schooling included. Farris and Woodruff note, "The Internet is transforming how we think about commerce; it soon will transform how we think about education" (2000, p. 246). E-learning, or web-based learning built on the technology of the Internet, has been growing and becoming popular among students of all types.

The goal of this research is to measure, in a selective study, how some home school students and parents are utilizing technology in the pursuit of their educational choice. While there are studies that discuss the socialization of home school students and their academic preparedness for college (Ray, 2000, pp. 75-76; Ray, 2010, pp. 1-2), this study will focus more on the use of technology - the computer, the internet, DVD's and CD-ROM's in the course of the home school experience. The popularity of web-based learning has been explored in respect to college-aged students, but not as much among high school students.

LITERATURE REVIEW

Because of the fact that the home schooling movement is growing by "leaps and bounds" (McDowell & Ray, 2000, p. 1), the editors of the journal *Peabody Journal of Education* dedicated an entire issue to the home schooling movement. In the journal issue, they look at both the positive and negative commentaries on the practice. They concluded that the home education movement is "experiencing a growing acceptance in the popular culture" (McDowell & Ray, 2000, p. 1). Their goal was to offer a "scholarly, balanced evaluation of the movement and the issues surrounding it" (McDowell & Ray, 2000, p. 7).

In a review of home school research, Brian Ray (2010) found that home school students are exceptionally prepared for college and the workforce. He found research which indicated that home school students, in general, did as well as, or better, than their public-school counterparts in standardized tests and graduation from college (p. 2). The conclusions reached by Ray provided support for the proposition that, generally, home schooling "is associated with relatively high academic achievement, healthy social, psychological, and emotional development, and success into adulthood" (p. 2).

In an earlier study, Ray reported that home school students who used computers gained a three percent improvement in their reading skills over those who did not use computers. This was a significant difference according to Ray (2000, p. 87). Authors Farris and Woodruff state that "the Internet's first benefit to home schooling is near-instant access to information and knowledge" (2000, p. 246). A second benefit included the ability of the internet to engage in e-learning – or web-based classrooms (p. 247). A further option addressed by Farris and Woodruff is the use of direct-broadcast satellite television, which involves both "strong visual impact" and often a "high-caliber instructor." This option makes the home school experience more like a traditional public-school classroom (p. 248). These authors conclude that "technology and home education will help each other grow" (Farris & Woodruff, 2000, p. 248).

There are many technologies that can be utilized today in education. Some of them cited by Shreiderman, Borkowski, Alavi, and Norman (1998) are email, bulletin boards, newsgroups, chat rooms, websites with digital libraries, CD-ROMS, educational software, and video/audio conferencing (p. 23-24). Since the publication of this research, DVDs, smartphones, tablets, and other technologies are now available. As pointed out in the article by Shreiderman et al. (1998), "the plethora of technologies is matched by the diversity of pedagogical philosophies" (p. 24). One of the concerns stated by the authors is that there are high costs involving these technologies (p. 25), and although they are concerned about the cost, the goal of their paper is whether these technologies are a "tool for promoting effective learning" (p. 25). This is also a goal of home schooling parents and students, as they too could benefit from the use of these technologies. Home schoolers who are prepared to utilize technology will be more ready for a technology-rich college experience, as Shreiderman et al. (1998) suggest that these "electronic classrooms seem likely to become more common across our campus and at other universities, even though the cost is high" (p. 41).

Ma, Andersson, and Streith (2005) studied student teachers to determine their user acceptance of computers. Building on factors of perceived ease of use (PEU) and perceived usefulness (PU), these researchers examined student teachers' "subjective perceptions of computer technology usefulness and ease of use, in conjunction with his or her subjective norm" to determine their "intention to use computer technology" (p. 389). They concluded that it was the teachers' acceptance of the technology that determined its use in the classroom (Ma et al., p. 393).

The Technology Acceptance Model measures the intrinsic indicators perceived usefulness (PU) and perceived ease of use (PEU) and how they affect a user's intention to use, as indicated by Davis (1989); but, as reported by Adams, Nelson, and Todd (1992), "both ease of use and usefulness are significantly correlated with self-reported frequency of usage" (p. 239). As Adams et al. (1992) continue, this result is not consistent across different technologies; "ease of use" is more important in some cases but "usefulness" is in others" (p. 243). These same researchers noted that "usage may influence perceptions of ease of use" (p. 245). Davis (1993) found that "ease of use had a strong effect on usefulness" and that "usefulness had a strong direct effect on use" (p. 481). According to Davis (1993), there is a direct relationship between usefulness and usage and usefulness mediates the effect of ease of use on usage (p. 482-483). Research by Henderson and Divett (2003) lend further support to Davis' conclusion, with the unique contribution of perceived ease of use to the prediction of behavior seemingly channeled through perceived usefulness (p. 393).

The idea of mediation between PEU and actual use by PU has been applied in the education area via "e-learning" as studied by Cheng (2011) who also found that ease of use indirectly, through usefulness, affects usage of e-learning systems (p. 292).

The topic of technology and home schooling has been studied from the aspect of the rise of home schooling by Andrade (2008). This doctoral dissertation focused on the "relationship between the wide-scale diffusion of computer and communication technologies and the growth of home education in the U.S." (p. 3). The author's target data set came from "27 practicing and former home school parents from the greater Albany, New York region" (p. 3). There were several interesting conclusions drawn by the author that highlighted the positive influence of technology on the decision to home school by his focus group. In addition, technology was employed to create and maintain groups of like-minded home schoolers in their quest to educate their children. The technology allowed the parents to feel like they had the ability to satisfactorily rear their offspring in a nurturing environment. Andrade (2008) points out many factors that have caused the growth in the home schooling movement and that more research is needed to determine how "modern technology" interacts with these other factors for better understanding of the "modern home schooling phenomenon" (p. 4).

METHODOLOGY

Based on Andrade's dissertation (2008), it is proposed to explore the use of technology by home schoolers in the Central Texas area. The questionnaire provided in Andrade (2008, pp. 185-190) will be employed. Whereas Andrade utilized "focus groups" to allow interaction between participants, the participation in this proposal is limited to questionnaires via a web survey tool - SurveyMonkey.com. The first section of the survey will collect demographic data and the second section will collect technology responses.

To assist with measuring the technology usage and perceptions of home schoolers, the survey has a third section which utilizes the questions asked by Ma et al. (2005) in their paper (p. 394). The questions used are the first twelve that they adapted from Davis (1989, p. 324). The measure of actual use will be based on Andrade's question number 22 (2008, pp. 185-190). Andrade categorized four areas in which technology was used by home school families: 1) build social networks, 2) acquire and share knowledge, 3) administrative actions, and 4) instructional activities (2008, pp. 137-138). The questions of Ma et al. were modified to measure technology use for each of the four categories. Actual use was measured using Andrade's question 22, again modified to address each of the four categories. The questionnaire for this research is available from the authors.

Goals

The goal of this study is the understanding of what technologies are being used and their perceived usefulness and their perceived ease of use in the home education of students by both the home school parents and home schooled students in the Central Texas area. In addition, by collecting the demographic data, there will be an understanding of who the participants are in the study and how this could limit the results.

Conceptual Framework

The review of literature provides support for the research question that technology aids and assists home school parents to excel in their home school endeavors (Ray, 2000; Farris & Woodruff, 2000; Ray, 2010; Andrade, 2008). In particular, because of the "high" level of technology companies in the Central Texas area, there are a lot of technically-savvy people who make Austin a desirable place to live and work according to Mashable, a social media website, as reported in a blog post by Marcus (Eaton, 2011). Some of these tech-savvy people have also chosen home schooling as the educational option for their children.

Research Questions

As shown in Figure 1, the research model tests to see if actual use is related to perceived usefulness and/or perceived ease of use. These two factors were described by Davis (1989) as "the degree to which a person believes that using a particular system would enhance his or her job performance" (p. 320) and "the degree to which a person believes that using a particular system would be free of effort" (p. 320), respectively. The research model also tests if PEU influences PU.

A narrow demographic will limit the application of the results (Welner & Welner, 1999; Nermer, 2002; Chiu, Sun, Sun, & Ju, 2006). The second and third sections of the survey will be applied to the research model shown in Figure 1.

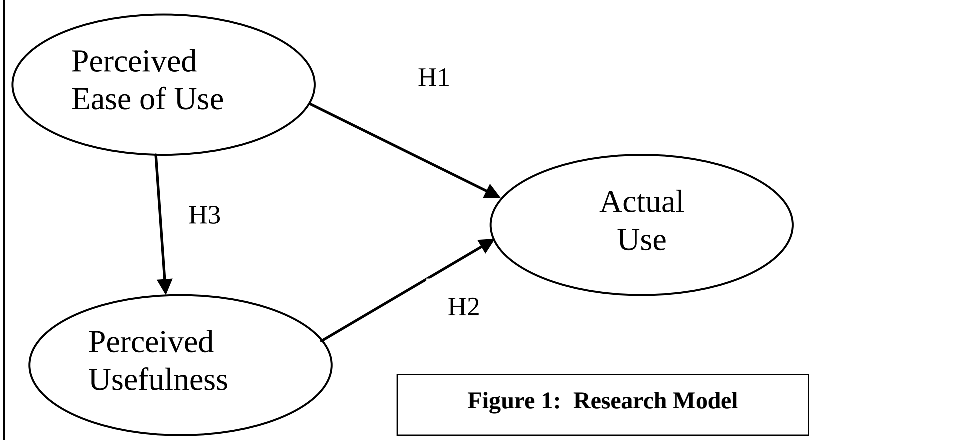

Figure 1: Research Model

The research questions hypothesized relate perceived ease of use (PEU) and perceived usefulness (PU) to the actual use (AU) of technology in home schooling.

H1: A home school parent's (or student's) perceived ease of use of technology would directly influence his or her usage of technology.
H2: A home school parent's (or student's) perceived usefulness of technology would directly influence his or her usage of technology.
H3: A home school parent's (or student's) perceived ease of use of technology would directly influence his or her perceived usefulness of technology.

This last research question was seen in several studies that examined PEU and PU as being an important relationship (Ma et al., 2005; Martinez-Torres et al., 2008; Tselios et al., 2011). The form of the question was modified from Ma et al. (2005, p. 390). These research questions will be applied to the four categories identified by Andrade (2008) for the use of technology by home schoolers: 1) building social networks, 2) acquiring and sharing knowledge, 3) administrative actions (for parents only), and 4) instructional activities (pp. 137-138).

Methods

Home schoolers were contacted via local home school groups and asked to fill out a web survey. The technology usage and perceptions data are based on a 5-point Likert-type scale ranging from "not at all typical" to "very typical."

Validity

The demographic data were analyzed with simple descriptive statistics to help define the sample populations of respondents to the survey. The PU and PEU data were analyzed using Partial Least Squares (PLS) path modeling. The software utilized was SmartPLS, version 2.0 M3 Beta (Ringle, Wende, & Will, 2005). According to Martinez-Torres et al. (2008), "PLS has, as its objective, the explanation of variance in a regression sense and thus, R^2 and the significance of relationships among constructs are measures more indicative of how well a model is performing" (p. 499).

To help improve the validity of the results, the research will minimize the bias when possible and be aware of reactivity, especially during data collection and analysis. Utilizing Andrade's (2008) and Ma et al.'s questions (2005) should help in both of these areas. The validity of the PLS data will be discussed below.

RESULTS

Demographic Profile

There were 53 participants in the web survey, of which 72% (n = 38) were home school parents and 28% (n = 15) were home school students. Of the 53 participants, 85% (n = 45) are current home school parents or students and 15% (n = 8) are former home school parents or students.

Technology Profile

A large number of participants (n = 43) reported that they relied on computer and communication technologies "heavily" to "moderate," a few (n = 10) reported that they relied on these modern technologies "somewhat" to "minimally," and no participant replied that they did not rely on technologies at all.

Comparing the parental responses to the student responses, the home school parents relied heavily on modern technology 9% more than the students, but the students relied moderately on technology 7% more than the parents, as shown in Table 1.

Table 1: Extent of Technology Reliance

	% Parent	% Student
Heavily	28.9	20.0
Moderate	52.6	60.0
Somewhat	10.5	13.3
Minimally	7.9	6.7
Not at all	0.0	0.0

Participants reported that they utilized a wide variety of technologies to assist their home schooling activities. Table 2 indicates the technology used, the number of participants who used the specific technology, and the percentage that number represents among the participants.

Table 2: Specific Technology Usage

Technology	# Participants	Percentage
Internet	51	96%
Email	47	89%
Videos/DVD	40	75%
Educational Software	36	68%
Productivity Software	35	66%
Streaming	23	43%
Message Boards	21	40%
Cell Ph (Text)	19	36%
TV	19	36%
Cell Ph (Voice)	18	34%
Blogs	17	32%
Wiki	14	26%
Imaging Soft	13	25%
MP3	13	25%

Table 2 cont.

Cell PH(Image)	11	21%
IM (Video)	9	17%
Instant Messaging	7	13%
Other	7	13%
PDA	5	9%

The Internet and email comprised the largest usage of technology usage. These categories allowed home school parents and students to network with other home schooling parents or groups. It also allowed access to educational materials utilized by nearly 90% of the participants. The next major use was to deepen learning by about 66% of the participants. The four subsequent uses were: 1) general administration, 2) assisting child's networking with other home schoolers, 3) to facilitate instruction, and 4) to access online courses - all four around 57%. The remaining uses were reported at less than 40%.

The final question in this section of the web survey asked the participants to provide an estimate of the amount they spend on computer and communication technology to support their home school efforts. They were informed that their estimates should include costs for cell phones and subscriptions, internet fees, hardware upgrades, software purchase and maintenance, etc. (Figure 2). Correlation between participant income and technology spending shows a random, non-linear relationship between the two responses ($r = 0.18$; $r^2 = 0.03$).

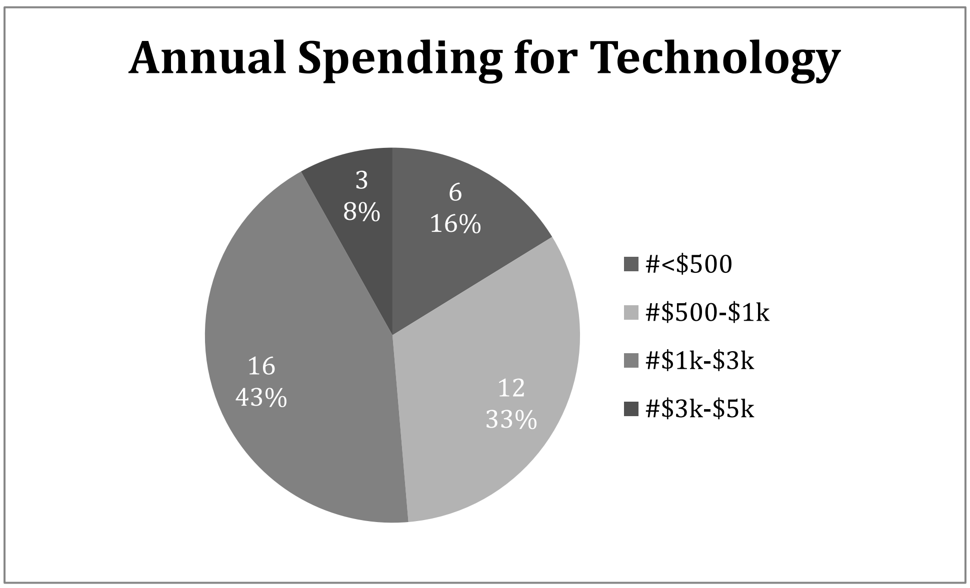

Figure 2: Annual Spending on Technology

Technology Usage and Perceptions

Technology perceived usefulness, perceived ease of use, and actual use were explored in four specific uses of technology: 1) building social networks, 2) acquiring and sharing knowledge, 3) administrative actions (for parents only), and 4) instructional activities.

To determine actual use, the technology used responses were divided into the four categories for each respondent, as shown in Table 3. This allowed actual use data to be incorporated in the research model to determine if perceived ease of use and perceived usefulness can predict actual use based on the PLS path model for each category.

Table 3: Division of Technology Used Questions into the Four Categories

Building Social Networks
Network with other home educators and groups
Collaborate and/or co-develop activities, lessons, or projects with other home school parents and community members
Collaborate and or co-develop activities, lessons, or projects with local school teachers and curriculum officials
Cultivate and support child's social networks and interactions
Acquire And Share Knowledge
To access educational materials, information and resources
Deepen learning and understanding
Access local, state, or federal regulatory or legal agencies and organizations concerning home education
Access local, state, and/or federal standards, exams, tests, etc.
Administrative Actions (Parents Only)
General administration
To assess and/or evaluate child's progress
Curriculum development
Professional development
Seek and access on-going feedback from peers and/or instructors on child's learning
Communicate with school officials
Instructional Activities
Facilitate and/or complement instruction
Create, modify, or use online or digital tools
Access online courses and/or instruction (for your child)
Access instructors, mentors, tutors (for your child)

Each specific use of technology category was examined individually, utilizing the research model and PLS path modeling. The measurement model was explored via loadings, composite reliability, average variance extracted (AVE) and the discriminant validity (Roland & Leal, 2003, p. 75, as cited by Tselios et al., 2011, p. 227) and the structural model was assessed via the statistical significance of the path coefficients by carrying out a bootstrapping analysis, using 500 sub-samples that were created by removing cases from the total dataset (Martinez-Torres et al., 2008, p. 500). "PLS estimates that the parameters of each sub-sample and 'pseudo values' are calculated by applying the bootstrap formula" (Martinez-Torres et al., 2008, p. 500). The structural model will examine the t-values "based on a two-tailed test with statistically significant levels of $p < 0.05$ (*), $p < 0.01$ (**), and $p < 0.001$ (***)" (Tselios et al., 2011, p. 228). In addition, in Figures 3-6, the dotted lines indicate paths that are not significant.

Building Social Networks

The participants answered five questions on perceived usefulness and seven questions on perceived ease of use in regard to using technology to build social networks. This data analyzed using PLS and the model constructed. Table 4 shows the Measurement Model for the Building Social Networks category.

According to Chin (1998), as cited by Tselios et al. (2011, p. 227), individual item loadings should exceed 0.7. As shown in Table 4, all the loadings are above 0.7, which says that "each indicator shares more variance with the component score than with error variance (Martinez-Torres et al., 2008, p. 500). The internal consistency is indicated by the given block of indicators as the composite reliability. According to Nunnally (1978), as cited by Martinez-Torres et al. (2008, p. 500), this value should be above 0.7 to indicate consistency. Convergent validity was shown with the average variance extracted (AVE), which should be greater than 0.5, "as proposed by Fornell and Larcker (1981)" (cited in Tselios et al., 2011, p. 228). As seen in Table 4, all the measures exceed the recommend levels.

Table 4: Measurement Models of the Four Categories

		Building Social Networks			Acquire & Share Knowledge			Administrative Actions			Instructional Activities		
Construct	**Item**	**Composite Reliability**	**AVE**	**Loading**	**Composite Reliability**	**AVE**	**Loading**	**Composite Reliability**	**AVE**	**Loading**	**Composite Reliability**	**AVE**	**Loading**
Actual use	Actual	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Perceived Usefulness	PU-1	0.0964	0.842	0.912	0.964	0.842	0.900	0.986	0.933	0.961	0.985	0.928	0.965
	PU-2			0.948			0.933			0.989			0.965
	PU-3			0.960			0.933			0.958			0.967
	PU-4			0.842			0.891						0.954
	PU-5			0.920			0.928						0.966
Perceived Ease of Use	PEU-1	0.973	0.836	0.904		0.847	0.927		0.824	0.879	0.947	0.718	0.842
	PEU-2			0.901			0.941			0.879			0.820
	PEU-3			0.861			0.884			0.874			0.870
	PEU-4			0.908			0.909			0.917			0.894
	PEU-5			0.940			0.929			0.947			0.790
	PEU-6			0.952			0.909			0.912			0.860
	PEU-7			0.932			0.941			0.943			0.851

AVE = Average Variance Extracted

The discriminant validity, as shown in Table 5, is "the extent to which the measure is not a reflection of some other variable" (Martinez-Torres et al., 2011, p. 500). The building social networks category shows that the "square root of average variance extracted for each construct (on the diagonal) is greater than the correlations between the constructs and all other constructs" (Martinez-Torres et al., 2011, p. 501), which demonstrates that there is adequate discriminant validity of the measurements.

Table 5: Discriminant Validity of the Four Categories

	Building Social Networks			Acquire & Share Knowledge			Administrative Actions (Parents)			Instructional Activities		
	PU	**PEU**	**Actual**	**PU**	**PEU**	**Actual**	**PU**	**PEU**	**Actual**	**PU**	**PEU**	**Actual**
PU	0.917			0.917			0.966			0.963		
PEU	0.434	0.914		0.407	0.920		0.642	0.908		0.393	0.847	
Actual	0.412	0.019	1.000	0.500	0.197	1.000	0.618	0.420	1.000	0.644	0.446	1.000

PU = Perceived Usefulness; PEU = Perceived Ease of Use; Actual = Actual Usage

The building social networks structural model, shown in Table 6, lists the t-values from the bootstrapping algorithm in PLS and the significance of the path coefficients. The values shown indicate that one of the paths (H2) - perceived usefulness to actual use - is significant at the p-value < 0.001 level. The path (H3) - perceived ease of use to perceived usefulness - is significant at the p-value < 0.01, but the path (H1) - perceived usefulness to actual use - is not significant. Thus, only H2 and H3 were supported and H1 was not.

Table 6: Structural Model Values for Four Categories

	Building Social Networks			Acquire & Share Knowledge			Administrative Actions (Parents)			Instructional Activities		
	PU	**PEU**	**Actual**	**PU**	**PEU**	**Actual**	**PU**	**PEU**	**Actu al**	**PU**	**PEU**	**Actual**
PU		2.729**			2.141*			4.393***			2.582**	
PEU												
Actual	4.362***	1.400		3.793***	0.0429		3.181**	0.119		5.675***	1.948	

*p < 0.05; ** p < 0.01; *** p < 0.001. t(0.05;499) = 1.967; t(0.01;499) = 2.586; t(0.001;499) = 3.310. PU = Perceived Usefulness; PEU = Perceived Ease of Use; Actual = Actual Usage

Figure 3 illustrates the fit statistics and estimated path coefficients of the research model as applied to the category of home schoolers using technology to build social networks. For this category, perceived usefulness has the strongest effect on actual use, followed by perceived ease of use on perceived usefulness. The figure also reveals that the proposed model accounted for 20.1% of the variance in the actual usage. The significance shown in the figure is from the bootstrapping algorithm's t-values.

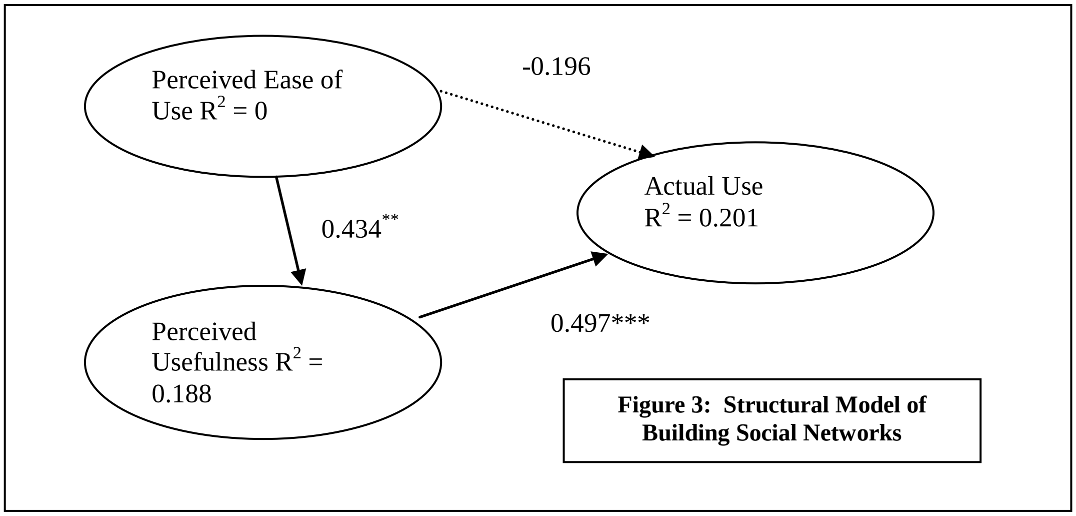

Figure 3: Structural Model of Building Social Networks

Acquiring and Sharing Knowledge

Following the same procedure as above, the respondents answered five questions about perceived usefulness and seven questions about perceived ease of use. The data were analyzed using the PLS path model. Table 4 shows the Measurement Model for the Acquiring and Sharing Knowledge category.

As seen in Table 4, all the measures exceed the recommend levels, all the loadings are above 0.7, the composite reliability is above 0.7, and the AVE is above 0.5. The dataset shows internal consistency.

The discriminant validity for the Acquiring and Sharing Knowledge category shown in Table 5 validates that there is adequate discriminant validity of the measurements because the diagonals are larger than the off diagonal elements.

The Acquiring and Sharing Knowledge structural model, shown in Table 6, illustrates that one of the paths (H2) - perceived usefulness to actual use - is significant at the p-value < 0.001 level. The path (H3) - perceived ease of use to perceived usefulness - is significant at the p-value < 0.05, but the path (H1) - perceived usefulness to actual use - is not significant. Thus, only H2 and H3 were supported and H1 was not. This is similar to the results from the Building Social Networks model.

Figure 4 shows the fit statistics and estimated path coefficients of the research model as applied to the category of home schoolers using technology to acquire and seek knowledge. For this category, perceived usefulness has the strongest effect on actual use, followed by perceived ease of use on perceived usefulness. The figure also reveals that the proposed model accounted for 25.0% of the variance in the actual usage.

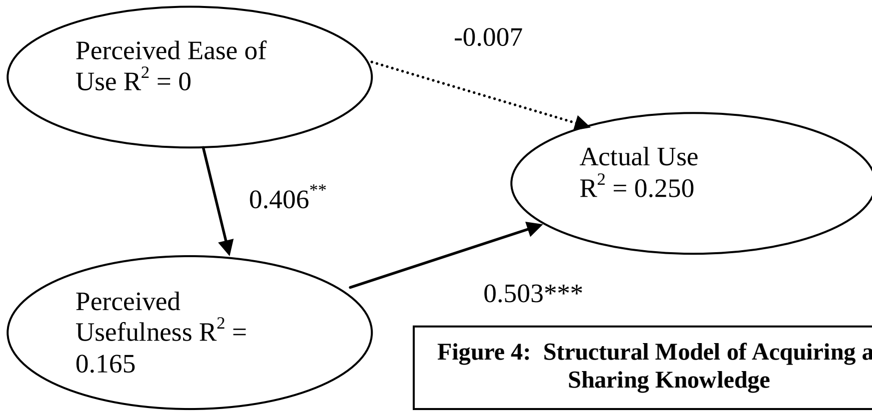

Figure 4: Structural Model of Acquiring and Sharing Knowledge

Administrative Actions (Parents Only)

The parental participants answered five questions on perceived usefulness and seven questions on perceived ease of use in regard to using technology in their administrative actions; i.e., keeping grades, preparing transcripts, or making certificates. Table 4 shows the Measurement Model for the Administrative Actions category.

As seen in Table 4, all the measures exceed the recommend levels, all the loadings are above 0.7, the composite reliability is above 0.7, and the AVE is above 0.5. The dataset shows internal consistency.

The discriminant validity for the Acquiring and Sharing Knowledge category, shown in Table 5, validates that there is adequate discriminant validity of the measurements because the diagonals are larger than the off diagonal elements.

The Administrative Actions structural model shown in Table 6 reveals that strongest effect is that of path (H3) - perceived ease of use to perceived usefulness - is significant at the p-value < 0.001. Also revealed is that one of the paths (H2) - perceived usefulness to actual use - is significant at the p-value < 0.01 level. Again, the path (H1) - perceived usefulness to actual use - is not significant. Thus, only H3 and H2 were supported and H1 was not. This is similar to the results from both the Building Social Networks model and the Acquire and Share Knowledge model, but with H3 having a stronger effect.

Figure 5 indicates the fit statistics and estimated path coefficients of the research model as applied to the category of parents of home schoolers using technology for administrative actions. For this category, perceived ease of use has the strongest effect on perceived usefulness, followed by perceived usefulness on actual use. The figure also reveals that the proposed model accounted for 40.1% of the variance in the actual usage.

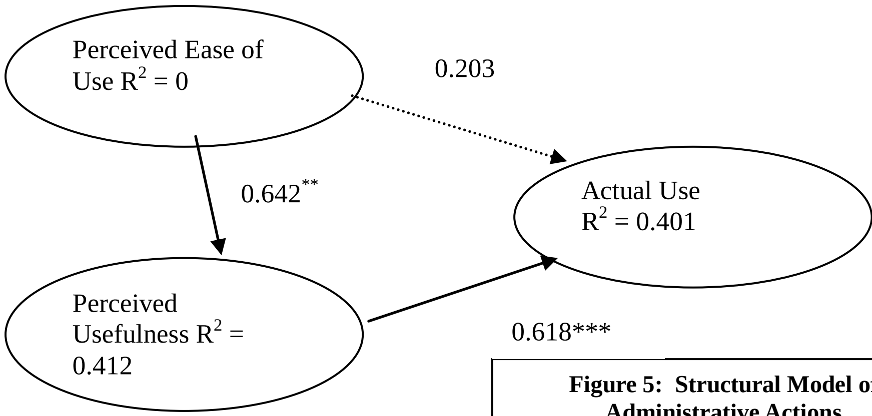

Figure 5: Structural Model of Administrative Actions

Instructional Activities

Finally, the participants answered five questions on perceived usefulness and seven questions on perceived ease of use in regard to using technology for instructional activities, such as online classes, web-based demonstrations, etc. Table 4 shows the Measurement Model for the Instructional Activities category.

As seen in Table 4, all the measures exceed the recommend levels, all the loadings are above 0.7, the composite reliability is above 0.7, and the AVE is above 0.5. The instructional activities dataset shows internal consistency.

The discriminant validity for the Instructional Activities category, shown in Table 5, validates that there is adequate discriminant validity of the measurements, because the diagonals are larger than the off diagonal elements.

The Instructional Activities structural model shown in Table 6 indicates that one of the paths (H2) - perceived usefulness to actual use - is significant at the p-value < 0.001 level, the path (H3) - perceived ease of use to perceived usefulness - is significant at the p-value < 0.01, but the path (H1) - perceived usefulness to actual use - is not significant. Thus, only H2 and H3 were supported and H1 was not. All four of the categories demonstrate that H1 is not significant and that H2 and H3 show significance.

Figure 6 shows the fit statistics and estimated path coefficients of the research model as applied to the category of home schoolers using technology for instructional activities. For this category, perceived usefulness has the strongest effect on actual use, followed by perceived ease of use on perceived usefulness. The figure also reveals that the proposed model accounted for 45.9% of the variance in the actual usage.

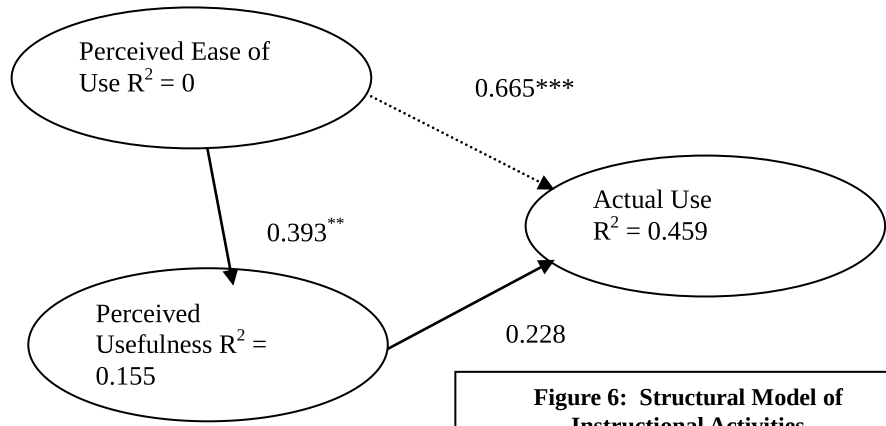

Figure 6: Structural Model of Instructional Activities

DISCUSSION

The research objective of this study was to explore technology's usage and perceptions by home schoolers – both parents and students. The findings indicate that technology – computer and communication technology, specifically – is being widely utilized by home schoolers to aid and assist their home schooling endeavor. The findings of this study, limited by demographic make-up of those surveyed, may not be generalized to other areas of the country, but will still be valuable for home school parents, makers of educational materials for home schoolers, and even for public school educators.

While approximately two-thirds of the participants were parents, there were enough student responses to show some minor differences in usage of technology between parents and students. Students and parents both indicate heavy to moderate reliance on technology to accomplish their home schooling decision. The use of internet and email by over ninety percent of respondents supports the findings that technology is used for networking with other home schoolers and for accessing educational materials.

In terms of the four categories of technology usage and perceptions, Table 7 shows that in all cases, at least at a significance of p-value < 0.05, that hypotheses H2 and H3 are supported, while H1 is not supported. There is a common thread that when technology is perceived useful, it will lead to actual use. As was seen in each of the four areas of technology usage, the results follow what was suggested by various researchers (Davis, 1993; Adams et al., 1992; Henderson & Divett, 2003; Cheng, 2011) - that perceived usefulness consistently has a statistically significant effect on actual usage of technology. However, while perceived ease of use does not directly affect actual usage, it does have an indirect effect, which is mediated by perceived usefulness. As shown in Table 7, the results from the four areas support the existence of this mediation model for all four categories of technology studied.

Table 7: Research Questions Evaluated for the Four Categories

	Category			
Hypothesis	**BSN**	**ASK**	**AA**	**IA**
H1 – A home schooler PEU of technology would directly influence their AU	Not supported	Not supported	Not supported	Not supported
H2 – A home schooler PU of technology would directly influence their AU	Supported**	Supported**	Supported***	Supported***
H3 – A home schooler PEU of technology would directly influence their PU	Supported***	Supported**	Supported***	Supported***

PU = Perceived Usefulness; PEU = Perceived Ease of Use; Actual = Actual Usage. BSN = Building Social Networks; ASK = Acquire and Seek Knowledge; AA = Administrative Actions; IA = Instructional Activities. * p < 0.05; ** p < 0.01; *** p < 0.001

CONCLUSION

This study explored home schoolers' technology usage and perceptions in the Central Texas region. The utilization of technology was shown to be highly significant to both parents and students who have chosen to home school.

This study further showed that, consistent with previous researchers (Davis, 1993; Adams et al., 1992; Henderson & Divett, 2003; Cheng, 2011), perceived usefulness mediates the effect of perceived ease of use on actual usage. As suggested by Henderson and Divett (2003), the mechanism involves an indirect relationship between PEU and actual usage mediated by PU, which may be due to "quality of alternatives" (p. 393). Davis considers that the indirect relationship could be due to "both the 'benefits' and 'costs" (p. 483). He further implies that PU and PEU "may not be the only beliefs mediating between system and attitude" (p. 483). Also, Adams et al. (1992), in replicating Davis' research, considers the relationship between PEU and PU to be "more complex than is typically postulated" (p. 245). He goes on to even suggest that "usage may influence perceptions of ease of use" (p. 245).

This study could be applied to other areas of the country to see if the "tech-savvy" nature of the Central Texas area is influencing these results over an area that has been less influenced by technology. Further research into the differences between the generations (parents and students) is also recommended to determine if there is a bias between perceptions and usage among these two groups. It is recommended that further investigation be done regarding how perceived usefulness and perceived ease of use can be manipulated through interventions and thus leverage the relationships found to affect actual technology usage.

It was noted that this was a limited study in size and population; self-reporting data have their own limitations as well. The demographic data helped to define the population and recognize some information about the home schooling community in the Central Texas region, but a larger population response would have made the results more generally applicable to the home school community.

AUTHOR INFORMATION

Ted Neil has worked as an analytical scientist for nearly 30 years and has recently completed a Master of Science in Information Systems. He has been teaching as an adjunct professor for 2 years. He has work for SEMATECH, Motorola, Advanced Micro Devices, Spansion, and currently works for Cerium Laboratories in Austin, TX. As a home schooling parent and instructor, he has been interested in the use of technology for many years. E-mail: TNeil@umhb.edu

Nancy Bonner has over 10 years of industry experience in the areas of commercial software development as well as software project management. Her research and teaching interests include software development and implementation (including software process innovation), leadership/project management and user acceptance/adoption of IT. E-mail: NBonner@umhb.edu (Corresponding author)

David Bonner has over thirty years of experience in IT software development and services, working across a number of industries. Prior to completing his Ph.D., Dr. Bonner led a large services organization in North America and before that was a partner at a consulting firm. Dr. Bonner also has experience in managing commercial software product development, IT project management, outsourcing, and business process management. E-mail: dmbonner@umhb.edu

REFERENCES

1. (2010). *Five foundations fund initiative to improve student success in community colleges*. Retrieved from http://www.carnegiefoundation.org/newsroom/press-releases/five-foundations-fund-initiative
2. Adams, D. A., Nelson, R. R., & Todd, P. A. (1992). Perceived usefulness, ease of use, and usage of information technology: A replication. *MIS Quarterly, 16*(3), 227-247.

3. Andrade, A. G. (2008). *An exploratory study of the role of technology in the rise of home schooling.* (Doctoral Dissertation). Retrieved from http://etd.ohiolink.edu/view.cgi?acc_num=ohiou1204138318
4. Cheng, Y. M. (2011). Antecedents and consequences of e-learning acceptance. *Information Systems Journal, 21*(3), 269-299.
5. Chin, W. W. (1998). The partial least squares approach for structural equation modeling. In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295-358). Mahwah, NJ: Lawrence Erlbaum.
6. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340.
7. Davis, F. D. (1993). User acceptance of information technology: system characteristics, user perceptions, and behavioral impacts. *International Journal of Man-Machine Studies, 38*(3), 475-487.
8. Eaton, M. (2011, July 20). Austin voted top tech-savvy place by mashable. [Blog post]. Retrieved from http://blog.midtowncommons.lincolnapts.com/around-town/austin-voted-top-tech-savvy-place-by-mashable/
9. Farris, M. P., & Woodruff, S. A. (2000). The future of home schooling. *Peabody Journal of Education, 75*(1&2), 233-255.
10. Fornell, C., & Larker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39-50.
11. Henderson, R., & Divett, M. (2003). Perceived usefulness, ease of use and electronic supermarket use. *International Journal of Human-Computer Studies, 59*(3), 383-395.
12. Ma, W., Andersson, R., & Streith, K. (2005). Examining user acceptance of computer technology: an empirical study of student teachers. *Journal of Computer Assisted Learning*, *21*(6), 387-395.
13. Martínez-Torres, M. R., Toral Marín, S. L., García, F., Vázquez, S., Oliva, M., & Torres, T. T. (2008). A technological acceptance of e-learning tools used in practical and laboratory teaching, according to the European higher education area. *Behaviour & Information Technology*, *27*(6), 495-505.
14. McDowell, S. A. & Ray, B. D. (2000). The home education movement in context, practice, and theory: Editors' introduction. *Peabody Journal of Education, 7 5*(1&2), 1-7.
15. Nermer, K. M. (2002). Understudied education: Toward building a home schooling research agenda. (Occasional Paper No. 48). National Center for the Study of Privatization in Education. pp. 1-21. Retrieved from http://ncspe.org/publications_files/114_OP48.pdf
16. Nunnally, J. C. (1978). *Psychometric theory* (2nd Ed.). New York: McGraw Hill.
17. Ray, B. D. (2000). Home schooling: The ameliorator of negative influences on learning? *Peabody Journal of Education*, *75*(1&2), 71-106.
18. Ray, B. D. (2010). Academic achievement and demographic traits of home school students: A nationwide study. *Academic Leadership Live, The Online Journal*, *8*(1). Retrieved from http://www.academicleadership.org/article/Academic_Achievement_and_Demographic_Traits_of_Homeschool_Students_A_Nationwide_Study
19. Ringle, C. M., Wende, S., & Will, A. (2005). SmartPLS, Version 2.0 (M3) Beta (computer software). Retrieved July, 6, 2012 from http://www.smartpls.de
20. Roland, J. L., & Leal, A. (2003). A validation test of an adaptation of the DeLone and McLean's Model in the Spanish EIS Field. In J. J. Cano (Eds.), *Critical reflections on information systems: A systemic approach.* Hershey: IGI Publishing.
21. Shreiderman, B., Borkowski, E. Y., Alavi, M., & Norman, K. (1998). Emergent patterns of teaching/learning in electronic classrooms. *Educational Technology, Research and Development*, *46*(4), 23-42.
22. Tselios, N., Daskalakis, S., & Papadopoulou, M. (2011). Assessing the acceptance of a blended learning university course. *Journal of Educational Technology & Society*, *14*(2), 224-235.
23. Welner, K., & Welner, K. M. (1999). Contextualizing home schooling data: A response to Rudner. Education Policy Analysis Archives, 7, 13. Retrieved from http://epaa.asu.edu/ojs/article/view/548

