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Perceptions of Online Voting: New Voters and Senior Citizens

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ABSTRACT

The ability to vote online greatly increases the convenience of voting in state and federal elections as opposed to going to traditional voting polls. However, acceptance of online voting systems is more complex than simply creating it and making it available for the next election. There are many variables that affect an individual's intention to use new technology. This study determines what factors influence the acceptance of an online voting system using the Unified Theory of Acceptance and Use of Technology (UTAUT). In addition to the constructs of performance expectancy, effort expectancy, and social influence, we include the constructs of trust and computer anxiety in the model. For this research-in-progress paper, we provide the results from one age group (new voters aged 18 to 25). At the time of the conference, we will report comparisons between that age group and senior citizens (55 and older).

Keywords

Online voting, Internet voting, Unified Theory of Acceptance and Use of Technology (UTAUT), acceptance

INTRODUCTION

Over the past several years, the Internet has rapidly revolutionized the way in which individuals, businesses, and governments exchange information and interact. It is the only place in the world where, at the click of a mouse, individuals can do anything from buying groceries to mailing relatives half way around the world to conducting business meetings. This incredible convenience has required businesses, and even the US government, to provide their products and services online. The US government currently provides thousands of its services online, including applying for grants, jobs, and social security. Taking into account the number of services already provided, the government is still expected to expand its online initiatives. In 2004 alone, e-government initiatives were estimated to be \$4 billion USD and that figure is expected to grow to \$6 billion USD by 2009. A few of these initiatives will include software development for e-government, Web development, and government-to-business technology (Chabrow, 2005). However, one question that has yet to be answered is whether or not these initiatives should seriously consider online voting.

LITERATURE REVIEW

Online voting

For this study, online voting refers to the ability of individuals to securely access and log on to a government Web site that would allow them to vote in state and federal elections. This access would be available through residential and non-residential Internet connections. An online voting system would, therefore, provide a quick and convenient voting alternative to conventional voting methods. The automated tallying of votes would also provide a much quicker turnaround for the results. In addition, online voting would provide a way to give overseas absentee voters a better opportunity to vote.

The most notable experiment for developing an online voting system was the Secure Electronic Registration and Voting Experiment (SERVE). SERVE was funded by the Federal Voting Assistance Program of the US Department of Defense and was developed by Accenture (Jefferson, Rubin, Simons, and Wagner, 2004). This voting system was intended to allow overseas military families to register to vote and vote online. Security was the project's major concern and was the primary reason Accenture's final product was not cleared to be used in the 2004 Presidential election. The long list of security concerns included (but was not limited to): insider attacks, lack of voter-verified audit trails, DOS attacks, spoofing,

tampering, fabricated user accounts, and non open-source code (Jefferson et al., 2004). Despite SERVE's failure of being cleared for use just a short while ago, it is our belief that the technologically savvy college age generation of both present and future voting generations will strongly demand the convenience of voting online in the ever changing, fast-paced world we now live in.

While the technical limitations of SERVE, and online voting in general, have been discussed in numerous articles (e.g., Dill, Schneier, and Simons, 2003; Moynihan, 2004), fewer studies have focused on limitations arising from resistance by voters. In one study investigating acceptance of online voting, socio-cultural similarity between the voter and government agency was found to impact both trust and perceived usefulness (Gefen, Rose, Warkentin, and Pavlou, 2005). In another study, trust, compatibility, and ease of use were all found to be significantly related to intent to use e-government services (although this did not include e-voting) (Carter and Belanger, 2005). One common argument for online voting has been the potential for an increase in those who cast votes. However, only a slight increase in voter turnout was seen in the U.K. when an online voting system was provided because most of the online voters were already regular voters (Henry, 2003).

Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT was developed as a unified model to incorporate eight prominent models in the technology acceptance literature. Empirical validation found that UTAUT explains up to 70% of the variance in intention to use a new technology. Performance expectancy (perceived usefulness, relative advantage), effort expectancy (perceived ease of use), and social influence (subjective norms, social factors) were found to have a significant, direct relationship to behavioral intent. In addition, the model accounts for moderating variables of gender, age, and experience (Venkatesh, Morris, Davis, and Davis, 2003). Because UTAUT incorporates the major models and theories of user acceptance, we have used UTAUT as the model for this study.

In addition to the constructs identified in UTAUT, we are also incorporating computer anxiety and trust into the model. Individuals in our society may view the political world as corrupt and deceitful. For this reason, it is our belief that these individuals will fear that political elites could somehow sabotage an online vote in their favor; therefore, trust in the government and trust in the Internet will likely affect a person's intent to use an online voting system. Our last variable added to the model will examine whether an individual's fear of incorrectly using the technology would discourage them from using it. It is assumed that most people would be very adamant about their vote being accurately cast; therefore, the fear of accidentally misusing the online voting system could be correlated with the intent to use the technology.

RESEARCH MODEL AND HYPOTHESES

In the U.S., over 70% of citizens over the age of 55 vote; however only about 35% of citizens 18 to 25 vote (Jamieson, Shin, and Day, 2002). Conversely, citizens 18 to 25 are more likely to use a computer on a daily basis, to have used computers for much of their life, and to have lower levels of computer anxiety than those over 55, all factors that increase the use of technology (Martin, Steward, and Hillison, 2001). Because of these differences between the two age groups, this study will examine the barriers to online voting acceptance for both age groups.

H1: Higher levels of performance expectancy will increase intent to use an online voting system.

H1a: The influence of performance expectancy on intent will be moderated by gender and age.

H2: Higher levels of effort expectancy will increase intent to use an online voting system.

H2a: The influence of effort expectancy on intent will be moderated by gender, age, and experience.

H3: Higher levels of social influence will increase intent to use an online voting system.

H3a: The influence of social influence on intent will be moderated by gender, age, and experience.

H4: Higher levels of trust in the government will increase intent to use an online voting system.

H5: Higher levels of trust in the Internet will increase intent to use an online voting system.

H5a: The influence of trust in the Internet and intent will be moderated by gender, age, and experience.

H6: Lower levels of computer anxiety will increase intent to use an online voting system.

H6a: The influence of computer anxiety on intent will be moderated by gender, age, and experience.

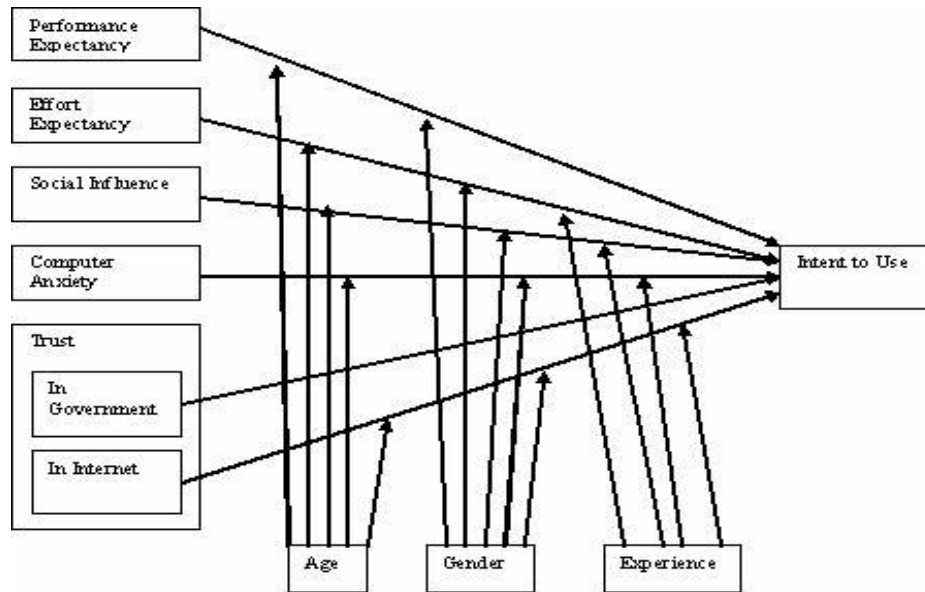


Figure 1: UTAUT model

METHODOLOGY

Subjects

Two different sample groups are utilized to assess our hypotheses. Students enrolled in a junior-level business class were surveyed for the first sample group. Seventy-six usable surveys from students between the ages of 18 and 25 were completed. Average age was 21 years, 60% were males. Survey responses indicate respondents have an average of eleven years experience using computers and that every respondent has used the Internet. All but one reported that they had convenient access to the Internet, and 95% reported using the Internet more than once a week. While an argument can be made that college students may be more technically savvy than the same age group in the general public, the increasing use of computers in high school (and lower grades) provides justification that in the future even those who don't attend college will still have computer education. However, it should be recognized that the results from the sampling of college juniors may not be generalizable to all 18 to 25 year olds.

Our second sample will be of senior citizens, 55 years of age and older. Sample size will be similar to the student group. Results from this sample will be available at the conference.

Instruments

Constructs were measured using validated instruments. Performance expectancy, effort expectancy, and behavioral intent were all measured with four items; social influence and computer anxiety were measured using five items each (Venkatesh et al., 2003). Trust was divided into two constructs: trust in the Internet and trust in government. Trust in the Internet was measured using six items, trust in the government was measured using three items (Carter and Belanger, 2005). Items were measured using a 7 point Likert scale with 1 being strongly disagree and 7 being strongly agree.

RESULTS

Data Analysis

Factor analysis and reliability tests were done. Reliability tests ranged from .770 to .969. Items loaded as expected, although one item from Social Influence was dropped. For each individual, responses were averaged to create one score for each construct. Full validity results will be provided at the conference; including a table providing full factor analyses.

Preliminary Results

Preliminary tests have been run on a subset of the data collected from the first group (18-25 years) only, so no tests of age as a moderator have been done.

Using Hierarchical regression, our model was significant, with adjusted R^2 showing the six independent variables explaining 61.4% of the variance of intent to use an online voting system. Three were significantly related to intent to use an online voting system: performance expectancy, social influence, and trust in the Internet.

We then tested with moderators. Results showed gender did not moderate any of the relationships with the younger age group, and computer experience was only moderately significant ($p=.095$) when moderating performance expectancy and intent to use. This indicates the effect between performance expectancy and intent to use is stronger for those who have used a computer for a longer time period. Table 1 provides a summary of the preliminary findings.

Variable	t	Significance	Moderators
Performance Expectancy	4.404	.000	Experience only: .095
Effort Expectancy	-.424	.673	Not tested
Social Influence	2.463	.016	None
Computer Anxiety	-.140	.889	Not tested
Trust in Government	.605	.547	NA
Trust in internet	4.913	.000	None

Table 1: Construct Significance

For the age group surveyed, our results were not surprising. While we expected all six independent variables to be significantly related to our dependent variable, computer anxiety, effort expectancy, and trust in government were not significant. Survey results from our preliminary data results came from students who have been using computers for a number of years and were very familiar with the Internet. Effort expectancy measured their perception of ease of use of an online voting system. Since 95% of the respondents report using the Internet several times a week, they likely feel very confident in using the Internet and do not see the ease of using an online voting system to be a significant barrier. Likewise, computer anxiety did not enter into the model. Because their anxiety over using a technology is low, it does not affect their intent to use the technology. We expect to see these two variables enter the model when we add our second group of survey data using senior citizens, an age group that hasn't been exposed to computers for the majority of their lives. Trust in the government was also not significant. It could be that this age group has not fully formed expectations of the government, so trust in the government does not affect whether they would use a new technology to vote.

Performance expectancy (perceived usefulness), social influence, and trust in the Internet were all positively related to intent to use an online voting system. If individuals perceive online voting systems to be useful, their intentions to use the system will increase. The significance of the performance expectancy variable is very important when considering the sample subjects' ages. This finding supports our initial belief that the younger generation will find it much more convenient to vote online rather than through traditional voting methods. The convenience of being able to vote online could create demand for online voting systems in the future. Social influence was also a significant factor in the intent to vote online. The possibility of seeing friends and coworkers using an online voting system is going to influence a person to use an online voting system also. This age group might also feel more pressure to conform to what they believe those around them are doing. Finally, results suggest that as individuals' trust in the Internet increases, they will be more likely to use the Internet for voting in state and federal elections. From these results, trust in the Internet appears to be a major barrier for online voting acceptance. Less than 1/4 of our respondents indicate they trust the Internet enough to vote online. Currently, this lack of trust in Internet security could outweigh any benefits online voting presents. In a portion of the survey where respondents were asked the major barriers to their use of an online voting system, an overwhelming majority stated something relating to Internet security. Internet security will clearly need to be guaranteed to some extent before individuals in the younger voting generation will be willing to use an online voting system.

DISCUSSION AND CONCLUSION

Additional results will be available at the AMCIS conference. At that time, we will have finished data collection of the senior citizen group and will make comparisons between the two age groups, their intent to use online voting systems, and what variables are most likely to pose barriers to the acceptance of online voting for the different age groups.

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