

2008

An evaluation of the Technology Acceptance Model as a means of understanding online social networking behavior

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An Evaluation of the Technology Acceptance Model as a Means of Understanding

Online Social Networking Behavior

By

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
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Date of Approval:
March 28, 2008

Keywords: Perceived Ease of Use, Perceived Usefulness, Personality, Experience, Intent
to use.

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ABSTRACT

Organizations invest sizable amounts of financial and human capital toward developing and implementing innovative technology solutions that will help them achieve organizational objectives. Professionals are now able to use online social networking technology to maintain and grow their network of business contacts virtually, resulting in increased efficiency and the ability to foster relationships with colleagues who otherwise would not be accessible. Organizations can use the benefits of online social networking to their strategic advantage if they understand the nature of the technology and how it is used. The Technology Acceptance Model is often used to explain the acceptance of new technology at work, and can predict which workers are likely to adopt a newly-implemented technology as it was intended to be used. It is not clear, however, if the model can predict the acceptance of social networking technology, and it does not account for experience the user might have had with similar systems. Five hundred students completed a questionnaire about their prior usage of online social networking systems as well as an assessment of their perceptions of the technology in terms of ease of use and usefulness, and the social forces influencing usage decisions. Findings suggest

the Technology Acceptance Model is a reasonable model of the acceptance of online social networking systems, but the subjective norm component was not predictive of acceptance.

As technology becomes more integral to the functioning of organizations as a whole, the ability of employees to integrate new technology into their workflow becomes an ever-larger determinant of success. Organizations that can anticipate and predict which of their workers will accept the technology changes that the organization has implemented are at an advantage over those that adopt a wait-and-see approach. Communication technology is among the most visible areas where workplace technology is advancing. To one degree or another, computer-mediated communication is part of most office workers' daily activity. E-mail and other computer-mediated communication now comprise a large percentage of workplace communication, but were met with considerable resistance when they were initially introduced.

Business networking is another area where workplace technology advancement can be seen. Cultivating and maintaining professional relationships is an important part of business and professional development that has traditionally been conducted either in person or by telephone, but is now also being done online. Workers are increasingly comfortable using the Internet for social interaction in their private lives, so they are more amenable to using these systems for business communication. This is one of the reasons why employees are now using mediated technologies such as online social networking systems to conduct much of the professional networking that was previously conducted in person (Kumar, Novak, Raghavan, and Tomkins, 2004).

There are many advantages to online networking, but there are also some unanswered questions regarding the way people adopt and use these systems. The goal of this dissertation is to shed light on the factors that influence acceptance of these systems,

particularly where they differ from the factors that have proved to be important in predicting the acceptance of other technologies. I begin with a discussion of social networking in general, focusing on the way it manifests in organizations, and then a description of online social networking and computerized social networking systems. A discussion of technology acceptance in organizations follows, including an introduction to the Technology Acceptance Model. I then evaluate the suitability of this model with data collected from a sample of online social networking system users and present an alternative model to predict online social networking system acceptance.

Social Networking

Social networking theory is used to explain complex interrelationships between groups of people. It is the study of the structure of interpersonal connections between individuals (Barabasi, 2002). An individual's social network includes everyone he or she knows, and everyone they know. Close relationships such as those between good friends or family members are considered strong connections, whereas the connection between two acquaintances is weaker. The strength of the tie between two people is representative of the closeness of the relationship that tie represents. From a social networking perspective, the most important connections are not the strong ties that you have with the people closest to you, but rather the weaker ties that connect you to acquaintances. The "strength of weak ties" phenomenon (Genovetter, 1973) exists because in general, social networks form as clusters of people who are in the same geographical area or who have similar interests. The result is a relatively homogenous cluster, in which everyone knows the same people and has access to similar resources. Most people exist in more than one

cluster, however, and thus serve as bridges between groups. When someone bridges two clusters, every member of both clusters gains a new (weak) tie to each member of the other cluster. Genovetter's finding that weak ties are more influential than strong ties comes from the fact that weak ties provide access to new social resources. A weak tie might connect a user to a cluster of people with entirely new information, opportunities, and skills. Weak ties usually manifest through social intermediaries, such as when someone has "a-friend-of-a-friend" or when someone "knows someone who would be perfect for that." In traditional social networking, the existence of such a connection is often unknown to one or both of the parties involved.

Stanley Milgram (1967) showed that two strangers can be linked to each other by tracing their social networks. His research showed that it usually takes between five and seven steps to connect two seemingly unrelated people. He called this interconnectedness "the small-world problem," referring to the comment that is often made when one discovers an unexpected social connection, though the finding is more popularly referred to as "six degrees of separation". Milgram mapped the social networks of his participants by asking them to deliver a postcard to a person they did not know by giving the card to someone they knew personally and who was more likely to know the target person. He then counted the number of times the card changed hands before it was delivered to its final destination.

We owe a great deal of our understanding of social networks to Milgram's research, but advances in technology have changed not only the way we communicate, but also the way we might explore social networks. For example, the participants in

Milgram's study had no way of knowing whom the other intermediaries knew, so it is unlikely that they always gave the card to the intermediary with the nearest connection to the target person. If, however, they had some way of knowing whom everyone was connected to, it is likely that they would have found a shorter route. Although mapping one's entire social network must have seemed impossible to Milgram, it is one of the defining characteristics of online social networking.

Social Networking in Organizations

Social capital exists when employees form relationships that create competitive advantage for the organization. Social capital is often beneficial to the employee recruitment and selection process. Ties of friendship often influence which applicant is hired or selected for interview, in part because in the course of developing a friendship with a potential applicant, the recruiter has learned valuable information about him or her that can be used to determine level of fit with the organization. When social ties exist between recruiter and applicant during the selection process, the subsequently-hired employee often has lower turnover intention and increased organizational commitment (Nguyen, Allen, and Godkin, 2006). Recruiters with expansive social networks often reduce the overall cost of staffing because they can eliminate many candidates based on their resumes alone, thereby saving the expense of interviewing candidates that are unlikely to be a good fit with the organization.

Organizations often find that the job performance of employees who were sourced from the social networks of current employees is better than the performance of employees who are recruited through traditional channels (Barabasi, 2002). This is partly

because these employees come in with a link to the social network from the very beginning, and so they benefit from informal on-the-job training, increased sales from personal referrals, and other network benefits that their less-connected peers aren't privy to (Teten and Allen, 2005). The benefits of a well-developed social network go beyond individual job performance, however. Adler and Kwon (2002) showed that in addition to increased individual job performance, team job performance and creativity are significantly better for teams that include employees with well-developed social networks.

Social networking theory is also relevant to the study of leadership. Using social networking principles leaders can see how their actions affect not only those employees they directly interact with, but everyone in their network, and everyone outside their network. Sparrowe and colleagues (2001) found that the performance of an individual in an MBA team depends in part on how close he or she is to the center of their social network. Workers who were more centrally-located within the network performed better on assigned tasks and also exhibited increased contextual performance. Balkundi and Harrison (2006) showed that it is especially important for the leader of a work team to be centrally-located. When leaders are at the center of their team's social network they can distribute resources to the team more efficiently. It is thus in an organization's best interest to develop and utilize the professional social networks of its members.

Online Social Networking

The principles of social networking apply to online social networking as they do to its offline counterpart. The important difference is that the connections between users

are clearly identified with online social networking. Contrary to traditional networking, two people who share a common connection can interact with each other directly without an intermediary person first introducing them. The relationships users form are visible to the network.

Traditional computer-mediated communication theory holds that the only time two people communicate with “full bandwidth” is when they speak face-to-face. That is to say that some information is lost whenever communication is mediated through technology such as a telephone or a computer. The degree of bandwidth reduction is increased when that communication is asynchronous, such as is the case with email or many other types of Web-based technology that prevent the transmission of social cues. This often contributes to an overall feeling of anonymity on the part of the users, but it is less problematic with computerized social networking systems. With computerized social network systems, users create a profile that includes contact information and any other information he or she would like to share with the network such as work history or qualifications, employment objectives or business needs. He or she indicates (connects to) the people in his or her network before any interaction has taken place.

Because users can see the connections other users have made, they have what amounts to a roadmap of his or her social network. This is a very low-bandwidth method of transmitting a great deal of social information. Feelings of anonymity are minimized because users primarily interact with people that they know in real life. Even if a user is unknown, he can usually be traced through his social network until a common connection is found.

Although computerized social networking technology is capable of operating in very low-bandwidth conditions, the addition of images and multimedia capabilities improves the quality of the communication. (Barth and McKenna, 2004). The fidelity of the medium has increased to the point that in terms of social dynamics, the distinction between online and face-to-face interaction is disappearing. Spears, Postmes, Lea, and Wolbert (2002) found that many of the group process dynamics that are seen in online groups are identical to those found in traditional groups. Bryant, Sanders-Jackson, and Smallwood (2006) found evidence that interpersonal connections might actually be stronger when they are formed through online social networking technology than when formed through face-to-face interaction. These studies suggest that the underlying psychological process of individual and group social interaction is similar in online and offline interactions.

Although similar from a conceptual and psychological standpoint, from a process standpoint, communicating through online social networking systems is very different from the way people traditionally communicate online. Traditional chat rooms, bulletin-board systems, and online discussion forums are created around a particular issue or topic, but the focus of an online social networking site is a single user. Online social networks also provide a social validation function. An implicit recommendation of a previously-unknown user exists if that user is connected to someone you trust. The user's network can also provide valuable information about his or her professional abilities. Past clients, employers, and employees are all part of the user's social network and can provide a rich source of information for potential clients or employers. Employers have

been known to search an applicant's network to find former jobs, coworkers, or clients and elicit references or other information about the applicant. This often results in the acquisition of information that the applicant would not have otherwise supplied.

The use of online social networking systems has clear ramifications in terms of the way employees do their jobs. These procedural and organizational changes are often associated with financial and non-tangible benefits for the organization, to the extent that the technology is utilized by its target audience. Examining the factors that influence technology acceptance in general can help us better understand the acceptance of online social networking systems.

Technology Acceptance

There is a general tendency for people to view new technology in a positive light. Because of this, organizations sometimes adopt new technology when it is against their best interest to do so. Abrahamson (1991) discusses this phenomenon in terms of a pro-innovation bias that often results in the adoption of inefficient technologies that are expensive to implement but do not add value to the organization. The justification of any technological innovation in economic terms is problematic, however, in part due to unknown implementation costs, which can be much greater than the cost of the technology itself. Fichman (2004) presents a framework to evaluate the economic value of a new technology based on system factors as well as organizational factors. The framework, however, is only accurate to the extent that individuals actually *use* the new technology.

Even when employees use the technology supplied to them, human error is a large component of the success or failure of any technology initiative. Rarely can organizations remain competitive unless they make large investments in information technology (Howard, 1995), but most system performance shortfalls are the result of behavioral errors rather than hardware or software deficiencies (Henderson and Divett, 2003). These shortfalls often stem from users failing to use the new technology the way the decision-makers envisioned. In most cases, workers would increase their performance if they would fully utilize the technology that has already been adopted by their organization (Davis, Bagozzi, and Warshaw, 1989). Underutilization is a central concern for organizations because in addition to having to justify the sizable investment in technology that they have made, organization leaders must justify the downtime that occurs as a result of implementing that change.

Modeling Behavioral Intention

The study of human decision-making has resulted in models that posit the mental processes that humans use to make decisions. Most of these have been used by organizational researchers to predict which employees are likely to accept new technology and why. In particular, the Theory of Planned Behavior and the Theory of Reasoned Action have been used to predict many types of behavior, but have been less successful in predicting technology acceptance. This led to the development of the Technology Acceptance Model.

Theory of Reasoned Action. The theory of reasoned action is widely used to understand the determinants of intentional behavior. The theory holds that the intention to

act a certain way is a function of the belief that a specific behavior will lead to a given outcome. The theory allows for two types of beliefs or knowledge: behavioral and normative. Behavioral beliefs influence our attitude about performing the behavior in question, and normative beliefs affect the subjective norms we associate with the behavior (Madden, Ellen, and Ajzen, 1992). Thus, any intentional behavior is determined both by our attitudes toward performing the act, and by what people will think about us (social norms) if we do it. The Theory of Reasoned Action (figure 1) allows for a formulaic conceptualization of attitudes and subjective norms. Attitude toward behavior refers to the result of an evaluation of the positive and negative consequences of engaging in the behavior. It is conceptualized as the sum of all the beliefs one holds about the consequences of the behavior, multiplied by the evaluation of each consequence.

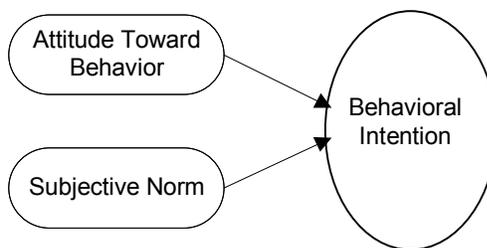


Figure 1: Theory of Reasoned Action

Subjective norm refers to the perception of pressure to participate in an action as a result of the influence of other people. It is calculated by multiplying the normative beliefs of the actor (expected behavior) by his or her motivation to comply with those beliefs (Davis, Bagozzi, and Warshaw, 1999). Within the context of technology acceptance, the two factors that are the most formative of social norm are peer influence and superior

influence. Normative pressure can often be so high as to induce total compliance in order to experience a favorable reaction.

Sheppard, Hartwick, and Warshaw (1988) meta-analytically analyzed 87 studies to test the predictive utility of the theory. They found a significant correlation between the theorized predictors (attitudes toward behavior and subjective norms) and behavioral intention ($r=0.66$, $p<.001$). Additionally, they found strong evidence for the relationship between behavioral intention and actual performance ($r=0.52$, $p<.01$).

The Theory of Planned Behavior. The Theory of Planned Behavior extends the Theory of Reasoned Action by including perceptions of internal and external constraints on behavior. Figure 2 shows how the effects of behavioral control, attitude toward the behavior, and subjective norm combine to influence the actor's intention to engage in any given behavior. With the inclusion of perceived behavioral control, the model accounts for the fact that most behavior is constrained to a greater or lesser degree by the availability of resources and the presence of outside restrictions (Madden, Ellen, and Ajzen, 1992).

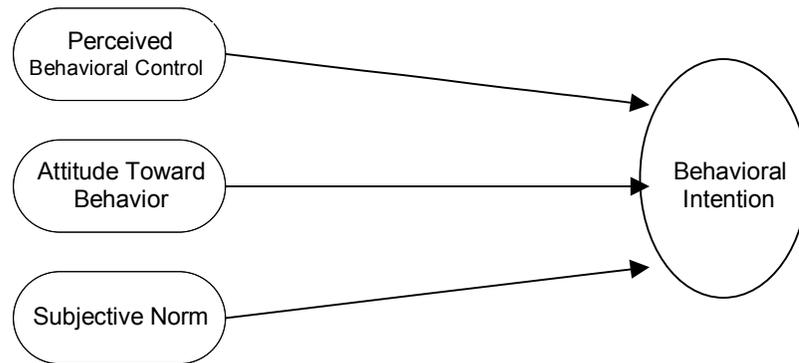


Figure 2: Theory of Planned Behavior

Workers perceive their behavior to be under their control to the extent that they feel they have the resources and opportunities that they need to perform a given task or function in a given situation.

Technology Acceptance Model. The Technology Acceptance Model (Davis, 1989, Davis and Venkatesh, 1996) was developed specifically to predict who is most likely to accept new technology in a workplace environment. It is an adaptation of the Theory of Reasoned Action, in that the model posits that beliefs determine behavioral intentions, which determine behavior. The Technology Acceptance Model differs from the Theory of Planned Behavior in that it accounts for the fact that in organizational settings the adoption of technology is not determined solely by the user's beliefs.

Davis (1989) recognized that workers very often use technology because it is required of them as part of their job or might improve their job performance, but they might not use it otherwise. This presented a problem because all of the existing models assumed the target behavior was voluntary. Davis extended the Theory of Planned Behavior to account for the use of a technology to meet work-related goals. Figure 3

shows the resulting model, the Technology Acceptance Model (Davis, 1989; Davis and Venkatesh, 1996) and its refinement, TAM2 (Venkatesh and Davis, 2000), which holds that users will make an adoption decision based on the outcome of their evaluation of the difficulty of using the technology (Perceived Ease of Use), their belief that using the technology will increase their job performance (Perceived Usefulness), and the influence from people that are important to them (Subjective Norm).

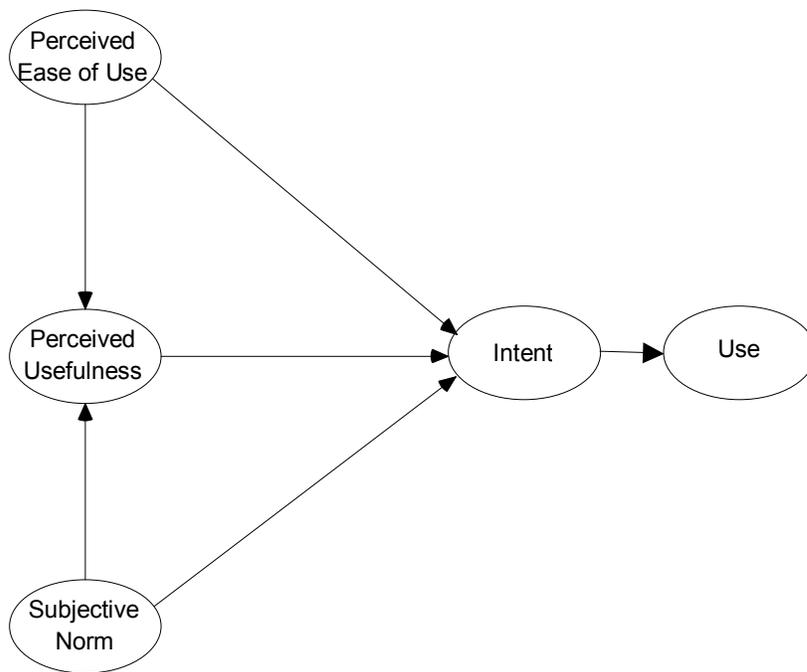


Figure 3: Technology Acceptance Model (TAM2).

This model has been studied with a variety of populations and technologies and has proven to be one of the most robust theories of behavior at work. Over the past fifteen years the model has effectively predicted or explained the acceptance of workplace innovations but it sometimes does not predict acceptance as well for special populations or very specialized technology. For example, Hu, Chau, Liu Sheng, and Tam (1999) used the Technology Acceptance Model to study the acceptance of telemedicine technology by physicians. They found moderate fit of the model overall, but the influence of perceived ease of use on intent was not significant. It is thought that ease of use considerations can be overridden when it is necessary; presumably in this case the physicians were willing to use a technology that was not easy to use because they found it to be beneficial to their patients. This is one of the unknowns associated with using the Technology Acceptance Model to predict online social networking technology use. We have evidence that perceived usefulness can override concerns about ease of use, but what happens in situations where the usefulness of a technology is either unknown or varies greatly among users?

Measuring Acceptance

There has been some discussion regarding the most appropriate measure of technology acceptance (see Sun and Zhang, 2006). The Technology Acceptance Model can predict both behavioral intention to use the technology (Intent) and also actual use after implementation (Use). These two indications of technology acceptance are conceptually different in that Intent is derived from attitudes, whereas Use is a measure of completed actions. For most applications, technology acceptance is conceptually most

similar to behavioral intent; that is, we can infer acceptance of the technology if respondents indicate that they intend to use it. The alternative measure of future usage depends on a number of implementation and history factors that may or may not be directly associated with characteristics of the technology itself.

The Current Study

This study looks at two models of technology acceptance: the Technology Acceptance Model, and the Technology Acceptance Model with the addition of an experience component. The hypothesized effects of perceived usefulness, perceived ease of use, and subjective norm are the same in both models, so these hypotheses are designated H1a to H5a for the Technology Acceptance Model and H1b to H5b for the model that includes experience.

Perceived Usefulness

Perceived usefulness is the perception that a given technology will help a user achieve his or her work goals. Within the context of adopting and using a new technology in the workplace, Venkatesh, Morris, and Ackerman (2000) provide evidence that the most important determinant of an employee's attitude toward adopting and using a new technology is his or her perception of the usefulness of the technology (perceived usefulness), typically explaining 30-35% of the variance observed in behavioral intent. Employees are much more likely to adopt a system that they believe will help them achieve their work goals.

H1a: If the social networking technology is perceived to be useful it is associated with increased intention to use the technology.

In this study Perceived Usefulness is assessed with a four-item scale that has been used consistently in studies using the Technology Acceptance Model.

Perceived Ease of Use

Ease of use refers to the user's belief that the technology in question is difficult to use. Specifically, it is the evaluation of the degree to which using the technology is free of effort (Davis, 1989). If a given piece of technology or system is overly complex or otherwise difficult to use, it is not likely to be used when an alternative method exists. Thus, these difficult-to-use technologies are judged by the operator to be less useful under voluntary conditions. The online social networking system technology under investigation in this study is voluntary, so we would expect perceptions of ease of use to have a positive effect on perceived usefulness (hypothesis H2). There is evidence that perceived ease of use also directly affects intent to use. Easy-to-use technologies are more likely to be used than those that are difficult to use, regardless of how useful they are perceived to be. For this reason, I expect a direct, positive effect of Perceived Ease of Use on Intent to Use (hypothesis H3).

- H2a: Users who believe social networking systems are easy to use will rate them as being more useful.
- H3a: Increased perceptions of ease of use are associated with increased intention to use social networking technology

The Perceived Ease of Use measure that is used in this study addresses the user's perception of mental effort requirements and the clarity and understandability of the

system. Sun and Zhang's (2006) review of technology acceptance predictors showed perceived ease of use to be less stable than perceived usefulness when predicting behavioral intention to use a technology. This study uses the four-item measure developed by Davis (1989), which is the traditional measure of Perceived Ease of Use in studies utilizing the Technology Acceptance Model.

Subjective Norm

Subjective norm refers to social pressure to use (or refrain from using) a technology. It results from an agreed-upon understanding of what constitutes acceptable behavior (normative beliefs), and a person's degree of motivation to comply with those beliefs (Davis, Bagozzi, and Warshaw, 1989). Subjective Norm was not part of the original Technology Acceptance Model, but was added later to help explain the influence that coworkers and other employees have on the behavior of an individual. According to Venkatesh (2000), Subjective Norm also influences intention indirectly through perceived usefulness in voluntary compliance implementations. That is, the usefulness of a given technology is influenced in part by how it is generally perceived by others. I would expect that when the technology is perceived by relevant-others to be useful, the user is more likely to use the technology (hypothesis 4) and to judge it as useful (hypothesis 5).

H4a: The perception of social pressure to use online social networking systems is associated with increased intent to use.

H5a: Users who feel social pressure to use the system will consider the technology to be more useful.

Subjective Norm is measured by a two-item scale developed by Davis et al.

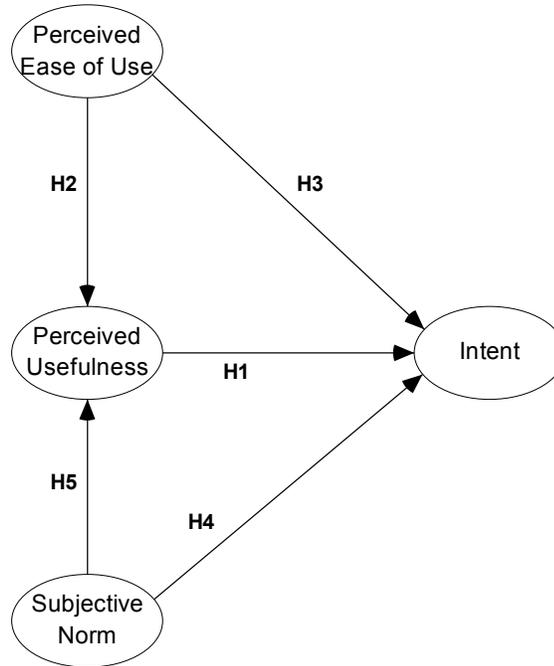


Figure 4: Technology Acceptance Model Hypotheses

Experience

The second model hypothesizes the same relationships as the Technology Acceptance Model, and adds an experience component. Experience refers to the amount of exposure the user has had to a given technology. The Experience score is derived from a five-item scale that asks about the user’s history using various social networking systems. Each item in the scale asks the user to rate his or her use of a particular system on a five-point scale anchored at “[have] never used” and “use every day.” Experience is an important concept in the study of technology acceptance because In general, people

rely on the knowledge gained through their past experiences to form their behavioral intentions for the future. Users who are exposed to technology that is similar to systems that he or she has used in the past will assimilate new information more easily because it is associated with previously-acquired knowledge. (Ajzen and Fishbein, 1975).

Many of the studies that used the Technology Acceptance Model were conducted in organizational settings with controlled rollouts of new technology initiative. One of the advantages of studies that use new systems is that it is reasonable to assume that all of the participants have had the same (lack of) prior experience with the technology. Venkatesh and Davis (2000) have shown that even over a wide variety of jobs (retail electronics store employees, real estate professionals, and financial accounting clerks) the factors that affect technology acceptance vary as a function of experience with the system. Specifically, they found that more variance in perceived ease of use was explained at higher degrees of experience (60%) than at lower experience levels (40%).

Venkatesh's study suggests that the nature of the relationship between user and technology varies as a function of experience with that technology. His findings suggest that user characteristics (as opposed to characteristics of the technology) become increasingly important as user experience grows. Szajna (1996) conducted a longitudinal study of 91 email users and found support for the technology acceptance model, but cautioned that there is an "experience component" that is not accounted for by the model. She found that perceived ease of use was partly a function of experience, and ease of use is not predictive of intention when experience is high. Igbaria, Zinatelli. Cragg and Cavaye (1997) found that experience and training are both positively related to

perceptions of ease of use and usefulness, and user expertise is a significant determinant of technology use.

This dissertation presents a new model of technology acceptance that includes the effects of prior experience to the same or similar technology. It is thought that experience augments the Technology Acceptance Model without changing the nature of the existing relationships. Therefore, the first five hypothesized relationships in model B are the same as those that are hypothesized for Model A with regard to perceived usefulness, perceived ease of use, subjective norm, and intent to use:

- H1b: In model B, perceived usefulness is positively associated with intention to use online social networking systems.
- H2b: In model B, perceived ease of use is positively associated with perceived usefulness.
- H3b: In model B, perceived ease of use is positively associated with intention to use online social networking systems.
- H4b: In model B, subjective norm is positively associated with intention to use social networking systems.
- H5b: In model B, subjective norm is positively associated with perceived usefulness.

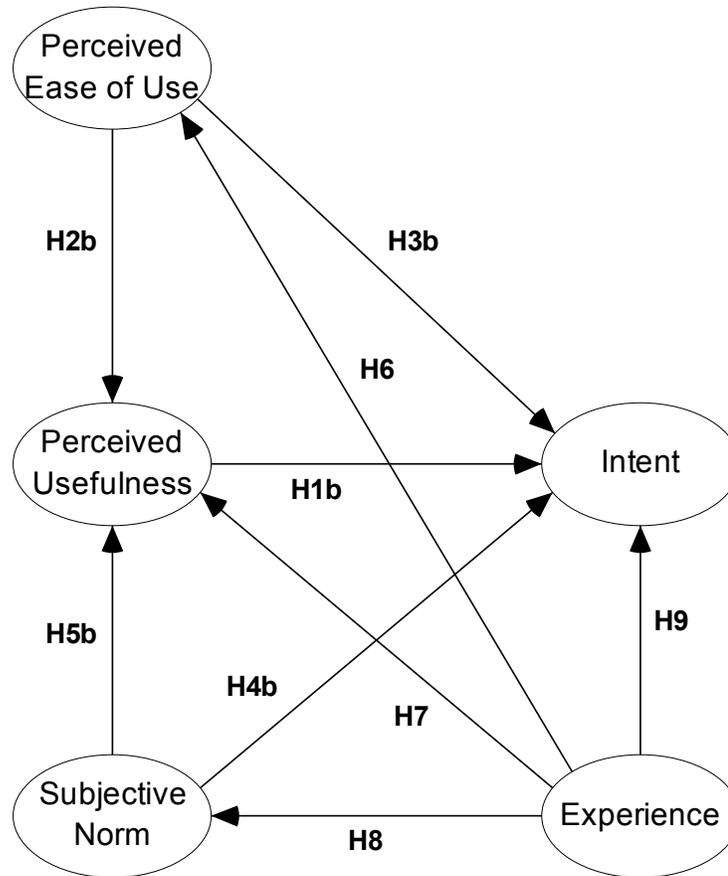


Figure 5: Model B (TAM plus experience) Hypotheses.

Four hypotheses are made with regard to the effect that prior exposure to similar technology will have on acceptance of online social networking systems. Hypotheses H6, H7, H8, and H9 refer to the effect of experience on ease of use, perceived usefulness, subjective norm, and intent to use, respectively. Figure 5 shows how these relationships augment the existing Technology Acceptance Model.

By comparing a respondent's ease of use with his or her level of experience we can determine the extent to which perceptions of ease of use relate to the user's past experience. In most cases, experienced users of any given technology rate it as being

easier to use than do less experienced users (Davis, 1989; Adams et al., 1992; Taylor and Todd, 1995; Venkatesh et al., 2003). I expect to find the same phenomenon at work in the present study. Specifically, I hypothesize that experience will relate to perceived ease of use directly. The model in Figure 5 indicates a path from Experience to Perceived Ease of Use.

H6: Experienced users will rate online social networking systems easier to use than will inexperienced users.

The same model includes a path from experience to perceived usefulness. It is unclear at this point whether familiarity with online social networking systems will result in increased perceptions of usefulness, but it is thought that users who have had the opportunity to evaluate the system will more likely rate the system as being useful than those who have not used it.

H7: Compared with inexperienced users, experienced users will perceive the social networking systems as being more useful.

With increased experience with a technology comes a better understanding of the social ramifications of its use. Users who are less experienced with a technology look to others to determine appropriate courses of action. According to the Technology Acceptance Model, Subjective Norm influences Intention to Use directly and also indirectly through perceived usefulness. Venkatesh and Davis (2000) found that users

employ a combination of direct experience and others' opinions to form behavioral intention and perceptions of usefulness. Users who lacked experience with the technology relied more heavily on the opinions of others when they made acceptance decisions. Thus, it is expected that the perception of social pressure is greater for inexperienced users.

H8: There is a negative, direct relationship between Experience and Social Norm.

If hypothesis H8 is supported, we will see a significant main effect between Experience and Subjective Norm in the model in Figure 5. Finally, as was found by Venkatesh and Davis (2000) and because past behavior is a very good predictor of future behavior, I expect that we will see a positive direct effect of Experience on Intent (hypothesis H9).

H9: More experienced users will indicate greater intent to use online social networking systems than those who are less experienced.

These nine hypotheses provide a framework to answer the two main questions in this study: First, can the Technology Acceptance Model explain the acceptance of technology such as online social networking—technology that is relationship oriented, rather than task oriented? Second, can we improve our understanding of technology acceptance if we examine the impact of prior experience with similar technology?

Table 1:

Hypothesis Summary Table

| | |
|------|--|
| H1a: | In model A, perceived usefulness is positively associated with intention to use online social networking systems. (PU → Intent) |
| H2a: | In model A, perceived ease of use is positively associated with perceived usefulness. (PEOU → PU) |
| H3a: | In model A, perceived ease of use is positively associated with intention to use online social networking systems. (PEOU → Intent) |
| H4a: | In model A, subjective norm is positively associated with intention to use social networking systems. (Subjective Norm → Intent) |
| H5a: | In model A, subjective norm is positively associated with perceived usefulness. (Subjective Norm → Perceived Usefulness) |
| H1b: | In model B, perceived usefulness is positively associated with intention to use online social networking systems. (PU → Intent) |
| H2b: | In model B, perceived ease of use is positively associated with perceived usefulness. (PEOU → PU) |
| H3b: | In model B, perceived ease of use is positively associated with intention to use online social networking systems. (PEOU → Intent) |
| H4b: | In model B, subjective norm is positively associated with intention to use social networking systems. (Subjective Norm → Intent) |
| H5b: | In model B, subjective norm is positively associated with perceived usefulness. (Subjective Norm → Perceived Usefulness) |
| H6: | In model B, experienced users rate online social networking systems easier to use than inexperienced users. (Experience → Perceived Ease of Use) |
| H7: | In model B, experience is positively associated with perceived usefulness. (Experience → Perceived Usefulness) |
| H8: | In model B, experience is negatively associated with subjective norm. (Experience → Subjective Norm) |
| H9: | In model B, experience is positively associated with intent to use online social networking systems (Experience → Intent) |

Chapter Two:

Method

Participants

Five hundred students from the Psychology Subject Pool at the University of South Florida participated in the study for partial course credit. These 87 men and 413 women ranged in age from 18 to 52 years old (median 20 years, $M=21.19$, $SD=4.34$). This sample represents an adequate sample size to ensure statistical power for the measurement model -- guidelines established by MacCallum, Browne, and Sugawara (1996), suggest running more than 195 participants in order to reach a power level of at least 0.80 for tests of close fit, not-close fit, and exact fit.

Measures

A social networking systems user experience questionnaire (Appendix B) was developed for this study. It consists of established measures of perceived ease of use, perceived usefulness, and subjective norm, plus questions about prior and intended future use of online social networking systems.

Perceived Ease of Use. Perceived Ease of Use refers to the degree to which the use of a technology is free of effort (Davis, 1989). Four questions were used to measure the amount of mental energy that is required to use the system and the degree of difficulty involved with understanding the technology. They were adapted from the perceived ease

of use scale ($\alpha = .86$) developed by Davis, Bagozzi, and Warshaw (1989). The questions in the current study were modified to apply specifically to social networking technology. Two examples from this scale are “Using social networking systems does not require a lot of mental effort” and “Social networking systems are easy to use.” The reliability for the modified scale was slightly lower than Davis et al.’s ($\alpha = .65$).

Perceived Usefulness. Perceived Usefulness is the perception that a given technology will help the user achieve his or her work goals. In this study, the user's work goal is increased academic performance. The four-question Perceived Usefulness measure ($\alpha=.87$) that was developed by Davis (1989) and has been used extensively (e.g. Venkatesh et al. 2003) was modified slightly for this study. The four questions ask the user to rate the usefulness of social networking systems in terms of improving grades, increasing productivity, and overall effectiveness in their academic work. For example: “Using social networking systems makes me more productive.” Manifest reliability ($\alpha=.85$) was similar to that obtained by Davis.

Subjective Norm. Subjective Norm refers to the influence that other people have on one’s behavior; it stems from an understanding of expected and appropriate behavior in a given situation. Subjective norm is "a person's perception that most people who are important to him think he should or should not perform the behavior in question" (Ajzen and Fishbein, 1975, p. 302). Two questions ask about the pressure to use technology that the user feels originates from people close to him or her. For example: “People who are important to me think I should use social networking systems” ($\alpha=.78$).

Intention to Use. Intention to use a technology is typically measured using items developed by Davis (1989). For each of five social networking technologies, users are asked to indicate the likelihood that they would access that system at least once in the next thirty days, using a five-point scale anchored at “not at all likely” and “definitely will.” As with the Experience scale, the internal consistency calculation of this scale ($\alpha=.31$) should be interpreted with caution as lack of internal consistency is a function of individual characteristics of the various systems, not just measurement error.

Experience. The Experience subscale is a measure of the amount of prior use of online social networking systems. Five questions asked how often the respondent used various social networking systems. For example, a respondent would respond to “How often have you used MySpace?” with “never”, “only once”, “sometimes”, “often”, or “all the time.” Internal consistency for this scale was somewhat low ($\alpha=.30$).

Procedure

Five hundred undergraduate students completed an online measure in exchange for extra credit in their psychology class. Each participant accessed a computerized testing system using login credentials that uniquely identified him or her and assigned participation credit. The student’s login information was not saved with his or her survey data. Prior to beginning the survey, each participant was provided informed consent and was given the option to withdraw from the study at any time without penalty or loss of credit. Following informed consent, participants were given a definition of social networking systems in general and read a description of a computerized social networking system as implemented in an academic setting (Appendix A). The 35-item

multiple-choice questionnaire took approximately 20 minutes to complete. At the conclusion of the study the participant was provided debriefing information including an assurance that the information he or she provided will remain confidential.

Table 2
Item Correlations

| | PU 1 | PU 2 | PU 3 | PU 4 | PEOU 1 | PEOU 2 | PEOU 3 | PEOU 4 | SN 1 | SN 2 | Use MS | Use FB | Use FR | Use XA | Use YA | Int MS | Int FB | Int FR | Int XA | Int YA | |
|-------|---------|---------|---------|---------|-----------|-----------|-----------|-----------|---------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--|
| PU1 | 1.00 | | | | | | | | | | | | | | | | | | | | |
| PU2 | .65** | 1.00 | | | | | | | | | | | | | | | | | | | |
| PU3 | .58** | .71** | 1.00 | | | | | | | | | | | | | | | | | | |
| PU4 | .59** | .55** | .54** | 1.00 | | | | | | | | | | | | | | | | | |
| PEOU1 | -.05 | -.05 | -.01 | .00 | 1.00 | | | | | | | | | | | | | | | | |
| PEOU2 | -.06 | -.13* | -.09* | -.07 | .18** | 1.00 | | | | | | | | | | | | | | | |
| PEOU3 | .07 | .01 | .03 | .00 | .30** | .33** | 1.00 | | | | | | | | | | | | | | |
| PEOU4 | -.07 | -.09* | -.07 | -.06 | .29** | .37** | .43** | 1.00 | | | | | | | | | | | | | |
| SN1 | .23* | .23** | .30** | .25** | -.01 | -.07 | .03 | -.06 | 1.00 | | | | | | | | | | | | |
| SN2 | .21* | .25** | .30** | .24** | .07 | .05 | .12** | .02 | .64** | 1.00 | | | | | | | | | | | |
| UseMS | .02 | -.02 | .02 | .03 | .24** | .11* | .21** | .19** | -.01 | .07 | 1.00 | | | | | | | | | | |
| UseFB | -.07 | -.07 | .01 | .00 | .24** | .21** | .28** | .25** | .02 | .10* | .32** | 1.00 | | | | | | | | | |
| UseFR | .05 | .12* | .13** | .08 | .03 | .01 | .04 | .02 | .03 | .05 | .02 | .04 | 1.00 | | | | | | | | |
| UseXA | -.06 | -.01 | -.06 | .02 | .03 | .01 | .05 | .10* | .04 | .04 | .13** | .14** | .14** | 1.00 | | | | | | | |
| UseYA | .06 | .07 | .05 | .06 | -.03 | -.03 | .04 | .00 | .00 | -.02 | -.07 | -.11* | .07 | .00 | 1.00 | | | | | | |
| IntMS | .05 | .05 | .06 | .07 | .21** | .13** | .17** | .16** | .05 | .10* | .82** | .24** | .05 | .13** | -.01 | 1.00 | | | | | |
| IntFB | -.04 | -.02 | .03 | .03 | .24** | .21** | .24** | .26** | .02 | .08 | .28** | .89** | .04 | .17** | -.05 | .29** | 1.00 | | | | |
| IntFR | .02 | .13* | .09 | .09* | .00 | -.08 | .03 | .02 | -.02 | .01 | -.03 | -.04 | .34** | .12** | .04 | .01 | -.02 | 1.00 | | | |
| IntXA | .03 | .05 | .07 | .02 | .00 | -.01 | .04 | .08 | .00 | -.01 | .00 | .01 | .12** | .50** | .05 | .05 | .08 | .43** | 1.00 | | |
| IntYA | .08 | .07 | .08 | .09* | -.02 | -.04 | .04 | .04 | -.05 | -.02 | -.07 | -.11* | .05 | .01 | .71** | .02 | -.07 | .29** | .20** | 1 | |

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Chapter Three:

Results

Data Integrity

The data collection system employed in this study reduced the occurrence of missing values in the dataset because users could not continue until they had entered a score for each item. Prior to beginning the analyses I inspected the data for outliers and out-of-range values, response inconsistencies, and item distribution imbalances. Of the 500 completed response sets, only one was removed from the dataset due to out-of-range age data. I inspected the dataset for patterns that would indicate error such as repeating patterns of responses or consistent overuse of a response choice. Table 3 shows the means and standard deviations for all study variables.

Table 3.

Item Means and Standard Deviations

| | Mean | Std. Dev. |
|-----------------------------|------|-----------|
| Experience using Facebook | 3.54 | 1.569 |
| Experience using MySpace | 3.55 | 1.432 |
| Experience using Friendster | 1.07 | 0.319 |
| Experience using Xanga | 1.34 | 0.695 |
| Experience using Yahoo 360 | 1.23 | 0.681 |
| Perceived Ease of Use 1 | 3.87 | 0.793 |
| Perceived Ease of Use 2 | 3.87 | 0.93 |
| Perceived Ease of Use 3 | 3.61 | 0.839 |
| Perceived Ease of Use 4 | 4.05 | 0.746 |
| Perceived Usefulness 1 | 2.24 | 0.835 |
| Perceived Usefulness 2 | 2.17 | 0.898 |
| Perceived Usefulness 3 | 2.43 | 0.916 |
| Perceived Usefulness 4 | 2.48 | 1.025 |
| Subjective Norm 1 | 2.57 | 0.934 |
| Subjective Norm 2 | 2.68 | 1.007 |
| Intention to use Facebook | 3.80 | 1.635 |
| Intention to use MySpace | 3.72 | 1.657 |
| Intention to use Friendster | 1.09 | 0.372 |
| Intention to use Xanga | 1.15 | 0.469 |
| Intention to use Yahoo360 | 1.29 | 0.806 |

Many of the fit indices and discrepancy functions that are used to evaluate structural equation models require certain assumptions of normality to be met. In reality, all discrepancy functions vary in their tolerance of non-normality, so it is important to know how our data are distributed prior to fitting our models. Table 4 lists the skew and kurtosis values for the subjective norm, perceived usefulness, and perceived ease of use scales. The Kolmogorov-Smirnov value obtained for each of these components indicates a significant departure from normality (either skew or kurtosis or both) at $p < .001$. In

addition to individual scales being non-normally distributed, there exists a significant amount of multivariate non-normality (joint multivariate kurtosis = 202.67; CR=76.38). The departure from normality that is reported in Table 4 is fairly typical of ordinal data. The asymptotically-distribution-free Weighted Least Squares (WLS) discrepancy function that is used in this study is relatively insensitive to this type of non-normality.

Table 4:
Normality Tests of Predictor Indicator Variables

| | Skewness (S.E.=0.11) | Kurtosis (S.E.=0.22) | Kolmogorov- Smirnov |
|-------------------------|-------------------------|-------------------------|------------------------|
| Perceived Ease of Use 1 | -0.79 | 1.24 | 0.33 [†] |
| Perceived Ease of Use 2 | -0.88 | 0.66 | 0.30 [†] |
| Perceived Ease of Use 3 | -0.50 | 0.29 [*] | 0.29 [†] |
| Perceived Ease of Use 4 | -0.89 | 1.75 | 0.31 [†] |
| Perceived Usefulness 1 | -0.04 [*] | -0.53 | 0.24 [†] |
| Perceived Usefulness 2 | 0.27 | -0.55 | 0.21 [†] |
| Perceived Usefulness 3 | 0.09 [*] | -0.51 | 0.21 [†] |
| Perceived Usefulness 4 | 0.18 [*] | -0.86 | 0.22 [†] |
| Subjective Norm 1 | -0.06 [*] | -0.60 | 0.24 [†] |
| Subjective Norm 2 | 0.02 [*] | -0.48 | 0.22 [†] |

* confidence interval includes zero.

[†] indicates significant non-normality (p<0.001).

Model A: Technology Acceptance Model

The Technology Acceptance Model appears to fit data from social networking system users very well. Figure 6 shows standardized β -weights and item loadings, paths significant at p<.05 are bold. The chi-square value ($\chi^2 = 136.15$, df=85) is significant

($p < .001$), but that is to be expected with this sample size ($n=499$). Other indices show good fit: The comparative fit index is high (.922), the Standardized Root Mean Square Residual is low (.057), and RMSEA indicates very good fit (.035). ECVI=.413 and CFI=.922. The model accounts for 42% of the variance associated with Intent ($R^2=.42$). This is consistent with the variance in Intent explained in two studies by Chau and Hu (2001, 2004) that found $R^2=.42$ and $R^2=.43$, respectively.

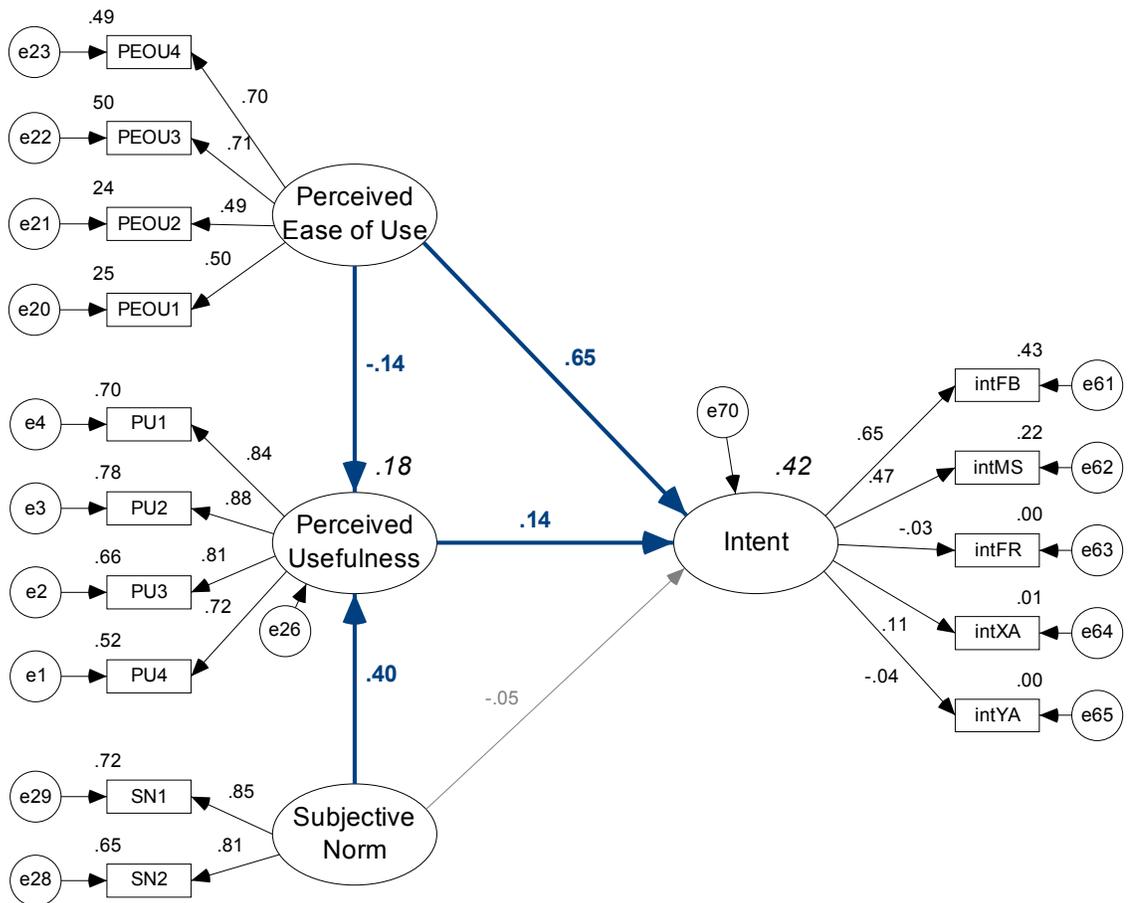


Figure 6: Model "A" Results.

Distribution Characteristics

The item loadings for Intent were unusual in this model, in terms of consistency of magnitude and direction of effect: Intent loaded positively onto intFB and intMS, but negatively onto intYA and intFR. As can be seen in figure 7, the distributions of Intent to use for MySpace and Facebook are slightly negatively skewed and bimodal (see Table 5), but their distributions are similar to each other, and otherwise relatively normal. The other three indicators of Intent are shown in figure 8.

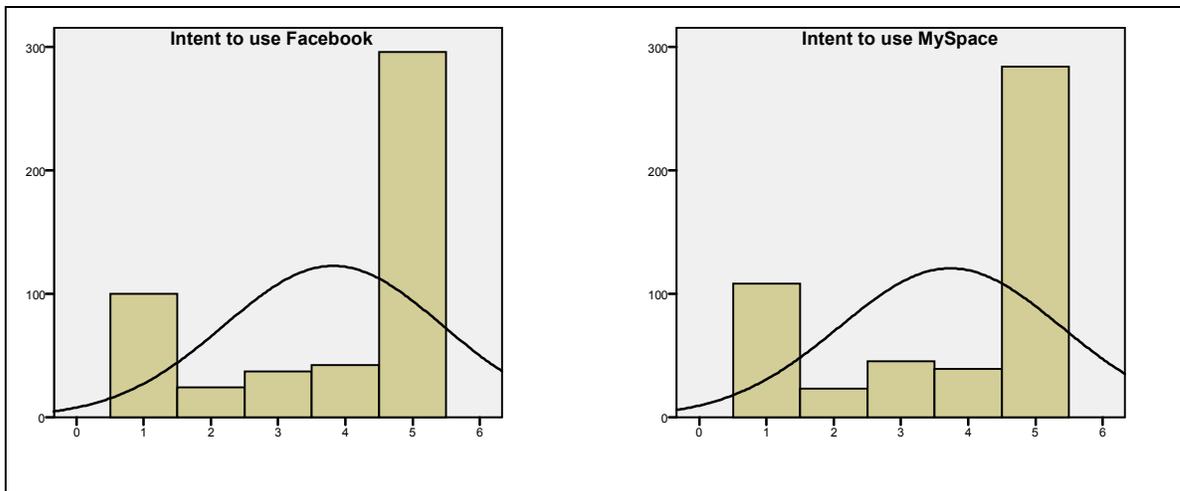


Figure 7: Distributions for Intent to use Facebook and MySpace.

It is clear from Figure 8 and Table 5 that the Friendster, Xanga, and Yahoo360 Intent variables are similar to each other but different from the MySpace and Facebook indicators of Intent in terms of skew magnitude and direction, kurtosis, and mean. I applied a series of transformations to these distributions as recommended by Tabachnick and Fidell (1996). Table 5 shows the resulting skew, and kurtosis statistics following logarithmic and square root transformations. Neither of the transformations produced a

clearly more normal distribution, and both increased skew for the two distributions that were most normal. Original values were retained and used to calculate model fit.

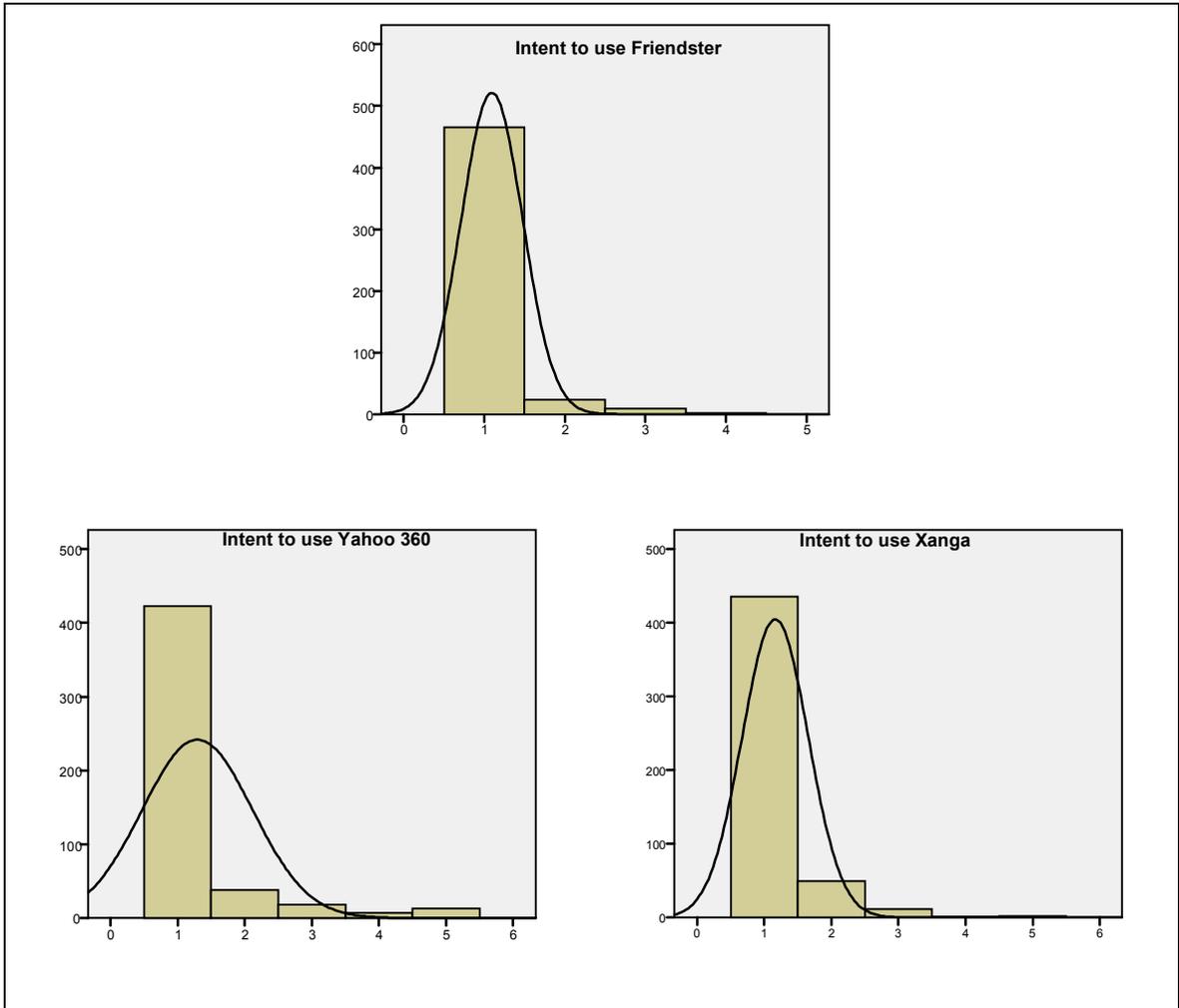


Figure 8: Distributions for Intent to use Friendster, Yahoo360, and Xanga

Table 5:

Normality Tests of Intention Variables

| | Skew (S.E.=0.11) | Kurtosis (S.E.=0.22) | Kolmogorov- Smirnov |
|--|---------------------|-------------------------|------------------------|
| <i>Observed Distribution</i> | | | |
| Intention to use Facebook | -0.91 | -0.92 | 0.39 † |
| Intention to use MySpace | -0.80 | -1.10 | 0.37 † |
| Intention to use Friendster | 4.64 | 23.48 | 0.53 † |
| Intention to use Xanga | 3.90 | 19.42 | 0.50 † |
| Intention to use Yahoo360 | 3.22 | 10.20 | 0.49 † |
| <i>Square root Transformation</i> | | | |
| Intention to use Facebook | -0.99 | -0.75 | 0.26 † |
| Intention to use MySpace | -0.88 | -0.95 | 0.22 † |
| Intention to use Friendster | 4.34 | 19.70 | 0.53 † |
| Intention to use Xanga | 3.36 | 13.15 | 0.45 † |
| Intention to use Yahoo360 | 2.93 | 8.13 | 0.51 † |
| <i>Logarithmic Transformation</i> | | | |
| Intention to use Facebook | -1.08 | -0.58 | 0.37 † |
| Intention to use MySpace | -0.97 | -0.80 | 0.36 † |
| Intention to use Friendster | 4.10 | 16.92 | 0.53 † |
| Intention to use Xanga | 2.99 | 9.31 | 0.51 † |
| Intention to use Yahoo360 | 2.68 | 6.42 | 0.50 † |
| * confidence interval includes zero. | | | |
| † indicates significant non-normality (p<0.001). | | | |

Hypothesis H1: Perceived Usefulness → Intent

The Technology Acceptance Model posits that a user's perception of the utility of a technology impacts whether or not he or she intends to use it. Thus, I expected to see a

positive, direct effect of Perceived Usefulness on Intent. There is some support for Hypothesis H1 in model A ($\beta = .14$, $t=1.99$, $p=.046$). This small effect suggests that the potential user's evaluation of the usefulness of the technology impacts whether or not he intends to use it.

Hypothesis H2a: Perceived Ease of Use \rightarrow Perceived Usefulness

I hypothesized that ease of use has a direct effect on perceived usefulness because easier-to-use technologies are seen as being more useful. Thus, I expected to find a positive, direct effect of Perceived Ease of Use on Perceived Usefulness. In reality, I found a significant *negative* causal relationship of ease of use on usefulness ($\beta = -.14$, $t=2.6$). In other words, respondents in this study said that online social networking systems are more useful if they are more difficult to use. Another way to describe this finding is that respondents found easy-to-use technologies to be of little use. This might signal that users might judge easier-to-use systems as lacking the more complex features that make the system useful. This finding is in contrast to prior studies and is not consistent with hypothesis H3.

Hypothesis H3a: Perceived Ease of Use \rightarrow Intent

I hypothesized that if a given technology is easy to use it is associated with greater intent to use it. Thus, I expected to find a significant, positive, direct effect of Perceived Ease of Use on Intent. As can be seen in Figure 6, there was in fact a significant, positive effect of perceived ease of use on intent to use online social networking systems. ($\beta = .65$, $t=6.91$). Hypothesis H2 is supported.

Hypothesis H4a: Subjective Norm → Intent

In this study I expected to find greater intention to use the system among users who perceive a great deal of social pressure to use online social networking technology. This was not the case, there was no statistically-significant effect of subjective norm on intent ($\beta = -.05$, $t = 0.72$). Hypothesis H4a is not supported.

Hypothesis H5a: Subjective Norm → Perceived Usefulness

I hypothesized that subjective norm would also affect perceived usefulness, such that increased social pressure to use social networking systems would be associated with an increased perception of the technology's usefulness. Since a worker's perception of the usefulness of a tool or technology is largely dependent on the way that technology is perceived by his or her coworkers, I expected to see a positive relationship between subjective norm and perceived usefulness (Hypothesis H5). This hypothesis was supported ($\beta = .40$, $t = 7.65$): Increased social pressure to use the technology is associated with increased perceptions of its usefulness.

Model B: TAM plus experience.

This study sought to expand the application of the Technology Acceptance Model to a new technology, and to attempt to increase the explanatory power of the model by accounting for prior experience with similar technology. Figure 9 shows the results of fitting the TAM-plus-experience model to the social networking system data that was collected in this study. According to established guidelines, the fit is moderate at best ($\chi^2 = 661.186$, $df = 161$; $SRMR = 0.57$; $RMSEA = .079$, $CFI = .813$). This model can be

compared with “Model A” using the χ^2 likelihood ratio (Pedhazur, 1997). Subtracting Model B values from Model A values leaves $\chi^2_{\text{diff}} = (661.19 - 136.15) = 525.04$. Since this is less than $\chi^2_{\text{crit}(76)} = 107.6$ the difference between the two models is statistically significant. To put it another way, Model A fits the data significantly better than model B. The Expected Cross-validation Index (ECVI) obtained from model B ($\text{ECVI}_{\text{Model.B}} = 1.527$) was much higher (less favorable) than the value obtained from model A ($\text{ECVI}_{\text{Model.A}} = 0.413$), owing in part to increased in model complexity without improved fit.

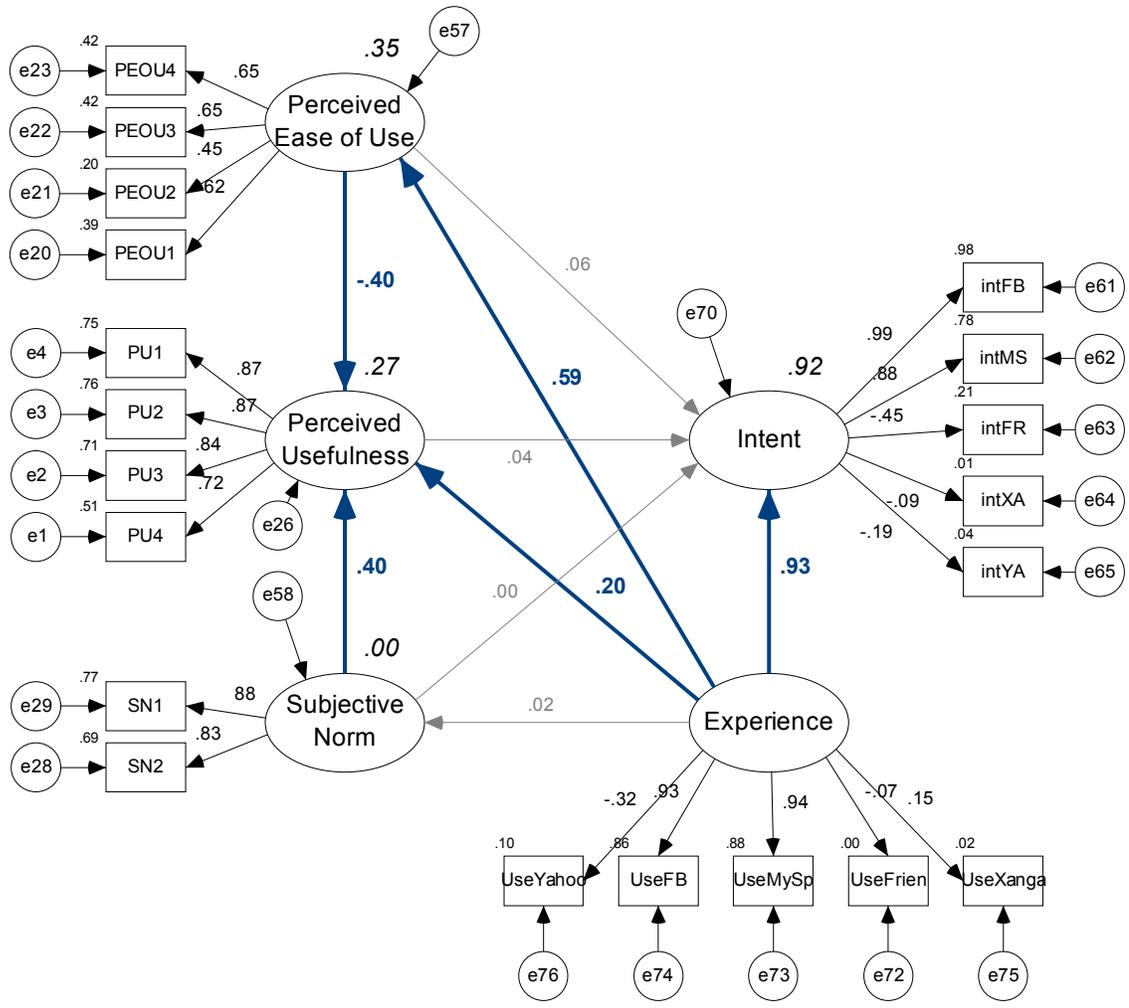


Figure 9: Model “B” Results.

A check was made to see if there might be a suppressor variable affecting the observed lack of relationship between perceived ease of use and Intent in model B. In a separate analysis I fixed the effect of perceived ease of use on intent at zero. If a suppressor was at work I expected to see a sizable change in the effect that perceived ease of use had on perceived usefulness. The observed change was from -0.40 to -0.39 , and the

effect of perceived usefulness in intent changed from .04 to .02, both non-significant changes.

Distribution Characteristics

When Model B was fit to the data, the indicators for the latent variable *Experience* showed inconsistent factor loadings similar to what was observed with the indicators of *Intent*. I looked at the distributions individually and found a similar pattern of non-normal distributions (see figure 10). The distributions of responses to questions of experience with MySpace and Facebook were similar to each other and nearly normal (though again slightly negatively skewed, see Table 6).

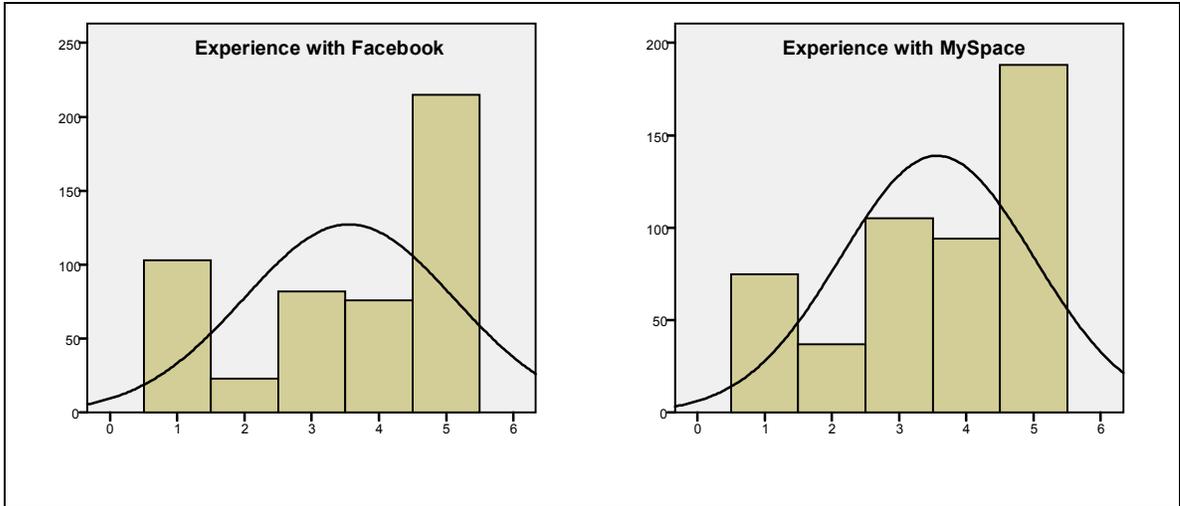


Figure 10. Distributions of Experience with Facebook and MySpace.

The distributions for Experience with Friendster, Xanga, and Yahoo360 are decidedly not non-normal (Figure 11 and Table 6). As before, I conducted square root and logarithmic transformations to these distributions. These transformations did not normalize the distributions.

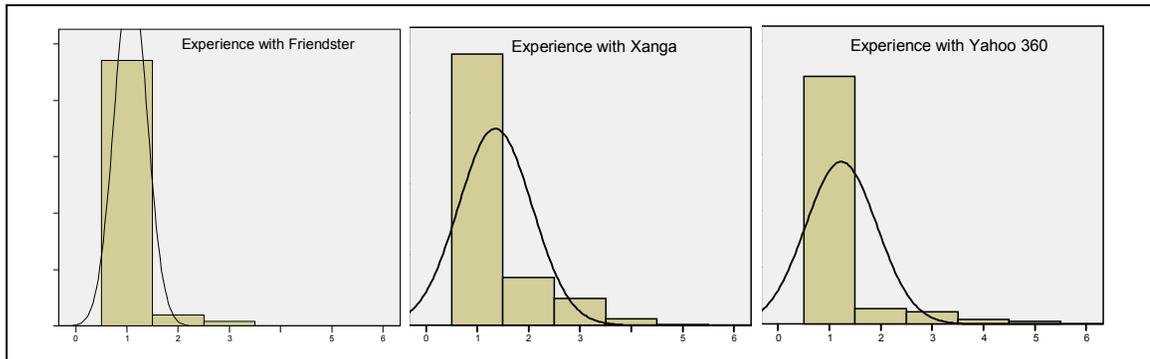


Figure 11: Distributions for Experience with Friendster, Xanga, and Yahoo360.

Table 6:

Normality tests of Experience Variables

| | Skewness (S.E.=0.11) | Kurtosis (S.E.=0.22) | Kolmogorov- Smirnov |
|-----------------------------------|-------------------------|-------------------------|------------------------|
| <i>Observed Distribution</i> | | | |
| Experience using MySpace | -0.60 | -0.95 | 0.23 † |
| Experience using Facebook | -0.61 | -1.16 | 0.27 † |
| Experience using Friendster | 4.72 | 22.87 | 0.53 † |
| Experience using Xanga | 2.13 | 4.08 | 0.45 † |
| Experience using Yahoo 360 | 3.40 | 11.85 | 0.50 † |
| <i>Square-root Transformation</i> | | | |
| Experience using MySpace | 0.31 | -1.70 | 0.28 † |
| Experience using Facebook | 0.12 * | -1.83 | 0.32 † |
| Experience using Friendster | 6.26 | 41.20 | 0.52 † |
| Experience using Xanga | 7.33 | 79.33 | 0.38 † |
| Experience using Yahoo 360 | 7.41 | 60.19 | 0.45 † |
| <i>Logarithmic Transformation</i> | | | |
| Experience using MySpace | -0.80 | -0.64 | 0.37 † |
| Experience using Facebook | -0.76 | -0.97 | 0.38 † |
| Experience using Friendster | 4.53 | 20.67 | 0.53 † |
| Experience using Xanga | 1.92 | 2.77 | 0.51 † |
| Experience using Yahoo 360 | 3.12 | 9.38 | 0.49 † |

* confidence interval includes zero.

† indicates significant non-normality ($p < 0.001$).

Hypothesis H1b: Perceived Usefulness → Intent

I hypothesized that perceived usefulness would have a positive effect on intent to use social networking systems. That hypothesis was not supported ($\beta = .04$, $t = 1.64$). One

possible explanation for this finding (in both models) is that the value of social networking in general is not always recognized, and rarely is it standardized. Thus, perceptions of the usefulness of an online social networking system depends to a certain degree on the rater's evaluation of the usefulness of social interaction in general. This interference would be seen to a lesser extent with the technologies that have more established criteria for successful use.

Hypothesis H2b: Perceived Ease of Use → Perceived Usefulness

I expected to find a positive relationship between perceived ease of use and perceived usefulness, meaning that users are likely to view a given technology as more useful only if they thought using it would be relatively free of effort. In this study I found the opposite. Perceived ease of use was inversely associated with perceived usefulness ($\beta = -.40$, $t = 4.93$). The more difficult the system was to use, the more useful it was perceived to be. It may be that easier-to-use systems do not have the features needed to be useful to the user. Hypothesis H8 was not supported.

Hypothesis H3b: Perceived Ease of Use → Intent

I expected to find a positive effect of ease of use on intent, such that easy-to-use technology was associated with greater intent to use it. In fact I found no significant relationship between ease of use and intent ($\beta = .06$, $t = 1.63$). Hypothesis H7 is not supported.

Hypothesis H4b: Subjective Norm → Intent

I hypothesized a positive relationship between subjective norm and intent to use social networking systems. Specifically, I thought potential users are more likely to adopt

a new technology if there exists a climate of acceptance. Instead, I found no significant effect at all ($\beta=.00$, $t=0.20$). Hypothesis H9 is not supported.

Hypothesis H5b: Subjective Norm \rightarrow Perceived Usefulness

I hypothesized a significant positive effect of subjective norm on perceived usefulness. That is, people who report social pressure to use the technology are likely to find it useful. Hypothesis H10 was supported ($\beta=.40$, $t=8.82$).

Hypothesis H6: Experience \rightarrow Perceived Ease of Use

Hypothesis H6 states that users who are experienced with similar technology will rate online social networking systems as being easier to use. Thus, I expected a positive, direct effect of experience on perceived ease of use. This was in fact the case ($\beta = .59$, $p<.01$). Experienced users are more likely to report that the system was easy to use. Hypothesis H6 is supported.

Hypothesis H7: Experience \rightarrow Perceived Usefulness

Potential users who are not familiar with the system, that is, users who are inexperienced, usually do not know whether or not the system is of value to them until they have tried it. Thus, experienced users of a system may or may not find it valuable, but inexperienced users certainly will not have found a system they have not used to be of value. Therefore it is expected that in the long run, the value ratings of experienced users is higher than those from inexperienced raters for any given technology. Further, given that this is a voluntary-use environment, it is likely that users who have used online social networking systems a great deal continue using them because they have found them to be useful. Thus, according to hypothesis H7 I expected to find a positive, direct relationship

between experience and perceived usefulness. I found support for this hypothesis ($\beta = .20$, $p < .01$). Experienced users are more likely to rate online social networking systems as useful.

Hypothesis H8: Experience \rightarrow Subjective Norm

Users are more likely to judge the system as useful when there is a social climate conducive to making that judgment. This feeling of social pressure depends to some extent on the amount of experience a user has with the technology. That is, if a user is experienced with social networking systems, they is influenced less by social forces. Thus, I expected perception of subjective norms to depend on level of experience, such that experienced users are less likely to report social pressure to use online social networking systems. This would manifest as a direct, negative relationship between experience and subjective norm in our analysis. Such a relationship was not found ($\beta = .02$, $p > .05$). Hypothesis H8 was not supported.

Hypothesis H9: Experience \rightarrow Intent

I hypothesized that there is a direct, positive effect of experience on intention to use social networking technology. Those who have used the systems in the past have the means and knowledge to do it again, and are more likely to do so. I did in fact find support for this hypothesis ($\beta = .93$, $t = 31.70$). Hypothesis H9 was supported by the data, and is consistent with prior studies of the Technology Acceptance Model (and established behavioral principles), but the obtained effect size suggests the potential existence of multicollinearity between Experience and Intent is a possibility that should be ruled out if this study is replicated.

Table 7.
Direct, Indirect, and Total Effects

| | Experience | | | Subjective Norm | | | Perceived Ease of Use | | | Perceived Usefulness | | | Intent | | |
|-----------|------------|----------|-------|-----------------|----------|-------|-----------------------|----------|-------|----------------------|----------|-------|--------|----------|-------|
| | Direct | Indirect | Total | Direct | Indirect | Total | Direct | Indirect | Total | Direct | Indirect | Total | Direct | Indirect | Total |
| Subj Norm | 02 | 00 | 02 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| PEOU | 60 | 00 | 60 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| PU | 20 | -23 | -03 | 40 | 00 | 40 | -40 | 00 | -40 | 00 | 00 | 00 | 00 | 00 | 00 |
| Intent | 93 | 03 | 96 | 00 | 02 | 01 | 06 | -02 | 04 | 04 | 00 | 04 | 00 | 00 | 00 |
| intFB | 00 | 95 | 95 | 00 | 01 | 01 | 00 | 04 | 04 | 00 | 04 | 04 | 99 | 00 | 99 |
| intYA | 00 | -19 | -19 | 00 | 00 | 00 | 00 | -01 | -01 | 00 | -01 | -01 | -19 | 00 | -19 |
| intMS | 00 | 85 | 85 | 00 | 01 | 01 | 00 | 04 | 04 | 00 | 04 | 04 | 88 | 00 | 88 |
| intFR | 00 | -43 | -43 | 00 | -01 | -01 | 00 | -02 | -02 | 00 | -02 | -02 | -45 | 00 | -45 |
| intXA | 00 | -09 | -09 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | -09 | 00 | -09 |
| UseYahoo | -32 | 00 | -32 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| UseXanga | 15 | 00 | 15 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| UseFB | 93 | 00 | 93 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| UseMySp | 94 | 00 | 94 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| UseFrien | -07 | 00 | -07 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| SN1 | 00 | 02 | 02 | 88 | 00 | 88 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| SN2 | 00 | 02 | 02 | 83 | 00 | 83 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| PEOU1 | 00 | 37 | 37 | 00 | 00 | 00 | 62 | 00 | 62 | 00 | 00 | 00 | 00 | 00 | 00 |
| PEOU2 | 00 | 27 | 27 | 00 | 00 | 00 | 45 | 00 | 45 | 00 | 00 | 00 | 00 | 00 | 00 |
| PEOU3 | 00 | 38 | 38 | 00 | 00 | 00 | 65 | 00 | 65 | 00 | 00 | 00 | 00 | 00 | 00 |
| PEOU4 | 00 | 39 | 39 | 00 | 00 | 00 | 65 | 00 | 65 | 00 | 00 | 00 | 00 | 00 | 00 |
| PU1 | 00 | -02 | -02 | 00 | 35 | 35 | 00 | -35 | -35 | 87 | 00 | 87 | 00 | 00 | 00 |
| PU2 | 00 | -02 | -02 | 00 | 35 | 35 | 00 | -35 | -35 | 87 | 00 | 87 | 00 | 00 | 00 |
| PU3 | 00 | -02 | -02 | 00 | 34 | 34 | 00 | -34 | -34 | 84 | 00 | 84 | 00 | 00 | 00 |
| PU4 | 00 | -02 | -02 | 00 | 29 | 29 | 00 | -29 | -29 | 72 | 00 | 72 | 00 | 00 | 00 |

Table 8
Hypothesis Summary Table

| Hypothesis | Supported? |
|---|---------------------|
| H1: Perceived usefulness is positively associated with intention to use online social networking systems. (PU → Intent) | Yes in A No in B |
| H2: Perceived ease of use is positively associated with perceived usefulness. (PEOU → PU) | No* |
| H3: Perceived ease of use is positively associated with intention to use online social networking systems. (PEOU → Intent) | Yes in A No in B |
| H4: Subjective norm is positively associated with intention to use social networking systems. (Subjective Norm → Intent) | No |
| H5: Subjective norm is positively associated with perceived usefulness. (Subjective Norm → Perceived Usefulness) | Yes in A No in B |
| H6: Experience is positively associated with perceived ease of use. (Experience → Perceived Ease of Use) | Yes |
| H7: Experience is positively associated with perceived usefulness. (Experience → Perceived Usefulness) | Yes |
| H8: Experience is negatively associated with subjective norm. (Experience → Subjective Norm) | No |
| H9: Experience is positively associated with intent to use online social networking systems (Experience → Intent) | Yes |

*This relationship was significant in both models, but in the non-hypothesized direction.

Chapter Four:

Discussion

There are two primary research questions addressed in this study. First I wanted to know if the Technology Acceptance Model explains online social networking technology. Second to this, I wanted to know if the model fit was better if I accounted for the user's past experience with the same or similar technology. The study was successful in that it allows some light to be shed on both questions.

Summary of Findings: Model A

To test model fit in this study we used a discrepancy function that was less likely to be biased by non-normal distributions because we found significant skew and kurtosis in our Intent scale. Care should be taken in the interpretation of these data to the extent that further comparisons assume parametric techniques have been used. The Technology Acceptance Model (figure 4) fit the data from our sample very well. This lends support to the use of the model to explain and predict acceptance of social technologies. The only path in the model that was not significant was the relationship between subjective norm and Intent ($\beta=-0.05$, Hypothesis H4). This is counter-intuitive from a theoretical point of view given the social nature of the technology, but is likely a result of the lack of a standard workplace environment for all respondents. The Subjective Norm component of

the Technology Acceptance Model is intended to capture the potential adopter's feeling of what his or her peers think he "should" do, which is usually the result of his "feel" for the norms of the workplace. The respondents to this survey represented a wider scope of social settings than would a sample of workers from a single organization

In model A I found a significant negative effect of ease of use on perceived usefulness. This was counter to what I expected to find with this relationship. In general, people rate difficult-to-use systems as less useful, and past research has shown a positive relationship between ease of use and usefulness. Although this effect was modest ($\beta = -.14$), it was clearly not consistent with past research. I believe two factors are at play: First, the sample is homogenous in terms of computer literacy and use—71% reported using online social networking systems "often" or "all the time." It is also possible that "easy to use" was interpreted as "doesn't have enough features" by some. Second, users were asked to rate the usefulness of these systems for their academic performance. There is a lot of variation in that job title, and answering the question requires each user to determine the criteria of academic success. To the extent that the respondents to this survey disagree about the criteria that lead to academic success, perceived usefulness is less accurately measured in this population than it would be in an organization that has more established performance criteria.

Summary of Findings: Model B

In model B I proposed an augmented version of the Technology Acceptance Model. One limitation of the Technology Acceptance Model is that it doesn't account for the effect of the experience that users have when presented with the technology. In

essence, the model assumes that each technology under review is completely novel to the users. In reality, this is rarely the case because new technologies are built on established technologies, with which employees are familiar to varying degrees. The question is rarely “who will accept this brand new technology?” but rather “who will accept this modification to an existing technology?” When investigating social networking systems this is particularly relevant due to the overlap between professional and personal use of the technology.

I found that past experience accounted for virtually all the variance in intent to use social networking systems. This was largely a result of the way intent and experience are measured in this study. I would expect a high correlation between past usage behavior and future behavior in any situation, but in the absence of intervention there is good reason to believe that users’ assessment of what they “intend to do” is very similar to what they “have done.” The experience questions, as operationalized, did not assess constructs that are sufficiently different from the intent questions to make them useful as a predictor. Future research should revise these such that they look at Internet socialization and familiarization concepts that are distinct from a binary use/haven’t used format such as was assessed in the intent questions.

Some interesting findings came from Model B in terms of the effect experience has on perceived ease of use and perceived usefulness. I found support for the theory that users who are more experienced with these types of systems find them easier to use. They also found them to be more useful, which suggests that there is a minimum amount of exposure to a new technology that is required before ratings of usefulness can be valid.

The negative relationship between ease of use and usefulness that I found in Model A was replicated in Model B, but the effect was much stronger when Experience was factored out. This suggests that the relationship between ease of use and perceived usefulness is partially mediated by the user's experience with other similar technologies. This finding is meaningful to the extent that experience is distinct from intent, so its interpretation is limited with the current data but it is a relationship that is worth investigating in future studies.

Subjective Norm does not affect intent, regardless of experience level. This is consistent with Venkatesh and Davis's (2000) finding that subjective norm affects intent only when the use of the technology is mandatory, and then only for low-experienced users. Our hypothesis that subjective norm would affect perceived usefulness was supported in both models, with virtually identical effect sizes. Venkatesh and Davis and others reported experience moderating the effect of Subjective Norm on Perceived Usefulness. I did not replicate this finding, but I had different conceptualization and operationalization of Experience: Venkatesh and Davis used a three-point scale that indicated the number of times the user had been exposed to the new technology, whereas ours was a self-report of frequency of use of multiple social networking systems.

The voluntary nature of social networking systems is an issue that is relevant to the study of its acceptance. The Technology Acceptance Model has been used to understand both voluntary and mandatory-use technologies, but rarely is there so much overlap between work- and non-work use than when technology is used to socialize. Many work-related technologies are designed to accomplish a single task, the purpose of

which is known and agreed-upon. The motivations for the use of online social networking systems, however, depend to a certain extent on the objective of the user. Further, the protocols and usage standards associated with system use are not universally agreed-upon as they often are with technologies that are designed to accomplish a finite task. When the technology being studied can be given in a controlled environment many of the challenges of this study can be mitigated. Criteria for effective use of the technology can be established, experience can be measured over time, and compliance can be ensured. The challenge of the current study was to use an established tool to learn about a completely voluntary use of a new technology to help accomplish a goal that is somewhat user-specific. The motivating factors associated with social networking system use are a function of individual differences to a greater extent than are most of the technologies that have previously been examined with technology acceptance models.

Online social networking technology is fundamentally different from the non-social technologies to which the technology acceptance model has previously been applied, because a system that facilitates interaction must be much more flexible to account for individual requirements, objectives, personalities, and preferences. Within the context of a system that facilitates social interaction, “social norm” takes on a meaning that is different than those of other technologies. Thorbjørnsen, Pedersen, and Nysveen (2007) suggest that in acceptance models of social technologies, intent to use the system is influenced by notions of social *identity* rather than social *norms*. In a study of Multimedia Messaging System (MMS) use they found that subjective norm was

completely mediated by social identity expressiveness. This is consistent with our no-effect finding of subjective norm on intent.

The hypothesis that stemmed from the idea that technologies that are easy to use are perceived to be more useful was not supported. In fact, this study presents evidence that there might be a small negative relationship for this technology. This is worth investigating further. Of particular importance is to determine whether this finding, if replicated, is a result of a technology difference (social vs. traditional technology), or a sample difference (young and Internet savvy vs. not). A recent study by To, Liang, Chiang, Shih, and Chang (2008) suggests it might be both. Their study of Instant Messaging technology use in Taiwanese corporations found a non-significant relationship between ease of use and usefulness in the workplace. They also found that perceived ease of use was not associated with intent. It is worth noting that the technology they used was a communications system, not a networking technology, but it was similar to social networking systems in the way it established psychological presence, and allowed for limited asynchronous communication. It is likely the case that as in the current study, the technology they used was too easy to use for the perceived ease of use construct to be relevant.

Theoretical Impact

In several important ways, online social networking systems are very different from technologies that have thus far been used in the study of technology acceptance. The model has with few exceptions been used to explain task-based technologies that could be easily quantified. Applying the model to interpersonal relationships and

situations that do not have associated usage metrics requires a certain amount of revalidation of the model. The results of this study suggest that there is value in using the Technology Acceptance Model for social phenomenon, but there is also room for improvement.

Despite some complications arising from measuring intent, model A (The Technology Acceptance Model) predicts Intent to use online social networking systems very well. This supports the use of traditional technology acceptance models to predict social technologies, and suggests that at least from an acceptance measurement standpoint, social networking is not dissimilar from other tasks that require technology at work. One reason these data might not produce as large an effect as other studies has to do with the inherent social nature of the technology and the value placed on social interaction in general.

Limitations

Several factors limit the findings of this study. First, the sample recruited for the study was relatively homogenous in terms of age and computer experience. Second, all the participants were given information about the purpose of the study prior to their participation, so the sample consisted of people who are comfortable with answering questions about social networking technology. Research by King and He (2006) shows that students can serve as surrogates for professional users with regard to the study of technology acceptance, but Sun and Zhang (2006) argue that studies that are based on student samples overestimate the predictability of the Technology Acceptance Model. Their primary concern is that laboratory studies are consistently better at predicting

technology acceptance than are field studies, even when studying the same technology. The discrepancy might mean that different factors influence technology acceptance in field versus organizational settings, or it might simply be a result of the increased control that is possible with lab studies.

There are some methodological issues associated with the scale that I used in this study that limit generalizing. For example, in the case of subjective norm, I used the two-item scale that was used in the majority of the Technology Acceptance Model studies, but the measure would have been improved with more items in this scale. Also, an objective assessment of technology “use” and “intention” is difficult to make using self-report, but a more conceptually different set of questions for intent and experience would have helped eliminate the possibility of multicollinearity among the predictors. “Experience” was conceptualized as the user’s level of familiarity with social networking systems in general, but was operationalized as the breadth of prior experience the respondent had with five specific social networking systems. There was not a good way to combine these five into an overall measure of experience with social networking systems that accounted for the breadth of experience across systems and depth of experience within one technology.

The attenuated effect of perceived ease of use on intent that we observed in model B is likely a result of incomplete independence of the experience and intent variables. Even if users were able to carefully distinguish between intent (future behavior) and experience (past behavior), the questions in these two scales are structurally very similar, which has likely introduced some common-method error.

Future Research

Future research should focus on revising the “experience” measure to include a wider set of experiences, and include experiences that are similar but distinct from Intent to use online social networking systems. Future studies should use a broader measure of subjective norm, and should consider using a measure of social identity as suggested by Thorbjørnsen et al. A better description of the “outcome” of using online social networking systems is needed to have a more meaningful understanding of perceived usefulness. Attempts should be made to reduce or eliminate common method bias, perhaps using a multi-trait/multi-method technique to assess use and intent. Finally, because any social activity is very dependent on individual characteristics, more demographic information and personality data might inform researchers of user characteristics that are important in understanding online social networking system adoption.

It is worth further research to determine the effect that prior experience has on acceptance decisions. The Technology Acceptance Model is fundamentally a voluntary model, so prior experience is tantamount to prior acceptance. The interesting research questions are going to come from looking at the intersection of “voluntary” and “optional.” That is, what factors are inherent in the technology or integral to the individual are directing behavior toward or away from the use of these systems? A measure of experience will have to be developed that will assess the different types of prior experience to determine which of them are predictive of interesting behavior. For example, are certain types of usage patterns associated with an ability or propensity for

creating new contacts versus keeping in touch with existing friends? The variance in Experience will only get larger as new people enter the workplace and are exposed to new types of technology that will let them do a wider variety of tasks in an ever-changing set of situations. Experience, then, is very much a moving target whose context-specificity must not be taken for granted.

Conclusion

This study used the Technology Acceptance Model to explain the acceptance of online social networking technologies as used for academic achievement. Prior studies of the Technology Acceptance Model have shown it to work well with technologies that are task-based, but this study shows that it is appropriate to use it to predict the acceptance of technologies that are relationship-focused. Several issues were identified with respect to the way subjective norm affects the acceptance of social technologies; it is suggested that the sources of subjective norm be carefully evaluated, as social influence to use this type of technology often extends beyond the scope of a single workplace. Finally, the Experience component appears to be an important addition to Technology Acceptance Model when studying online social networking systems because many users will have used them prior to the system “introduction.” Many opportunities exist for future research to determine the applicability of existing models of technology acceptance to social technologies.

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Appendices

Appendix A: Technology Acceptance Model Scale Items

| | ----- ----- ----- ----- | | | |
|----------|--|------------------------------|-------------------------------|-------------------|
| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree |
| | | | | Strongly Agree |
| Variable | Item Text | Factor | | |
| PEOU1 | My objective for using the system is clear and understandable | Perceived Ease of Use* | | |
| PEOU2 | Using the system does not require a lot of mental effort | | | |
| PEOU3 | It is easy to get the system to do what I want it to do | | | |
| PEOU4 | The system is easy to use | | | |
| PU1 | Using social networking systems improves my grades | Perceived Usefulness* | | |
| PU2 | Using social networking systems make me more productive | | | |
| PU3 | Using social networking systems makes me more effective at | | | |
| PU4 | I find social networking systems to be useful for schoolwork | | | |
| SN1 | People who influence my behavior think I should use the system | Subjective Norm† | | |
| SN2 | People who are important to me think I should use the system | | | |
| BI1 | Assuming I had access to the system, I intend to use it | Intent to Use‡ | | |
| BI2 | Given that I have access to the system, I predict that I would use | | | |

*Davis (1989), Davis, Bagozzi & Warshaw (1989), Venkatesh & Morris, (2000).

†Ajzen & Fishbein (1975), Taylor & Todd (1995); ‡Davis (1989)

Appendix B: Social Networking Systems Experience Scale

Directions to Participant:

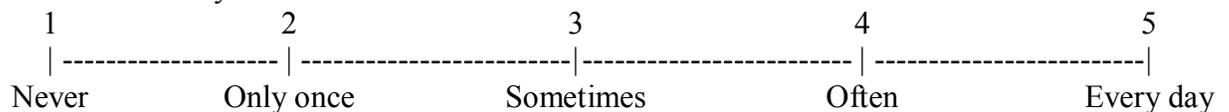
This survey looks at how people use online social networking systems, and takes about 15 minutes to complete. First I will explain what I mean by online social networking systems, and then I'll ask you about your use of the systems for academic purposes.

Online social networking systems allow users to connect with each other through online profiles. The defining characteristic of online social networking sites is that they allow users to establish an online presence (profile), and let them make connections with other users by linking to their profile. These connections are then viewable by others. MySpace and Facebook are both examples of personal social networking systems.

For this study, use what you know about social networking systems to answer questions about how you use them (or might use them) to accomplish your academic goals.

Experience Items:

- How often have you used Facebook?
- How often have you used MySpace?
- How often have you used Friendster?
- How often have you used Xanga?
- How often have you used Yahoo 360?



Intention to Use items:

- In the next 60 days, how likely are you to use Facebook?
- In the next 60 days, how likely are you to use MySpace?
- In the next 60 days, how likely are you to use Friendster?
- In the next 60 days, how likely are you to use Xanga?

About the Author

Timothy Willis earned the Bachelor of Science degree in Psychology from Texas A&M University in 1999 and the Master of Arts degree from the University of South Florida in 2003. He now resides in Washington, DC.