

Examining Factors that Influence Student Effort of Learning and Using Class-Related IT: The Tam Approach

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ABSTRACT

This paper examines factors that influence student learning effort and usage of class-related technologies (e.g., software packages) using the technology acceptance model (TAM) as the basis for the research framework. The TAM models have been employed in voluntary and mandatory settings. In a voluntary setting, where the use of technology is optional, behavior intention was the main factor in predicting usage. On the other hand, attitude was the main variable in predicting usage in the mandatory settings where usage is required. Therefore, it is important for instructors to recognize this fact to help students in learning and using the required software. The attitudes of students toward software packages will determine the level of learning effort and usage. The research framework extends the original TAM model by considering external variables such as training (hands on), experience, students' testimonials, subjective norm, career relevance, and design and content that impact perceived usefulness and perceived ease of use which in turn effect the attitude toward learning and using required software packages.

INTRODUCTION

Information technology (IT) has been employed and utilized in the educational system. However, it is still a challenge for instructors to make their students utilize such technologies to their full capabilities. Most of the time students are motivated by the short-term benefits and deal with learning and using IT on a course-by-course basis. As many instructors require the usage of certain software packages, many students do not utilize and exert the effort in learning such software on their own since they feel that it is required (imposed). It is essential for instructors to understand student behavior with respect to learning and utilizing these required software packages.

A popular framework for understanding individual behavior regarding accepting and using IT is the technology acceptance model (TAM) which was introduced by Davis (1989). In his model, Davis proposed two main belief factors that predicted computer usage (e-mail): perceived ease of use and perceived usefulness. Since then, researchers have been using the model in predicting usage of different computer-related technologies, and they have extended the original model by incorporating additional variables (Gefen and Straub, 1997; Hwang, 2005; Mathieson, 1991; Venkatesh et al, 2003).

Most research on technology acceptance has taken place in voluntary situations, but users do not always have the choice of accepting a technology (Brown et al, 2002). There are many instances, on the job or in educational environments that mandate the usage of a certain type of technology to either keep the job or earn a good grade. Mandatory environment can be defined as “one in which users are required to use a specific technology or system in order to keep and perform their jobs,” (Brown et al, 2002, pp. 283). On the other hand, voluntariness is the extent to which potential adopters perceive the adoption decision to be non-mandatory (Venkatesh and Davis (2000). It is expected that the factors influencing individual behavior would be different in both settings. Venkatesh and Davis (2000) examined two sites where mandatory systems were implemented and another two sites where the usage of systems was optional. The major findings were that when the usage of the system was mandatory, subjective norm had a direct effect on intention during the pre-implementation period or during the one-month post-implementation period. However, when the usage was voluntary, subjective norm did not have a direct effect on intention, but had indirect effect through perceived usefulness and perceived ease of use. Singletary et al (2002) examined the aspect of voluntary usage following mandatory usage. Their study involved high school students where a certain program, Geometer’s Sketchpad, was required to be used in a geometry class. It was found that some students voluntarily went on to use the program for other classes and even for non-school related things like landscape design. This sort of study also helps demonstrate how it can be difficult to separate mandatory and voluntary usage. As pointed out by Brown et al., (2002) voluntary will cross over to mandatory, but where exactly that point is, is hard to determine.

Although mandatory involves a required use of a technology, there are actually different degrees of mandatory. Brown et al (2002) offers a continuum of truly mandatory to truly voluntary situations. Mandatory usage tends to have some degrees of voluntary in it. There can be a somewhat mandatory, and mostly mandatory, rather than truly mandatory. An example would be the standardization of Word as the word processing program across an organization. For a long time, both Word and WordPerfect were used as word processing programs. Employees could use the one they preferred, but at some point it was decided that Word would be the standard program used. However, employees that preferred WordPerfect could still request a license to use it on their computer. So, in essence it was a mandatory situation with voluntary degrees because there was still the option to use the other program. However, in the educational environment one can expect to find the truly mandatory situation in which instructors usually require students to use a certain technology (e.g., software packages) as part of the course requirements.

LITERATURE REVIEW

Attitude

The original TAM Model presents “use” as the dependent variable, however, in a mandatory setting (e.g., class-related technology), use is required. Brown et al (2002) proposed that in a mandatory setting “attitude” is the dependent variable and in a voluntary setting “behavioral intention” is the dependent variable. Attitude will be the main factor that influences the way a student utilizes a technology in a mandatory setting. Even though it has become the norm to exclude attitude from the TAM Model, it should

be realized that attitude is a critical factor because it represents the degree to which users are satisfied with the system (Brown et al, 2002). Additionally, in a recent meta-analysis of the TAM, Yousafzi et al. (2007) mention that although the revised TAM does not mandate attitudinal mediation between beliefs and intentions, research indicates that in mandatory environments as well as in other settings, attitude has been shown to correlate strongly with usage behavior (Mathieson, 1991; Brown et al. 2002; Benedetto et al. 2003).

Ajzen and Fishbein (1980) define attitude as “the person’s judgment that performing the behavior is good or bad” (p. 6). Diminished attitudes can result in destructive behaviors from employees, which may or may not be intentional. An employee will use the technology to perform, or in this case, keep his or her job, but it may just be enough to keep the job, and not enough to actually be more productive. The same conclusion could be drawn with the respect to student usage of class-related technology (software packages). Students might use the required software packages to enable them to earn a grade, but will not use them for other classes or continue using them in the future. A software package can be integrated into class activities, but it may not be utilized (learned) by students to their best efforts if they have a negative attitude toward the software. Thus, it is posited that

H₁: Attitude has a positive effect on the learning effort and intensity of software usage.

Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)

The technology acceptance model (TAM) theorizes that perceived ease of use (PEOU) and perceived usefulness (PU) are the key determinants of computer usage. PEOU is defined as the “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989). PU is defined as the “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989). Therefore, students who perceive the required software as easy to use and helpful in improving their understanding and performance will most likely develop positive attitudes toward that software and then try hard to learn it and use it in the future. TAM has been tested in numerous studies and shown to explain a reasonable amount of the variance in actual use of the technology. For example, Heijden et al. (2003) investigated factors that influence consumers’ intentions to purchase online. The results showed that perceived risk and perceived ease of use directly influence consumers’ attitudes toward purchasing online. Davis et al. (1989) proposed an extension to the original TAM wherein PEOU has an indirect impact on attitude through PU. Similarly, Teo et al. (1999) and Venkatesh and Morris (2000) concluded that PEOU had a direct impact on attitude and indirect impact via PU. Therefore, a link was established between PEOU and PU. In this study, the authors posit the following hypotheses:

H₂: Perceived usefulness (PU) has a positive effect on student attitude toward software usage.

H₃: Perceived ease of use (PEOU) has a positive effect on student attitude toward software usage.

H₄: Perceived ease of use (PEOU) has a positive effect on the perceived usefulness (PU) of software.

The Impact of External Variables

In his original model, Davis (1989) suggested that the model could be extended by exploring other external variables that might affect ease of use, usefulness, and user acceptance. The extended model (known as TAM2) by Venkatesh and Davis (2000) included external variables. In this study, many variables such as training, experience, student testimonials, design and content, subjective norm, and career relevance are considered as external variables.

Training and Experience

In creating a positive attitude about using a software package it is important to make sure that students see how the required software is going to help them to be more productive and effective in their education and jobs in the future. Many times students do not truly exert effort to learn required software packages because they do not truly understand how they work and how they can help them in their education and career. In a voluntary situation, if the impact of perceived usefulness and perceived ease of use are not strong, the technology will not be used, but in a mandatory setting, even if the impact of both factors are not significant, the technology must still be used. As a result, negative attitudes develop (Brown et al, 2002). Proper training (hands on activities) is a key to overcoming this problem. Training is shown to affect perceived ease of use and perceived usefulness. If the instructor has effective ways of delivering instruction related to these software packages by providing hands on exercises and lab sessions, then the software will appear to be more useful and easier to learn and use by the students, which will improve their attitudes toward the required software packages.

Another factor that influences attitude through PU and PEOU is the student experience with similar software packages. The results of Taylor and Todd's study (1995) of inexperienced and experienced users confirmed that there is a stronger correlation between behavioral intention and behavior (usage) for experienced users. They found that computer experience and user training were positively associated with perceived ease of use and perceived usefulness. Thus the following hypotheses are proposed:

H₅: Training (hands on) has a positive effect on the PU of the software package.

H₆: Training (hands on) has a positive effect on the PEOU of the software package.

H₇: Experience with the software has a positive effect on the PU of the software package.

H₈: Experience with the software has a positive effect on the PEOU of the software package.

Student Testimonials

Senior student feedback and testimonials could influence freshmen and sophomore students' perceptions of the usefulness and the ease of use of the required software packages. Students' testimonials include things like formal and informal communications. Instructors might invite senior students or recent graduates to the class to present their experience with such software packages in terms of how they have been utilizing these software packages and how they helped them in their careers. It is important for the testimonials to explain advantages in detail to students in order to foster

the positive attitudes. This will affect perceived usefulness and perceived ease of use, which in turn, impact attitudes. Thus the following hypotheses are proposed:

H₉: Senior student testimonials have a positive effect on the PU of the software package.

H₁₀: Senior student testimonials have a positive effect on the PEOU of the software package.

Design and Content

The content and the design of the instructions related to the required software packages affect perceived ease of use and perceived usefulness. If students feel that instructions are not easy to follow and to understand, then they will develop negative attitudes toward the software packages; and thus, they will not exert effort in learning and continuing using such software. The following hypotheses are proposed:

H₁₁: The design and content of the instructions have a positive effect on the PU of the software package.

H₁₂: The design and content of the instructions have a positive effect on the PEOU of the software package.

Subjective Norm

Ajzen (1991) defined subjective norm as the perceived social pressure to perform or not to perform the behavior in question (in this study, the level of learning effort and using the required software). In his study, Ajzen concluded that subjective norm was a strong predictor of intention. This assertion has been proven successful in predicting and explaining behaviors in various contexts (Brown et al., 2002; Harrison, 1997; Taylor and Todd, 1995). In the current study, subjective norm was defined as the combination of social pressure from classmates and other close members. It is expected that a student may feel such pressures to learn and utilize the software. Venkatesh and Davis (2000) found that subjective norm had a direct impact on behavior intention in the mandatory settings and indirect impact (through PU) in the voluntary settings. Therefore, subjective norm was incorporated as one of the variables that impact perceived usefulness. The following hypothesis is posted:

H₁₃: Subjective norm has a positive effect on the PU of the software package.

Career Relevance

Career or job relevance as defined by Venkatesh and Davis (2000) is the employee perception regarding the degree to which the target system is applicable to his/her career. In this study career relevance is the student perception regarding the degree to which the required software is relevant to their career and program of study. If students feel that the required software is relevant to their careers and helpful for them to excel in their education, then they will develop a positive attitude toward such software and they will exert effort in learning it. Thus, the following hypothesis is proposed:

H₁₄: Career relevance has a positive effect on the PU of the software package.

Based on the above-mentioned literature review and hypotheses, the following research model depicted in Figure 1 is proposed. This Model will be validated and tested by collecting data through a survey questionnaire in a future study.

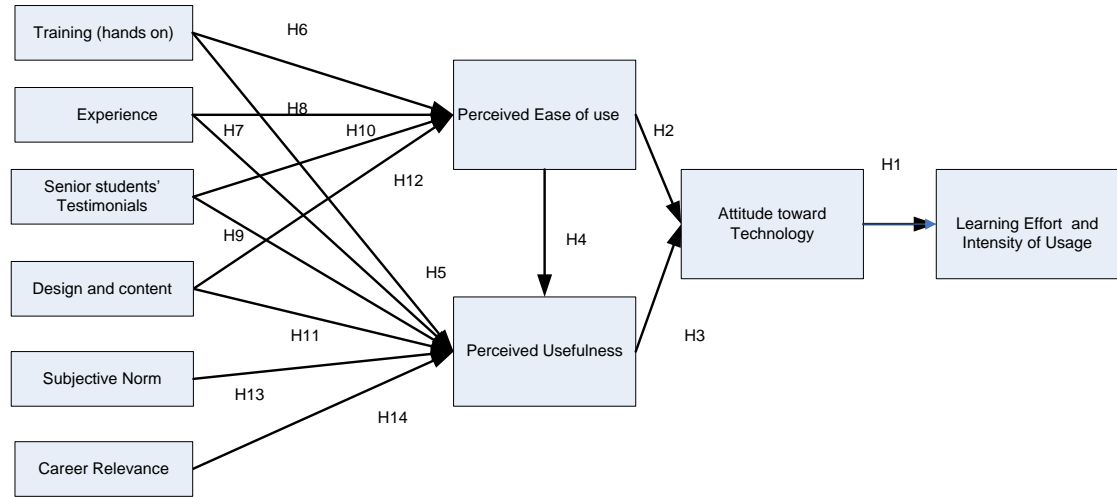


Figure 1: The Proposed Research Model

CONCLUSION

This paper is an attempt to develop a model that explores the factors that affect student learning effort and usage of required software packages. In a mandatory setting, the dependent variable becomes attitude. Attitude is one of the most important indicators impacting the degree of use in mandatory settings. Moreover, in a mandatory setting (e.g., educational system), the technology (software) will be used or learned, but there are different degrees to which it can be used and learned. A student may learn and use the software, but not to the extent that it could truly be learned and utilized. The extent to which it is truly learned and utilized is based on the attitude of the students toward the software. Positive attitudes will increase the extent to which the software is actually learned and used. On the other hand, negative attitudes could be the result in mandatory settings if instructors do not consider factors that influence students' attitudes. These negative attitudes could negatively impact the extent to which the students actually learn and use the software.

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