

MALADAPTIVE VS. ADAPTIVE USE OF INTERNET APPLICATIONS IN THE CLASSROOM: A TEST OF COMPETING MODELS

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Abstract:

This paper examines adaptive versus maladaptive use of Internet technologies in a classroom environment. Using data collected from 353 student respondents, we empirically test our model using the Partial Least Squares approach to structural equation modeling. Our analysis found support for distinct antecedents to adaptive and maladaptive Internet use. Specifically, we found that subjective norms contributed to the intention to cyber-slack, while perceived ease of use and perceived usefulness contributed to behavior intention. Cognitive Absorption was a significant predictor of both maladaptive and adaptive behavior. The paper concludes with a discussion of implications for research and practice.

Keywords: Cognitive Absorption; Intention to Cyber-Slack; Behavior Intention; Theory of Planned Behavior; Technology Acceptance Model; Subjective Norm

Introduction

Internet technologies have assumed an increasingly important role in higher educational institutions. With the implementation of “E” initiatives teachers have changed how they interact with students. For example, Internet-enabled tools are used to frequently update course materials, grades, and communicate with students. As mobile computing has grown, faculty increasingly depend on the Internet technologies to enable classroom activities. For example, on many campuses, students’ use wireless hotspots to access course materials such as slides or to take on-line exams. Through using Internet technologies, faculty deliver timely, relevant, and updated material to their students. However, despite successful “E” initiatives, Internet technologies have also unintentionally enabled maladaptive behavior from students in the classroom – such as off-task web surfing, instant messaging, or gaming. To understand sources of maladaptive and adaptive use of Internet technologies, we investigate competing models of technology use in a classroom environment. Specifically, we focus on the follow question:

What beliefs and emotions lead to maladaptive vs. adaptive behaviors in the classroom?

We begin with a review of the literature that informs our understanding of sources of behavior in the classroom. We then develop hypotheses tying subjective norms, perceived ease of use, perceived usefulness, and cognitive absorption to intention to use (an adaptive behavior) and intention to cyber-slack (a maladaptive behavior). Next, we empirically test and present the results of our research models. The paper concludes with implications for practice and research.

Literature Review

For a depiction of our theoretical models, see Figure 1. Model A draws on two theoretical strands: the Theory of Planned Behavior and the Technology Acceptance Model, in order to explain Behavioral Intention (BI). Our

competing model, Model B, focuses on the same theoretical arguments, but focuses on the Intention to Cyber Slack (ITS), the maladaptive form of Behavioral Intention. The following sections explain the logic behind the selection and application of each construct and more explicitly maps the nomological network among constructs.

Behavioral Intention and the Intention to Cyber-Slack

In this study, we focus on two types of desires, maladaptive and adaptive behavior. BI was evaluated as an adaptive behavior. Behavioral intention evaluates the strength of one's desire to perform a specific behavior (Fishbein & Azjen, 1975). BI has been widely tested in the TAM model. However, ITS has not yet been defined and empirically tested. To glean an understanding to ITS, the social loafing literature provides a useful lens of the phenomenon. Rooted in the notion that "many hands make light the work" (Latane, Williams, & Harkins, 1979), this literature suggests that although people can achieve individual goals easier through collaboration, that with collaboration, or the group context, people also have the opportunity to "shirk" or "slack" off from working. The core observation of this literature is that individuals take advantage of getting "lost in a crowd" – due to how outcomes are measured or anonymity created by the context (Latane et al., 1979) – to slack or loaf.

While social loafing provides insight into how the context provides an opportunity to slack, cyberloafing is a recent addition to MIS literature that also provides insight into ITS. Formally defined, cyberloafing refers to employee's use of the Internet for non-work related purposes (Blanchard & Henle, 2006; Lim, 2002). Cyberloafing says that an individual is more likely to be influenced by peers when it concerns a lesser offensive action, then a serious action. Therefore, minor actions, as in our definition of ITS, are more likely to be encouraged by subjective norms.

Subjective Norms

Subjective norms (SN) refers to the degree to which an individual believes that people who are important to them think that they should perform that behavior in question (Fishbein & Azjen, 1975). SN was designed to capture the social pressures involved in performing a behavior in order to aid in predicting the intention (Azjen, 1991), i.e., measure the degree to which friends, family and peers influence an individual's behavior. Even if they lack a positive opinion of a behavior, individuals may perform a behavior if they believe their peers or important referent others think they should perform the behavior in question (Venkatesh & Davis, 2000).

Consistent with prior research (Venkatesh, Morris, Davis, & Davis, 2003), we posit that when important peers believe that a behavior with a technology is acceptable, then our respondents will be more likely to report an intention to perform that behavior. When an individual reports that people who influence their behavior condone slacking with Internet technologies in class, they will be more likely to form the intention to cyber-slack with Internet technologies. Therefore, SN will be more likely have an effect on ITS rather than BI. Hence:

Hypothesis 1a: Subjective Norms negatively affects Behavioral Intention.

Hypothesis 1b: Subjective Norms positively affects the Intention to Cyber- Slack.

Perceived Usefulness

Perceived Usefulness (PU) refers to the degree to which a person believes that using Internet technologies will enhance his or her school performance (Davis, 1989). When students believe Internet technologies are useful, then they are more likely to use the technologies. However, since the effect is on performance, the student will more likely be influenced by perceived usefulness regarding adaptive behaviors that lead to better performance in the classroom. Therefore, PU will more likely have a positive effect on BI rather than ITS. Hence:

Hypothesis 2a: Perceived Usefulness positively affects Behavioral Intention.

Hypothesis 2b: Perceived Usefulness has no affect on the Intention to Cyber-Slack.

Perceived Ease of Use

Perceived ease of use (PEOU) refers to the degree to which a person believes that using Internet technologies is free from effort (Davis, 1989). When a student thinks that the option to use the Internet technologies is easy, whether to slack or to use adaptively, it will influence them to use them in the classroom. However, other options need to go

into the equation when figuring out what is easy. Slacking may also condone punishment from the teacher, leading to the option with the most effort. Therefore, PEOU will more likely influence BI than ITS.

Hypothesis 3a: Perceived Ease of Use positively affects Behavioral Intention.

Hypothesis 3b: Perceived Ease of Use has no effect on the Intention to Cyber-Slack.

It has been widely found that PEOU positively affects PU. To be consistent with prior research, we include this relationship in our model. Hence:

Hypothesis 4a: Perceived Ease of Use positively affects Perceived Usefulness

Hypothesis 4b: Perceived Ease of Use positively affects Perceived Usefulness.

Cognitive Absorption

Cognitive Absorption (CA) refers to a *state* of deep involvement with an individual task. CA is a personal factor that helps us understand individuals' intentions and uses of information technology. The earliest work on the notion of absorption was first derived in the psychology literature as a personality *trait* (Tellegen & Atkinson, 1974). Absorption was defined as an intrinsic trait that led to periods where an individual's total attention was consumed by the object of attention. While Tellegen's absorption is a widely accepted measure of a trait, CA was developed to capture absorption as a state.

CA also reflects one's feelings of flow (Trevino & Webster, 1992) and cognitive engagement (Webster & Hackley, 1997). Although closely related to flow and engagement, CA captures a broader range of feelings including control, curiosity, heightened enjoyment, focused immersion, and temporal dissociation (Agarwal & Karahanna, 2000). See Agarwal and Karahanna (2000) for an in-depth discussion of CA's dimensions.

In the context of this study, CA refers to the state of deep involvement with Internet technologies. CA has been established as a predictor of the TAM model (Agarwal & Karahanna, 2000), positively affecting PU, PEOU, and BI. Since students can either be absorbed in adaptive or maladaptive behavior, we expect no difference between models A and B. Also, when engrossed in IM or email, individuals may also experience states of pleasure, which increases the likelihood they will "loaf" or "slack". Also, when playing Internet games, which are designed to positively influence an individual's mood, they provide interactions of heightened enjoyment, thus encouraging the probability of staying in the game. We believe that experiences of CA may predispose individuals to slack with IT. Hence:

Hypothesis 5a: Cognitive Absorption positively affects Perceived Usefulness.

Hypothesis 5b: Cognitive Absorption positively affects Perceived Ease of Use.

Hypothesis 5c: Cognitive Absorption positively affects Behavioral Intention.

Hypothesis 5d: Cognitive Absorption positively affects Perceived Usefulness.

Hypothesis 5e: Cognitive Absorption positively affects Perceived Ease of Use.

Hypothesis 5f: Cognitive Absorption positively affects the Intention to Cyber-Slack.

Method

We collected data from students at a large university in the southeastern United States. Respondents were enrolled in one of four classes (1) a senior level statistics class, (2) a junior level overview of Management Information Systems class, (3) a senior level Strategy class, or (4) a senior level organizational behavior class in the College of Business. These courses are required for all business majors and represent a substantial cross-section of each major. In exchange for participation in the study, students were provided extra credit. Students were given a two week window to fill out the survey. A total of 353 students responded to our request to participate in the study. Since the access was a necessary condition for cyber-slacking, students who reported lacking access in the classroom were deleted. Our listwise deletion left 311 observations. On average the respondents' characteristics includes individuals who were primarily seniors, which have been in the university for over 3 years and were around 22 years of age. Slightly over half of the students comprised of males, which is typical for the college of business student body at the surveyed university.

Construct Measures

All constructs were measured using multi-item scales. Cognitive absorption was measured using Agarwal and Karahanna's (2000) scale. Subjective norms was taken from Venkatesh and Morris (2000). Measures of PEOU, PU, and BI were adapted from (Agarwal & Karahanna, 2000), All scales were modified to reflect the context of each construct within Internet technologies.

Scales to measure intention to cyber-slack were developed through a multi-stage process. First, we reviewed the literature for a validated measure of cyber-slacking. After failing to identify an appropriate measure, items were developed based on the theoretical definition of cyber-slacking. Next, the entire survey was peer-reviewed by two other academics, who were instructed to read each item carefully for face validity. Since they were not familiar with the research model, their results were both objective and unbiased. Each item was answered on a five point likert scale, with strongly agree, neither agree or disagree, and strongly disagree as anchors. Items were designed to capture intended future negative actions with Internet technologies.

Results

To test our empirical model, we used Partial Least Squares (PLS). PLS, a structural equation modeling technique, is useful because it handles, with relative ease, modeling formative constructs (Chin, 1998). When evaluating psychometric properties of the measures, reflective and formative measures must be treated differently. Internal consistencies along with convergent and discriminant validity, which is highly appropriate for reflective measures, are inappropriate for formative measures (Wixom & Watson, 2001). Instead, the weights can be examined to measure the relevance the items have to the research model.

BI, ITS, SN, PEOU, and PU were operationalized as reflective constructs. Properties of the constructs are assessed in terms of item loadings, discriminant validity, and internal consistency. Convergent validity ensures that each scale item moves in the same direction as a given construct for reflective measures (Campbell & Fiske, 1959). Each item did load appropriately on the appropriate construct. Next, discriminant validity was assessed to see if item loadings loaded higher on its respective construct than the remaining constructs. We did in fact find the CFA to display this manner, thus ensuring the substance of our data. Table 1 displays the correlation matrix. Each construct was found to share more variance with their respective indicators than with other constructs. Thus, our results point to convergent and discriminant validity.

Table 1: Correlation Matrix

	BI	SN	CA:FI	PEOU	PU	CA:CTL	CA:TD	CA:HE	CA:C	ITS
BI	0.94									
SN	-0.05	0.92								
CA:FI	0.09	-0.05	0.74							
PEOU	0.37	0.01	0.31	0.85						
PU	0.50	0.02	0.10	0.34	0.88					
CA:CTL	0.33	0.01	0.31	0.53	0.36	0.71				
CA:TD	0.45	0.04	0.32	0.44	0.23	0.35	0.85			
CA:HE	0.37	-0.06	0.21	0.48	0.30	0.27	0.49	0.86		
CA:C	0.16	-0.13	0.29	0.39	0.24	0.32	0.29	0.47	0.92	
ITS	0.16	-0.43	0.16	0.19	0.17	0.09	0.31	0.31	0.29	0.87

It is important to note that CA was measured as a formative construct. CA is 2nd ordered in nature and has dimensions that do not correlate with one another. CAHE, CAC and CATD were found to be a significant contributor to behavioral intention ($p < .01$; $< .01$; $< .01$). While CAFI and CACTL did not show significance, the general approach is to see how each indicator compares to one another, rather than taking a factor analysis approach by evaluating how close each measure is to one (Chwelos, Benbasat, & Dexter, 2001). Therefore, it is reasonable to expect to see lower values than factor scores or item loadings. CAHE, CACTL, CAC and CATD were found to be a significant contributor to intention to cyber-slack ($p < .01$; $< .05$; $< .01$; $< .01$).

For final PLS results, see Figure 1. Paths can be interpreted as regression beta coefficients. Below each path coefficients are the values for the t-statistics. Path coefficients along with explained variance (R^2) are included in the model. Each construct was modeled with multiple indicators, except CA, which was modeled with the latent variable scores of each dimension serving as items. This is due to the fact that PLS does not support 2nd order modeling.

PU and PEOU were found to have a stronger relationship with BI than with ITS. SN was found to have a stronger relationship with ITS. Also CA seemed to have a relatively unchanged influence on adaptive and maladaptive behaviors, suggesting that individuals can be absorbed either ways.

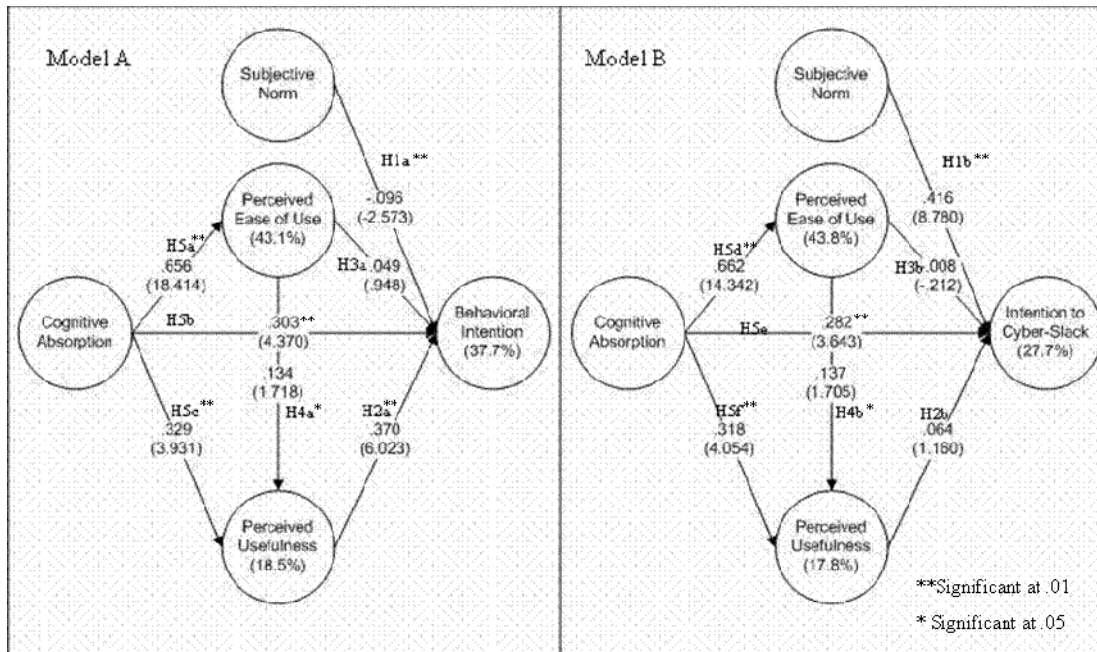


Figure 1: Results from PLS Analysis

Conclusion

Our research examined the underpinning of BI and ITS in the classroom. Prior to discussing the implications of this study, it is important to consider the limitations of this research. One concern is common method variance, where self-reported measures may inflate the observed relationships between constructs. However, James et al. (1979) report that common method variance is only prevalent where a pattern of high correlations among constructs is evident. As illustrated in Table 1, the correlations among constructs were generally low and varied across the model, suggesting that common method variance did not significantly confound our results.

Our research has a number of implications. First, our analysis suggests that BI and ITS have different antecedents. In regard to SN, our analysis suggests that perceptions of relevant peers influence one's intention to cyber-slack. Future researchers can try to further test this influence by measuring proximity to the behavior. For instance, would a peer influencing another have to be in the classroom, or would their influence still exist after contact. Second, we found that individuals who report CA when using Internet technology are more likely to be absorbed into either adaptive or maladaptive behavior depending on the context of the classroom. Future researchers can try to differentiate mechanisms to gear students more towards their intentions, while gain more control of the classroom. PEOU and PU were found to be more influential on BI. However, since our sample was of experienced Internet users, future researchers may want to examine novice as well as experienced users.

Teachers can realize practical implication from this research. First, many students are heavy users of the Internet. Therefore, the students may be easily distracted when offered access to material on the Internet instead of the "dry material" presented in the lecture or a textbook. To remedy cyber-slacking, educational institutions may want to limit the range of applications that students may have access to in the classroom. Some preventative measures include implementing an Internet blocker in your classroom, so that you control their content. However, limiting

access must also be balanced with encouraging students to learn. While tools such as instant messenger may not be ostensibly useful in the classroom, blocking access to different websites may limit the instructor's ability to dynamically modify content – one of the benefits of access to Internet applications in the classroom.

The goal of this paper was to help understand the behavior of students with Internet technologies. We focus on the both adaptive and maladaptive behaviors with Internet technology, and how different sources lead a student to intend to use Internet technologies for good or bad purposes. We understand that maladaptive behaviors are occurring by the rate of CA and SN the individual has with the technology, while adaptive behaviors are occurring through PEOU and PU. Given the practicality that the Internet is still dispersing more readily throughout our schools, we discuss reasons why we should learn to focus students' attention for adaptive purposes. Our research provides avenues for future researchers, which we hope benefit from our findings.

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