https://doi.org/10.48009/2_iis_2016_82-92

Issues in Information Systems
Volume 17, Issue II, pp. 82-92, 2016

FACULTY PERCEPTIONS ON STUDENT USE OF MOBILE TECHNOLOGY IN THE CLASSROOM

Harry Benham, Montana State University, hbenham@montana.edu
Gerard Carvalho, Montana State University, jcarvalho@montana.edu

ABSTRACT

This paper examines the factors underlying faculty adoption of student in-class use of mobile-computing technologies. Following up on a survey of student options on in-class use of mobile devices, faculty were surveyed about their attitudes toward having students use their mobile devices in class in support of course learning objectives. The faculty's decision to allow or not allow mobile devices was framed as an acceptance of technology problem. Consequently, the faculty survey measured Perceived Usefulness, Enjoyment, Anxiety, Self-Efficacy, Tablet Playfulness, and Locus of Control as relevant to mobile devices. Perceived Usefulness and Enjoyment were found to have significant positive impacts on a faculty member's probability of allowing student in-class use of mobile devices. Faculty who scored higher on Tablet Playfulness and Locus of Control had lower probabilities of allowing student in-class use of mobile devices.

Keywords: Learning, Mobile Devices, TAM

INTRODUCTION

A recent study (Benham, Carvalho, & Cassens, 2014) examined students' perceptions of the integration of mobile-computing devices into their classroom experience. In that study, students indicated that they were eager to use their personal, mobile-computing devices in the classroom to enhance their learning experience. A desire to work on in-class assignments, research those assignments, collaborate with peers, access their e-textbook, use the course learning management system, and take notes were among the indicated mobile device uses. Students believed their learning was enhanced and they were more engaged when using their mobile devices in the classroom. The greatest hindrance to in-class use of mobile devices was the students' perceptions that most of their faculty would either prohibit or disapprove of students using their mobile devices in class. This study's objective is to investigate faculty attitudes toward the in class use of mobile computing devices.

There are many instructional technologies thought to enhance student learning: paper and pencil, chalk boards, overhead projectors, PowerPoint presentations, and i>clickers, to name a few. Mobile-computing devices that allow a student to research a question or topic, collaborate with peers, and write-up and submit a project are simply additional, instructional technologies. Instructors are generally free to adopt those instructional technologies they believe to be useful. Thus, whether an instructor "allows or encourages" student in-class use of mobile-computing devices is treated here as a technology adoption/acceptance decision on the part of an instructor.

This paper is organized as follows: First, the Literature Review section briefly surveys the impact of mobile-computing devices in the classroom and the adoption/acceptance of information technology. Following the Literature Review, we look at specific Research Questions. The Data and Methods section reviews how the data were collected, what measures were constructed, and how the data were analyzed. Next, in the Data Analysis section, results are presented and related to the Research Questions. The final section provides Discussion and Conclusions.

LITERATURE REVIEW

There are two bodies of literature germane to this paper: the literature on the use of mobile devices for educational purposes and the literature on user adoption/acceptance of information technology. Both bodies of literature are extensive. Rather than a complete review, the purpose of this section is to indicate those works that contributed most directly to this study.

Mobile Computing Devices

We are concerned exclusively with the use of mobile-computing devices for educational purposes. Rossing, *et.al* define it: "*Mobile learning is the efficient and effective use of wireless and digital devices and technologies to enhance learners' individual outcomes during participation in learning activities*" (Rossing, Miller, Cecil, & Stamper, 2012). The mobile computing devices considered in this study include smartphones, tablets, and laptops since all of these devices can be used in different ways to enhance the classroom learning environment.

Much of the research into the use of mobile devices in education focuses solely on the use of tablets, specifically the iPad. This research shows a positive correlation between the use of technology in the classroom, student engagement, and the students' quality of learning (Benham et al., 2014) (Brand, Kinash, Mathew, & Kordyban, 2011) (Murray, & Olcese, 2011) (Rossing et al., 2012) (Smith, & Kukulska-Hulme, 2012). We extend the list of allowed mobile devices to include laptop computers, tablets, and smartphones.

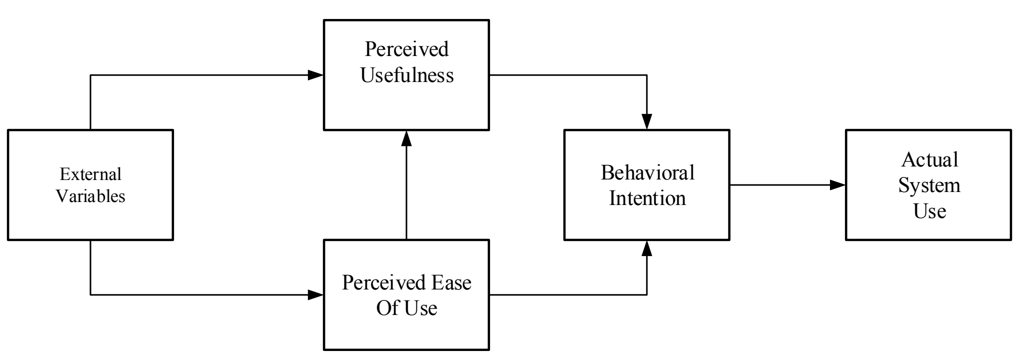
Early research into the use of mobile devices such as i>clickers show that students feel more engaged in the classroom when using these devices. i>clickers have been shown to increase student participation and engagement in the classroom through the use of interactive teaching techniques. It is apparent that students who are engaged in the classroom above and beyond traditional teaching styles, such as lecturing, perceive they experience greater depth of understanding of subject matter (Mayer, Still, DeLeeuw, Almeroth, Bimber, & Chun, 2009).

There is a difference in outcomes when people use their own devices instead of organizationally-mandated devices. According to Pillay, Nahm, Tan, Diaki, Senanayake, and Deshpande, when people use their own devices, devices they have chosen and invested in, they tend to be happier and more productive (Pillay, Nahm, Tan, Diaki, Senanayake, and Deshpande, 2013). Increased productivity comes from two sources. First, individuals tend to upgrade their personal equipment faster than their organization, leading to an overall improvement in the quality of the devices used. Second, since people invested money into these technologies, they tend to also invest the time required to learn the efficient use of that technology.

Technology Acceptance Model

Being able to understand individuals' motivations to accept and use information technology systems became important as organizations experienced increasing failures of information system adoption. Davis, (Davis, 2013) proposed that system use is a response that can be explained by user motivation that can be influenced by actual system's features and capabilities. Davis's model received considerable interest and was quickly extended and revised (Davis, 1989) Davis, Bagozzi, & Warshaw, 1989) to become the standard Technology Acceptance Model (TAM). Borrowing from Ajzen's Theory of Planned Behavior (Ajzen 1991), an expanded TAM model, sometimes referred to as TAM2, was introduced in 1996 (Venkatesh & Davis 2000).

FIGURE 1.
TAM Model



The TAM model (as indicated in Figure 1) focuses both on the individual's perception of how useful a technology will be and the individual's perception of how easy to use a technology will be as the primary determinants of that individual's intention to use a technology. Davis developed scales to measure Perceived Usefulness and Perceived Ease of Use. Perceived Usefulness was originally a prospective user's subjective probability that using a specific application system will increase job performance within an organizational context (Davis, 1989). Within this study, Perceived Usefulness is a faculty member's belief that in-class, student use of mobile devices will facilitate student learning. Similarly, Perceived Ease of Use was originally a prospective user's subjective impression of how easy or difficult it would be to get the specific application system to work for the user. In this study, Perceived Ease of Use is the faculty's impression of the ease of having students use their mobile devices in class. However, Chutter's overview of TAM's origins, developments, and future directions (Chutter, 2009) explicitly lists Perceptions of External Control, Computer Playfulness, Computer Anxiety, Computer Self-Efficacy, and Perceived Enjoyment as antecedents to Perceived Usefulness, Perceived Ease of Use, or both. In this study, we include these proposed antecedents as replacements for Perceived Ease of Use.

RESEARCH QUESTIONS AND HYPOTHESES

Our research questions and hypotheses follow directly from this paper's objective to investigate faculty attitudes toward the in-class, student use of mobile computing devices. At a very basic level, there is the question of faculty support for in-class use of mobile devices. Whether an individual faculty member chooses to incorporate in-class student use of mobile devices in their lesson plans is a technology acceptance question. What factors influence individual faculty acceptance decisions?

Support for in class use of Mobile Devices

Students perceive that faculty do not allow or disapprove of in-class use of mobile devices (Benham, et al., 2014). Student perceptions are no doubt correct if the in-class usage is to text friends, play games, or watch videos totally unrelated to class. Our concern here is with faculty willingness to have students use their mobile devices in support of student mastery of course learning objectives leading to the following research question.

R1: What proportion of faculty would allow/encourage in-class student use of mobile devices in support of course objectives?

There are many possible ways that mobile devices could be used in class: collaborating with peers, researching an in-class assignment or problem, accessing an e-textbook or the course learning management system, or simply taking notes, to name a few. Students in a prior study (Benham, et al., 2014) indicated how they would like to use their mobile devices in class leading to the following research question.

R2: How do faculty's anticipated uses of mobile devices in class compare with students' expressed uses?

Factors influencing acceptance of in-class use of mobile devices

The underlying theoretical model is TAM2 (Venkatesh, Davis, 2000), the extension of TAM that explains perceived usefulness and usage intentions in terms of social influence and cognitive processes. Our social influence and cognitive processes are taken from the list of perceived usefulness and perceived ease of use antecedents indicated by Chutter (Chutter, 2009). The following hypotheses are expressed as null hypotheses. The phrase "allow in-class usage" is used to designate allowing and encouraging students to use their mobile devices in class in support of course objectives.

H1: Faculty who perceive in-class use of mobile devices to be more useful are no more likely to allow in-class usage.

Our expectation is that this hypothesis will be rejected and that faculty who perceive in-class, student use of mobile devices to be more useful will indeed allow and encourage such usage in their courses.

H2: Faculty who derive enjoyment from using mobile devices will be no more likely to allow in-class usage.
We expect faculty who experience enjoyment in using mobile devices will be more inclined to use their devices and be willing to design and provide what they perceive as enjoyable experiences for their students.

H3: Faculty who experience a greater degree of anxiety in using mobile devices will be no less likely to allow in-class usage.
Faculty who are anxious about using computers, specifically mobile computing devices, are seen as not desiring to cause themselves anxiety. Therefore, we expect them to be less likely to use mobile devices themselves and less likely to permit student in-class use of such devices.

H4: Faculty who score higher on a self-efficacy scale are no more likely to allow in-class usage.
In general, self-efficacy is the belief that one has the capability to perform a particular behavior. The self-efficacy referred to in this case is the belief that one has the capability to effectively use mobile devices, specifically tablets and smartphones. We would expect faculty who believe they can effectively use mobile devices to be more willing to create learning opportunities involving mobile devices and hence, more likely to allow student in-class usage.

H5: Faculty who are more playful with their smartphones are no more likely to allow in-class usage.
Smartphone playfulness is an extension of computer playfulness to smartphone-computing devices. We would expect faculty who are more likely to experiment and "play" with their phones to be more likely to design in-class activities where students could use their smart phones or other mobile device.

H6: Faculty who are more playful with their tablets are no more likely to allow in-class usage.
Tablet playfulness is an extension of computer playfulness to tablet-computing devices. We would expect faculty who are more likely to experiment and "play" with their tablets to be more likely to design in-class activities where students could use their tablets or other mobile device.

H7: Faculty who more strongly feel they can control events in their lives are no more likely to allow in-class usage.
Locus of Control refers to a person's belief about their ability to control their lives. Some feel they are personally responsible for everything that happens, others feel that what happens in their lives is a result of forces beyond their control, and the vast majority are located somewhere between these extremes. We believe that faculty who more strongly feel that by their actions they can influence outcomes in their lives would be more likely to believe that they could create in-class mobile device exercises that would result in positive learning experiences for their students and, therefore, would be more likely to allow in-class usage.

DATA & METHODS

A survey was designed, interviews were scheduled with faculty in a business college, and the survey was completed during these interviews. A copy of the questionnaire may be obtained from the authors upon request. Data were obtained from 29 faculty. While 29 is a fairly small number, over 75% of the tenure track faculty and over 40% of the non-tenure track faculty were included in the survey. Non-tenure track faculty who teach only one or two courses are less represented than non-tenure track faculty who are more heavily engaged in the college. Other demographics indicate that the 29 faculty are representative of the college in terms of their age, discipline, gender, and years of teaching experience.

Research Questions 1 & 2

Questions in the survey were designed to provide data to answer the two research questions. Research question 2 requires student data that was available from a recent study (Benham, et al., 2014) in order to compare faculty and student sentiments.

Measurement

The survey contained items either directly from established scales or adapted from established scales for this specific application. A 5-point scale from Strongly Agree to Strongly Disagree was used on all scales. Construct measures were computed in accordance with the established scale. The constructs are briefly described below.

Perceived Usefulness: The degree to which an individual believes using a particular system would enhance his or her job performance. This measure was developed and extensively tested by Davis (Davis, 1989). Items were designed to be changed to accommodate specific applications or devices. In this study, we adapted the questions to refer to mobile computing devices.

Enjoyment: Perceived Enjoyment is the extent to which fun can be derived from using the system or device. It is a source of intrinsic motivation to use the device. The instrument used to measure enjoyment from using a mobile device can be traced to Lee (Lee, Cheung, Chen, 2005), Cheung (Cheung, Chang, & Lai, 2000), and Igbaria (Igbaria, Livari, Maragahh, 1995).

Anxiety: Anxiety refers to a complex combination of negative emotional responses including fear, apprehension, and agitation. Computer anxiety refers to anxiety evoked by real or imaginary interactions with computer-based technology (Heinssen, Glass, Knight, 1987). An 18-item Computer Anxiety Rating Scale developed by Heinssen, Glass and Knight (Heinssen, et al., 1987) has been widely cited in many studies and was adapted for use here to measure mobile-device anxiety.

Self-Efficacy: Self-efficacy is an important psychological construct indicating a belief that one has the confidence and ability to perform the actions required to achieve a specific result. Computer self-efficacy refers to the self-efficacy concept when the actions to be performed involve using a computer. Many measurement tools have been developed and used to measure computer self-efficacy including instruments by Murphy, Coover, and Owen (Murphy, Coover, & Owen, 1989) and Compeau and Higgins (Compeau & Higgins, 1995). The Murphy, Coover, and Owen tool was better suited to modification for use with mobile devices, and it has a long history of being adapted by other researchers (Khorrami-Arani, 2001). The instrument used here consisted of 8 items.

Playfulness: Computer Playfulness indicates the degree of cognitive spontaneity in interactions with a computing device. The measure was initially developed by Webster and Martocchio (Webster & Martocchio, 1992) and has subsequently been adapted to new types of devices and applications. In this study, we measured smartphone playfulness and tablet playfulness separately.

Locus of Control: Locus of Control refers to an individual's belief about control over life events. Lower scoring individuals tend to believe their lives are controlled more by external forces than by themselves. Higher scoring individuals tend to believe they are more in control of their own lives. The Locus of Control instrument, developed by Duttweiler (Duttweiler, 1984), consists of 28 items.

Hypothesis Tests

Linear regression using the construct measures was the primary technique used to test all hypotheses. Structural equation modeling is frequently employed to test TAM models. However, with only 29 observations, there is hardly enough data to support a structural equation model. The dependent variable in our regression model is binary; would the faculty member allow/encourage students to use their mobile devices in class on class activities or not? Technically, a binary dependent variable violates the residual error zero expected value assumption of linear regression. However, linear regression is a robust statistical technique, and the central limit theorem provides some assurance that the statistical properties will be approximately correct. A benefit of regression lies in the ease with which the regression coefficients can be interpreted. With a 0/1 dependent variable, linear regression beta estimates multiplied by the dependent variable standard deviation allow us to interpret the adjusted betas as the change in probability corresponding to a one standard deviation change in one of the independent variables.

RESULTS

This section reports our empirical results. Before examining the research questions and hypothesis tests, some summary statistics are provided. Then research questions R1 and R2 are addressed. The final section looks at the hypothesis test results for H1 – H7.

Table 1 displays summary statistics with some demographic characteristics of the faculty sample and the constructs used to test the hypotheses. Some additional information on the faculty demographics may be useful. Faculty range in age from 30 to 68 years. While the average teaching experience is around 12 years, there were three clusters of teaching experience, less than 5 years, 11-15 years, and over 21 years. Thus, there is a wide range of teaching experience. All business college disciplines are represented in the respondents, 41% of the respondents are female, and there is a good mix of tenure track and non-tenure track faculty.

Table 1. Summary Statistics

	Mean	**Median**	**Std. Deviation**
Demographics			
Age	49.9	48.0	11.60
Teaching Experience	12.4	13.0	9.20
Variables			
Allow	0.897		0.304
Perceived Usefulness	14.6	15.0	3.22
Enjoyment	21.6	22.0	5.07
Anxiety	42.7	42.0	9.49
Self-Efficacy	28.6	29.0	7.27
Phone - Playfulness	21.7	21.0	2.36
Tablet - Playfulness	20.2	21.0	3.23
Locus of Control	104.5	106.0	9.00

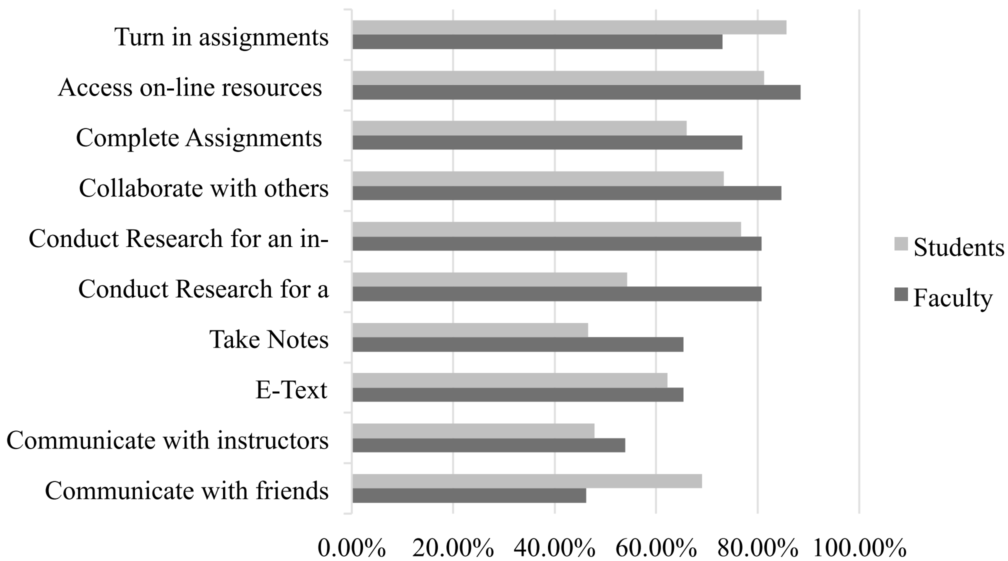
In Table 1, the variable names are shortened. "Allow" refers to whether a faculty respondent would allow/encourage students to use mobile computing devices in class. "Usefulness" refers to the faculty member's perception of the usefulness of mobile device use in class to further the course learning objectives. "Enjoyment", "Anxiety", and "Self-Efficacy" all pertain to mobile computing devices. "Phone-Play" and "Tablet-Play" refer to the degree of "computer" playfulness reported with smartphone and tablet devices respectively.

Research Questions 1 & 2

Research Question 1 is answered in Table 1. Almost 90% of faculty indicated that they would be willing to allow students to use their mobile devices in class. This result is somewhat surprising given the previous study of student perceptions. In that study, students perceived that faculty were not amenable to in-class use of mobile devices (Benham, et al., 2014).

Research Question 2 is answered in Figure 2 below. This figure compares data from this study's faculty survey with comparable data from a previous study of students (Benham, et al., 2014). For most in-class uses of mobile computing devices, faculty and students are pretty much in agreement. There are some notable exceptions. Faculty are much less inclined than students to support student's communication with friends during class. Faculty persist in wishing students would take notes and approximately two thirds would support in-class use of mobile devices for that purpose. Less than half of the students see note-taking as a desirable in-class use of mobile devices. Similarly, almost 80% of faculty would like to see their students use mobile devices in class to conduct research. Yet, students appear much less interested in using their mobile devices for research.

FIGURE 2
Faculty Use vs. Student Use of Mobile Technology in Class



Hypothesis Tests

Table 2 below contains the results of the regression results testing hypotheses H1 – H7. Although not reported here, the regression did include a constant. Recall that the regression's beta coefficients were multiplied by the dependent variables standard deviation, so the adjusted beta can be interpreted as the change in the probability of allowing student in-class use of mobile devices that would result from a one standard deviation increase in an independent variable. The section of Table 2 labeled Full TAM Model contains the hypothesis test results to be discussed.

Table 2. Linear Regression - Dependent Variable Allow

	Full TAM Model			Reduced TAM Model		
Variable	Adj. Beta	T	P-Value	Adj. Beta	t	P-Value
Perceived Usefulness (H1)	0.1924	2.300	0.032*	0.1569	2.487	0.020*
Enjoyment (H2)	0.1450	2.353	0.028*	0.1231	2.133	0.043*
Anxiety (H3)	0.0572	0.839	0.411			
Self-Efficacy (H4)	-0.0237	-0.493	0.627			
Phone-Playfulness (H5)	-0.0410	-1.048	0.307			
Tablet-Playfulness (H6)	-0.0961	-2.392	0.026*	-0.1663	-3.998	0.001**
Locus of Control (H7)	-0.1541	-3.632	0.002**	-0.0982	-2.523	0.019*
Adj. R Square	0.603			0.604		

* Significant at 5% ** Significant a 1%

Hypothesis test H1 concerned the impact of a faculty member's perception that student in-class use of mobile devices is beneficial in facilitating student learning on that faculty member's willingness to allow in-class use. The null hypothesis can be rejected at a 5% level of significance. The results indicate that a standard deviation increase in perceived usefulness results in an almost 20% increase in the probability of allowing in-class usage of mobile devices.

Similarly, the null hypothesis H2 regarding enjoyment is rejected at a 5% significance level. The argument was that faculty who derive enjoyment from using mobile devices are more likely to allow student in-class use. In this case, a faculty member who scored a standard deviation higher on enjoyment than an otherwise comparable faculty is over 14% more likely to allow his/her students to use their mobile devices in class.

For hypothesis H3, we cannot reject the null hypothesis. The argument was those for whom using a mobile device induced more anxiety are less likely to allow in-class student usage. That argument is not supported by the data. The sign of the estimated coefficient is opposite what we would expect, and the estimate is not statistically significant.

For hypothesis H4, we argued that those who exhibited a greater degree of self-efficacy in the use of mobile devices are more likely to allow student in-class usage. But the data simply do not support rejecting H4. Again, the sign of the estimated coefficient is opposite what we expected, and the estimate was not statistically significant.

For hypothesis H5, we expected smartphone playfulness to be associated with being more likely to allow student in-class use. H5 was not supported by the data. If anything, faculty who were more playful with their smartphones were less likely to allow students to use them in class, and the result is not statistically significant.

Hypothesis H6 stated that faculty who were more playful with their tablets are more likely to allow student in-class use. Although the results are statistically significant, the direction of the effect is opposite what we expected. Therefore, we cannot reject null hypothesis H6.

Finally, in hypothesis H7 we expected that those faculty who were more internally controlled, those who have stronger beliefs that their actions lead to the outcomes in their lives, are more likely to allow student in-class use of mobile devices. The results are statistically significant and contrary to our expectation. A faculty scoring a standard deviation higher than an otherwise comparable faculty is 15% less likely to allow student in-class usage of mobile devices. We cannot reject null hypothesis H7.

Below in the Discussion section, we attempt to understand these results. First, we tried dropping from the analysis the explanatory variables without statistically significant results. These results are also reported in Table 2 in the section labeled Reduced TAM Model. At first glance, the reduced model results are quite similar with the same signs and significances as found in the full model. Looking at the adjusted R-Square statistic, we were able to explain 60.3% of the variance in Allow in the full model and 60.4% in the reduced model. Dropping the insignificant explanatory variables made virtually no difference in the overall explanatory power.

In the reduced model, we can continue to reject null hypotheses H1 and H2. Perceived Usefulness and Enjoyment have a significant and positive impact on the probability that a faculty member will allow student in-class use of mobile devices. For Tablet Playfulness and Locus of Control, the reduced model continues to generate "incorrect" signs and statistically significant results. For these two variables, particularly Tablet Playfulness, there was a substantial shift in the size of the estimated coefficients and the significance levels suggesting that in the full model there was some degree of multi-collinearity. We looked at correlations to verify this. Phone playfulness is not particularly well correlated with any of the independent variables nor was it correlated with the dependent variable, Allow. Anxiety had a significant negative correlation with both Usefulness and Enjoyment. Thus, the dropping of Anxiety may explain the slight drop in the size of the estimates for Usefulness and Enjoyment. Self-Efficacy had significant correlations with both Tablet Playfulness and Locus of Control. Those correlations could explain the changes in the coefficients and significance on Tablet Playfulness and Locus of Control in the reduced model.

DISCUSSION & CONCLUSION

Research Questions

Our research questions were motivated by a recent study of student attitudes to the use of mobile devices in class to enhance their learning. Specifically, students expressed the opinion that it was their instructors' attitudes that prevented their in-class use of mobile devices. Our study of faculty indicates nearly 90 percent were supportive of having students in their courses use their mobile devices. Figure 2 indicates a substantial amount of agreement among students and faculty as to the types of in-class uses. Faculty were not particularly supportive of students communicating with friends during class, nor were students as receptive to conducting research and taking notes as faculty were. Overall, it is interesting that students' perceptions of faculty attitudes towards in-class student use of mobile devices appear to differ from the attitudes expressed by faculty.

Hypotheses

We were able to reject hypotheses H1 and H2. The probability that a faculty member would allow their students to use mobile devices in class is higher for those faculty who perceive more usefulness to student in-class use of mobile devices and is higher for those faculty who get more enjoyment out of using mobile devices. These results were strong and entirely consistent with theory and literature.

Our inability to reject hypotheses H3 through H7 is much more interesting and worthy of discussion. Hypothesis H3 cannot be rejected due to a lack of significance. Simple correlations suggest that individuals with greater mobile device anxiety are less inclined to allow in-class student use of mobile devices. For this sample, Anxiety was also negatively correlated with Perceived Usefulness and Enjoyment. Perhaps mobile devices are not sufficiently intimidating to induce mobile-device anxiety sufficient to provide any independent explanatory power. Similarly, the mobile device Self-Efficacy hypothesis, H4, cannot be rejected due to a non-statistically significant coefficient estimate. Perhaps mobile devices are sufficiently easy to use that everyone has sufficient confidence in their ability to be successful. Hypothesis H5 concerning the role of Phone Playfulness cannot be rejected, again due to non-significant statistical results. However, hypothesis H6 concerning the role of Tablet Playfulness produced significant statistical results but of a sign contrary to what we hypothesized. The mean and median playfulness measures are almost identical. One would expect Phone Playfulness and Tablet Playfulness to be closely related, particularly since it is not uncommon for one's phone and tablet to have the same operating system. However, correlation between Phone Playfulness and Tablet Playfulness was -0.086; essentially, the two playfulness measures were uncorrelated. Non-significant results in the statistical analysis for hypotheses H3 through H5 are what they are. Statistically significant results of the incorrect sign for hypotheses H6 and H7 lead one to speculate about what may be causing the observed relationships.

The strong negative influence of Tablet Playfulness on a faculty member's probability of allowing students to use their mobile devices in class is perplexing. The original thought behind the Playfulness measures was those individuals who experiment with computing or try new things to see what happens with computing devices in some way, exhibit more affinity with computing devices and are more likely to use them. Our sample is of business faculty most of whom we would not characterize as "computer geeks." Could it be that those who responded to the playfulness questions were still trying to learn how to use their device rather than exploring the limits of its capability? If that is the case, then one can see why faculty who are still trying to master their tablet are less inclined to allow students to use their devices in class. The faculty member is not adept at designing in-class assignments or exercises that make use of the mobile device the faculty member was still learning to use. This, of course, is speculation, but it would explain both the strength and direction of the observed effect of Tablet Playfulness.

We were also unable to reject hypothesis H7, not for lack of a statistically significant result, but because the estimated effect was of the opposite direction of what we hypothesized. Locus of Control is used to classify respondents into externally controlled, those who believe their actions have relatively little to do with outcomes in their lives, and internally controlled, those who believe their actions are primarily responsible for the outcomes in their lives. Our university faculty sampled were virtually all internally controlled individuals. Variation in the Locus of Control measure was in degree of their internal control. It could be that faculty with the highest Locus of Control scores felt so in control of their classrooms that they believed their students would not use mobile devices in class unless the faculty explicitly allowed mobile-device use. Those somewhat lower on the Locus of Control scale may have some doubts about their ability to control students in-class mobile device use. By allowing students to use mobile devices and by designing in-class exercises using mobile devices, these faculty could avoid potential confrontations with students over the use of mobile devices. Again, this is speculation that may explain the empirical results observed.

Finally, we must acknowledge that our sample was small. However, our sample was representative of business faculty. We hope to sample a much wider faculty group in the future to acquire more observations. Still, we believe the results presented here are interesting and should stimulate discussion of both the adoption of mobile computing devices and their educational use.

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