Gender as a Predictive Factor for Tasks Completed Using Smartphones

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Abstract

Smartphone usage among undergraduate students is growing (Woodcock, Middleton, & Nortcliffe, 2012). The prevalence of these devices in every aspect of student routines presents the research problem: how will smartphone usage affect how college students manage their coursework?   To address this research problem, we conducted a pilot study examining the current level of smartphone usage among college students. A distinct battery of questions were created and posted to an online survey. Forty-two undergraduate students who own and use smartphones participated. Survey questions focused on how frequently students utilized specific smartphone functions to complete class-related tasks. This paper applies a quantitative analysis to this specific battery of questions in an effort to address the research question: Is gender a significant factor in determining the frequency with which smartphones are used to complete informal learning tasks?

Keywords: gender, smartphone*,* mobile learning, task, behavior

Introduction

Smartphone usage among undergraduate students is growing exponentially (Woodcock et al., 2012). The prevalence of these devices in every aspect of student routines presents researchers with the question: how will smartphone usage affect how college students manage their college coursework and task responsibilities?   Initially, this research study sought to address this question through a qualitative analysis of current student interviews. We hypothesized that the level of adoption and how frequently students use their smartphones to manage coursework could indicate the level of impact that smartphones have in a college setting. For this purpose, we took the preliminary step of developing a battery of questions based on observations made while teaching a college-level blended learning class. The initial draft of questions focused on how frequently the students utilized their smartphones to complete specific tasks related to managing their blended-learning coursework inside the classroom. Next, we broadened the scope of the questions to include tasks that could be conducted using a smartphone while outside of the classroom. These were paired down to a final battery of 15 questions testing task frequency for each student, inside and outside of the classroom. Forty-two undergraduate students, 15 males and 27 females, who owned smartphones and were enrolled in a blended learning course at the time of the survey, participated.

After compiling the results, we tested the online survey as a statistical instrument to see if more might be gleaned from the data collected.   We hypothesized that a student's gender could be a key determinant in how frequently students choose to utilize their smartphones to complete different types of

activities relevant to their coursework. This study applies a quantitative analysis to the battery of questions in the online survey, in an effort to test the research question:

> Is gender a significant factor in determining the frequency with which smartphones are used for informal learning tasks?

The outcome of this analysis will provide insight into whether a student's gender might be a predictor of how frequently students use smartphones to complete specific tasks related to managing their coursework.

Literature Review

It has been well-established that gender plays a critical role in the formulation of an individual's personality traits (Bouchard Jr. & Loehlin, 2001). Studies also indicate that specific personality traits have a significant impact on smartphone usage (Lane & Manner, 2011). Clough, Jones, McAndrew, and Scanlon (2008) suggest that smartphones are already, "used extensively in an informal learning context by enthusiasts." Furthermore, extensive research shows a significant difference in how men and women use social networking sites and web-based media, one of the most-used applications on smartphones (Muscanell & Guadagno, 2012; Oulasvirta, Rattenbury, Ma, & Raita, 2011).

Gender differences also relate to purchase decisions by smart phone users. Wilska (2003) examined the relationship of consumption patterns and mobile phone use when adopting mobile phones as a form of new technology. An "addictive" use of mobile phones linked females to "trendy" and "impulsive" consumption styles. Technology enthusiasm and trend-consciousness related males to consumption and "hard" values.

While currently little research exists that shows a connection between gender and smartphone usage for informal learning and the management of undergraduate coursework, gender differences have been studied in technology affinity. Studies indicate that there are differences *of interest* in technology and in perceptions of skills toward technology by gender, with women displaying lower levels of interest (Frantom, Green, and Hoffman, 2002). The Technology Affinity Survey (Knezek, 2011) was designed to assess involvement with communications technology, Internet, and media tools. In a study of 68 teacher preparation candidates (Knezek, Mills, Wakefield, & Hopper, 2011) findings showed gender as a significant ($p < .05$) discriminator for the level of technology affinity. Males were higher in digital technology affinity than females. Morris and Venkatesh (2000) researched the adoption of a new technology in general using the Technology Acceptance Model. Women's technology usage decisions were strongly influenced by their perceptions of ease of use. In contrast, men's were more strongly influenced by their perceptions of usefulness.

Gender differences exist in use of social and web based media, consumption patterns, attitudes and affinity toward technology. Results from the *Smartphone Usage Instrument* (Hopper & Evans, 2012) will explore gender differences in frequency of smartphone tasks and should it prove reliable and valid, could contribute additional findings to the field.

Method

In this study, 42 college students enrolled in a blended learning class answered 15 survey questions about how they use their smart phones. Each question asked the students to rate the frequency with which they used their smartphones to complete a specific task for their class by choosing never, once per month, 2-3 times per month, once per week, 3-5 times per week, every day or several times per day. Participants were able to see all of the questions at one time (as shown Figure 1) and experienced no time limits while completing the survey. An assessment of the survey questions was conducted to test for content validity. The survey questions were clear and understandable and passed the fundamental requirement for content validity (Sireci, 1998).

The instrument proved to be reliable, with a Cronbach's Alpha score of .947 (Cronbach, 1951) (DeVellis, 1991). Dimension reduction through exploratory factor analysis showed two distinct categories of data using varimax criterion (Kaiser, 1958). Two constructs were created based on the categories identified. The first factor centered on using smartphones for logistics and organizational tasks for the course (F1). The second factor centered more on activities that facilitated deeper social relationships, including such tasks as sharing videos or photographs (F2). These categories were also tested for

internal reliability using Cronbach's Alpha and both factors proved reliable (DeVellis, 1991). F1 returned a Cronbach's Alpha of .915 and F2 returned a Cronbach's Alpha of .943. An additional factor analysis which forced 3, then 4 constructs showed no additional factors worth consideration.

Cronbach's Alpha factor scores demonstrated excellent reliability for creating scales, so scales were created accordingly, defined as F1and F2 (DeVillis, 1991). These scales were then tested for criterion-related validity using a one-way ANOVA test with gender as the discriminating factor. We hypothesized that how frequently students use smartphones to support different informal learning tasks would be dependent on gender. Specifically, we predicted that female students would more frequently use their smartphones in activities related to F2, which helped facilitate social relationships and also involved sharing videos or photographs. The results confirmed our hypothesis.

Please indicate how often you use your smart phone for the following tasks in your blended course.	Never	Once per Month	2-3 Times per Month	Once per Week	3-5 Times per Week	Everyday	Several Times per Day
I use my smart phone to check email pertaining to my course from my professor.	O	O	O	O	O	O	O
I use my smart phone to email my professor about questions in my course.	O	O	O	O	O	O	O
I use my smart phone to Google information I need for my course.	O	O	O	O	O	O	O
I use my smart phone to enter due dates on a calendar for my course.	O	O	O	O	O	O	O
I use my smart phone to check the course content (Moodle, Blackboard,etc.) for details about my course.	O	O	O	O	O	O	O
I use my smart phone to check websites I may need for assignments in my course.	O	O	O	O	O	O	O
I use my smart phone to email friends in my class about assignments for my course.	O	O	O	O	O	O	O
I use my smart phone to text my professor about assignments for my course.	O	O	O	O	O	O	O
I use my smart phone to text my friends about assignments for my course.	O	O	O	O	O	O	O
I use my smart phone to call friends about assignments for my course.	O	O	O	O	O	O	O
I use my smart phone to read journals or information for my course.	O	O	O	O	O	O	O
I use apps on my smart phone to assist in my course.	O	O	O	O	O	O	O
I use my camera on my smart phone to complete tasks in my course.	O	O	O	O	O	O	O
I use my video camera on my smart phone to complete tasks in my course.	O	O	O	O	O	O	O
I use my smart phone to watch videos for my course.	O	O	O	O	O	O	O

Figure 1: Survey of Smartphone Usage Instrument frequency. [(Hopper & Evans, 2012)

While F1 was far from showing any significant difference based on gender (p=.798), F2 showed a significance score that did merit further consideration (p =.089). Female students used their smartphones more frequently than male students to facilitate social relationships or share videos and pictures. Though this score failed to meet the threshold for significance where p <.05, the sample size was fairly modest. We then tested the effect size to see if a larger sampling should be considered. The effect size is moderately large, with a Cohen's d =.601 (Cohen, 1988). Due to the moderately large effect size, a slightly larger sample size is worthy of consideration, as this result would be considered educationally significant (Sivin-Kachala, Bialo, & Langford, 1997). By increasing sample size by a modest amount, the

instrument would pass the Criterion validity test, meaning that gender could be a predictive factor in whether the student used their smartphone for high-end social communication and multimedia content.

Conclusion

The Smartphone Usage Instrument tested in this study is reliable. The scales created showed promise in using gender to predict the frequency that undergraduate students will use their smartphones for social relationship tasks and sharing video and pictures in the context of a blended learning class. The effect size is moderately large and with a larger sample size, gender would prove to be a significant predictive factor. Based on these results, we believe this pilot reveals the need for further study on smartphone usage among students in college courses. We intend to make subtle refinements to the instrument, as well as increase our sample size, in an effort to show more conclusively whether gender can be used as a determining factor in predicting the types of tasks students use smartphones to complete when managing college coursework, as well as the frequency with which they complete those tasks.

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