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# CRITICAL FACTORS IN ADOPTION OF PODCASTING FOR EDUCATIONAL USES

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## ***Abstract***

The paper took a semi-grounded theory approach to develop a comprehensive framework of critical factors in adopting podcasting for educational use and showed how these critical adoption factors differ for two groups of users: faculty and students. The paper is theory-rich as it was based on synthesized technology adoption models (i.e., TAM3 and UTAUT) and yet uncovered new adoption determinants. The study also has practical impacts as it can help education administrators to tailor the podcasting adoption plan to different user constituencies.

## ***Keywords:***

Podcasting, technology acceptance, mobile learning, e-learning, functional role, qualitative research

## **1. Introduction**

Mobile technologies have provided a great opportunity to revolutionize the pedagogy, as they enable a learning experience that can be personalized, learner-centered (Sharples, 2000), situated, collaborative (Brown et al., 1989), and ubiquitous (Sharples et al, 2005). That is, empowered with mobile technologies, learners can now take a more proactively role in the process of learning by controlling the pace, timing, locations of learning and by engaging in two-way interactions with the educators, the resources and beyond.

Among the mobile technologies, podcasting has garnered much attention as of late (Kennedy, et. al., 2008). A podcast is a method for distributing digital media file over the Internet for playback on either portable media players (e.g., MP3 player or iPod) or personal computers (Lazzari, 2009). A podcast can be in either an audio or video format, subscribed to or automatically downloaded using free software such as iTunes. In higher education, podcasts enable students and teachers to share and communicate the course materials. Edirisingha et. al (2007) pointed out familiarity with the technology and lowered operational cost have made podcasting ripe for educational uses.

While there has been some research on critical success factors of e-learning technologies in general (e.g., Selim, 2007; Zhao and Cziko, 2001; Volery and Lord, 2000), studies on podcasting acceptance and adoption are still relatively unsystematic and tended to only discover key factors fragmentally. For example, Brown and Green (2007) pointed out that the efforts required for teachers in higher education to produce podcasting materials remain quite significant. Bolliger et al. (2010) found that students' motivation to adopt podcasting is associated with prior online learning experience. O'Bannon, et. al. (2011) concluded that barriers to podcasting adoption include unfamiliarity, technical problems, and not seeing its relevance.

Our study aims to provide a systematic examination on the critical factors in adopting podcasting for educational use. Moreover, it would compare faculty's perspective to students' to shed lights on how to best assist different stakeholders in adopting podcasting for educational use.

Our research questions can be summarized as the following.

RQ1: What are the import determinants for faculty to decide whether they would adopt podcasting for teaching purposes?

RQ2: What are the import determinants for students to decide whether they would adopt podcasting for learning purposes?

RQ3: How are the adoption determinants different between faculty and students for educational uses?

To answer these research questions and develop a comprehensive framework of “context-specific” determinants to adopt podcasting, a semi-ground theory approach was taken. We first created a framework of critical adoption factors by integrating technology adoption determinants from the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, et al. 2003) and Technology Acceptance Model 3 (TAM3) (Venkatesh and Bala, 2008). We then surveyed both faculty and students regarding what would be important for them to adopt podcasting for educational use and coded their answers based on the initial framework of critical adoption factors. The answers that did not fit the coding categories on the framework were labeled and went through several rounds of relabeling and regrouping until new categories eventually emerged. The critical adoption factors between faculty and students were then compared to explore the interaction effects of functional roles and adoption determinants in podcasting adoption for educational uses.

Our study has both theoretical and practical implications. Theoretically, it will enrich the technology acceptance literature by demonstrating how the critical adoption factors will vary depending on functional roles of the users. Practically, the result can help the education administrators design different adoption guidelines for faculty and students, respectively.

## **2. Literature review and theoretical framework**

The Technology Acceptance Model (TAM) (Davis, 1989) has been considered as the most influential and common theory for studying the adoption of information technologies/ systems (Lee et al, 2003). It has been extended to study electronic/mobile learning (Huang and Lin, 2007; Martinez-Torres, et al, 2008; Liu 2008; Cheng and Chen, 2007; Yuen and Ma, 2008).

Recent work has synthesized the multitude of variations and extensions to TAM into a unified theoretical model of technology acceptance and use, such as UTAUT (Venkatesh, et al. 2003) and TAM3 (Venkatesh and Bala, 2008).

The UTAUT compared and grouped the core antecedents to intention to use new technologies in eight technology acceptance models, proposing the four major antecedents in its integral model. The main dependent variables in the UTAUT model are behavioral intention (BI) and use behavior. BI is similar to the *intention to use* (IU)

construct put forth in Davis's (1989) TAM model. The main antecedents to BI include *performance expectancy* (PE), *effort expectancy* (EE), *social influence* (SI), and *facilitating conditions* (FC). The UTAUT was tested and found to outperform eight well-known technology acceptance models in explaining the variance in BI, including the original TAM.

The TAM3 combined TAM2 (Venkatesh and Davis, 2000) and the model of the determinants of perceived ease of use (Venkatesh, 2000) for a nomological network of the determinants of individuals' IT adoption and use (Venkatesh and Bala, 2008).

Table 1: Integral framework based on UTAUT and TAM3

Constructs with \* are TAM3 constructs

<b>Level 1 construct (factors)</b>	<b>Conceptual definition of Level 1 constructs</b>	<b>Level 2 constructs (dimensions)</b>
PE	the degree to which an individual believes that using the system will help improve her job performance	Perceived Usefulness*
		Relative advantage*
		Result demonstrability*
		Job fit*
EE	the degree of ease with which users associated use of the system	Perceived Ease of Use*
FC	the degree to which an individual believes that an organizational and technical infrastructure exists to support system use	Technical support
		Organizational support
SI	the degree to which an individual perceives that important others believe that s/he should use a new technology	Subjective norm*
		Image*
Self efficacy	The degree to which an individual believes that he or she has the ability to perform a specific task/ job using the computer (Compeau and Higgins, 1995a, 1995b).	
Computer anxiety*	The degree of "an individual's apprehension, or even fear, when she/he is faced with the possibility of using computers" (Venkatesh, 2000, p. 349).	
Perceived enjoyment*	The extent to which "the activity of using a specific system is perceived to be enjoyable in its own right, aside from any performance consequences resulting from system use" (Venkatesh, 2000, p. 351).	
Voluntariness	Whether the use of technology is voluntary or mandatory	
Experience	Various stages of experience with a new technology (post training, 1 month after implementation, 3 months after implementations)	

There is a high level of similarity between the UTAUT and TAM3, as Venkatesh et. al. (2003) has grouped many independent-variable constructs in the TAM3 into the four main predictors of BI in the UTAUT: PE, EE, SI and FC, for their conceptual resemblance. Table 1 presents the conceptual definitions of all the constructs in UTAUT and TAM3.

Based on the conceptual similarity between the two models, a framework for coding the adoption determinants was developed. The first level of coding categories are considered as adoption factors, including UTAUT constructs like PE, EE, SI, FC, along with self efficacy (common in both models), computer anxiety (in both), perceived enjoyment (only in TAM3), voluntariness (in both) and experience (in both). For PE, SI and FC, there is a second level of coding categories, as shown in table 1, which can be considered as dimensions of adoption factors in the sense that they further manifest the subtitle conceptual differences within the factors; e.g., perceived usefulness and relative advantages all concerns about PE, but the latter put more emphasis on the comparative usefulness of one technology over another completing or alternative technology.

Several constructs in TAM3 were excluded in the coding framework: objective usability, output quality and computer playfulness, as they cannot be observable with a questionnaire methodology.

### **3. Methodology**

#### **3.1 Data collection**

The data were collected at a small four-year college in the Northeastern United States using a survey methodology. The survey was pilot tested with a small sample of faculty and students before formal data collection commenced. The results of the pilot testing helped revise the questionnaire to clarify any confusion.

#### **3.2 Data analysis**

The data were coded and classified based on the coding framework (table 1) by two independent coders. For the factors that are not on the coding framework, the coders assigned labels freely and then aggregated through multiple rounds of discussions between coders. The disagreement was resolved by a third coder. The count for each factor was then tallied and compared between faculty and students. To ensure the reliability of coding, we adopted the Holsti Agreement index for intra-coder stability and Krippendorff's Alpha value for inter-code reproducibility (Holsti 1969; Pavlou and Dimoka 2006).

### **4. Preliminary Results**

227 faculty and 1892 students were invited to participate. Data were collected from 108 faculty members and 213 students (response rate of 47.58% and 11.26% respectively for each group). After removing invalid or substantially incomplete answers, the final dataset included 96 faculty responses (42.29% response rate) and 153 students (8.14% response rate).

The analysis of preliminary results showed (a) that some factors in the coding framework need to adjust its dimensions (e.g., the effort expectancy factor has a new dimension in content creation efforts), (b) that some factors were unconfirmed empirically (e.g., the image dimension of the SI factor and the computer anxiety factor), (c) that some factors were not on the framework but were uncovered empirically, including the technology factor, the content factor, the service factor, and the contextual factor. The technology factor entails traits of the technology (i.e., hardware) that are important for considering the adoption of podcasting for an educational task. The content factor includes various characteristics of the content that are important to faculty and students for considering the adoption of podcasting for an educational task. The service factor included factors that connote the “perceived mobility” value identified by Seppä-la and Alama`ki (2003). The contextual factor concerns the variables surrounding the use of podcasting, including such dimensions as time constraint and monetary cost.

## **5. Expectations and Findings Thus Far**

The project is at its final analysis stage. The further analysis of the preliminary results and the comparison between faculty and students will be available for presentation in the conference. Theoretical implications of our findings, including comparison to prior literature, will also be presented in the conference.

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