The Effect of Perceived Innovativeness of Student Response Systems (SRSs) on Classroom Engagement

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Abstract

Students’ engagement in classes, especially in the large classes, is a challenge. Information technology (IT) is changing the way of learning in a classroom and use of IT in the education sector has significantly improved effective teaching and the learning process. Student response systems (SRSs) are one of such technologies that can enhance students’ engagement in the classroom environment. The purpose of this study is to understand how SRSs affect students’ motivation to engage in classroom activities. We hypothesized that innovativeness of SRSs, enjoyment and attitude toward SRSs can enhance students’ engagement in classrooms. We will empirically test the hypotheses. The study will help IS researchers and instructors to understand better how students’ engagement in the classroom environment can be augmented using SRSs. The findings of this study will also help in technological solution of SRSs.

Keywords

Student response systems, theory of innovation diffusion, engagement intention, classroom environment

Introduction

Technology is changing the way of learning in a classroom and use of IT in the education sector has significantly improved effective teaching and the learning process (Raman, 2011). Recently, many studies are trying to exploit digital technologies to increase student engagement in teaching and the learning process, because students’ engagement in classroom activities is essential for effective learning (Blasco-Arcas, BuiI, Hernández-Ortega, & Sese, 2013; Hwang, Wu, Tseng, & Huang, 2011; Kim & Kizildag, 2011; Liu & Chen, 2015). Student response systems (SRSs) are one of such technologies that can enhance students’ engagement in the classroom environment.

A SRS is an instructional technology that is used to gather immediate feedback in response to questions posted by an instructor (Chui, Martin, & Pike, 2013; Heaslip, Donovan, & Cullen, 2014; Hoffman & Goodwin, 2006). SRSs may vary in terms of underlying devices but the basic functionality is the same. The system generally utilizes infrared waves, radio waves or a wireless internet signal (Hooker, Denker, Summers, & Parker, 2016). In a SRS, students use a small device that allows them to respond simultaneously to the questions presented by an instructor in the classroom. The SRS server collects the students’ responses and then SRSs software produces a summary of the results. Recently, new free innovative mobile-optimized SRSs (e.g., REEF Poling) are available on any device with a browser and for download as a mobile app for smartphones (Stav, Nielsen, Hansen-Nygard, & Thorseth, 2010).

Most of the SRSs research has focused on students’ achievement and engagement in the class comparing the cases of using and not using SRSs technology in learning (Addi, Alias, Harun, Safri, & Ramli, 2013; Chui et al., 2013; Heaslip et al., 2014; Judson & Sawada, 2002). However, actual engagement in class is much more complex than what expressed by exam scores (Perkins & Unger, 1999). Thus, more research is needed to investigate how SRSs facilitate students’ engagement in a class setting. The purpose of this study is to understand what factors affect students’ motivation to be engaged in classroom activities using SRSs. More specifically, this study investigates following research question: Does perceived innovativeness of SRSs significantly influence students’ engagement in classroom activities using a SRS in the classroom environment?
The remainder of this paper follows. The next section reviews the literature and explains background theories that provide foundation for the framework. The third section presents the research model along with research hypotheses. The fourth section discusses the search methodology and data collection plan. After that, we will briefly discuss expected contributions of this research.

**Literature Review**

Now a days, modern higher-level institutions run large classes because of the staffing and funding problems (Cullen, 2011). Such accumulation of large groups of undergraduate students in the single classroom and spreading this tradition throughout higher-level education increases the possibility of learners' disengagement (Flynn, 2010; Usher & Cervenan, 2005). Engaging students in the classroom, especially in a large classroom is a challenge for the instructors (Addi et al., 2013; Cutler, 2007). In a large classroom, it is impossible for instructors to interact with every student during the class session. When an instructor poses questions to the class, only a few students are able to respond. Some students also feel shy to express their opinion in the classroom. Instructors also cannot have enough time to assess responses of all students. For learning to take place, educators should engage students with technology in the classroom (Salvo, 2002). Students' engagement in the classroom is one of the most essential factors that contributes to the learning outcomes and providing knowledge and skills to students (Addi et al., 2013). Using SRSs, interactive communications between the instructor and students in the classroom can be increased significantly (Blasco-Arcas et al., 2013) . SRSs not only allow every student spontaneously to respond to instructor’s questions, but also compare their responses to that of others’. In the smaller classroom, SRSs allows the instructor to pose difficult questions, preserving option of students’ anonymity. Moreover, to respond correctly, they concentrate on the lecture, in which increases the engagement in the classroom (Stowell & Nelson, 2007).

Using SRSs, instructors can gather a large amount of formative feedback in a short time that encourages students to be attentive to the lecture. Chan, Tam, and Li (2011)) explains, “Timely and high quality feedback is the underlying milestone of formative assessment in promoting students’ individual responsibility for their own learning and thus fostering deep learning” (p. 326). Ioannou and Artino (2010) noted that with SRSs, instructors could conduct formative assessments in real time that help to engage students in the lecture. Furthermore, SRSs provide more accuracy on reviewing the questions that helps the instructor to realize the better picture of students’ understanding (Stowell & Nelson, 2007).

While SRSs offer students’ engagement, students also note a range of enjoyment to use SRSs. Students report that SRSs produce an enjoyable learning environment (Cohn & Fraser, 2016; Ioannou & Artino, 2010; Stowell & Nelson, 2007). They enjoy receiving feedback on how well they understand the course material (Barnett, 2006; FitzPatrick, Finn, & Campisi, 2011; Ioannou & Artino, 2010). They enjoy the interactivity that SRS provide (Barnett, 2006; Ioannou & Artino, 2010).

**Proposed Research Model and Research Hypothesis**

Innovation diffusion theory (Rogers Everett, 1995) provides the general expiation of dissemination of new ideas and things in the social system over time. Slappendel (1996) explains innovation as an interactive and complex process that can be achieved by the interaction of structural influences and the actions of individuals. Recently, Perceived innovativeness has received greater attention to IS researchers and researchers in the IS field have begun to depend on the theory of innovation diffusion to study the implementation and acceptance problem (Agarwal & Prasad, 1997; Brancheau & Wetherbe, 1990; Cooper & Zmud, 1990; Moore & Benbasat, 1991; Prescott & Conger, 1995; Van Slyke, Hao, & Day, 2002). Several studies explain about user perceptions of the innovativeness that influence their adoption decisions towards internet-based IS (Lean, Zailani, Ramayah, & Fernando, 2009; Papies & Clement, 2008; Teo & Pok, 2003). Perceived innovativeness can be considered as a primary predictor of technology adoption in the classroom environment. The innovation diffusion theory provides a set of innovation attributes to operationalize (Rogers Everett, 1995). Using a meta-analysis study, Tornatzky and Klein (1982) found that relative advantage, compatibility, and complexity are the most consistent and significant innovation attributes.

Rogers (1962) suggests that complexity is negatively related to innovation adoption. Any new idea may be classified on the complexity-simplicity continuum. That means simplicity is positively related to innovation adoption and instead of complexity, simplicity is included in this study to measure innovation.
innovation along with attitude towards SRSs use and enjoyment of SRSs use will be the measure of students’ intention to engage in the class and that will provide the theoretical framework for this study. Figure 1 depicts the proposed research model of the study.

Figure 1: Research Model

Compatibility, relative advantage, simplicity

Perceived compatibility refers to the degree to which a system or an idea is perceived as being consistent with the existing values, previous experiences and needs of the potential adopter (Rogers, 1995). Greater consistency with existing values and needs is more preferable because an idea that is more consistent with values and more necessary is less uncertain to the potential adopter and fits more closely with the individual’s life situation. When users find the system or idea consistent with values and more necessary, they consider it more innovative. So, we propose the following hypothesis:

H1a: Perceived compatibility of SRSs has a positive effect on perceived innovativeness of SRSs.

Perceived relative advantage refers to the degree to which a system or idea provides more benefits than its precursor (Rogers, 1995). Relative advantages manifest as increased efficiency, economic benefits, social benefits, time saved or hazards removed (Rogers, 1995). Users always want more effective and more beneficial systems or ideas for their activities. If a system or idea is more beneficial or effective to users than the previous one, it is considered more innovative. So, perceived relative advantage reflects the innovation of a system or idea. Therefore, we propose the following hypothesis:

H1b: Perceived relative advantage of SRSs has a positive effect on perceived innovativeness of SRSs.

Simplicity is the degree to which an idea or a system is perceived as relatively convenient to understand and use (Pothos & Chater, 2002). It is just opposite of complexity defined in Rogers (1995) as complexity is the degree to which an innovation is perceived difficult to understand and use. Though simplicity is similar to the ease of use construct of TAM, still there are some differences. It differs in regards to functionality, construction and so forth. A complex or heavy system or a system that require a lot of components that make it costly can be easy to use but a simple system will be easy to understand along with being free from functional complexities and production complexities. When an idea or system is convenient to understand or use it will be considered as more innovative. Thus we propose the following hypothesis:

H1c: Simplicity of SRSs is positively related to perceived innovation of SRSs.

Perceived Innovativeness

Innovation plays a central role in creating value and sustaining competitive advantage. Du Plessis (2007); p21) notes: “innovation is the creation of new knowledge and ideas to facilitate new business outcomes, aimed at improving internal business processes and structures and to create market driven products and services. Innovation encompasses both radical and incremental innovation.” The significance of innovation is not restricted to business organizations. Damanpour and Schneider (2006) state that innovation is studied in many disciplines and has been defined from different perspectives. To investigate our emerging research question, we have drawn Thompson’s definition (Thompson, 1965);p.2) that simply states: “Innovation is the generation, acceptance and implementation of new ideas, processes products or services”. Seliaman and Al-Turki (2012) in their research on adoption of mobile learning, found that
perceived innovativeness has positive effect on attitude towards mobile use and use intention of mobile phone for learning purpose. Talukder (2012) also explains the positive effect of enjoyment with innovation on attitude in the context of technological innovation adoption. In our research context, when students will find innovativeness in SRSs, they will change their attitude towards the use of SRSs in the classroom. Their perception of innovativeness also increase enjoyment while using SRSs as Kumar and Mukherjee (2013) found significant positive relationship between innovativeness and enjoyment in the context of purchase through mobile devises. Thus we propose the following hypotheses:

H2: When an individual perceives higher innovation of the student response systems, he or she is more likely to perceive higher enjoyment to use the systems.

H3: An individual’s perception higher innovation of the student response systems positively effects on his or her attitude towards SRSs use in the classroom.

H4: An individual’s perception higher innovation of the student response systems positively effects on his or her intention to engage in the class using the system.

Engagement Intention

Chapman (1997)) stated that “. . . something that ‘engages’ us is something that draws us in, that attracts and holds our attention” (p. 3). Engagement is studied in many areas including online shopping (Arnold & Reynolds, 2003), web searching, (Nahl & Bilal, 2007), video games (Read, MacFarlane, & Casey, 2002) and college environment (Kuh, 2003). By exploring engagement in education application area, we have found that attitude (Kappelman, 1995), enjoyment or pleasure (Douglas & Hargadon, 2000) and innovation (Kappelman, 1995) have significant influence on students’ engagement on educational technologies.

Students’ engagement in the classroom is crucial for their performance (Mayer et al., 2009; Shernoff & Hoogstra, 2001). Ahlfeldt*, Mehta, and Sellnow (2005) highlighted the importance of developing students’ engagement in the classroom to increase students’ performance. In the learning literature, students’ engagement has been addressed from different perspectives. While, Gallini and Moely (2003) describe the dimensions of community, academic and interpersonal engagement, Fredricks, Blumenfeld, and Paris (2004) describe in behavioral, emotional and cognitive perspective. In this study, we will consider both approaches of students’ engagement. We can define engagement as the students’ perception which results from his/her interactions with peers and instructors during the learning in the classroom that generates involvement with the topic taught in the class (Fredricks et al., 2004; Gallini & Moely, 2003).

Enjoyment

Enjoyment is another construct that influence the intention to use a technology (Davis, Bagozzi, & Warshaw, 1992). This construct can be interpreted as the degree to which the activity of using the system is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated (Davis et al., 1992). Moon and Kim (2001) found that perceived enjoyment is positively related to attitude towards using a specific source. Praveena and Thomas (2014) in their study of continuance intention to use Facebook found significant relation between perceived enjoyment and attitude. Though the main goal of a user is use of a system to solve a problem in an easier way, enjoyment in using SRSs play an important role to form a positive attitude towards SRSs use as well as to form the intention to be engaged in the class using the system. Hence, the hypothesis below is proposed.

H5: Enjoyment in attending to lecture using SRS has positive effect on attitude towards SRSs use in the classroom.

H6: Enjoyment in attending to lecture using SRS has positive effect on intention to engage in classes using the system.

Attitude

Attitude refers to the degree to which an individual is favorably or unfavorably inclined towards something (Fishbein & Ajzen, 1975). Ajzen (1989) describes attitude as a pre-disposition to respond favorably or unfavorably to an object, person, event, institution, or another discriminable aspect of the individual’s world. Attitude towards using a system is a strong determinant of behavioral intention to use that system (Davis, 1989). Various researches in different research context have examined the mediating role of attitude in acceptance of a system (Chau & Hu, 2001; Davis, 1989; Hsu & Lu, 2004). When students will have a
positive attitude towards SRSs use, they will have a positive intention to be engaged in the class using SRSs. Thus, we can propose following hypothesis:

H7: The higher the positive attitude towards SRSs use in the class, the higher the intention to be engaged in the class.

Research Methodology

To test the proposed model, we will collect empirical data from students in classroom setting. Measurement items for each construct are adopted and revised from previously validated items of literature. The measures of three types of innovation characteristics were adopted from the study by Ostlund (1974)) and (Tornatzky & Klein, 1982). For the data collection procedure, we will follow following steps. First, we will give survey participants an introduction about the SRSs to make them clearly understand the systems. Next, we give them several excise quizzes to answer questions using SRSs. After that, we will ask them to participate in the survey to provide their perceived innovation characteristics of SRSs, usefulness, enjoyment and future engagement intention based on their actual experiences of the systems.

Expected Contributions

The study will help IS researchers and instructors, as well as general students to understand better how students’ engagement in the classroom environment can be augmented using SRS. The findings of this study will also help in technological solution of SRSs.

Selected References


