

# Using Clickers in a Large Business Class: Examining Use Behavior and Satisfaction

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## **Abstract**

As more and more institutions are integrating new technologies (e.g., audience response systems such as clickers) into their teaching and learning systems, it is becoming increasingly necessary to have a detailed understanding of the underlying mechanisms of these advanced technologies and their outcomes on student learning perceptions. We proposed a conceptual model based on the technology acceptance model (TAM) to understand students' use behavior and satisfaction with clickers. The valid response from 138 second year business students of Digital Marketing module of taught in a British University, where clickers are extensively used in the teaching and learning process, made the basis for data analysis. The results provided a strong support for the proposed model with a reasonably adequate variance (i.e., adjusted  $R^2$ ) of 67% on behavioral intentions and sufficiently high variance on use behavior (i.e., 86%) and user satisfaction (i.e., 89%).

## **Keywords**

Clickers, Adoption, Success, Students, Digital Marketing, TAM

## **Introduction**

Technology is regularly used in an effort to increase student engagement and thought to improve student outcomes (Clark and Feldon, 2005). In an effort to accomplish a vibrant learning environment in which students actively participate, the faculties need to include tools and technologies that would effectively enhance class participation (Butler et al., 2001; Fryling, 2013). A number of such classroom response technologies have been used to allow students to take part in real time polling and assessment in the class (Hoanca, 2013). Examples of such technologies include Clickers (Oigara and Keengwe, 2013), WebCT (Blasco-Arcas et al., 2013), ClassQue (Robbins, 2011), and poll-sheet (Gain, 2013) to name a few. Higher education has recently received considerable criticism as researchers have

suggested that undergraduates learn little while they are in school (Arum and Roksa, 2011; Pascarella et al., 2011). Business education has received some of the harshest criticism as studies have found business undergraduates spend less time studying and have smaller gains on standardised tests than other undergraduates (Glenn, 2011). These problems are likely partially attributable to business students' lack of engagement and accountability, problems that are aggravated by large class sizes at many colleges and universities (Arum and Roksa, 2011; Hedgcock and Rouwenhorst, 2014; Pascarella et al., 2011). An increasingly adopted classroom technology to address these issues is student response systems (or "clickers") (Hedgcock and Rouwenhorst, 2014; Hoanca, 2013; Oigara and Keengwe, 2013). Our experience of using clickers in a large classroom setting also designates that clickers tend to be an effective tool for delivering quality and engaging lectures, enhance students' participation in the learning process, and provide them effective feedback on time (Raska, 2014). In the time of intense competition among universities to attract students from across the country, the use of a technology like clickers in the classrooms would give weightage to the universities' overall drive to promote quality education.

Despite recent interests in the role of clickers, several aspects prevent researchers from fully understand its influence on student learning (see Kay and LeSage, 2009). Firstly, existing knowledge on clickers is primarily imparted through qualitative research. Such studies provide little direction toward understanding the mechanism through which clickers influence the student learning process (Blasco-Arcas et al., 2013). For example, studies by Mula and Kavanagh (2009) in the introductory accounting context, Nelson and Hauck (2008) in the undergraduate management information systems context, and Stowell and Nelson (2007) in an introductory psychology context only report improvement of student learning and satisfaction with courses using clickers, relative to non-clickers-using courses. Secondly, there is a lack of quantitative studies, which, if based on sound theory, would help us better

understand the role of clickers in student learning and the underlying mechanisms (Blasco-Arcas et al., 2013; Fies and Marshall, 2006; Keough, 2012) that explain the ensuing impact on their intention to use and satisfaction outcomes. Thirdly, there has not been any effort made till date to explore the most widely technology adoption model like the TAM to analyse the usefulness and ease of use of clicker technology to understand students' behavioral intentions and satisfaction with it. Also, analysing student behavioral intentions and satisfaction is important as it would allow educational institutions to understand whether using the expensive technology like clickers really adds to the values they intend to provide to the quality of education or not.

Moreover, the prior research on clickers has been conducted on a limited set of educational settings, mainly on technical and scientific subjects such as such as mathematics (e.g., Roth et al., 2012), chemistry (e.g., Flynn, 2011), engineering (e.g., Laxman, 2011; Stehling et al., 2013), computer science (e.g., Gain, 2013), and astronomy (e.g., Hoekstra and Mollborn, 2012) and none of them have explored the use and subsequent satisfaction with this technology. It would be timely to partially fill in this this research gap by analysing students' perceptions on clickers in the social science perspective. Therefore, the objective of this research is to understand students' perception about the use of clickers in the Digital Marketing and explore their use behaviour and satisfaction with clickers in the context of this module. To do so, we found the TAM as an appropriate basic adoption model and also measured satisfaction as an external construct to test around it.

## **Literature Review**

Recent years have seen exceptional possibilities for the use of different educational techniques and technologies to improve learning in the marketing courses (Lowe and Laffey, 2011). Various literature studies in the area of marketing education have used different alternative techniques and tools for students' learning. These techniques are listed in Table I

and briefly described below before presenting a detailed review of literature on clickers, which is the main focus of this paper.

The literature related to alternative techniques indicates that they are quite diverse in nature. In order to identify such techniques, we explored the literature of last ten years (i.e., 2005 up to 2014) from *Journal of Marketing Education* and found 20 different techniques other than clickers that have been used as an aid to enhance teaching and learning in marketing discipline.

The review indicates that Twitter was used by couple of studies (i.e., Lowe and Laffey, 2011; Rinaldo et al., 2011). Lowe and Laffey (2011) revealed that the results from the Twitter project provided strong evidence that Twitter enhanced a number of learning outcomes (e.g., using Twitter makes marketing examples more accessible, using Twitter is more enjoyable, enhances brevity of communication etc.) in the course for Twitter followers. Rinaldo et al. (2011) argued Twitter to have numerous benefits (e.g., less bounded as a community like Facebook, ability to receive RSS feeds without logging in, interactive messaging etc.) for marketing educators who are interested in engaging students in experiential learning. Similarly, couple of studies (i.e., Mills, 2010; Weinrauch, 2005) also talked about musical metaphors as the key to marketing education. For example, Weinrauch (2005) provided the role, scope, instructional experiences, and prospects of implementing musical metaphors as a prospective teaching tool in the marketing education to improve student learning. Similarly, Mills (2010) also discussed how the metaphor of Jazz music can help the instructor in facilitating students' learning of the more fundamental and particular skills that make up the course.

Raska (2014) used Web-based peer benchmarking as a performance-enhancing feedback tool that allows instructors to make clear references in their comments and suggestions to

excellent works of students' peers in a given assignment. Loughry et al. (2014) described the way to set free web-based tools available at [www.CATME.org](http://www.CATME.org) that allows colleges to collect data to find whether their students are developing good team skills and display accomplishment for accreditation reviews. Brennan and Vos (2013) suggested using simulation game to improve marketing students' numeracy and financial skills. A similar tactic was used by Bascoul et al. (2013) who demonstrated the use of novel business game as the basic cornerstone for the development of a wider understanding of the environmental impact of marketing decisions. Mills et al. (2013) suggested presenting graphic cartoons as an educational tool and means of bringing humour into the marketing classroom. Moreover, Das (2012) presented a discussion on the participatory photo novel as an innovative pedagogical tool. This method puts the responsibility of learning to the students and allows them to co-create content further learn it through classroom discussions.

Buzzard et al. (2011) found that students preferred more traditional instructional technologies such as online whiteboards, online quiz, multi-player games, communication tools, office suites, websites, social networking etc. for effective engagement and learning. Dowell and Small (2011) indicated that use of online resources has a significant and positive impact on the students' grade. McCabe and Meuter (2011) found that although students enjoyed using the various course management tools (such as email, chat and discussion tools, Blackboard), they don't see them highly efficient at improving their learning experience. Debusse and Lawley (2011) outlined the development of an innovative computer-based marketing tool called SuperMarkIt (SMI) to promote sustainability. The expected student benefits of using SMI include fast turnaround, standardisation, and equity.

Steward et al. (2010) introduced Madeline Hunter Direct Instruction Model (HDIM) to considerably improve student learning through course-embedded assessment. The effectiveness of the method was explained in three different marketing courses that resulted

in significantly higher student achievement on assessments in comparison to non-HDIM instruction for the same topic. Aylesworth (2008) argued that by establishing the “improv mind-set” in the business classroom, an instructor may be able to overcome some of the problems linked with the case method (e.g., shy students, dominating students etc.). Clarke III et al. (2006) examined the use of visual summaries (e.g., flow charts, diagrams, timelines, films etc.) as an instructional technique for visual learners. The findings indicated that use of visual summaries along with more traditional instructional approaches can enhance students’ performance and overall course satisfaction on specific marketing topics. Pearson et al. (2006) followed the development of computerised in-basket exercise in the sales management classroom. This exercise provided significant benefits including quantitative, immediate, and consistent feedback to students over regular in-baskets. Ng (2006) showed how photoessays should be constructed and instructed to facilitate marketing education. The findings indicated that the use of this technique provides student understanding, cognitive efficiency, and motivation to learn the marketing modules.

To continue to maintain class interest, focus, and motivation, today’s students expect more visually inspiring content and integration of technology into their lessons (Smart et al., 1999; Sprague and Dahl, 2010). The use of clicker technology into teaching pedagogy has created implications for teaching practice, student satisfaction, engagement, active learning (Sprague and Dahl, 2010), immediate feedback, and performance (Hedgcock and Rowenhorst, 2014) to name a few.

**Table I.** Potential educational tactics/assignments useful for marketing courses

Potential Educational Tactics	Students’ Education Level	Source(s)
Twitter	[1]Postgraduate (marketing), [2]Upper level consumer behavior	[1] Lowe and Laffey (2011), [2] Rinaldo et al. (2011)
Jazz metaphor/Musical metaphors	[1]Not specified, [2] Undergraduate	[1] Mills (2010), [2] Weinrauch (2005)
Web-based peer benchmarking	Undergraduate	Raska (2014)
CATME system	Undergraduate	Loughry et al. (2014)
Simulation game	Undergraduate (Final Year)	Brennan and Vos (2013)
Experiential business game	Undergraduate	Bascoul et al. (2013)

Cartoons	Undergraduate	Mills et al. (2013)
Participatory photo novel	Postgraduate	Das (2012)
Traditional digital tools (e.g., online whiteboards, online quiz, multi-player games)	Not specified	Buzzard et al. (2011)
Online resource materials	First Year On-Campus/Distance Education	Dowell and Small (2011)
Course management software	Undergraduate	McCabe and Meuter (2011)
SuperMarkIt (SMI)	Mixed	Debusse and Lawley (2011)
Madeline Hunter Direct Instruction Model (HDIM)	Mixed	Steward et al. (2010)
Improv mind-set	Not specified	Aylesworth (2008)
Visual summaries (e.g., flow charts, diagrams, timelines, films etc.)	Undergraduate	Clarke III et al. (2006)
Computerised in-basket exercise	Not specified	Pearson et al. (2006)
Photoessays	Postgraduate	Ng (2006)

Having presented a brief review of alternative educational tools and techniques, we now move on to present a detailed literature review related to the use of clickers. A total of 33 studies (e.g., Blasco-Arcas et al., 2013; Fryling, 2013; Guthrie and Carlin, 2004; Han and Finkelstein, 2013; Marshall et al., 2012; Sprague and Dahl, 2010; Thoms and Williams, 2010) have researched clickers in the field of business and management. The review of literature indicates that 23 of these studies are qualitative whereas only 10 are quantitative in nature. Qualitative studies (e.g., Bain and Przybyla, 2009; Fryling, 2013) have largely analysed the mean and standard deviations of the responses on the data gathered on different scales and reported the students' or instructors' perceptions about the use of clickers in small and large classroom settings. For example, Bain and Przybyla (2009) conducted a survey asking students their perceptions of how student response systems influenced their behaviour inside and outside of the classroom.

Similarly, Fryling (2013) found that use of clickers resulted in improving class participation. The literature review also suggests that questions related to students' engagement, performance, participation, feedback, active learning experience, satisfaction, attendance, and attitude were some of the most explored items explored and analysed across the different studies. For example, some studies (e.g., Fryling, 2013) analysed how use of clickers

enhances students' engagement and participation whereas some others (e.g., Premuroso et al., 2011) explored their performance and satisfaction. Sprague and Dahl (2010) examined student attitudes and preferences and measured student performance outcomes relating to the use of clickers in introductory marketing courses. The study found the evidence that clickers benefit those students who were frequently disadvantaged in the classroom. However, findings of these studies are exploratory in nature and deserve further investigation.

Moreover, some studies (e.g., Blasco-Arcas et al., 2013; Chui et al., 2013; Dunnett et al., 2011; Eastman et al., 2011; Lojo, 2009) are quantitative in nature and examined the different factors including student performance, attitude, satisfaction etc. but are largely inconclusive and need additional attention. For example, Chui et al. (2013), Dunnett et al. (2011), Keough (2012), and Lojo (2009) have just analysed mean, standard deviations, and hypothesis-based t-test to analyse certain factors such as students' performance, attendance, and satisfaction for clicker and non-clicker users and compare these statistics to understand their perceptions on clickers use.

Although a couple of studies (e.g., Blasco-Arcas et al., 2013; Eastman et al., 2011) have devised models and tested them using structured equation modelling, they were largely based on the selection of some of the frequently encountered factors that influence students' attitude, satisfaction, and overall performance using clickers. For example, Blasco-Arcas et al. (2013) examined the impact of learning and engagement on student performance. Similarly, Eastman et al. (2011) examined whether the students' perception of interactive technology in terms of attention and preparation lead them to their attitude toward and satisfaction with it. However, none of the studies of business and management have ever examined any technology adoption model to understand how they perform in context of clicker technology. To fill in this research gap, this study will test the extended TAM model



to understand how the ease of use and usefulness of clicker technology impact students' behavioural intention, use behaviour, and their overall satisfaction with it.

Based on the literature review of *Journal of Marketing Education* (JME) of last 34 years, Gray et al. (2012) emphasised the need for data-driven articles as they are increasingly more common place in *JME*, and they expect this trend to continue. Deriving from the literature review of empirical research in general and considering the recommendation provided by Gray et al. (2012), this study would provide a timely and useful contribution in terms of publishing empirical research in this area.

## **Research Model Development and Hypotheses**

### *Theoretical Background – TAM Model*

Determinants of information systems (IS) acceptance and use have been addressed for technologies ranging from personal e-mail to enterprise resource planning systems (e.g., Davis, 1989; Taylor and Todd, 1995). Over the years, of the many models to study adoption of information technology, Davis' (1989) TAM has been found as the most widely applied (Yao and Murphy, 2007) robust, powerful, and parsimonious model explaining user's technology acceptance in a variety of contexts such as social networks, e-shopping, online games, and healthcare to name a few (Teo et al., 2012). The TAM is an adaptation of the theory of reasoned action (TRA) and was specifically introduced to explain computer usage behaviour (Davis et al., 1989). The TRA was introduced by Fishbein and Ajzen (1975) in order to understand behavioral intention. In TRA, the behavioral intention of performing a specific behavior is determined by a personal factor (i.e., attitude toward the behavior) and a social factor (i.e., subjective norm). TAM is one of the well-established models (based on the TRA) to predict user acceptance and many researchers have used this model to explain user acceptance of various systems (Gefen et al., 2003). The TAM, in either in its original or modified forms, is a popular model for understanding the level to which individuals choose to

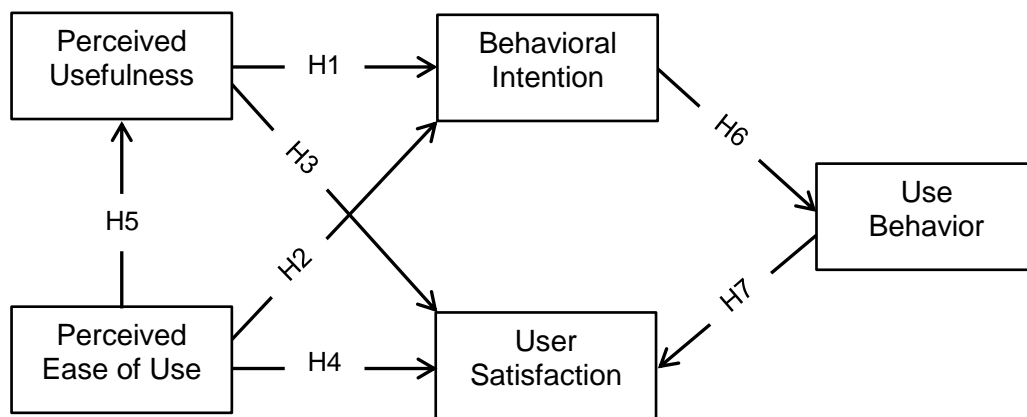
engage with various types of technologies (Buchanan et al., 2013). It posits that *perceived usefulness* and *perceived ease of use* influence one's *behavioural intention* to use a system, which, in turn, determines actual system usage. Davis defines *perceived usefulness* as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989), and *perceived ease of use* as “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989). The model also posits that *perceived ease of use* is predicted to influence *perceived usefulness*, because the easier a system is to use, more useful it can be (Davis et al., 1989).

While the original TAM formulation has been widely used, a number of extensions to the basic model have also been developed. What these have in common is that they tend to extend the scope of the TAM by adding additional variables (Buchanan et al., 2013). Dishaw and Strong (1999) recommended that the TAM be studied further to obtain more insights into its validity. Another recommendation is to include other variables so that technology integration can be better explained and a wider perspective can be introduced within the TAM framework (Legris et al., 2003). Arising from these suggestions, researchers have found and examined the relationship between the external factors and those specified in the TAM (Teo et al., 2012). One such area of particular practical interest is to include satisfaction as an external variable to the basic TAM model. As such framework has not yet been used for exploring students' intentions and satisfaction with the pedagogical technology such as clickers in any prior studies, this would be timely to use the TAM model to understand the impact of usefulness and ease of use of such tool in the classroom beyond merely using it as a device to capture students' attendance.

### *Overview of Proposed Research Model*

When used in the new fields of study, the TAM often needs to be adapted or expanded to suit the characteristics of the specific service (Colesca and Dobrica, 2008). Hence, while

implementing the TAM as a basic model for measuring the adoption and success of clicker technology, we included *user satisfaction* as an additional construct along this model. To see the model in the broader perspective, *perceived ease of use* and *perceived usefulness* were considered as not only the determinants of *behavioural intentions* as specified in the TAM model, but these variables are also presented to determine the students' satisfaction. Among all the variables that may contribute to system use, research suggests that *perceived usefulness* and *perceived ease of use* are especially important as ways of measuring user satisfaction with IS (Davis, 1989; Venkatesh and Davis, 1996).



**Figure 1.** Proposed Research Model (Source: Davis, 1989)

Mawhinney and Lederer (1990) stated *user satisfaction* being strongly related to the *perceived usefulness* of the IS. Moreover, student's actual system use is also considered to be a direct determinant of his/her satisfaction with the technology. DeLone and McLean (1992) IS success model posits that positive experience with "use" will lead to a greater "user satisfaction" in a causal sense. Also, as per the basic TAM model, *perceived ease of use* was considered as the antecedent of *perceived usefulness*.

Considering support for the various relationships along the basic TAM model, the proposed research model (see Figure 1) postulates that *perceived ease of use* and *perceived usefulness* will have a positive and significant impact on both *behavioural intention* and *user satisfaction*. *Behavioral intention* will have a positive and significant impact on *use*

*behaviour*, which, in turn, positively determines *user satisfaction*. Also, *perceived ease of use* will have a significant impact on *perceived usefulness*.

### *Hypotheses Development*

As illustrated in Figure 1, a total of seven hypotheses are proposed based on the relationships between five constructs.

*Perceived Usefulness*. This construct follows from the definition of the word “useful” i.e., capable of being used favourably. Robey (1979) theorised that a system that does not help users perform their jobs is not likely to be received valuably in spite of careful implementation efforts. Prior research provides the theoretical premises that underlie the relationship between perceived usefulness and user acceptance (e.g., Davis et al., 1989) and substantial empirical evidence was found in support of the significant impact of perceived usefulness on behavioral intentions (e.g., Calisir et al., 2014; Davis, 1989; Davis et al., 1989; Kim and Lee, 2014; Kucukusta et al., 2015; Rana et al., 2015; Venkatesh and Davies, 1996). Similarly, Studies (e.g., Joo et al., 2011; Kim and Lee, 2014; Rai et al., 2002; Seddon, 1997) establishing IS success have theorised the relationship between *perceived usefulness* and *user satisfaction*. Therefore, we hypothesise:

H1. *Higher levels of perceived usefulness are positively related to higher levels of student’s behavioral intention to use the clickers in Digital Marketing class.*

H3. *Higher levels of perceived usefulness are positively related to higher levels of student’s satisfaction while using clickers in Digital Marketing class.*

*Perceived Ease of Use*. This construct follows from the definition of “ease”, which indicates freedom from difficulty or great effort. Effort is a finite resource that an individual might allocate to the different activities for which he or she is responsible for (Radner and Rothschild, 1975). All else being equal, an application perceived to be easier to use than another, is more likely to be accepted by users (Davis et al., 1989). There is extensive

empirical evidence accumulated over a decade that *perceived ease of use* significantly linked to intention, both directly and indirectly via its impact on perceived usefulness (e.g., Davis et al., 1989; Venkatesh, 1999). Rai et al. (2002) empirically assessed the Seddon IS success model (Seddon, 1997) and specified *user satisfaction* as influenced by *perceived ease of use*. Moreover, prior studies (e.g., Chiu et al., 2005; Joo et al., 2011; Roca et al., 2006; Verhagen et al., 2011) on IS continuance intention have also advocated the positive impact of *perceived ease of use* on *user satisfaction*. Therefore, we hypothesise the following hypotheses:

H2. *Perceived ease of use will have a positive and significant impact on student's behavioral intention to use clickers in Digital Marketing class.*

H4. *Perceived ease of use will have a positive and significant impact on student's satisfaction with use of clickers in Digital Marketing class.*

H5. *Perceived ease of use will have a positive and significant impact on perceived usefulness.*

*Behavioral Intention.* The TAM posits that an individual's actual use of a new technology depends on his or her intentions (Cheung and Vogel, 2013; Davis et al., 1989; Im et al., 2011; Martins et al., 2014), such that behavioral intentions fully mediate the impacts of other variables on the actual use of technology. Prior research suggests that behavioral intentions explain 40-60% of the variance in actual technology use (Venkatesh and Davis, 2000). We similarly expect that factors that influence students' intention to use clickers also affect their actual use of the technology, as mediated by their intentions. Therefore, we hypothesise:

H6. *Student's behavioral intentions to use clickers relates positively to his or her actual use of the technology.*

*Use Behavior.* As was true in the original formulation of the DeLone and McLean (1992) Model, *use* and *user satisfaction* are closely interrelated. Moreover, *use* must precede *user satisfaction* in a process sense, but positive experience with *use* will lead to greater *user satisfaction* in a causal sense (see Maillet et al., 2015). Therefore, we hypothesise:

*H7. Student's actual use of clickers relates positively to his or her satisfaction with this technology.*

## **Research Methodology**

The sample for this study was gathered from level two undergraduate business students of a British University about their perception on using clickers in the Digital Marketing module. Every student is given this device at the time of their admission in the university. The students primarily use this device for registering their attendance across all the modules. However, it is also used as an effective tool for student engagement and active participation in teaching and learning process across various modules including Digital Marketing. The use of clickers by students to record their attendance and responding to the multiple-choice questions asked by the faculty during the lecture is voluntary in nature. As the survey was conducted on the students for the second year of their undergraduate programme, they have been quite familiar with handling this device. Clickers use Microsoft's Office PowerPoint in building the content of the module using the TurningPoint application and allow embedding various multiple-choice questions related to the topic of teaching to understand students' attentiveness and engagement with the module. Students have liked this pedagogical technique for better and in-depth understanding of the course.

There are a total of 151 students for this module. We conducted a paper based questionnaire survey to understand students' perception on the use of clickers and asked them 16 different items (see Appendix A) related to five variables included in the proposed research model. In other words, all questions asked in the questionnaire represent students' perceptions on using the clickers in the digital marketing module. Moreover, one question was asked related to respondents' gender. The survey items were measured using seven-point Likert scale ranging from [1] - (strongly disagree) to [7] - (strongly agree). We conducted this survey during the lecture and seminar sessions to get hold of maximum number of students for about two

weeks. In other words, the survey was conducted during the sixth and seventh weeks of the term teaching during the first and second weeks of November 2014. We distributed this questionnaire to 140 students who were available during the lecture and lab sessions during the specified time. Two questionnaires were removed from the overall returned responses as they were found incomplete during the scrutiny. Hence, we were left with 138 valid responses for the final analysis. This research is based on the structural equation modelling (SEM) analysis of latent variables using AMOS 20.0 to develop a research model that represents the seven relationships among the five proposed constructs measured using 16 items.

## Results

As per the questionnaire results, of the overall 138 responses, the male students accounted for 60% of the sample whereas 40% were female students. The remaining sections will present the descriptive statistics, measurement model, and structural model testing for the constructs of the proposed research model.

### *Descriptive Statistics*

Table 2 presents mean, standard deviation, and Cronbach's alpha for each construct used in the proposed research model. The mean values for all constructs were found close to six on the Likert scale of [1-7] with '7' representing 'strongly agree'. This indicates that users responded favourably about the clickers at large. A reasonably moderate standard deviation around one for all the constructs indicate that users' views were not quite divergent as far as their perception about using clickers in the module is concerned.

**Table 2.** Mean and Standard Deviation (SD) of Items (N=138)

Construct	Mean	SD	Cronbach's Alpha ( $\alpha$ )
Perceived Usefulness (PU)	5.73	0.78	0.74
Perceived Ease of Use (EU)	5.81	0.80	0.76
Behavioral Intention (BI)	5.93	0.90	0.90
Use Behavior (UB)	5.97	0.90	0.76
User Satisfaction (US)	5.67	1.03	0.87

Reliability analysis was implemented using Cronbach's alpha. It is used for evaluating the reliability of the scale that provides an indication about the internal consistency of the items measuring the same construct (Hair et al., 1992; Zikmund, 1994). Cronbach's alpha (see Table 2) for all the constructs was found to exceed the recommended minimum acceptable level of 0.70 (Hair et al., 1992; Nunnally, 1978).

### *Measurement Model*

The study tested the convergent and discriminant validity of the scales using confirmatory factor analysis (CFA) as part of justifying the measurement model. Anderson and Gerbing (1988) recommended three ad hoc tests for convergent validity. Table 3 shows the standardised factor loadings (SFLs), composite reliabilities (CRs), and average variance extracted (AVE) for this purpose. SFLs are representative of the level of association between scale items and a single latent variable. The loadings are found highly significant in all cases. CRs, similar to Cronbach's alpha, were found well beyond the minimum limit of 0.70 (as recommended by Hair et al., 1992; Nunnally, 1978) in each case. AVE estimates are measures of the variation explained by the latent variable to random measurement error (Netemeyer et al., 1990) and ranged from 0.57 to 0.87 for all constructs. These estimates are found way beyond the recommended lower limit of 0.50 (Fornell and Larcker, 1981). Hence, all three tests related to convergent validity of the scales were supported.

**Table 3.** Results of Confirmatory Factor Analysis

Measure	SFL	CR	AVE
Perceived Usefulness (PU)			
PU1	0.55		
PU2	0.75	0.75	0.62
PU3	0.82		
Perceived Ease of Use (EU)			
EU1	0.53		
EU2	0.77	0.75	0.57
EU3	0.58		
EU4	0.72		
Behavioral Intention (BI)			
BI1	0.91	0.90	0.87
BI2	0.80		



BI3	0.87		
Use Behavior (UB)			
UB1	0.50		
UB2	0.71	0.77	0.66
UB3	0.93		
User Satisfaction (US)			
US1	0.82		
US2	0.85	0.87	0.82
US3	0.82		

Discriminant validity was also measured using the test recommended by Anderson and Gerbing (1988). To pass this test, the factor correlation between a pair of latent variables should be less than the square root of AVE (shown along the diagonal of the table in bold fonts) of each variable as shown in Table 4 through factor correlation matrix. The evaluation of this validity indicates that the square root of AVE for each variable as shown along the diagonal of Table 4 is always greater than the correlation value for any pair of variables. For example, correlation between *use behaviour* and *behavioural intention* is 0.75, which is less than the square root of AVE shown along the diagonal of both these variables (i.e., 0.81 and 0.93 respectively). In other words, a variable is considered to be different from other variables if the square root of the AVE for it is greater than its correlations with other latent variables (Smith and Barclay, 1997), which is satisfied for every variable of the proposed research model of the current study.

**Table 4.** Factor Correlation Matrix

Variable	PU	EU	BI	UB	US
PU	0.79				
EU	0.51**	0.75			
BI	0.67**	0.51**	0.93		
UB	0.62**	0.49**	0.75**	0.81	
US	0.70**	0.57**	0.75**	0.68**	0.91

[Note: Square root of AVE on Diagonals in Bold] [\*p<0.05, \*\*p<0.01]

### *Structural Model Testing*

The overall model fit looks adequate as can be seen from Table 5. The test of overall model fit resulted in a  $\chi^2$  value of 134.24 with degrees of freedom of 94 and a probability value of less than 0.001. The significant p-value indicates that the absolute fit of the model is less than desirable. However, although the  $\chi^2$ -test of absolute model fit is sensitive to sample size and non-normality, a better measure of fit is  $\chi^2$  over degrees of freedom. This ratio for the

proposed model in this study is 1.428, which is within the suggested [3-1] bracket (Chin and Todd, 1995; Gefen, 2000).

In addition to the above-mentioned ratio, we also report some of the fit indices. Descriptive fit statistics compare a specified model to a baseline model, typically the independence model, with a view to show the superiority of the proposed research model. We report the Goodness-of-Fit index (GFI), the adjusted GFI (AGFI), the Comparative Fit Index (CFI), and the Tucker-Lewis index (TLI). Gerbing and Anderson (1992) found CFI as one of the most stable and strong fit indices. We also report RMSEA (Root Mean Square Error of Approximation), which measures the discrepancy per degree of freedom (Steiger and Lind, 1980).

**Table 5.** Model Fit Summary for the Research Model

Fit Statistics	Recommended Value	Model Value
Chi-Square ( $\chi^2$ )/Degree of Freedom (DF)	$\leq 3.00$	134.24/94=1.43
Probability Value (p)	$> 0.05$	0.004
Goodness of Fit Index (GFI)	$\geq 0.90$	0.90
Adjusted Goodness of Fit Index (AGFI)	$\geq 0.80$	0.86
Comparative Fit Index (CFI)	$\geq 0.90$	0.97
Tucker-Lewis Index (TLI)	$\geq 0.95$	0.96
Root Mean Square Error Approximation (RMSEA)	$\leq 0.08$	0.06

The GFI should be at or above 0.90 (Hoyle, 1995), while the AGFI should be at or above 0.80 (Chin and Todd, 1995; Segars and Grover, 1993). The CFI statistics should be at or above 0.90 (Bentler and Bonett, 1980; Hoyle, 1995). TLI is more restrictive and requires a value of 0.95 or above (Hu and Bentler, 1999). Finally, RMSEA has been suggested to represent a reasonable error of approximation and indicative of good fit between the hypothesised model and the observed data if it is below the more restrictive threshold of 0.06 (Hu and Bentler, 1999). Table 5 illustrates these statistics and found all of them within the recommended levels.

Having established the relative adequacy of the model's fit, it is suitable to examine individual path coefficients corresponding to our hypotheses. This analysis is presented in

Table 6. All seven hypotheses are supported. *Perceived usefulness* and *perceived ease of use* significantly influenced *behavioral intention* (i.e., H1 and H2) and *user satisfaction* (i.e., H3 and H4) whereas later found positively influencing the former (i.e., H5) as well. Moreover, *behavioral intention* significantly influenced *use behavior* (i.e., H6), which in turn, significantly determined *user satisfaction* (i.e., H7).

**Table 6.** Path Coefficients and Hypotheses Testing

Constructs' Relationship	Standardised Regression Weight	Critical Ratio (CR)	Significance (p)	Hypothesis-Supported (YES NO)
PU→BI	0.62***	4.90	p<0.001	H1-YES
EU→BI	0.26*	2.23	p=0.03	H2-YES
PU→US	0.28*	2.12	p=0.03	H3-YES
EU→US	0.24*	2.20	p=0.03	H4-YES
EU→PU	0.69***	5.94	p<0.001	H5-YES
BI→UB	0.93***	5.96	p<0.001	H6-YES
UB→US	0.54***	3.87	p<0.001	H7-YES
R <sup>2</sup> (BI)	0.67			
R <sup>2</sup> (UB)	0.86			
R <sup>2</sup> (US)	0.89			

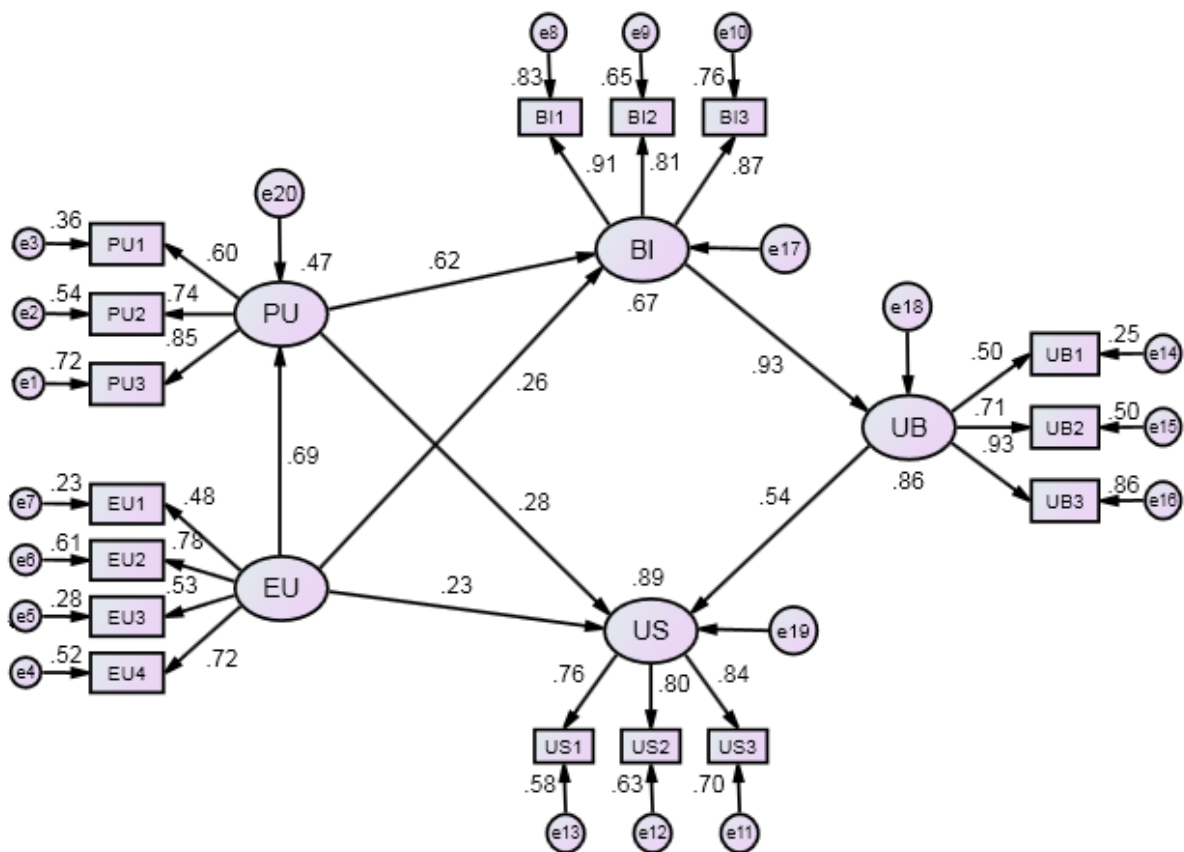
[Legend: CR: Critical Ratio, p: Significance: \*p<0.05, \*\*p<0.01, \*\*\*p<0.001]

Figure 2 shows the validated research model with path coefficients and significance of each relationship. It also demonstrates the variance of the model shown on each of the three dependent variables (i.e., *behavioral intention*, *use behavior*, and *user satisfaction*). A significantly high variance shown by the model shown on BI (i.e., 67%), UB (i.e., 86%), and US (i.e., 89%) indicates that the fundamental combination of variables used in this research model is extremely significant and determines a large proportion of relevant variables in the model.

## Discussion

As more and more educational institutions assimilate clickers into their learning systems to improve the learning process, it becomes increasingly essential to have a comprehensive understanding of the mechanisms behind the effect of clickers on learning process. In spite of recent research on the impact of clickers in the student learning process, several research gaps remain that prevent us from having a complete understanding of the phenomenon and that offer researchers new opportunities to advance in the study (Blasco-Arcas et al., 2013).

In this study, our primary objective was to identify and understand the mechanisms that underlie the use of clickers in the students learning process and to explore their perception about its use and satisfaction with this technology. Drawing upon the theories of technology adoption and the existing empirical research, we developed the conceptual framework based on one of the most widely acceptable and highly implemented theories called the TAM. The results of our empirical study provided strong support for the proposed model. None of the prior empirical literature on clickers has validated the fundamental and one of the widely used models of technology adoption called the TAM before. In that way, this study contributes to the available knowledge on clickers by exploring students' acceptance and satisfaction with this technology.



**Figure 2.** Validated Research Model

Our findings suggest that *perceived usefulness* significantly influenced students' *behavioral intention*. This may suggest that students are relatively “pragmatic” and tend to focus on the

usefulness of the technology itself. Therefore, for the clicker technology to be accepted by the students, it would be necessary to demonstrate its ability to fulfil the needs of individual students, who tend to treat clickers as tools, acceptable only when desired values in their practices have been proven. In this connection, proper user training is essential in directing and solidifying the students' perceptions of the usefulness of the technology (Hu et al., 1999). Moreover, the significance of this relationship in context of this research also indicates that students' faster way to interact and respond to the discussion and improved learning experience endorsed them to accept such system. The significant impact of *perceived usefulness* on *user satisfaction* indicates that effectiveness and usefulness of clickers in the classroom has successfully fulfilled students' needs to interact with the lectures and met their expectations in order to be overall satisfied with its use in the classroom. The significance of this relationship is consistent with the prior research (e.g., Rai et al., 2002; Seddon, 1997) on information systems success. Earlier studies (e.g., Buyukkurt et al., 2012; Han and Finkelstein, 2013; Heaslip et al., 2014; Koppel and Berenson, 2008) on clickers have although used the questions related to *perceived usefulness* of the device, they were not used for establishing its causal relationships to students' acceptance or satisfaction with the system. For example, Buyukkurt et al. (2012) provided a simple analysis of the overall impression of the clickers among students in a Canadian university where they found that 65% of the overall respondents preferred clickers as useful device to be used in the introductory business statistics course. Similarly, Heaslip et al. (2014) collected post-test information relating to perceived usefulness of clickers after implementing it in a large class for 12 weeks and found the mean for perceived usefulness of using clickers really high. The significant relationship between *perceived ease of use* and *behavioural intentions* indicates that students perceived clickers as easier to operate and use, flexible to interact with, and get the intended work done with it and its all such qualities persuade them to use it in the

lecture. A large number of studies on technology adoption have supported this relationship (e.g., Davis et al., 1989; Venkatesh, 1999). A significant relationship between *perceived ease of use* and *perceived usefulness* indicates that easier a system is to interact with and less effort needed to operate it, more useful it is going to be perceived as (Davis, 1989). In hindsight, when the students find the clickers easy to operate and use, they tend to perceive it as a useful tool for their learning purposes of this module. Taylor and Todd (1995) found that those users who have no experience of handling technology may first focus on ease of use, and as experience increases, users presumably overcome concerns about ease of use and may focus their attention on perceived usefulness. This suggests that path from *perceived ease of use* on *perceived usefulness* will be stronger for inexperienced users. This could well be the situation for relatively strong relationship between these variables in this research as students are not much experienced in terms of using the clickers beyond registering their attendance in majority of the modules.

The research also established a significant impact of *perceived ease of use* on *user satisfaction*. Both Seddon (1997) and DeLone and McLean (1992) specified user satisfaction as impacted by beliefs about ease of use. In context of this research, the flexibility and ease of use linked to operating or handling clickers effectively fulfilled students' needs of interacting with lectures and meeting their levels of expectations. A few studies (e.g., Heaslip et al., 2014; Keough, 2012; Thoms and Williams, 2010) on clickers have used questions relating to perceived ease of use of this device but they are again limited to the very basic analysis relating to the handling and use of the system. For example, Keough (2012) analysed the mean and t-value for constructs including perceived ease of use and satisfaction but the authors did not analyse the causal relationship between these constructs. However, the mean values for these constructs were found high and their t-values were also found high and significant. Similarly, Heaslip et al. (2014) found the mean value for perceived ease of use

very high suggesting that the students perceived the use of the clickers to be free of effort and the system made it easier for them to interact in the classroom. However, none of these studies analysed the construct in light of students' intention to use it or getting satisfied with its use.

A very strong and highly significant impact of students' *behavioural intentions* on *use behaviour* indicates that students' intentions to use clickers in the lectures very closely determine their continuance to use in the future learning processes as well. Sutton (1998) argued that if intentions are measured after they are actually formed, in the context of the real decision, one would expect to find a stronger relationship between intention and behaviour. In the context of the current research, students were asked to respond to the survey sometime during the mid-term. This is probably the time where they already made up their minds to use this system and hence the relationship between intention and use behaviour was found very strong at that time. Many studies (e.g., Davis et al., 1989; Venkatesh and Davis, 2000) on technology adoption have endorsed a strong causal relationship between these variables. Subsequently, the higher actual use behaviour leads students to greater overall satisfaction with the clickers system. That means, the continuance use of clickers fulfil their needs of constructively interacting and engaging with lectures and let them get satisfied with its use. The information systems success model (by DeLone and McLean, 1992) has also endorsed the strong correlation between these variables.

### *Implications for Theory*

This study contributes a more nuanced understanding of the outcomes of the use of clickers in the field of technology and assessment in higher education. This is a first study of its type which has not only empirically tested the most widely acknowledged model of technology adoption i.e., TAM but also provided a good understanding of clickers acceptance, use, and success in a specific perspective. This research will lay a foundation toward validating the

TAM model on which the further research of acceptance and success can be built upon and empirically tested. The empirical testing outcomes of the hypotheses linked to the model can help researchers toward better understanding of students' adoption, use, and satisfaction with the system. The current research only tests some technical factors to explore user's behaviour and satisfaction with the clickers. Hence, the scope of this research can be further enhanced by using some additional factors relating to attitudinal (i.e., *attitude*), normative (i.e., *subjective norm*), and control (i.e., *perceived behavioural control*) beliefs to understand the students' behaviour to adopt the device like clickers. The system can also be tested for its success by using IS success models (e.g., DeLone and McLean, 1992, 2003; Seddon, 1997). Such analysis will also bring the quality of the system/technology to the forefront of its users and will allow the researchers to further explore the further research in this direction.

### *Implications for Practice*

In addition to the theoretical contribution, the research model suggests important practical implications for clicker's acceptance, use, and success and develops an understanding on how to improve student's intention to use and actual use in the clickers based teaching in the educational institutions. A relative weak though significant path coefficient between *perceived ease of use* and *behavioural intention* indicates that students are not yet adequately confident about how to use clickers flawlessly. The bigger challenge to them while using it is to align the clickers with the software application i.e., TurningPoint on which it is targeted on. The channel number changes each time when it is used in a new lecture and sometimes students struggle to synchronise it with the corresponding application on which the content of the lecture is demonstrated.

The device is not able to register the response due to some technical glitch in it or slowness of the application on which the lecture content is displayed. The designer of the system should keep this in mind particularly about how to automatically align the channel number of



clickers with each individual lecture. This will also improve students' overall satisfaction with the use of this device in the lecture. Moreover, a higher and significant path coefficient between *perceived ease of use* on *perceived usefulness* indicates that students seem to be not very experienced (Taylor and Todd, 1995) with the use of clickers and hence still put greater emphasis on the ease and flexibility of its use. Hence, emphasising on improved design is also very important due to this reason. Our analysis also indicates that although perceived ease of use is clearly important, the usefulness of the clickers is even more important and should not be overlooked. Students may be willing to tolerate an less friendly interface to an extent to access the functionality that is very important, while no amount of ease of use can substitute for a system or technology that does not do a useful task (Davies et al., 1989). Moreover, a weaker but significant relationship of *perceived usefulness* and *user satisfaction* indicates that students should be given initial example based training on the usefulness and effectiveness of clickers in the lecture and how this in its most likelihood meets student's expectations and satisfaction. The lecturers should also innovate different ways in which clickers can be brought in practice during the lecture so that students are convinced to use it out of interest and not compulsion. If we were able to improve student attendance, interest, engagement, and active participation using clickers, our objective of making the overall learning process would tend to be fulfilled. As the student intentions are measured when they are already formed, it shows a strong relationship with behaviour. This finding clearly indicates that students are positively looking forward to use clickers to participate in the digital marketing lectures. The marketing educators just need to encourage students not to miss the lectures and they would more likely to use this device to participate, learn, and judge their capability on the various lectures.

The high and significant impact of use behaviour on user satisfaction indicates that clickers use leads users to be more familiar with the system and discover new uses for it, which will,

in turn, lead to enhanced user satisfaction with the system (Baroudi et al., 1986). This indicates that clickers use need to be promoted in the class even if it's use is voluntary in nature. The marketing educators could possibly encourage this by linking the effective use of clickers to answer the multiple-choice questions correctly and gain a small percentage of marks (say 5% of the overall module marks). This provision can tremendously enhance students' seriousness and participation in the lectures. In the British universities where the content of modules is equally divided in ten two hours sessions, each session would then get 0.5% marks for effective use of clickers in answering the certain percentage of the overall questions (say 70% questions) being asked during the lecture.

The scope of the current research can also be expanded with regard to its practical implications where the role of the management/marketing educators will be of larger significance than designing the system in a better way. The testing of attitudinal, normative, and control based factors can bring some useful recommendations for practitioners to follow in order to make the induction of technology like clickers a competitive advantage and big success for the educational institutions.

### *Recommendations for Class Integration*

Class integration is all about how to engage students through the effective use of clickers in the class. This could be formed in a number of ways during the lecture to attract students' attention and engage them in the class. Firstly, to ensure the student engagement, some questions should be formed to test whether students are following the lecture content or not. For this, the students can be asked different types of questions (i.e., true-false type question, multiple-type questions) from what has already been taught during the lecture every now and again to make sure they are focused on what is going on and understand the content well. Such questions can possibly be embedded every few slides. The significant positive impacts of perceived ease of use on behavioral intention (Davis et al., 1989) and user satisfaction are

intended indicator to ensure that students are easily able to handle the device to answer all different types of questions.

Secondly, at the end of each subtopic, one or two opinion-based questions should be asked and answer should be selected in such a way that different students would likely to select different options, which can be used to trigger a discussion why a set of students selected a specific option. The questions can be designed in a way that students can also select more than one option in case they would like to argue multiple options. Again, the ease of handling clickers and its significant impact on students' behavioral intention (Davis et al., 1989) and satisfaction (Chiu et al., 2005) indicate that students are well aware of the diversified use of the device and adopting such strategies can bring in all different opinions even for the same option selected from different students. This argument is also supported by the highly significant relationship between use behavior and user satisfaction (Maillet et al., 2015) where students actually use the device and they have a feeling of satisfaction by doing so.

Finally, a further extension of this would be to give students a paragraph long scenario relating to the text covered in the lecture and then ask them to provide their opinion in groups formed either in the form of a pair or of three or four students depending on the size of the class. This would likely to have discussion more constructively as they would not be that afraid of being incorrect as possibly they would be when they answer the questions independently. These all are possible only because of the effectiveness or usefulness of clickers, which allows the students to accept it as the effective medium of interaction and communication in the class. This argument is also supported by the positive and significant impact of perceived usefulness on behavioral intention (Davis, 1989; Davis et al., 1989) and user satisfaction (Seddon, 1997) in the proposed research model.

## **Conclusion**

This research is a timely response to the call of lack of empirical research on the use of clickers in the business and management discipline. The purpose of this study is to examine the impact of factors such as usefulness and ease of use on students' acceptance and use of and satisfaction with clickers in the digital marketing lecture. Understanding the use of clickers becomes even more significant in the marketing courses as they are increasingly turning to technology to facilitate teaching and learning (Hollenbeck et al., 2011). As there has not been any such empirical research undertaken on clickers adoption and success in management stream, the current study fulfils this research gap by developing and validating a research model laid on the sound foundation of an adoption model of the like of TAM. The model is extended by considering user satisfaction as an additional construct to understand students' view beyond the use of this device. The research considered seven hypotheses among five constructs and found significant relationships between them. Notable results from our study are the outcomes for improving and enhancing student learning experience.

#### *Limitations and Future Research*

First, our sample consists only of students who have used clickers for the learning of different modules including Digital Marketing. The future research can consider both students' as well as teachers' views on its use. Secondly, the sample size gathered to analyse the data was relatively small as this research was mainly focused on the use of clickers in the digital marketing lecture. The future research can test the model using even large sample. Thirdly, although the variance explained by the model on behavioural intention (i.e., 67%) was reasonably high, it's worth testing the model with some more specific learning-oriented factors including learning experience, engagement, interactivity etc.

Fourthly, the current research has only used the snapshot design approach of the data collection where the data were gathered only once during the entire semester of teaching. The future research can use the longitudinal design approach where students' perceptions

regarding the use of clickers can be gathered during the starting lecture and also toward the end of the term to see if there is any difference in students' perception due to the specific way in which clickers were used to enhance student learning of and engagement with the module. Finally, the current proposed research model does not contain any social factors such as subjective norm that could possibly enhance students' intention to use the system particularly at the initial stage of its use and to increase the performance of the proposed model even higher. The future research can look at including subjective norm as an additional variable to formulate a proposition and validate the proposed model.

Moreover, the further research direction could be to analyse some additional factors such as interactivity using the clickers. Promoting interactivity is important as it leads to better and more effective learning (Draper and Brown, 2004; Liu et al., 2003). This concept has been found as one of the major pedagogical issues in the classroom, especially for the larger classes. When interactivity is present in the student learning process, students don't only tend to be motivated but also more attentive, participative, and more likely to exchange ideas with others (Liu et al., 2003; Sims, 2003). Subsequently, interactivity enhances student-learning outcome such as their attitude and their achievement. Hence, the future research can test the following research proposition using interactivity:

**Proposition 1:** Interactivity using clickers will positively influence student behavioral intention and satisfaction with this technology.

Prior studies (e.g., Fryling, 2013; Hancock, 2010; Sprague and Dahl, 2010) have found that the use of clicker technology can foster students' active learning process. Conclusive evidence also suggests that the active learning enhanced through the use of clickers would greatly facilitate its adoption (Sprague and Dahl, 2010). Our past experience of student learning with and without clickers also indicates that the use of clickers has positively

influenced the way students learn the specific module. Deriving from the above discussion, the following research proposition can be formulated:

**Proposition 2:** Active learning through the use of clickers would positively influence students' intention to adopt it.

Also, whether use of clickers enhances student performance is a highly debated topic in the business literature (e.g., Hedgcock and Rouwenhorst, 2014; Hoanca, 2013). Literature on whether the use of clickers results in student performance indicates a mixed response. Some studies advocate that clickers' use enhance the student performance (e.g., Bain and Przybyla, 2009) whereas others are of the opinion that use of clickers alone does not improve student performance. Our own experience says that use of clickers in the class has enhanced students understanding of the content being taught in the class and also increased their class test performance in general. Therefore, we argue that the clickers' use behavior for students (in the current context of research) would further lead to enhance their performance:

**Proposition 3:** Students' use behavior for clickers would lead to their enhanced overall performance.

Moreover, a fair number of prior studies (e.g., Chui et al., 2013; Keough, 2012) on clickers have compared the student performance for those students who use clickers to those who don't use them. For example, Keough (2012) posited that students using clickers would demonstrate higher level of academic performance than those students not using clickers technology and found a significant difference between two sections who used this technology and those who did not. In other words, the section that used clickers demonstrated the higher level of academic performance than the one, which did not use it. Similarly, Chui et al. (2013) also found a higher in-class performance on multiple-choice quiz question for students using clickers versus those who did not use it. However, no significant difference was noted between the groups in terms of examination performance or course performance. Based on

our experience, we will also posit that students who use clickers in the class will demonstrate an improved level of performance to those who don't use clickers. Therefore, the following research proposition can be developed on this basis:

**Proposition 4:** Students using clickers would demonstrate improved academic performance in the class tests/quizzes to those who do not use it during lectures.

Engagement has been found as a research priority in the learning literature and has been addressed from different perspectives (Blasco-Arcos et al., 2013; Zepke and Leach, 2010). For example, Gallini and Moely (2003) explored the dimensions including community, academic, and interpersonal engagement. Fredricks et al. (2004) found behavioral, emotional, and cognitive components. This research will support both approaches defining engagement as the perception of the student that results from his/her interactions with peers and teacher during the learning experience (Fredricks et al., 2004; Gallini and Moely, 2003). Students learn better when they engage in specific cognitive process; hence their engagement can be considered as a significant explanatory variable of their success (Mayer et al., 2009). High engagement can be considered as exact antecedent of continuing motivation, commitment, and overall performance (Blasco-Arcas et al., 2013; Shernoff and Hoogstra, 2001). In other words, prior research suggests that students who are more engaged and who participate more in the class should learn more (Dallimore et al., 2010; Young, 2010). A number of researchers (e.g., Caldwell, 2007; Hu et al., 2006) have found that engagement of students using clickers has a direct impact on their individual performance. There are studies that have either found no impact (e.g., Morling et al., 2008) or negative impact (e.g., Carnaghan and Web, 2007) of clickers use on students' engagement. Our experience also suggests that students who engage themselves constructively in the class using clickers are able to learn the lecture content better than those who don't bring it or use it during the class. Therefore, the following research proposition can be formulated on this basis:

**Proposition 5:** Students using clickers would demonstrate improved learning outcomes/performance in the class to those who do not use it during lectures.

Feedback is identified as a key component to successful learning in a number of learning (Hedgcock and Rouwenhorst, 2014). Prior research has established that learning is improved when students received corrective feedback on incorrect answers (Guthrie, 1971) and that learning is enhanced with immediate feedback in comparison to the delayed feedback (Kulik and Kulik, 1988). Clickers are handheld devices that improve instructor's abilities to provide immediate feedback by recording and measuring students' responses during lectures (Nelson and Hauck, 2008; Stuart et al., 2004; Yourstone et al., 2008).

Instructors can present course material and ask students to answer questions based on material presented through clickers. Unlike the traditional question/answer session where only few students get opportunity to voice their views, every student in the class gets the opportunity to answer the question. Moreover, the question is graded immediately where the instructor can see whether or not the class is able to comprehend the course material being displayed and discussed. At one hand, the benefit of student understanding alone can serve as an incentive for instructors to consider the adoption of clicker technology (Keough, 2012). On the other hand, the use of clickers supports help student building confidence, as they are able to receive the immediate feedback on their learning. This also helps a student to understand where they stand in the class in terms of learning and understanding the course material in comparison to his or her peers (Perry et al., 2002). From the above discussion, it is very clear that feedback helps both students and instructor to understand an overall scenario of learning and judging their positions in the class. This leads to the following proposition:



**Proposition 6:** The immediate feedback provided by the clickers helps both students and instructor to understand more about learning on the subject material than those who don't use this technology.

The researchers have got a positive response for a question relating to the enjoyment of the courses using clickers. A fair number of studies (e.g., Bain and Przybyla, 2009; Carnaghan et al., 2011; Lincoln, 2007) on the use of clickers in the classroom have found that a majority of students enjoyed the class using the clickers. These studies also indicated that only a fraction of students were not agreed with this question. For example, Bain and Przybyla (2009) found that most students enjoyed using clickers. However, only few of them (i.e., 2-17%) found to show that clickers use is not that enjoyable in the class in response to the different questions asked to them. Similarly, Lincoln (2007) in perspective of a marketing class found that a majority of students considered the use of clickers as a fun to use in the classroom. We also feel that use of clickers is not only a medium to constructively engage students in the class but it is also make them enjoy the lecture and feel lively throughout the lecture. This leads to the formulation of following proposition:

**Proposition 7:** The use of clickers makes the students feel more enjoyable in the class than the class without the use of clickers.

The anonymity linked with clickers allows students to willingly use this technology to answer more sensitive questions and to take controversial positions on issues (Carnaghan et al., 2011). A fair number of research studies (e.g., Guthrie and Carlin, 2004; Heaslip et al., 2014) on clickers have suggested that students appreciate anonymity for better participation in the class. However, Guthrie and Carlin (2004) also revealed that a reasonable percentage of students were not worried about being judged poorly by their peers while answering incorrectly in the classroom. Our experience also suggests that keeping the response

anonymous encourages students to participate more in their response to the questions asked than making it disclosed to audience. This leads to the formulation of following proposition:

**Proposition 8:** The anonymous use of clickers make a better participation of students in the class than the named responses.

## References

- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: a review and recommended two-step approach. *Psychological Bulletin*, *103*, 411-423.
- Aylesworth, A. (2008). Improving case discussion with an improv mind-set. *Journal of Marketing Education*, *30*(2), 106-115.
- Bain, L. Z., & Przybyla, J. (2009). The impact of student response systems on student behavior and performance in a management information systems course. *Issues in Information Systems*, *10*, 1-12.
- Baroudi, J. J., Olson, M. H., & Ives, B. (1986). An empirical study of the impact of user involvement on system usage and information satisfaction. *Communications of the ACM*, *29*(3), 232-238.
- Bascoul, G., Schmitt, J., Rasolofoarison, D., Chamberlain, L., & Lee, N. (2013). Using an Experiential Business Game to Stimulate Sustainable Thinking in Marketing Education. *Journal of Marketing Education*, *35*(2), 168-180.
- Bentler, P., & Bonett, D. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, *88*, 588-606.
- Blasco-Arcas, L., Buil, I., Hernandez-Ortega, B., & Sese, F. J. (2013). Using clickers in class. The role of interactivity, active collaborative learning and engagement in learning performance. *Computers & Education*, *62*, 102-110.
- Brennan, R., & Vos, L. (2013). Effects of participation in a simulation game on marketing students' numeracy and financial skills. *Journal of Marketing Education*, *35*(3), 259-270.
- Browne, M. W., & Cudeck, R. (1993). *Alternative ways of assessing model fit*. In K.A. Bollen and J. S. Long (eds.). *Testing Structural Equation Models*. Newbury Park, CA: Sage, 136-162.
- Buchanan, T., Sainter, P., & Saunders, G. (2013). Factors affecting faculty use of learning technologies: implications for models of technology adoption. *Journal of Computing in Higher Education*, *25*(1), 1-11.
- Butler, A., Phillmann, K-B., & Smart, L. (2001). Active learning within a lecture: Assessing the impact of short, in-class writing exercises. *Teaching of Psychology*, *28*, 257-259.
- Buzzard, C., Crittenden, V. L., Crittenden, W. F., & McCarty, P. (2011). The use of digital technologies in the classroom: A teaching and learning perspective. *Journal of Marketing Education*, *33*(2), 131-139.

- Caldwell, J. E. (2007). Clickers in the large classroom: current research and best-practice tips. *CBE Life Sciences Education*, 6(1), 9–20.
- Calisir, F., Altin Gumussoy, C., Bayraktaroglu, A. E., & Karaali, D. (2014). Predicting the Intention to Use a Web-Based Learning System: Perceived Content Quality, Anxiety, Perceived System Quality, Image, and the Technology Acceptance Model. *Human Factors and Ergonomics in Manufacturing & Service Industries*, 24(5), 515-531.
- Carnaghan, C., & Webb, A. (2007). Investigating the effects of group response systems on student satisfaction, learning, and engagement in accounting education. *Issues in Accounting Education*, 22(3), 391-409.
- Carnaghan, C., Edmonds, T.P., Lechner, T.A., and Olds, P.R. (2011). Using student response systems in the accounting classroom: Strengths, strategies and limitations. *Journal of Accounting Education*, 29(4), pp. 265-283.
- Cheung, R., & Vogel, D. (2013). Predicting user acceptance of collaborative technologies: An extension of the technology acceptance model for e-learning. *Computers & Education*, 63, 160-175.
- Chin, W. W., & Todd, P. A. (1995). On the use, usefulness, and ease of use of structural equation modeling in MIS research: A note of caution. *MIS Quarterly*, 19, 237-246.
- Chiu, C. M., Hsu, M. H., Sun, S. Y., Lin, T. C., & Sun, P. C. (2005). Usability, quality, value and e-learning continuance decisions. *Computers & Education*, 45, 399–416.
- Chui, L., Martin, K., & Pike, B. (2013). A quasi-experimental assessment of interactive student response systems on student confidence, effort, and course performance. *Journal of Accounting Education*, 31, 17-30.
- Clark, R. E., & Feldon, D. F. (2005). *Five common, but questionable principles of multimedia learning*. Cambridge handbook of multimedia learning, Cambridge: Cambridge University Press.
- Clarke III, I., Flaherty, T. B., & Yankey, M. (2006). Teaching the visual learner: The use of visual summaries in marketing education. *Journal of Marketing Education*, 28(3), 218-226.
- Colesca, S. E., & Dobrica, L. (2008). Adoption and use of e-government services: The case of Romania. *Journal of Applied Research and Technology*, 6, 204-217.
- Dallimore, E. J., Hertenstein, J. H., & Platt, M. B. (2010). Class participation in accounting courses: Factors that affect comfort and learning. *Issues in Accounting Education*, 25, 613–629.
- Dallimore, E. J., Hertenstein, J. H., & Platt, M. B. (2010). Class participation in accounting courses: factors that affect student comfort and learning. *Issues in Accounting Education*, 25(4), 613-629.
- Das, K. (2011). Using participatory photo novels to teach marketing. *Journal of Marketing Education*, 34(1), 82-95.

- Davis F. D., Bagozzi R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, *35*, 982-1002.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*, 319-339.
- Debuse, J. C., & Lawley, M. (2011). Using innovative technology to develop sustainable assessment practices in marketing education. *Journal of Marketing Education*, *33*(2), 160-170.
- DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, *3*, 60-95.
- DeLone, W. H., and McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, *19*(4), 9-30.
- Dishaw, M. T., & Strong, D. M. (1999). Extending the technology acceptance model with task-technology fit constructs. *Information and Management*, *36*(1), 9-21.
- Dowell, D. J., & Small, F. A. (2011). What Is the Impact of Online Resource Materials on Student Self-Learning Strategies? *Journal of Marketing Education*, *33*(2), 140-148.
- Draper, S. W., and Brown, M. I. (2004). Increasing interactivity in lectures using an electronic voting system. *Journal of Computer Assisted Learning*, *20*, 81-94.
- Dunnett, A. J., Shannahan, K. L., Shannahan, R. J., & Treholm, B. (2011). Exploring the Impact of Clicker Technology in a Small Classroom Setting on Student Class Attendance and Course Performanc. *Journal of the Academy of Business Education*, *12*, 43-56.
- Fies, C., & Marshall, J. (2006). Classroom response systems: a review of the literature. *Journal of Science Education and Technology*, *15*, 101-109.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*, 39-50.
- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, *74*(1), 59-109.
- Fryling, M. (2013). Click It and Ticket: Extending the benefits of clickers in small classrooms to increase non-anonymous class participation. *In Proceedings of the Information Systems Educators Conference*, 1-11.
- Gain, J. (2013). Using poll sheets and computer vision as an inexpensive alternative to clickers. *Proceedings of the South African Institute for Computer Scientists and Information Technologists Conference*, 60-63.
- Gallini, S. M., & Moely, B. E. (2003). Service-learning and engagement, academic challenge, and retention. *Michigan journal of community service learning*, *10*, 5-14.
- Gefen, D. (2000). E-commerce: the role of familiarity and trust. *Omega: The International Journal of Management Science*, *28*, 725-737.

- Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly*, 27, 51-90.
- Gerbing, D. A., & Anderson, J. C. (1992). Monte Carlo evaluations of goodness of fit indices for structural equation models. *Sociological Methods and Research*, 2, 132-160.
- Gray, D. M., Peltier, J. W., & Schibrowsky, J. A. (2012). The Journal of Marketing Education Past, Present, and Future. *Journal of Marketing Education*, 34, 217-237.
- Guthrie, J.T. (1971). Feedback and Sentence Learning. *Journal of Verbal Learning and Verbal Behavior*, 10, 23-28.
- Guthrie, R., & Carlin, A. (2004). Waking the dead: Using interactive technology to engage passive listeners in the classroom. In *Proceedings of the 10<sup>th</sup> Americas Conference on Information Systems*, New York, USA.
- Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1992). *Multivariate data analysis with readings*. 3rd edn. New York, NY: Macmillan Publishing Company.
- Han, J. H., & Finkelstein, A. (2013). Understanding the effects of professors' pedagogical development with Clicker Assessment and Feedback technologies and the impact on students' engagement and learning in higher education. *Computers & Education*, 65, 64-76.
- Hancock, T. M. (2010). Use of audience response systems for summative assessment in large classes. *Australasian Journal of Educational Technology*, 26(2), 226-237.
- Hedgcock, W. H., & Rouwenhorst, R. M. (2014). Clicking their Way to Success: Using Student Response Systems as a Tool for Feedback. *Journal for Advancement of Marketing Education*, 22, 16-25.
- Hoanca, B. (2013). How well do clicker scores correlate with course performance? A case study in two MIS courses. In *Proceedings of the Information Systems Educators Conference*, 1-9.
- Hollenbeck, C. R., Mason, C. H., & Song, J. H. (2011). Enhancing Student Learning in Marketing Courses: An Exploration of Fundamental Principles for Website Platforms. *Journal of Marketing Education*, 33, 171-182.
- Hoyle, R. H. (1995). *The Structural Equation Modeling Approach: Basic Concepts and Fundamental Issues*. Thousand Oaks, CA: Sage Publications.
- Hu, J., Bertol, P., Hamilton, M., White, G., Duff, A., & Cutts, Q. (2006). *Wireless interactive teaching by using key-pad ARS*. In D. A. Banks (Ed.), *Audience response systems in higher education* (pp. 209–221). Hershey, PA: Information Science Publishing.
- Hu, L-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1-55.
- Hu, P. J., Chau, P. Y., Sheng, O. R. L., & Tam, K. Y. (1999). Examining the technology acceptance model using physician acceptance of telemedicine technology. *Journal of Management Information Systems*, 16, 91-112.

- Im, I., Hong, S., & Kang, M. S. (2011). An international comparison of technology adoption: Testing the UTAUT model. *Information & Management*, 48(1), 1-8.
- Keough, S. M. (2012). Clickers in the Classroom: A Review and a Replication. *Journal of Management Education*, XX, 1-26.
- Kim, Y., & Lee, H. S. (2014). Quality, Perceived Usefulness, User Satisfaction, and Intention to Use: An Empirical Study of Ubiquitous Personal Robot Service. *Asian Social Science*, 10(11), 1-16.
- Kucukusta, D., Law, R., Besbes, A., & Legohérel, P. (2015). Re-examining perceived usefulness and ease of use in online booking: The case of Hong Kong online users. *International Journal of Contemporary Hospitality Management*, 27(2), 185-198.
- Kulik, J.A., & Kulik, C-L.C. (1988). Timing of Feedback and Verbal Learning. *Review of Educational Research*, 58, 79-97.
- Legris, P., Ingham, J., & Colletette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & Management*, 40(3), 1-14.
- Lincoln, D. (2007). Using student response pads ('clickers') in the principles of marketing classroom. In *Proceedings of the 2007 ANZMAC Conference* (pp. 3328-3333).
- Liu, T., Liang, J., Wang, H., Chan, T., & Wei, L. (2003). Embedding educlick in classroom to enhance interaction. In *Proceedings of International Conference Computers in Education (ICCE)*, Hong Kong, China, 117-125.
- Lojo, M. (2009). A comparison of clicker effectiveness for multiple choice and quantitative questions. *California Journal of Operations Management*, 7, 130-135.
- Loughry, M. L., Ohland, M. W., & Woehr, D. J. (2014). Assessing teamwork skills for assurance of learning using CATME team tools. *Journal of Marketing Education*, 36(1), 5-19.
- Lowe, B., & Laffey, D. (2011). Is Twitter for the birds? Using Twitter to enhance student learning in a marketing course. *Journal of Marketing Education*, 33(2), 183-192.
- Maillet, E., Mathieu, L., & Sicotte, C. (2015). Modeling factors explaining the acceptance, actual use and satisfaction of nurses using an Electronic Patient Record in acute care settings: An extension of the UTAUT. *International journal of medical informatics*, 84(1), 36-47.
- Marshall, L. L., Valdosta, G., & Varnon, A. W. (2012). An Empirical Investigation of Clicker Technology in Financial Accounting Principles. *Learning in Higher Education*, 8, 7-17.
- Martins, C., Oliveira, T., & Popovic, A. (2014). Understanding the Internet banking adoption: A unified theory of acceptance and use of technology and perceived risk application. *International Journal of Information Management*, 34(1), 1-13.
- Mawhinney, C. H., & Lederer, A. L. (1990). A study of personnel computer utilization by manager. *Information & Management*, 18, 243-253.
- Mayer, R. E., Stull, A., DeLeeuw, K., Almeroth, K., Bimber, B., Chun, D., Bulger, M., Campbell, J., Knight, A., & Zhang, H. (2009). Clickers in college classrooms: Fostering

learning with questioning methods in large lecture classes. *Contemporary Educational Psychology*, 34(1), 51-57.

McCabe, D. B., & Meuter, M. L. (2011). A Student View of Technology in the Classroom Does It Enhance the Seven Principles of Good Practice in Undergraduate Education? *Journal of Marketing Education*, 33(2), 149-159.

Mills, A. J., Robson, K., & Pitt, L. F. (2013). Using Cartoons to Teach Corporate Social Responsibility: A Class Exercise. *Journal of Marketing Education*, 35(2), 181-190.

Mills, M. K. (2010). Using the jazz metaphor to enhance student learning and skill development in the marketing research course. *Journal of Marketing Education*, 32(3), 300-313.

Morling, B., McAuliffe, M., Cohen, L., & DiLorenzo, T. M. (2008). Efficacy of personal response systems (“clickers”) in large, introductory psychology classes. *Teaching of Psychology*, 35, 45-50.

Mula, J. M., & Kavanagh, M. (2009). Click Go the Students, Click-Click-Click: The efficacy of a student response system for engaging students to improve feedback and performance. *e-Journal of Business Education and Scholarship of Teaching*, 3(1), 1-17.

Nelson, M. L., & Hauck, R. V. (2008). Clicking to learn: A case study of embedding radio-frequency based clickers in an introductory management information systems course. *Journal of Information Systems Education*, 19(1), 55-64.

Nelson, M., & Hauck, R. (2008). Clicking to learn: A case study of embedding radiofrequency based clickers in an introductory management information systems course. *Journal of Information Systems Education*, 19(1), 55-64.

Ng, I. C. (2006). Photoessays in the teaching of marketing. *Journal of Marketing Education*, 28(3), 237-253.

Nunnally, J. (1978). *Psychometric theory*. New York: McGraw-Hill.

Oigara, J., & Keengwe, J. (2013). Students’ perceptions of clickers as an instructional tool to promote active learning. *Education and Information Technologies*, 18(1), 15-28.

Pascarella, E. T., Blaich, C., Martin, G. L., & Hanson, J. M. (2011). How Robust are the Findings of Academically Adrift. *Change*, 43, 20-24.

Pearson, M. M., Barnes, J. W., & Onken, M. H. (2006). Development of a computerized in-basket exercise for the classroom: A sales management example. *Journal of Marketing Education*, 28(3), 227-236.

Perry, N., VandeKamp, K., Mercer, L., & Nordby, C. (2002). Investigating teacher-student interactions that foster self-regulating learning. *Educational Psychologist*, 37(1), 5-15.

Premuroso, R. F., Tong, L., & Beed, T. K. (2011). Does using clickers in the classroom matter to student performance and satisfaction when taking the introductory financial accounting course? *Issues in Accounting Education*, 26, 701-723.

- Radner, R., & Rothschild, M. (1975). On the allocation of effort. *Journal of Economic Theory*, 10, 358-376.
- Rai, A., Lang, S. S., & Welker, R. B. (2002). Assessing the validity of IS success models: An empirical test and theoretical analysis. *Information Systems Research*, 13, 50-69.
- Rana, N. P., Dwivedi, Y. K., Williams, M. D., & Weerakkody, V. (2015). Investigating success of an e-government initiative: Validation of an integrated IS success model. *Information Systems Frontiers*, 17(1), 127-142.
- Raska, D. (2014). Excited, Proud, and Accomplished Exploring the Effects of Feedback Supplemented With Web-Based Peer Benchmarking on Self-Regulated Learning in Marketing Classrooms. *Journal of Marketing Education*, 36, 258-271.
- Raska, D. (2014). Excited, Proud, and Accomplished Exploring the Effects of Feedback Supplemented With Web-Based Peer Benchmarking on Self-Regulated Learning in Marketing Classrooms. *Journal of Marketing Education*, 36(3), 258-271.
- Rinaldo, S. B., Tapp, S., & Laverie, D. A. (2011). Learning by tweeting: Using Twitter as a pedagogical tool. *Journal of Marketing Education*, 33(2), 193-203.
- Robbins, S. (2011). Beyond clickers: using ClassQue for multidimensional electronic classroom interaction. In *Proceedings of the 42nd ACM technical symposium on Computer science education*, 661-666.
- Robey, D. (1979). User attitudes and management information systems use. *Academy of Management Journal*, 22, 527-538.
- Roblyer, M. D., & Wiencke, W. R. (2003). Design and use of a rubric to assess and encourage interactive qualities in distance courses. *American Journal of Distance Education*, 17, 77-98.
- Roca, J. C., Chiu, C. M., & Martinez, F. J. (2006). Understanding e-learning continuance intention: an extension of the technology acceptance model. *Human-Computer Studies*, 64, 683-696.
- Seddon, P. B. (1997). A re-specification and extension of the DeLone and McLean model of IS success. *Information Systems Research*, 8, 240-253.
- Seddon, P. B., & Kiew, M. Y. (1996). A partial test and development of the DeLone and McLean model of IS success. *Australasian Journal of Information Systems*, 4(1), 90-109.
- Shernoff, D. J., & Hoogstra, L. (2001). Continuing motivation beyond the high school classroom. *New Directions for Child and Adolescent Development*, 2001(93), 73-88.
- Sims, R. (2003). Promises of interactivity: Aligning learner perceptions and expectations with strategies for flexible and online learning. *Distance Education*, 24(1), 87-103.
- Smart, D. T., Kelley, C. A., & Conant, J. S. (1999). Marketing education in the year 2000: Changes observed and challenges anticipated. *Journal of Marketing Education*, 21, 206-216.
- Smith, J. B. and Barclay, D. W. (1997). The effects of organizational differences and trust on the effectiveness of selling partner relationships. *The Journal of Marketing*, 61, 3-21.



- Sprague, E. W., & Dahl, D. W. (2009). Learning to click: An evaluation of the personal response system clicker technology in introductory marketing courses. *Journal of Marketing Education, 32*, 93-103.
- Sprague, E.W., & Dahl, D.W. (2010). Learning to click: An evaluation of the personal response system clicker technology in introductory marketing courses. *Journal of Marketing Education, 32*(1), 93-103.
- Steward, M. D., Martin, G. S., Burns, A. C., & Bush, R. F. (2010). Using the Madeline Hunter Direct Instruction Model to Improve Outcomes Assessments in Marketing Programs. *Journal of Marketing Education, 32*(2), 128-139.
- Stowell, J. R., & Nelson, J. M. (2007). Benefits of electronic audience response systems on student participation, learning, and emotion. *Teaching of psychology, 34*(4), 253-258.
- Stuart, S., Brown, M., & Draper, S. (2004). Using an electronic voting system in logic lectures: One practitioner's application. *Journal of Computer Assisted Learning, 20*, 95-102.
- Sutton, S. (1998). Predicting and explaining intentions and behavior: How well are we doing? *Journal of Applied Social Psychology, 28*(15), 1317-1338.
- Taylor, S., & Todd, P. A. (1995). Decomposition and crossover effects in the theory of planned behaviour: A study of consumer adoption. *International Journal of Research in Marketing, 12*, 137-155.
- Teo, T., Ursavas, O. F., & Bahcekapili, E. (2012). An assessment of pre-service teachers' technology acceptance in Turkey: A structural equation modeling approach. *The Asia-Pacific Education Researcher, 21*(1), 199-210.
- Venkatesh, V. (1999). Creation of favorable user perceptions: Exploring the role of intrinsic motivation. *MIS Quarterly, 23*, 239-260.
- Venkatesh, V., & Davis, F. D. (1996). A model of antecedents of perceived ease of use: Development and test. *Decision Sciences, 27*, 451-481.
- Venkatesh, V., & Davis, F. D. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science, 45*, 186-204.
- Venkatesh, V., & Morris, M. G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly, 24*, 115-139.
- Verhagen, T., Feldberg, F., van den Hooff, B., Meents, S., & Merikivi, J. (2011). Satisfaction with virtual worlds: An integrated model of experiential value. *Information & Management, 48*, 201-207.
- Weinrauch, J. D. (2005). An exploratory use of musical metaphors to enhance student learning. *Journal of Marketing Education, 27*(2), 109-121.
- Yao, Y., & Murphy, F. (2007). Remote electronic voting systems: An exploration of voters' perceptions and intention to use. *European Journal of Information Systems, 16*, 106-120.

Young, M. (2010). The art and science of fostering engaged learning. *Academy of Educational Leadership Journal*, 14,, 1–18.

Yourstone, S., Kraye, H., & Albaum, G. (2008). Classroom questioning with immediate electronic response: Do clickers improve learning? *Decision Sciences Journal of Innovative Education*, 6(1), 75-88.

Zepke, N., & Leach, L. (2010). Improving student engagement: Ten proposals for action. *Active Learning in Higher Education*, 11(3), 167–177.

Zikmund, W. G. (1994). *Business research methods*. 4th edn. New York, NY: The Dryden Press.

### **Appendix [A]**

The following questions were asked to respondents on Likert scale [1-7] where [1]=Extremely Disagree and [7]=Extremely Agree: [Legend: BI: Behavioral Intention; EU: Perceived Ease of Use; PU: Perceived Usefulness; UB: Use Behavior; US: User Satisfaction] [Source(s) for items on: PU, PEOU, BI, and UB: Davis (1989), Davis et al. (1989); US: Seddon and Kiew (1996)]

PU1. Using clickers in my lectures enables me to answer questions more quickly

PU2. Using clickers improves my learning experience in the lectures

PU3. I find clickers useful in my lectures

EU1. Learning to operate clickers is easier for me

EU2. I find clickers to be flexible to interact with

EU3. I find clicker easy to use

EU4. I find it easier to get clickers to do what I want it to do

BI1. I intend to use clickers in my lectures

BI2. I predict that I would use clickers in my lectures

BI3. I plan to use clickers in lectures in near future

UB1. I use clickers to handle multiple answer type questions

UB2. I prefer clickers to the traditional/manual question answering process

UB3. I will continue using clickers to in my lectures

US1. The clickers has met my expectations in lectures

US2. The clickers effectively fulfilling my needs of interacting with lectures

US3. Overall, I am satisfied with the use of clickers in lectures