A Meta-Analysis Study of Satisfaction and Continuance Intention to Use Educational Technology

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Abstract

Satisfaction is known as a major measure of continuance intention to use any information systems (IS). This article provides a systematic review of 30 research articles published on the educational technologies continuance intention between 2005 and 2017. The educational technologies continuance intention literature was analyzed based on a series of dimensions including author, relationship between constructs, type of respondents, contexts and instruments used. The main findings of this study, which is the first of its kind, are: (1) there is a significant relationship between satisfaction and continuance intention from the previous research, (2) most of the previous researchers have studied the relationship between satisfaction and continuance intention in the context of e-learning usage and (3) most of the previous researchers have used the instrument related with satisfaction of e-learning usage to measure the satisfaction in their studies. In order to improve research in IT continuance intention, future researchers could apply greater use of the theoretical and methodological approaches such as qualitative methods to investigate the continuance intention of educational technologies.

Keywords: Satisfaction, Continuance Intention, Educational Technology, Web-Based Learning, Continuance Use

Introduction

The evolution of technologies has recently influenced not only people's way of life including communication and social affairs, but also their methods of education (Tiyar & Khoshsima, 2015). With the development of information communication technology (ICT), educational institutions are trying to restructure its educational programs, now with using modern technology, education is not only the transfer of knowledge from the teacher to the students (Stošic & Stošic, 2015). Interactions between students and teachers, as well as interaction among students, may lead to effective learning by means of intellectual stimulation and

exchange of ideas (Agudo-Peregrina, Iglesias-Pradas, Conde-González, & Hernández-García, 2014).

An internet are primary sources of information for teachers from general fields to the elementary level, providing accessible opportunities for learning and contributing to teachers' repertoire of professional knowledge and instructional material (Stošic & Stošic, 2015). Compared with rigid, traditional textbooks, the teaching material offered by internet offer learners a variety of content and the experience of self-directed learning (Rahardjo, Sumardjo, Lubis, & Harijati, 2016).

The concept of satisfaction can be measured by the gap between what they experience and their expectations (Cheok & Wong, 2015). Success of the computer based systems is generally associated with the user's satisfaction. According to Oliver (1989), satisfaction can be viewed as an individual's emotional consideration based on experiences and beliefs. End-users' satisfaction assessment is one of the most widely used measures of information system effectiveness due to its high degree of face validity and easier to validate (Cheok & Wong, 2015).

Continuance intention has recently been the subject of substantial theoretical developments and scientific advances within mixture of terms, such as IS continuance (Bhattacherjee, 2001; Limayem & Cheung, 2008) and post-adoption IT usage (Jia, Guo, & Barnes, 2017; Ong & Lin, 2016). IS continuance, IS continuance behavior or IS continuous use behavioral patterns reflecting continuance use of an information system (Limayem & Cheung, 2011). Continuance refers to a form of post adoption behavior. Although the term post-adoption indicates a set of behaviors that follow initial acceptance, including continuance, routinization, infusion, adaptation, assimilation, and so forth, in the literature it is usually used as a synonym for continuance. In this paper, we focused on continuance intention as the dependent variable.

Based upon expectation-confirmation theory (Oliver, 1980), Bhattacherjee proposed an expectation-confirmation model (ECM) to examine the continued usage of information systems. According to the expectation-confirmation model of information systems and related previous studies, satisfaction and perceived usefulness are two crucial factors affecting continuance intention, while perceived usefulness and confirmation affects satisfaction (Hu & Zhang, 2016). This study focuses on the role of satisfaction as factors that influence a person's tendency to use an educational technology. Systematic literature review of some articles of the previous studies have been conducted to get a better understanding of the relationship between satisfaction and continuous intention to use educational technology.

According to Fink (2005) systematic literature review (SLR) represent: "a systematic, explicit, and reproducible method for identifying, evaluating, and synthesizing the existing body of completed and recorded work produced by researchers, scholars, and practitioners." In a SLR the most important aspects of the accomplished researchers must be investigated, and useful information and statistics must be extracted (Jula, Sundararajan, & Othman, 2014). This paper, therefore, seeks to contribute to the understanding of educational technologies continuance intention by undertaking a SLR of satisfaction and continuance intention.

The aims of this study are twofold. First, exploring a literature review on effect of satisfaction towards continuance intention to use educational technologies and to classify these studies based on a series of dimensions including authors, respondents, types of educational technologies and instruments used. Second, and, most importantly, we provide a useful and usable resource for future researchers. This overall purpose is recognized via the following research questions (RQs):

RQ1: What were the relationship between satisfaction and continuance intention to use educational technologies from previous research conducted?

RQ2: What types of educational technologies have been examined in previous studies?

RQ3: What instruments were commonly used to measure the relationship between satisfaction and continuance intention to use educational technologies?

METHODOLOGY
This study adopts Webster & Watson's (2002) structured method to locate and identify materials pertinent to the review. Firstly, several top leading databases available at the university's library such as EBSCOHost, Science Direct, Proquest, and Sage were used to search for articles. The Google Scholar search engine was also used to ensure the coverage of publications in other directories. The articles cited were published within the range of 2005-2017. The keywords used to find the articles include "continuance intention", "satisfaction", "online learning", "e-learning" and "satisfaction AND continuance intention". Finally, articles were selected for review if they were cited at least one time and the titles and abstracts are related to satisfaction and continuance intention to use. We have conducted a systematic literature review of 30 independent papers, mostly published in major journals.

RESULTS AND DISCUSSION
RQ1: What are the relationship between satisfaction and continuance intention to use educational technologies from previous research conducted?

In order to answer the first research question, we have conducted a systematic literature review of the articles related to the relationship between satisfaction and continuance intention to use educational technologies. The results are shown in the Table 1:

Table 1. Relationship Between Satisfaction and Continuance Intention to Use Educational Technologies

No.	Authors	Hypothesis Support	Path Coefficient (β)
1	Fleming, Becker, & Newton (2017)	Significant	0.20
2	Joo, Park, & Shin (2017)	Significant	0.70
3	Hu & Zhang (2016)	Significant	0.74
4	Daɬhan & Akkoyunlu (2016)	Significant	0.51
5	Joo, Kim, & Kim (2016)	Significant	0.14
6	Hsiao, Chang, & Tang (2016)	Significant	0.31
7	Kaewkitipong, Chen, & Ractham (2016)	Significant	0.29
8	Chaouali (2016)	Significant	0.36
9	Alraimi, Zo, & Ciganek (2015)	Significant	0.18
10	Bøe, Gulbrandsen, & Sørebø (2015)	Significant	-0.12
11	Chen, Lai, & Ho (2015)	Significant	0.36
12	Mohammadi (2015)	Significant	0.52
13	Pereira & Da Costa (2015)	Significant	0.92
14	Tiyar & Khoshsima (2015)	Significant	0.46
15	Chow & Shi (2014)	Significant	0.44
16	Stone & Baker-Eveleth (2013)	Significant	0.72
17	Lin (2012)	Significant	0.28
18	Lin & Wang (2012)	Significant	0.53
19	Yu, Yu, & Yu (2012)	Significant	0.93
20	T.-F. Yu, Lee, & Wang (2012)	Significant	0.91
21	Al-Busaidi & Al-Shihi (2012)	Significant	0.77
22	Ramayah & Lee (2012)	Significant	0.31
23	K.-M. Lin, Chen, & Fang (2011)	Significant	0.41
24	Hung, Chang, & Hwang (2011)	Significant	0.35
25	Deng, Turner, Gehling, & Prince (2010)	Significant	0.70
26	Sørebø, Halvari, Gulli, & Kristiansen (2009)	Not Significant	0.05
27	Larsen, Sørebø, & Sørebø (2009)	Significant	0.56
28	Chiu, Chiu, & Chang (2007)	Significant	0.86
29	Wu, Tsai, Chen, & Wu (2006)	Significant	0.49
30	Chiu, Hsu, Sun, Lin, & Sun (2005)	Significant	0.85

Based on the above table, there was a significant relationship between satisfaction and continuance intention to use educational technologies. Most of the findings of previous studies have found a positive correlation between satisfaction with continuance intention. Of the 30 studies reviewed, 14 were found to have the path coefficient greater than 0.5. The study by Yu, Yu, & Yu (2012) found a strong positive relationship between satisfaction with continuance intention, β = 0.93.

While we have only one study that has the path coefficient correlation between satisfaction and continuance intention of less than 0.1. The findings of a study by Sørebø, Halvari, Gulli, & Kristiansen (2009) found a very weak correlation between these two variables, β = 0.05. In

addition, the study also found a correlation between satisfaction and continuance intention to use is not significant. After investigation, one of the factors that led to such a situation is because satisfaction, as conceptualized in the that study, is based on a general experience of ''positive, indifferent, or negative feelings toward e- learning'' (Sørebø et al., 2009).

Meanwhile a study by Bøe, Gulbrandsen, & Sørebø (2015) found that a correlation between satisfaction and continuance intention are negative. Their findings are not consistent with the findings of other studies. Having examined in detail the findings of the study, it was found that researcher's using less precise instrument for measuring satisfaction. They have used the instrument to measure satisfaction in the context of the consumer, and they are not appropriate for use in an educational context. Hence the selection of the appropriate instrument is very important to ensure that it can measure what should be measured.

After examining the findings of the studies that have been conducted, it can be concluded that researchers should give a precise definition of each variable to study and choose the appropriate instrument to measure each of the variables studied. Both processes are very important to ensure that it really can answer the research question and in line with the objectives set. In addition, a study should be carried out systematically based on theory or model that is appropriate.

RQ2: What types of educational technologies have been examined in previous studies?

In order to answer the second research question, we have conducted a systematic literature review of the articles related to the types of educational technologies that has been studied from previous research. The results are shown in Table 2:

Table 2. Types of Educational Technologies

No.	Authors	Sample	Types of educational technologies
1	Fleming, Becker, & Newton (2017)	Employees	e-learning
2	Joo, Park, & Shin (2017)	Secondary School Students	Digital textbook

3	Hu & Zhang (2016)	Undergraduate Students	Mobile Book-Reading Apps
4	Daɪhan & Akkoyunlu (2016)	Undergraduate Students	online learning environments
5	Joo, Kim, & Kim (2016)	Undergraduate Students	mobile learning management system
6	Hsiao, Chang, & Tang (2016)	Undergraduate Students	mobile social Apps
7	Kaewkitipong, Chen, & Ractham (2016)	Undergraduate Students	social media
8	Chaouali (2016)	Undergraduate Students	social networking sites
9	Alraimi, Zo, & Ciganek (2015)	MOOC's Users	MOOCs
10	Bøe, Gulbrandsen, & Sørebø (2015)	College Teachers	e-learning
11	Chen, Lai, & Ho (2015)	Teachers	teaching blogs
12	Mohammadi (2015)	Undergraduate Students	e-learning
13	Pereira & Da Costa (2015)	Employees	e-learning
14	Tiyar & Khoshsima (2015)	Undergraduate Students	e-learning
15	Chow & Shi (2014)	Undergraduate Students	e-learning
16	Stone & Baker-Eveleth (2013)	Undergraduate Students	electronic textbooks
17	Lin (2012)	Undergraduate Students	Web-based learning
18	Lin & Wang (2012)	Undergraduate Students	e-learning
19	Yu, Yu, & Yu (2012)	Employees	e-learning
20	T.-F. Yu, Lee, & Wang (2012)	personnel of life insurance industry	M-Learning
21	Al-Busaidi & Al-Shihi (2012)	Teachers	Blended learning
22	Ramayah & Lee (2012)	Undergraduate Students	e-learning
23	K.-M. Lin, Chen, & Fang (2011)	Universities online users	e-learning
24	Hung, Chang, & Hwang (2011)	Teachers	web-based learning
25	Deng, Turner, Gehling, & Prince (2010)	Undergraduate Students	mobile Internet services
26	Sørebø, Halvari, Gulli, & Kristiansen (2009)	Teachers	e-learning
27	Larsen, Sørebø, & Sørebø (2009)	Teachers	e-learning
28	Chiu, Chiu, & Chang (2007)	Undergraduate Students	Web-based learning
29	Wu, Tsai, Chen, & Wu (2006)	Undergraduate Students	e-learning

30	Chiu, Hsu, Sun, Lin, & Sun (2005)	Undergraduate Students	e-learning

After analyzing the related articles, it was found that most of the previous researchers have studied the relationship between satisfaction and continuance intention in the context of e-learning usage. There are 13 studies that examined the factors affecting the continuance intention to use e-learning either among teachers, undergraduate students and employees. This illustrates that the context of studies on factors affecting the continuance intention to use e-learning is still relevant and should be implemented.

In addition, there are also some other types of educational technologies has been studied, namely web-based learning, mobile internet services, blended learning, m-learning, electronic textbooks, social media, teaching blogs, MOOCs and mobile book-reading apps. However, studies related to these types of educational technologies is not widespread compared with studies on factors affecting the continuance intention to use e-learning.

When viewed in the context of the sample involved in previous research, we found many are focused among undergraduate students. It was found that 17 of the studies carried out to study the factors affecting the continuance intention to use educational technology was conducted among undergraduate students. The remainder is among teachers, employees and secondary school students.

In all of these papers, the type of technology in education is the focus of previous studies are related to e-learning, and most studies have been conducted on undergraduate students. This clearly shows that e-learning is an important and appropriate technology is used as a method of delivering knowledge to students. This finding is consistent with studies that have been carried out by Nabavi, Taghavi-Fard, Hanafizadeh, & Taghva (2016)

RQ3: What instruments were commonly used to measure the relationship between satisfaction and continuance intention to use educational technologies?

We have conducted a systematic literature review of the articles related to the instruments commonly used to measure the satisfaction of educational technologies usage from previous research. The results are shown in Table 3:

Table 3. Instruments Commonly Used to Measure the Satisfaction of Educational Technologies Usage

No.	Instruments From	Authors/ Instruments Name
1	Bhattacherjee (2001)	• Joo, Park, & Shin (2017)/ Satisfaction to use digital textbooks • Hu & Zhang (2016)/ Satisfaction to use the mobile book-reading app(s) • Alraimi, Zo, & Ciganek (2015)/ Satisfaction with MOOCs use • Chen, Lai, & Ho (2015)/ Satisfaction to use a teaching blog • Sørebø, Halvari, Gulli, & Kristiansen (2009)/ Satisfaction of e-learning use • Larsen, Sørebø, & Sørebø (2009)/ Satisfaction with e-learning
2	Chiu et al. (2005)	• Daɫhan & Akkoyunlu (2016)/ Satisfaction with the performance of the online learning environment
3	Spreng et al. (1996)	• Joo, Kim, & Kim (2016)/ Satisfaction of a mobile learning management system (m-LMS) use • Bøe, Gulbrandsen, & Sørebø (2015)/ Satisfaction with using digital tools in education • Ramayah & Lee (2012)/ satisfaction of e-learning usage • Chiu, Chiu, & Chang (2007)/ Satisfaction with Web-based learning • Wu, Tsai, Chen, & Wu (2006)/ Satisfaction with electronic learning systems • Chiu, Hsu, Sun, Lin, & Sun (2005)/ Satisfaction with the performance of e-learning service
4	Vila and Küster (2011)	• Hsiao, Chang, & Tang (2016)/ Satisfaction in using social App
5	DeLone and McLean (1992)	• Kaewkitipong, Chen, & Ractham (2016)/ Satisfaction of using social media
6	Shi et al. (2010)	• Chaouali (2016)/ Satisfaction of using mobile Facebook
7	Lee (2010)	• Mohammadi (2015)/ Satisfaction of e-learning • Chow & Shi (2014)/ Satisfaction toward e-learning

8	McGill and Hobbs (2008)	• Lin (2012)/ satisfaction on web learning performance
9	Liaw et al. (2008)	• Lin & Wang (2012)/ Satisfaction with the e-learning system
10	Roca et al (2006)	• Yu, Yu, & Yu (2012)/ Satisfaction on E-Learning
11	Oliver (1980)	• T.-F. Yu, Lee, & Wang (2012)/ Satisfaction on M-Learning
12	Sun et al. (2008)	• Al-Busaidi & Al-Shihi (2012)/ Satisfaction of learning management systems
13	Flavian et al. (2006)	• Deng, Turner, Gehling, & Prince (2010)/ Satisfaction with mobile Internet service usage

Based on the analysis of previous studies, most of the previous researchers had either adopted or adapted Bhattacherjee's (2001) and Spreng's (1996) instrument to measure satisfaction of educational technologies usage. It was found that six researchers had used these instruments in their study. Other instruments that have been used by previous researchers are from Vila and Küster (2011), Lee (2010), Shi et al. (2010), McGill and Hobbs (2008), Liaw et al. (2008), Sun et al. (2008), Flavian et al. (2006), Roca et al (2006), Chiu et al. (2005), DeLone and McLean (1992) and Oliver (1980).

Under the spotlight of articles from previous studies also found that the earliest instruments used to measure satisfaction was developed by Oliver (1980). Meanwhile, the latest instrument was developed by Vila and Küster (2011). There are 13 instruments that have been developed by earlier researchers to measure the level of satisfaction starts from 1980 to 2011.

Selection of the appropriate instrument to measure each variable studied is very important to ensure that they really measure what should be measured (Records, Keller, Ainsworth, & Permana, 2012). The usage of wrong instrument will give a massive impact on research. For example, a study by Sørebø et al. (2009) found there is no significant relationship between satisfaction and continuance intention to use e-learning technology. The findings are not consistent with studies that have been conducted by previous researchers. The situation arises from the lack of proper instrument selection.

Overall most of the previous researcher has used the instrument based on expectation-confirmation model (ECM) to measure satisfaction. Although the model is constructed to explain the factors affecting continuance intention towards information system in general, however it is found very convenient to measure the effect of satisfaction towards continuance intention to use educational technologies.

CONCLUSION
This article has provided an overview of the relationship between satisfaction and continuance intention to use educational technologies literature by presenting the results of a systematic review of 30 papers from 2005 to 2017. We analyzed the contributions with respect to specific research questions including hypothesis testing, type of educational technologies and the instruments used to measure satisfaction of educational technologies usage. The contributions have been systematically classified, which provides the current

status of IT continuance intention and will ease researchers' search for relevant studies in the future.

Results of this analysis will be a useful reference material for those readers who want to learn more about the various aspects related to the existing body of published educational technologies continuance intention research. Also, readers may take advantage of the information provided on how to measure satisfaction which will affect the continuance intention to use the educational technologies.

The present study also faces some limitations, and readers should be aware of these. It is probable that during the selection phase, some articles were negligently excluded. A further limitation was the decision to limit our search to journal articles, but there are many conference papers and dissertations that are not included in this article, and this could limit our capability to recognize all related papers, while more research is needed to find the range of the influence of such aspects.

This article is one of the first comprehensive articles in reviewing educational technologies continuance intention literature systematically in the context of satisfaction factor. We think that still future studies should examine additional factors such as perceive usefulness, confirmation, service quality and information quality to improve the understanding of the factors affecting continuance intention research.

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