What Determines Student Satisfaction in an E-learning Environment? A Comprehensive Literature Review of Key Success Factors

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Abstract

COVID-19 has significantly changed the teaching-learning process and it may indeed be a permanent change. Schools, colleges and universities have had to switch to remote/e-learning in an attempt to continue their operations during the pandemic. Institutions have struggled to identify the key success factors necessary for effective e-learning. While there have been some studies that have identified a few key factors, there has not been a comprehensive review of the key success factors for effective e-learning. This paper fills that gap by presenting a detailed examination of the critical success factors required for effective e-learning. The results show that success in e-learning is a complex combination of key factors such as institutional/administrative support, systems configuration and technical design, the level of computer skills among learners, learners' interpersonal behavior, e-learning readiness, learner motivation, computer anxiety, self-efficacy, instructors' characteristics, environmental factors and the demand it imposes on learners of varying age and cognitive maturity.

Keywords: e-learning, learner motivation, learner readiness, student success

1. Introduction

In today's competitive educational environment, e-learning has become a new paradigm adopted by most educational institutions including universities and colleges. The current COVID-19 pandemic has brought e-learning/online learning in the fore front of our daily lives. Just about every sector of the education spectrum was forced to adopt some form of online learning to deal with the COVID-19 issue. As schools, colleges and universities closed their doors to curb the spread of the COVID-19 virus, online learning became the way of life for thousands of students, irrespective of whether they were prepared for it or not. One thing for certain, is that the education landscape has undergone a permanent transformation and the teaching-learning process will never be the same again as it was in the pre COVID-19 period.

There is the view that e-learning technologies have become widely accepted as a training methodology because of the flexibility and the standardization of the educational process they offer (Tuparova, Tuparov, Karastranova & Peneva, 2006). Studies indicate that online courses have shown significant growth in recent times. Data show that in 2003, an estimated 10% of students were enrolled in at least one online course and by 2009 enrollment grew to 30% (Christensen, Horn, Caldera, & Soares, 2011). The overall growth rate of online course is impressive, statistics show that the annualize increase in online course is 12.9% compared to traditional higher education courses which increased by only 1.2%, also, 33% of degree granting institutions view online course as vital to their strategic plan (Allen & Seamen, 2008). Other studies have claimed that the e-learning market has a growth rate of 35% (Arbaugh & Duray, 2002; Wu et al., 2006).

While there is no universal definition of e-learning, one view is that, e-learning is the use of telecommunication technology to deliver information for education and training (Sun, Tsai, Finger, Chen & Yeh, 2007). Others have provided numerous definitions; Zahm (2000), Coppola and Myre (2002), saw it as web-based training. It is seen as online or web-based training by Volery and Lord, (2000), Urdan and Weggan (2000). A few researchers describe e-learning as a virtual learning environment (Hiltz, 1988; Piccolo et al, 2001), while others said it is distance learning (Webster & Hackley, 1997; Hall & Snider, 2000). Interestingly, Connolly and Stansfield (2006) tried to differentiate between blended learning, online learning and e-learning. They argued that online learning is any class that offers it entire curriculum via the internet, hence, allowing learners to participate regardless of

geographic location. Connolly and Stansfield (2006), define blended learning as a combination of online learning and traditional classroom instructions, hence, e-learning is a generic term which includes both (fully) online learning and blended learning.

Despite the growth in the e-learning market, there have been some failures. Learners have discontinued their online courses after their initial experience and institutions have struggled to determine why. DeLone and Mclean (1992) argue that information system research shows that user satisfaction is a key factor in evaluating the success of system implementation. In an online learning environment, several factors explain users' satisfaction. These factors are normally grouped under six main headings or dimensions namely: environmental, system design, technology, course, student and teacher (Arbaugh, 2000; Arbaugh & Duray, 2002; Aronen & Dieressen, 2001; Chen & Bagakas, 2003; Hong, 2002; Lewis, 2002; Piccoli, Ahmad, & Ives, 2001; Stokes, 2001; Thurmond, Wambach, & Connors, 2002).

The concept of online learning implies that learners/students are physically distance from their instructors and thus require a delivery method (Wang, Shanon, & Ross; Wilde & Hus, 2019). It is agreed that effective online teaching results from careful instructional design and planning (Hodges et al., 2020). The COVID-19 pandemic forced many students to make the transmission in the middle of their semester with little time for planning. Hermida (2020) argues that individuals have limited information processing capacity and the likelihood of using a mix of learning modalities could lead to cognitive overload which could affect one's ability to learn new information. Bower (2019) points out that if students/learners lack the confidence in the technology or do not feel a sense of cognitive engagement, then the students' learning outcomes may be negatively affected. Ultimately, the success of e-learning systems will depend on students' willingness to use and acceptance of the system (Almaiah & Jalil, 2014; Almaiah & Alismaiel, 2019). Where there is a lack of usage by students, the result is a waste of resources by schools and universities (Naveed et al., 2017).

The success of online/remote learning is a major issue that has occupied the minds of instructors globally. Institutions invest significant amount of resources in their online infrastructure to provide students with a teaching experience as close as possible to the face-to-face format. Despite the best efforts, there have been times when the results as measured by students' satisfaction, deviate materially from what institutions expect. The result is that everyone is left asking: what are the key factors required for successful online learning?

2. Theoretical Background to E-Learning

Researchers have identified significant variables dealing with e-learning success. These include the technology acceptance model (TAM) (Ajzen, & Fishbein, 1997; Davis, Bagozzi, & Warshaw, 1989), and the expectation and confirmation model (Bhattacherje, 2001; Lin, Wu, & Tsai, 2005) all of which have assisted in our understanding of online learning success. Studies normally use six dimensions to evaluate critical factors in an e-learning environment, these include environmental dimension, design dimension, technology dimension, student dimension, course dimension and instructor dimension.

The six dimensions were then expanded to include thirteen sub categories or factors. The following sub-factors were obtained from Sun et al., (2007) classification; they include: the learner dimension- these factors are learner attitude toward computers, learner computer anxiety, and learner internet self-efficacy. Instructor dimension includes instructor response timeliness and instructor attitude toward e-learning, and for course dimension there were e-learning course flexibility. Technology dimension include technology quality and internet quality. Perceived usefulness and perceived ease of use were identified in the design dimension and diversity in assessment and learner perceived interaction with others were linked to the environmental dimension.

It has been stated that there are a number of critical success factors (CSFs) that are important for e-learning success. Wu, Tennyson and Hsia (2010) argue that a higher level of individual self-efficacy is positively associated with a higher level of learner performance which leads to increase use of e-learning. Both intrinsic motivation (Davis, Bagozzi & Warshaw, 1992), and extrinsic motivation (Teo, Lim, & Lai, 1999; Roca, & Gagne, 2008) are factors found relevant for learners and instructors using e-learning systems. In a study conducted by Lee (2010) it showed that perceived usefulness has a direct positive effect on the intention to use e-learning, however, perceived ease of use and perceived enjoyment have an indirect positive effect on intention to use. It was also shown that perceived usefulness, perceived ease of use and perceived playfulness were key determinants of e-learning continuance intention (Roca & Gagne, 2008).

Studies have uncovered numerous CSFs for online learning. Volery and Lord (2000) using the results of their study at an Australian university, found that technological factors (such as ease of access, support integration and design), instructors' characteristics (such as attitude toward students, teaching style, technical competence, encourage student's interaction) and students' characteristics affected online delivery effectiveness. Others such

as Soong, Chan, and Loh (2001) found that human factors, instructors and students' technical competency, instructors and students' mindset about online learning, level of collaboration, and IT infrastructure are critical success factors for online course resources in Singapore. A further classification of CSFs was done by Selim (2007), that study classified them into four factors. The first is based on student observations including instructors' characteristics (such as teaching style, attitude toward students, technology control), the second factor is students' characteristics (such as motivation, technical competence, perception of content and system, collaboration in interaction). The third factor is technology (which includes ease of access, internet speed, screen design), and the final factor is institution support (such as technical support, computer availability, learning material access and printing). In an earlier study, Govindasamy (2002) identified seven key factors for e-learning implementation including: institutional support, faculty support, student support, teaching and learning, course structure, evaluation and assessment. Bhuasri et al., (2012) also highlighted the need for strong pedagogical foundations, especially content issues, student support and assessment, as important elements for a successful e-learning implementation.

There is the general view that students normally believe that using interactive technologies help them to increase their learning productivity, encourage a more in-depth approach to learning, promote the development of communication skills and improve the understanding of course content (Kember, McNaught, Chong, Lam, & Cheng, 2010; McCarthy, 2010; Reiss & Steffens, 2010). It has been stated that the feeling of safety, anonymity, and connectivity which are inherent in online interaction may allow students to voice different or controversial viewpoints and thus harness the potential of an online learning community for collaborative participation in the exploration of a subject matter and the negotiation of its meaning (Ashton & Elliott, 2007). The e-learning environment nevertheless presents challenges to both students and instructors.

Students may encounter several challenges during the implementation of e-learning activities. Some students may need the necessary hardware and skills to access online information successfully (Al-adwan & Smedley, 2012). There are also those students who may lack the experience and confidence in using the technology. Arabasz et al (2003) argue that a student's technical limitation including hardware and bandwidth issues need to be considered by instructors when designing online courses. A point that is made is that students may have difficulties understanding their contents if they are expressed in complex language, due mainly to the fact that in e-learning, students are more stand-alone and responsible for their own learning process due to the lack of face-to-face contact with instructors and other students (Hatcher & Yen, 2005).

Instructors also have challenges with online courses. One of the main issues has to do with the amount of time required to deal with e-learning course delivery (Smith & Taveras, 2005). Instructors are normally required to redesign their courses to fit the online requirements, this increase workload and demand more time. Therefore, it is vital that appropriate boundaries are implemented to allow for realistic outcomes and the student receives a positive learning experience (Al-adwan & Smedley, 2012). Some instructors lack the knowledge and training in using technology to design online courses, and there are others who do not have the confidence in using technology in education (Educause, 2003), and finally, there are those instructors who are still unconvinced about the integration of technology in their learning (Ishtaiwa, 2006).

3. Understanding Success Variables

Previous studies have shown the variables identified in Table 1 to be critical success factors affecting learner satisfaction.

Table 1. Relevant references indicating critical success factors in e-learning environment

Author(s)	Factors
Kanuka and Nocente (2003)	Motivation aims, cognitive modes and interpersonal behavior
Arbaugh & Duray (2002)	Perceived usefulness and perceived ease of use, perceived flexibility
Thurmond et al. (2002)	Computer skills, initial knowledge of e-learning technology, received timely comments, offer various assessment methods, computer skills, acquaintance with instructor
Hong (2002)	Age, initial computer skills, gender, learning styles, interaction with instructor, interaction with students, gender, course activities, discussion sessions
Arbaugh (2002)	Prior instructor experience, perceived flexibility of medium, perceived usefulness and ease of use, interaction
Arbaugh (2000)	Flexibility of e-learning, perceived usefulness and ease of use, interaction with students, student usage and gender
Piccoli et al. (2001)	Motivation, technology comfort, computer anxiety, teaching styles, maturity, self-efficacy, procedural knowledge

A study conducted by Cidral et al (2018) in Brazil found that the main drivers of e-learning success measured in-terms of user perceived satisfaction were information quality, system quality, instructor attitude toward e-learning, diversity in assessment and learner perceived interaction with others. Understanding what drive e-learning success remains a complex issue. Sorgenfrei, Borschbach, and Smolnik (2013) identifies three main drivers responsible for the e-learning process, these were: technical and design size, individual motivation, and environment characteristic. According to Sorgenfrei et al (2013), these three main drivers will influence the students' decision to take other e-learning courses. Cheng (2011) examined e-learning acceptance predictors and found that ease-of use, perceived enjoyment, perceived usefulness, system factor, network externality factor, individual factors, and social factors are the main drivers of acceptance of the e-learning system. Students low rates of satisfaction were linked to several factors as explained by Frankola (2001), factors such as: failure in supervision of e-learning structure, the lack of motivation, students not having sufficient time, poor graphic design, and instructor deficiency. Wang (2003) found that students' satisfaction with e-learning was linked to factors such as: learning community, student interface, customization, and content. Sun et al. (2008) argued that the determination of e-learning success is a mix of factors such as: technology, student's dimension, design, and environment. Selim (2007) placed the critical success factors for e-learning success into four groups: student, university support, trainer, and information technology. Students' motivation is now recognized as an important success factor in e-learning.

3.1 Learner Motivation

Psychology defines motivation as the drive that makes an individual act. Learner motivation is significant for the learning process, thus Selim (2007) argued that learner motivation plays an important role in the adoption of online environments by students. Herminda (2020) argues that motivation refers to the perceived relevance of an activity that impacts persons behavioral intentions. Kemp et al. (2019) made the point that students who are motivated are more inclined to be engaged in self-regulatory activities to assist them in achieving their goals. Numerous studies have established a strong cause and effect relationship between learner success and motivation within the online learning environment (Cull, Reed, & Kirk, 2010; Baturay & Yukselturk, 2015). Rosenberg and Ranellucci (2017) also argued that students who are highly motivated normally spend more time in an online learning environment than less motivated students. Further, Albelbisi and Yasop (2019) made the point that students who are highly self-regulated tend to exhibit effective positive motivation and self-efficacy relating to their learning process selecting learning content, organizing and controlling their learning, and identifying relevant learning goals. The effect of students lacking motivation and self-regulated skills in an e-learning environment normally results in poor quality work, or late submission of assignments (Albelbisi & Yasop 2019). Pintrich et al. (1991) argues that motivation embodies three main components called value, affective components and expectation which further comprise several sub-factors such as self-efficacy and test anxiety. Although Wang, Shannon, and Ross (2013) argued that self-efficacy variable had positive effect on grade and satisfaction of the online experience, other studies have shown that motivation variables affect course outcomes and student-system interactions. Joo, Lim, and Kim (2013) found supporting evidence that self-efficacy and task value were major determinants of learning outcomes and student satisfaction. Heckel and Ringeisen (2019) argued that learners normally achieve online learning self-efficacy based on prior experiences with technology and some may require training and assistance to use the technology before starting an online course. However, once the students believe

they have the requisite knowledge and resources to assist them, it will positively affect their use of the application (Alghamdi, Karpinski, Lepp, & Barkley, 2020; Yakubu & Dasuki, 2019). Students may have the requisite level of motivation, but the question of their readiness for e-learning becomes relevant.

3.2 Importance of E-learning Readiness

Most persons would consider the e-learning environment as a system, and thus learner characteristics which are inputs to the system would definitely affect the outcomes from the system, hence e-learning readiness is an important component in the system (Keskin & Yurdugul, 2019). Several studies have shown that students' readiness to use e-learning environments was a major variable in these studies (Muilenburb & Berge, 2005; Yurdugul & Demir, 2017; Kaur & Zoraini Wati, 2004). Researchers have defined e-learning readiness as a combination of the knowledge, skills, affective characteristic, physical opportunities and skills which are required for students to maximize the e-learning environment (Yurdugul & Demir, 2017; Borotis & Poulymenakou, 2004). Hung, Chou, and Own (2010) identified six key components of e-learning readiness, namely: computer self-efficacy, internet self-efficacy, online communication self-efficacy, self-directed learning, learner control and motivation towards e-learning. Keskin and Yurdugul (2019) argue that the first three factors are associated with the learners' competence in technologies and communication tools for e-learning. They further argued that the variables of self-directed learning and learner control relate to learners' pedagogical knowledge and skills for e-learning. Yilmaz (2017) argues that self-directed learners are able to determine learning needs, goals and learning strategies without the assistance of others and evaluate their learning results, while learner control is the student's ability to manage the learning process. Therefore, in order to produce positive e-learning experiences, students must be ready for e-learning and the e-learning readiness structures would indicate the extent to which learners are ready for this process (Guglielmino & Guglielmino, 2003). The average learner is viewed as savvy with the technology, hence the assumption is made that learners are sufficiently knowledgeable to use e-learning technologies (Valtonen, Kukkonen Dillon, & Vaisanen, 2009). However, Keskin and Yurdugul (2019) remarked that the usage of these technologies at varying levels and the associated problems observed in e-learning processes have led to the need to evaluate the learner's e-learning readiness. Researchers can now conclude that e-learning readiness should not be discounted as there is a significant body of evidence which show it is a critical success factor in the remote teaching environment.

4. Concluding Comments

Achieving e-learning success for our students is not going to be an easy task. Success is the result of a complex combination of factors that a single institution/school may not have at the outset of its desire to transition from face-to-face to remote learning. The studies have shown that students' performance is determined by the inter-play of factors ranging from institutional/administrative support, system configuration and technical design, the level of computer skills among learners, learners' interpersonal behavior, learning styles, instructors' characteristics, environmental factors and learner motivation. Therefore, the extent to which institutions understand the complexity of the e-learning environment and the demand it imposes on learners of varying age and cognitive maturity, the easier it would be for institutions to design their e-learning platform and support services which would ensure that learners will have a positive experience and are encouraged to continue using the system.

It cannot be that once institutions have invested heavily in the software and hardware to facilitate the e-learning process, their obligations have ended. There is the need for continuous re-fining and evaluation of the system to ensure that the learners needs are being met and learners are experiencing positive results which translates into students' success and enjoyment of their courses. The e-learning system and the learners' experience interacting with the system and instructor's role should be subjected to continuous evaluation based on learner feed-back. One thing for sure is that, while an individual institution may not be able to display competence in all the critical success factors for effective e-learning identified in this literature review. This paper has presented a practical workable blue print for all institutions offering remote learning to consider as they contemplate the design of new online systems and the review of existing systems. Remember, the effectiveness of an e-learning system or platform can only be measured based on the learner's response.

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