Library and Information Science Research 40 (2018) 106–117

Contents lists available at ScienceDirect

Library and Information Science Research

journal homepage: www.elsevier.com/locate/lisres

Factors influencing undergraduate use of e-books: A mixed methods study

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ABSTRACT

Academic libraries invest millions of dollars to make electronic resources such as e-books available to students for free. However, free access might not necessarily result in students' sustained interest in and use of e-books. This interdisciplinary, mixed methods research investigates the factors influencing the intention of 279 undergraduate students to use e-books at a land-grant university in the southern US. Structural equation modeling of the survey responses suggests that organizational environment for information technology, external locus of control, subjective norm, perceived enjoyment (i.e., joyfulness), and information technology features play a significant role in influencing the intention of students to use e-books. Based on a combination of quantitative results and qualitative findings, this study identifies eight activities that libraries need to undertake in order to increase the use of e-books by undergraduate students.

1. Introduction

Undergraduate students born between 1982 and 2000, also known as millennials, have grown up in a digital world with easy access to technological advancements such as computers, smartphones, and Internet. There is a growing trend among millennials to interact with and learn from electronic resources such as e-books from anywhere, any time they like (Aharony, 2014a). Academic libraries spend millions of dollars on e-books and supporting information resource infrastructure for making e-books available to their students for free. But free access might not necessarily lead to generating students' sustained interest in and use of e-books.

2. Problem statement

Existing studies of e-book adoption by students often do not adopt a holistic approach (e.g., Foasberg, 2011; Girard, 2014; Mafunda, Bere, & Swart, 2016; Potnis, Deosthali, & Pino, 2017). For instance, they do not attempt to learn whether students find the existing collection of e-books in their academic libraries relevant, are influenced by peers about using e-books, can access and try any e-book of their choice before committing to using e-books, desire any specific features in e-books, have enough skills to use advanced features of e-books, or get timely help from librarians for addressing any issue related to accessing and using e-books. As another example, undergraduate students, who represent one of the main target user groups of e-books in academic libraries, rarely have equal or any say in the process of selecting e-books at academic institutions (Ashcroft, 2011; Slater, 2010). Very few studies investigate the effect of factors such as these on students' adoption of e-books.

From a practice point of view, academic libraries rarely have specific strategies relevant and applicable to the characteristics and needs of millennial students for creating, sustaining, or growing their interest in electronic resources including e-books (Cassidy, Martinez, & Shen, 2012; Walters, 2013). Several global surveys have reported two findings consistently: academic libraries need to a) raise awareness about the e-books they offer, and b) change how they offer them to students (Ashcroft, 2011). Studies also show that academic libraries need to make students' experience of reading e-books more congruent with that of other electronic resources (Slater, 2010). But there is hardly any focused guidance available for academic libraries to address these specific issues as they concern millennial user populations.

This mixed methods research examined the factors influencing the intention of undergraduate students to use e-books. The study adopted a holistic approach by employing theoretical perspectives from psychology, organizational behavior, information systems, library science, and information science to explain the behavioral intention of millennial undergraduate students to use e-books licensed by academic libraries. The results inform librarians, library administrators, e-book publishers, and academic instructors from all disciplines, as well as undergraduate students and their parents. The study also suggests ways in which academic libraries can better position their e-book collections for use by millennial undergraduate students.

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https://doi.org/10.1016/j.lisr.2018.06.001
Received 25 July 2017; Received in revised form 7 April 2018; Accepted 1 June 2018

3. Literature review

An individual's intention to engage in a particular behavior such as adoption of electronic resources is shaped by personality, technological, environmental, and organizational factors. A majority of empirical studies on the adoption of electronic resources by students are qualitative in nature (e.g., Urquhart & Rowley, 2007). These exploratory studies identify factors that can be broadly categorized into technological (e.g., features of e-books, features of e-readers, cost of accessing and using e-books), personality (e.g., self-efficacy, technology literacy, information literacy, etc.), and environmental (e.g., digital rights management, academic policies, etc.) (Girard, 2014; Potnis, Deosthali, & Pino, 2017). However, several of these exploratory studies report findings based upon relatively small sample sizes and they do not conduct any statistical testing or calculate the statistical significance of findings to confirm that findings are not by chance.

By contrast, some quantitative information science studies (Aharony, 2014b; Deosthali, Potnis, Elliott, & Fesmire, 2015; Johnston, Berg, Pillon, & Williams, 2015; Joo & Choi, 2015; Lai & Chang, 2011; Mafunda, Bere, & Swart, 2016; Shin, 2011; Wang & Bai, 2016) propose theoretical models using factors drawn from the information systems literature on information technology adoption to understand student acceptance of e-books. Several of these explanatory studies employ a combination or a variation of constructs from the decomposed theory of planned behavior (DPTB; Goodhue & Thompson, 1995), the technology acceptance model (Davis, 1989), the diffusion of innovation theory (Rogers, 2003), the unified theory of acceptance and use of technology (Venkatesh, Morris, Davis, & Davis, 2003), and similar theories built on constructs from psychology and communication (Potnis, 2015). Many of these studies find personality factors to be most significant in influencing students' adoption of e-books. Most frequently identified significant personality factors include attitude (Marques de Oliveira, 2012; Wang & Bai, 2016), perceived ease of use (Deosthali, Potnis, Elliott, & Fesmire, 2015; Johnston, Berg, Pillon, & Williams, 2015; Joo & Choi, 2015), perceived usefulness (Johnston, Berg, Pillon, & Williams, 2015; Joo & Choi, 2015; Shin, 2011), personal innovativeness (Aharony, 2014b; Mafunda, Bere, & Swart, 2016), and awareness of e-books (Wang & Bai, 2016). The present investigation advances this body of knowledge by testing the effects of the following five factors on the intention of millennial students to use e-books: organizational environment for information technology, external locus of control, subjective norm, perceived enjoyment, and information technology features (Table 1).

3.1. Organizational environment for information technology

In the context of existing research dominated by personality factors, an organizational factor such as organizational environment provides a complementary perspective by presenting possible effects of external conditions on the intention of students to adopt e-books. Nolan's (1973) information systems development stage theory provides the theoretical foundation for evaluating organizational environment for information technology. Based on this theory, some scholars have proposed measurement techniques and parameters. For example, Benbasat, Dexter, Drury, and Goldstein (1984) critique the stage theory and summarize and propose 19 criteria for measuring readiness and maturity of organizations for offering information technology services and products to patrons. Complexity, instability, and resource availability are the three most common dimensions of measuring organizational environment (Sharfman & Dean, 1991). In the present study, organizational environment refers to the conduciveness of the environment provided by the academic institution to millennial students for using e-books.

A combination of variables from the DTPB (Goodhue & Thompson, 1995), the diffusion of innovation theory (Rogers, 2003), and the stage model (Nolan, 1973; as well its critique by Benbasat, Dexter, Drury, & Goldstein, 1984), and the subsequent e-commerce adoption model (Liu, 2008) laid the foundation for the scale developed in the present study for measuring organizational environment for information technology. In particular, this research relies on resource facilitating conditions in organizations (from DTPB), trialability of innovation facilitated by organizations to its patrons (from the diffusion of innovation theory), and knowledge of employees to help patrons address issues with information technology adoption (from the stage model).

3.1.1. Resource facilitating conditions in academic libraries

Resource facilitating conditions refer to the resources needed to engage in the behavior of using e-books made available by an academic institution. Urquhart and Rowley (2007) propose a model for understanding students' information behavior when using electronic resources. According to this model, availability of electronic resources plays a key role in influencing students' use of electronic resources.

3.1.2. Trialability of innovation: trying e-books for free

Rogers (2003) describes the innovation-diffusion process as “an uncertainty reduction process” (p. 232), and he proposes five attributes of innovations that help to decrease uncertainty about the innovation. Trialability is one of the characteristics of innovation, and is the degree to which an innovation may be experimented with by potential adopters. This research study looks at trialability of e-books because cash-strapped undergraduate students would presumably like to try using e-books before committing to or renting them. If many e-books covering a wide variety of topics of interest are made available for free by their academic institutions, curious students may be more likely to try them before they start using them. The more an innovation is tried, the faster its adoption. After examining the adoption of e-books from the diffusion of innovation perspective Waheed, Kaur, Ain, and Sanni (2015) found that trialability of e-books significantly influenced the adoption of e-books by students. Due to the millennial students' affinity toward mobile devices, they may also be more likely to try e-books on their mobile devices anywhere and anytime they want. Students might discover unintended (i.e., academic) uses of e-books while just trying e-books for fun. Jamali, Nicholas, and Rowlands (2009) found that when students could use e-books for completing assignments, this stimulated their interest in using e-books on a regular basis.

Table 1
Classification of factors.

#	Factor	Key concept	Type of factor
1	Organizational environment	Organizational support in the form of various resources to help patrons use information technology artifacts (Agarwal & Prasad, 1997; Benbasat, Dexter, Drury, & Goldstein, 1984; Goodhue & Thompson, 1995; Liu, 2008)	Organizational factor
2	External locus of control	One's belief that they have no control over their life, and hence, their life and decisions are controlled by powerful people or fate (Chak & Leung, 2004; Rotter, 1966)	Personality factor
3	Subjective norm	Social influence or pressure from others for performing a behavior (Ajzen, 1991; Ajzen, 2001)	Environmental factor
4	Perceived enjoyment	Joyfulness associated with a behavior (Chang & Cheung, 2001; Davis, Bagozzi, & Warshaw, 1992)	Personality factor
5	Information technology features	Operations, functions, or characteristics of information technology (Jasperson, Carter, & Zmud, 2005)	Technological factor