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# Understanding Academic E-books Through the Diffusion of Innovations Theory as a Basis for Developing Effective Marketing and Educational Strategies

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## ARTICLE INFO

## ABSTRACT

Academic libraries are choosing to purchase electronic books (e-books) rather than print more frequently for multiple reasons. Unfortunately, e-books are not being used as much as they should be. With increasing academic e-book collections, many studies have examined student and faculty use of and attitudes towards this innovation. This paper will analyze the results in this area of research and align them with the Diffusion of Innovations Theory that includes the Rogers Diffusion of Innovations Curve, innovation categories, and the factors affecting the diffusion process of an innovation. This analysis will give libraries a better understanding of who is using academic e-books, why academic e-books are being used, and how to influence the behaviour of the academic libraries' patrons to increase their use of academic e-books. An analysis of these three areas will help libraries to develop effective marketing and education strategies aimed at increasing e-book usage.

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More and more, academic libraries are choosing to purchase electronic books (e-books) rather than the print versions. Reasons for this change in collection practice include accessibility (24/7 access through the Internet), lower cost, and space (as e-books require no physical storage space libraries can theoretically keep adding books to their electronic bookshelf without having to consider the removal of older material). As well, publishers provide package deals making it easier, cheaper, and more desirable to purchase e-books. It is important to note that there is a difference between academic e-books and those personally purchased for leisure reading. Academic e-books can be in different formats (e.g. pdf, html) and can be located on different platforms with different access, printing, downloading, copying, and annotation capabilities. There is a general belief among librarians that academic e-books are not being used to their fullest extent.

With increasing academic e-book collections, many studies have examined student and faculty use of and attitudes towards this innovation. This paper will analyze the results in this area of research and align them with the Diffusion of Innovations Theory that includes the Rogers Diffusion of Innovations Curve, innovation categories, and the factors affecting the diffusion process of an innovation. This analysis will give libraries a better understanding of who is using academic e-books, why academic e-books are being used, and how to influence the behaviour of the academic libraries' patrons to increase their use of academic e-books.

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## LITERATURE REVIEW

Library Information and Technology Abstracts, EbscoHost Academic Search Complete, and the University of Manitoba's integrated catalogue were searched to locate articles pertaining to the use of and attitudes towards academic e-books in a university or college setting.

## E-BOOKS USAGE ALONG ROGERS DIFFUSION OF INNOVATIONS CURVE

Hawkins, Best, and Kenneth (1998) define an innovation as "an idea, practice, or product perceived to be new by the relevant individual or group" (p. 248) and explain that the Rogers Diffusion of Innovations Curve is "the manner in which innovations spread throughout the market" (p. 251). The diffusion curve is a depiction of an innovation's migration through the market over time. It is divided into five stages of adopter categories: innovators, early adopters, early majority, late majority and laggards (Hawkins et al., 1998, p255).

The innovators love innovation for the innovation itself and are among the first 2.5% to embrace any new innovation. They are curious people who love new ideas and want to understand new products that come into the market place. The early adopters, people who love to be seen with the new innovations, are the next 13.5% of adopters. They take pride in being trendsetters and the innovation itself is not as important as being seen with the innovation. The early majority, the next 34%, are cautious, fact driven and embrace innovation when they can realize personal benefit. The sceptics, the pragmatics, the

people who like their comfort, and the people who are heavily influenced by price (the late majority) are the next 34% to adopt. The laggards are the last 16% to embrace new innovations. These people are attached to the past, do not usually like change, and are the most likely to skip versions of innovations. It is also important to note that opinion leaders are located all along this curve. Typically those who influence a category are in the preceding category (e.g. laggards are influenced by the late majority) (Hawkins et al., 1998, p.255; Bhatnagar, 2015).

How do academic e-books fall along the diffusion curve? The literature review revealed that there are various degrees of academic e-book usage:

- 39% Mount St. Joseph College in Cincinnati (Staiger, 2012)
- 57% University of Illinois (Staiger, 2012)
- 51.2% Royal Roads University (Croft and Davis, 2010)
- 38% University of Ulster (Smyth and Carlin, 2012)
- 44% of faculty and 44% of graduate students at the University of Oklahoma School of Geology and Physics (Foote and Rupp-Serrano, 2010)
- 37% of faculty and 40% of graduate students at the Sam Houston State Library (of the non e-book user group 68% of graduate students and 47% of the faculty said they would use e-books in the future) (Cassidy, Martinez, and Shen, 2012)
- <10% of students Watson School of Engineering and Applied Science; 17.6% of students from Community and Public Affairs; 37.5% of students from the Art Design and Art History, Binghamton University (Cummings, Larrivee, and Vega, 2015)
- 62.8% of the Franklin & Marshall College campus (Olney-Zide and Eiford, 2015).
- 32.5% daily or weekly academic use of e-books, University of Maryland Libraries - Undergraduates 38.6%, Graduate students 37.2%, Faculty 16.2% (Carroll, Corlett-Rivera, Hackman, and Zou, 2016)

When comparing these percentages to the diffusion curve, it appears that academic e-books have entered into the early majority of the diffusion curve. The University of Illinois and Royal Road University are the furthest along with the some of the late majority category already adopting this innovation. The statistics demonstrate that, in general, the innovators and the early adopters have embraced the academic e-book format, and the early majority are in the early stages of adopting this technology.

Who are these people who are currently using e-books? Who are these innovators, early adopters and the early majority? If we compare the e-book adopter percentages to the diffusion of innovation curve for undergraduate students (9.5% innovators, 25.9% early adopters, 51.4% early majority, 9.3% late Majority, 3.9% laggards) (Salaway and Caruso, 2008), it appears as if e-books usage is more prevalent for students than faculty. Rowlands, Nicholas, Jamali, and Huntington (2007) review of the literature found those using e-book technology are more likely younger in age (12 to 21 – 29%; 22 to 25 – 20.6%; 26 to 35 – 27.9%; 36 to 45 – 12.9%; 46 to 55 - 6.3%; 65 + - 0.3%), more likely male, more likely reliant on Google and other search engines or publisher websites, and less dependent on personal recommendations, and reference or reading lists. Gilbert and Fister's (2015) and Revelle, Messner, Shrimplin, and Hurst (2012) further corroborate a gender difference in academic e-book use. Gilbert and Fister (2015) found over one-third of the male participants would prefer to use e-books for research as compared to one in five women and Revelle et al. (2012) discovered only 35% female participants were comfortable reading online, compared to 47% of the male participants. Studies also found e-book users mainly originate from the departments of business, management (Nicholas, Rowlands, and Jamali, 2010), natural science, and social science (Gilbert and Fister, 2015). According to Ahmad, Brogan, and Johnstone (2014), only 0.5% of e-book users can be classified as "power users." Ahmad defines e-book power users as "early adopters and users with a propensity to use advanced features of hardware and software." Nicholas et al.

(2010) showed the e-book power users are more likely to be male, between the ages of 22 and 35 and have a strong preference for using and searching library e-books.

The last stage of adopter categories are the laggards, the library patrons who still rely on the print version of books and actively avoid using e-book technology. Cassidy et al. (2012) addressed this contingent in their study. They found that 22% of faculty respondents in Sam Houston State University library are members of the laggard group. Carroll et al., (2016) reported that faculty (33.1%) and staff (47.7%) were the most likely never to use e-books for academic purposes. To get a better understanding of why some innovations are not readily adopted, it is important to understand innovation categories and the factors affecting the diffusion process of an innovation.

## INNOVATION CATEGORIES

Acceptance and diffusion of innovations negatively or positively depend on the nature of and the categories of innovation. Determining what constitutes an innovation is subjective and based on the perceptions of individuals and groups. In the Diffusion of Innovations (Hawkins et al., 1998), innovations can be classified into one of three categories: continuous innovation, dynamically continuous innovation, and discontinuous innovation (p. 248). Into which category an innovation falls depends on the degree of behavioural change required and the level of importance that users attach to the behavioural change. A continuous innovation adoption requires minor changes in behaviour and these behaviours are seen as unimportant to the individual. Examples of continuous innovations include purchasing running shoes and pain relievers. In these instances, the individuals do not need to do anything different to use new products. In a dynamically continuous innovation, adoption "requires a major change in an area of behaviour that is of low or moderate importance to the individual" (p. 249). Examples in this category are digital video cameras and online shopping. Even though both involve a drastic technological change, most individuals would consider this a dynamically continuous innovation. A discontinuous innovation requires individuals to make major behaviour changes that are perceived as very important to the individual. Examples of these innovations include the initial introduction of office computers and weight loss surgery. It is important to note that the categorization of an innovation is entirely subjective and is linked to the level of interest of the individual. The way in which an innovation is categorized is based on how important individuals' current habits are, the perceived disruption the new innovation will have on current habits, and the level of importance individuals attach to the behaviour change required to accept or utilize the innovation. In the case of e-books, it depends on the level of importance an individual attaches to current reading and research practices, the changes in behaviour needed to include e-books in these practices, and the perceived importance in making these behaviour changes.

After reviewing the literature, arguments can be made that the academic e-book would fall into either the dynamically continuous or the discontinuous category. The use of academic e-books requires a definite change in behaviour; e-books do not look like nor do they operate the same as a print book. However, it is the individual who decides if the use of the e-book is a dynamically continuous innovation or a discontinuous innovation.

Studies found that students and faculty prefer print books for learning or lengthy reading (Ashcroft, 2011; Corlett-Rivera and Hackman, 2014; Foasberg, 2014; Hoseth and McLure, 2012; Woody, Daniel, and Baker, 2010) but many are using the search functionality of e-books to find a few pages or paragraphs of information (Nicholas et al., 2010; Plum and Franklin, 2015; Staiger, 2012). This suggests that while students and faculty still prefer their current reading and research practices, some are willing to embrace this new innovation. While not completely changing their routine, they are adapting and adopting new behaviours to include e-books into their learning practices. Because

both print and electronic versions are available, and both are used, an assumption can be made that these e-book users see this innovation as dynamically continuous. At the same time, they don't need to change their behaviour, as print books are still available, but they are changing their behaviour to include this new technology – this change is perceived as a positive one that facilitates their learning. An argument also can be made that when faculty and students actively avoid e-books (Cassidy et al., 2012), this group finds e-books to be a discontinuous innovation. Their current practices are too ingrained and important and they are unwilling to change their behaviour to include e-books into their research practice. Currently, as both book versions are available their habits are safe, but as libraries move towards an electronic dominant collection, these patrons will find themselves being forced to adopt e-books.

In order to understand the resistance to the use of e-books, it is important to examine how the use of print books and e-books differ. Berg, Hoffmann, and Dawson (2010) show how the use of print books and e-books are different. They found that even though the expected outcomes remained the same, how participants retrieved the information from these sources differed. Students took a very linear strategy when retrieving information from print books and had no strategy when using e-books. Information finding in books consisted of a methodical approach where students would look to table of contents and the index, go the pages, and scan for information. If nothing was found, they thought of different keywords to search and repeated the process until they found the needed information. However, when searching for information within e-books, participants appeared unsure on how to approach the task, starting then abandoning multiple search methods when faced with obstacles. The ingrained behaviour of successfully finding information in print books did not translate to searching successfully within e-books. This revealed that study participants did not view the e-book as the equivalent of a print book, but expected e-books to be more aligned with the functionality of a website. The transition from using print books to e-books is not seamless and is affected not only by the new technology, but how the patron perceives and uses the new technology. Smyth and Carlin (2012) corroborate this, when they found that in terms of finding information, e-books are not a perfect substitute for print books.

## FACTORS AFFECTING THE DIFFUSION PROCESS OF AN INNOVATION

An understanding of the factors that affect the diffusion process on an innovation is essential to academic libraries so that they can develop strategies that will influence patrons to increase the use of e-books. Hawkins et al. (1998), describes ten factors that affect the diffusion process of an innovation (p. 251). Of these factors, the following six factors are relevant to the diffusion process of academic e-books: type of group, fulfillment of need, relative advantage, observed positive effects, complexity, and marketing effort.

The type of group is a major factor in the resistance or acceptance of academic e-books. As noted above, there are those who are willing to accept and use the e-book but there also is a contingent of students and faculty who are firmly entrenched in their behaviours and prefer using print books (Ashcroft, 2011; Carroll et al., 2016; Cassidy et al., 2012; Gregory, 2008; Mizrachi, 2015). Ashcroft (2011) found that of the 3132 study participants who did not use e-books, 1420 individuals cited the reason for non-use of e-books was a preference for print books. Carroll et al., (2016) reported that undergraduate students preferred print, while faculty and graduate students showed a strong preference for e-books, except for scholarly monographs, edited collections, and literature. Delving deeper, Carroll also found that all three groups preferred conference proceedings, reference material, and style guides in electronic format. Comparing these results to a 2012 study, Carroll saw a decreased resistance to e-books and a shift in e-book preferences for certain types of material. Revelle et al. (2012) delved deeper into their e-book users at Miami University in Oxford, Ohio and found four distinct opinion types: book lovers, technophiles, pragmatists and printers (Table 1). Seven hundred thirty-five of the 1135 study respondents fell absolutely into one of the four opinion types: 24% book lovers, 23% technophiles, 17% pragmatists, and 26% printers. Thirty-one percent of undergraduate students were found to be book lovers, 24% technophiles, 16% pragmatists, and 29% printers. Graduate students had a fairly similar breakdown with 31% book lovers, 20% technophiles, 18% pragmatists, and 20% printers. Faculty had the highest number of book lovers (43%) and technophiles (31%), the lowest number of printers (13%), and comparable pragmatists (18%). The results of the Revelle et al., study indicates that there is still a stronger preference for the print book across all groups. Gregory (2008) and Mizrachi (2015) noted reasons for a print book preference including: tangibility (i.e. the physical aspects of the book), portability, no need for electronic technology, no eyestrain from reading a computer screen, and better reading comprehension, understanding, and knowledge retention. Research has indicated that one reason for acceptance of e-books is that they provide a new way to access information in a world where "chapters, paragraphs and sentences are now the unit of consumption – something which appeal[s] to the digital consumer, especially students, who prefer bite size chunks of information" (Nicholas et al., 2008).

The next three diffusion factors of (fulfillment of need, relative advantage, and observed positive effects) can be the deciding factors in the acceptance of e-books because they allow for the following qualities that are essential for acceptance: convenience, searchability, downloadability, remote access, 24/7 accessibility, ability to copy and paste, portability, environmentally friendly technology, storage, and the ability to copy, paste, email, highlight, and annotate (Cassidy et al., 2012; Carroll et al., 2016; Foote and Rupp-Serrano, 2010; Hoseth and McLure, 2012; Smyth and Carlin, 2012; Gilbert and Fister, 2015). Current users of e-books have their needs fulfilled with an easy to access information source where snippets of information can be found. They also have experienced the relative advantage and observed positive effects of using e-books with the different functions available in the electronic text.

Complexity of the product is a diffusion factor that can hinder the acceptance of e-books. The same technology that makes an e-book a desirable innovation also creates complexity, and thus barriers for use; to use an e-book is not as simple as opening a print book. Burton (2015a) outlines barriers to the use of e-books that include the multitude of different e-book platforms, the compatibility between e-books and different web browsers and devices; the requirement of a computer or some

**Table 1**
E-Book opinion types.

| Opinion type | Characteristics |
|---|---|
| Book lover | • Cherish book as physical object<br>• Do not read e-book for pleasure<br>• Strong dislike for reading long texts on a computer screen<br>• Feel they do not retain information as well reading off a screen |
| Technophile | • Strong interest in possibility of technology, especially with e-books<br>• Feel advantages in searchability and access out-weigh negatives in regards to e-books<br>• Love the idea of not having to go to a library to conduct research<br>• No trouble reading text from a computer screen |
| Pragmatists | • See both advantages and disadvantages of e-books<br>• Like searchability of electronic content<br>• Feels loss of margin note taking interrupts workflow<br>• Would not read an entire book on a computer screen, but would rarely an entire book anyways |
| Printers | • Have specific usability issues with e-books.<br>• Cannot read text on a computer screen and resort to printing any text that they need |

Source: Revelle et al. (2012). Book lovers, technophiles, pragmatists, and printers: The social and demographic structure of user attitudes towards e-books. *College & Research Libraries*, 73(5), 420–429.

piece of technology to use the e-book; the knowledge level required to use an e-book, the different platforms, and the technology; perpetual access is not always guaranteed.; some e-books are only available to one person at a time (single-user) and some allow multiple people to use an e-book simultaneously (multi-user); and digital right management which imposes restrictions on copying, printing, and if a book can be available electronically. Olney-Zide and Eiford (2015) note these barriers and how the increased complexity of e-books "hinder the ability to perform quality research, lead to discouragement, and reduce the overall acceptance of e-books." Other reasons indicated for not accepting e-books are: restrictions on copying, pasting, and printing; need for Internet access; dependency on electronic technology; non user-friendly interface for navigation and searching; difficulty in browsing electronic stacks; and the inability to write in the pages and flip between multiple books (Ahmad et al., 2014; Cassidy et al., 2012; Hoseth and McLure, 2012; Staiger, 2012; Gilbert and Fister, 2015). These reasons reflect a complexity in e-books that are not inherent in the print book. This also demonstrates that academic e-books are not fulfilling a need for everyone nor does everyone perceive an advantage in using e-books over print, even with the increased accessibility and functionality. The belief that complexity negatively affects the acceptance and use of e-books also was found in the results of a survey given to librarians. Ashcroft (2011) administered the survey to librarians with instructions to answer how they thought their students would answer. The top reason librarians felt students did not use e-books was due to their complexity. However, the top reason cited by students for not using e-books was a lack of awareness (Ahmad et al., 2014; Gregory, 2008; Staiger, 2012).

This discrepancy between the belief of the librarians and the students' actual response leads to the final diffusion factor affecting acceptance: marketing effort. This lack of awareness on the part of the student could be attributed to a low marketing effort by libraries. Libraries may not be promoting this resource to their full capability because they assume no one wants to use e-books due to their complexity. Awareness of e-books is different across campuses and is dependent on the local library efforts towards promotion and education. For example, research has shown the following levels of awareness in different geographical locations: 31% at University College London, 75% at Mount St Joseph College Cincinnati, and 55% at University of Denver (Staiger, 2012). Hernon, Hopper, Leach, Saunders, and Zhang (2007) found libraries can increase awareness through simple activities such as advertising on the library's homepage may lead to more acceptance by students and faculty. However, a high awareness does not mean e-books are being used. At Mount St Joseph College Cincinnati, 75% of respondents were aware of e-books, but only 39% used them (Staiger, 2012) and at the University of Ulster, 65% of non e-book users were aware of their availability (Smyth and Carlin, 2012). Olney-Zide and Eiford (2015) found that their respondents wanted more communication about e-books from the library than they previously received leading to the conclusion that the library did not invest enough time and energy into marketing endeavors. They concluded that communication is "essential when a format is new and not a physical, tangible item." Carroll et al., (2016) reached a similar conclusion and stated "libraries need to place more emphasis on marketing e-book collections and offer training on how to find, access, and [effectively] use them." Burton (2015b) remarks "if the readers aren't aware there is an e-book, if there are no links on reading lists, if they aren't in the library catalogue, if there aren't any shelf-marks, how are our users supposed to find them?" It would seem that the marketing effort of libraries is crucial to the increased acceptance and usage of e-books.

## DISCUSSION AND IMPLICATIONS FOR LIBRARIES

A clear understanding of e-book usage using the Rogers Diffusion of Innovations Curve, innovation categories, and the factor affecting the diffusion process of an innovation is essential for the promotion of an increased and effective usage of academic e-books. An analysis of these three areas will help libraries to develop effective marketing and education strategies aimed at increasing e-book usage.

By applying the current research on the use of academic e-books to the Rogers Diffusion of Innovation Curve, libraries can get a clear picture on how far this innovation has spread into the current market. We can see how many of our patrons are using e-books and more importantly how many are not. By determining at what stage the spread of the innovation is at, we can see which patrons and patron groups have adopted this technology and who have not. When we know where e-books, or any library innovation, falls on this curve it will allow libraries to tailor their marketing and educational efforts to ensure the creation of targeted and more effective campaigns. An innovation such as e-books requires the focus to be on the early majority, late majority, and laggard adopter categories. Rogers Diffusion of Innovation Curve shows us that one campaign will not be effective across all library patrons, as not everyone will accept the innovation at the same time. It will take a focused step-by-step approach, with different marketing efforts directed at the different adopter categories, at different times. Before marketing and educational strategies are developed, research should be conducted to determine who are the innovators, early adopters, early majority, late majority, and the laggards at your institution. Finding out the demographic and psychographic characteristics of these groups, as well as key opinion leaders, will help your marketing efforts and ease the diffusion of e-books.

Innovations can be classified into three distinct categories: continuous (no behaviour change required), dynamically continuous (change required in a relatively unimportant behaviour), and discontinuous (change required in an important behaviour). E-books fall into the dynamically continuous and discontinuous categories. Research needs to be conducted at your institution to determine trends regarding which patron groups fall into the two innovation categories associated with e-books. Discovering how library patrons perceive e-books, either dynamically continuous or discontinuous, will aid marketing and educational efforts. Libraries will gain important insights into how users rate the importance of their current personal reading, study, and research behaviours. Using this information, libraries can then detect the level of difficulty users perceive the required change in behaviour for effective e-book usage and adjust the intensity of marketing and educational efforts accordingly. This step is crucial as libraries move towards more electronic collections and yet the literature review demonstrates that there is still a strong preference for print and some groups show a strong resistance to the e-book. For these groups who do not see any benefit to transitioning to e-books, it is up to the libraries to change this perception and prove this innovation is dynamically continuous and not discontinuous. To do this, educational sessions should focus on the similarities of print books and e-books and the benefits offered by the electronic version. Not only would this help move e-books into a dynamically continuous category but it would also mitigate some of the negative factors affecting the diffusion of this innovation.

Focused marketing and education of e-books for increased e-book usage must address the factors affecting the diffusion of an innovation (type of group, fulfillment of need, relative advantage, observed positive effects, complexity, and marketing effort). By targeting specific identified groups with an emphasis on how e-books fill the needs of library patrons, the advantages of e-books over print, and how this technology will have a positive effect on their research, the three diffusion factors (fulfillment of need, relative advantage, and observed positive effects) can be used to increase the acceptance of e-books. With the emphasis on these three diffusion factors, libraries can reduce the perceived complexity of e-books.

Another way to reduce complexity is for libraries to become advocates for the standardization of academic e-book platforms and constraining use restrictions. Presently, academic e-books are very complicated to use and different publisher/vendors have different platforms, which increases the complexity even further. Academic libraries need

one voice to come up with a unified list of essential criteria that each e-book platform needs to meet. Once the list is in place and known by the publishers/vendors, the libraries can communicate that preference will be given to those who meet the criteria in their platforms. DeWitt Wallace Library (2013) has outlined that publishers/vendors have contributed to the complexity of e-book usage by the use restrictions placed upon the e-books. They further discuss how these use restrictions violate a library's long standing mission of building collections for their communities across the country and emphasize a required change to e-book use restrictions set by publishers/vendor. They have developed a set of standards that other libraries could use to delineate how the user restrictions can be changed to decrease the complexity of e-book usage.

Although marketing effort is indicated as a separate factor affecting the diffusion of an innovation it is an integral part to each section already discussed. It is directly linked to the educational strategies that are needed to increase e-book usage.

## CONCLUSION

Academic libraries are preferring to buy e-books instead of print for various reasons including lower costs, accessibility, and storage. They must be mindful that by focusing collections towards an electronic format, they are forcing the adoption of e-books in an era when print is still preferred. Libraries must realize that by purchasing e-books they are just not changing a format they are making their patrons change how they read, study, and research. E-books and print books are used differently for various reasons as discussed above, but they are also used to complement each other (Staiger, 2012). In the marketing and educational strategies, the emphasis needs to be on how print and e-books can complement each other. The educational component needs to build on the print based research behaviour and incorporate this behaviour into e-book usage. The marketing and educational strategies need to be based on a thorough understanding of your library patrons. The first step in increasing e-book usage is conducting research at your academic institution that identifies your patrons' usage and understanding of e-books by examining the patrons' demographic characteristics and psychographic characteristics (i.e. values, beliefs, attitudes, opinions, personality, and interests). These research findings then can be used to streamline your marketing and educational strategies.

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