

USE OF ROGERS'S DIFFUSION OF INNOVATION THEORY AND GARTNER'S HYPE CYCLE MODEL FOR TECHNOLOGICAL EXPLORATION OF E-BOOK ADOPTION

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Abstract

This paper aims to understand the adoption of e-books in line with Rogers's diffusion of innovation theory and Gartner's Hype Cycle Model. E-books are one of the newest information products introduced to Fiji National University from 2014. It is proven that the widespread adoption of new information products and services has the potential to improve the effectiveness of service provision in academic libraries. Thus, with the aim of having insight and good judgment on e-book adoption, 40 randomly chosen undergraduate students from the College of Business and Tourism Studies in Fiji National University were selected for the sample for unstructured interviews. The study revealed that knowledge of e-books and accessing devices was rather comprehensive as all respondents had personal experiences with many e-books, e-book formats and access devices. Most participants expressed their view on the potentials of e-books and the majority believes in e-books is a part of the everyday life of academicians. Based upon the outcomes of the research, the e-book adoption habits among the participants were divided mostly among early innovators, early adopters and early majority. It was found that the library administrators used Gartner's Hype Cycles to assist in decision-making related to innovation adoption. An exploration of the e-books adoption among university undergraduates in line with the Diffusion of innovation and Hype Cycle theories, is utterly valid as these two theories have proven that they can make a significant impact on identifying the level of user acceptance of e-books introduced in the library backdrop. The findings are important to enable librarians and higher education authorities to have a better understanding on user perceptions towards the adoption of e-books and permitting the

authorities to formulate strategies that could significantly affect teaching and learning process of the universities.

Keywords: *Innovation Theory, Technological Innovation, Information Product Innovation, e-Book Adoption, User Studies, User Perceptions.*

Introduction

Today, many publishers bring a greater number of electronic books (e-books) to the book industry passing through a wide range of business models. A number of organizations, which include universities and other academic institutions promote e-books among their wider user communities and are now procuring more e-books than ever before. During the last decade, a significant growth in publishing e-books and the use of e-books (Wischenbart, 2013) has been evident and the research on e-books, e-book publishing and use of e-books in different societies has become increasingly significant. Even though the distribution of e-books to the global publishing industry is ever growing, a considerable decline in the readership has been noticed within the last few decades in Europe (Clark, 2013) and in the US (Rainie & Duggan, 2012). The faculty need to identify technologies and technology based resources like e-books that they would like to have in their academic organizations, but few of them use theoretical models that can help them selecting and implementing such innovations more effectively. Thus, it evokes the emerging research agenda an important opening to ascertain as to whether users are ready to adopt e-books and related e-reading devices for learning purposes. Diffusion of technical innovations across universities in developing countries has been acknowledged to be uncoordinated and somewhat lingering. Putting this alongside, with classically restricted corroborating evidences and the potential of intricate executions, it has been acknowledged that the educators in higher education sector perceive adopting new technology as somewhat risky. Therefore, the important question is whether users will accept/have accepted the electronic form of books for their learning purposes, depending mainly on individual attitudes. Acceptance, Adoption or Rejection of technology based products and services determine the success or failure of the innovation. Thus, the results of such an investigation will have an important effect and can be used as a tool not only for policy planning but also for streamlining in publishing

industry, educational establishments, media and regarding general public as a whole.

The debate in the literature signifies that a strong and differentiated viewpoint on the individual disparities in the acceptance of e-books is still rare. Many research studies have focused on the use of e-books rather than reading and understanding the content (Anuradha & Usha 2006; Safley 2006). These studies conclude that users make use of e-books for their studies, but rather not comprehend the books by reading. Students in many academic organizations use the available e-books just to cut and paste any desired portion into another application but not necessarily for reading and comprehension (Safley, 2006). Thus, e-books are not being read but are merely employed to prepare and support arguments that they want to draw upon. It implies that the acceptance of e-books will have major effects from contributing and moderating factors of personal characteristics on intention. Specially, the discovered knowledge is very little about the psychological characteristics of the readers, who use e-books. Thus, this research attempted to fill this gap by providing a wider view on e-book adoption for the purpose of reading. The study has integrated reader preferences, socio-economic and psychological values, and wider experiences with the existing technology adoption literature.

Methods

There are past literature studies on the adoption of different electronic devices and services and many of these studies tend to have focused on developed and transitional countries but not predictable regarding many developing countries. Since the success or failure of e-books is contingent upon the degree of its adoption, a qualitative research strategy was used to gain insight into how undergraduate students perceive e-books and finally to examine the degree of acceptance or rejection of this new technology by interviewing only the students who are familiar with e-books. The study employed 40 undergraduates from the College of Business, Hospitality and Tourism Studies at Fiji National University (FNU) in Fiji in a process of unstructured interviews. The sample selection was merely made purposely, covering several aspects of students' interactions with technology such as

use of e-readers, computers, smart mobile phones etc for accessing e-books. All selected participants were explained the purpose of the research and about the e-books. Rogers's (1983) model of the innovation decision process was employed for drafting the themes for unstructured interview questions to lead the research. Rogers's diffusion of innovations theory is one of the most applicable theories for researching the adoption of technology in educational environments, particularly in higher education institutions (Medlin, 2001 and Parisot, 1995).

Rogers (2003: 172) describes the innovation-decision process as "an information-seeking and information-processing activity, where an individual is motivated to negate uncertainty about the advantages and disadvantages of an innovation". The model basically explains five stages of individual's experience that are being used to make decisions about adopting an innovation. This model was purposely selected as it outlines the stages clearly and step-by-step procedure precisely. Stages of the model in general, follow each phase in a time-ordered fashion as indicated in the Figure 1.

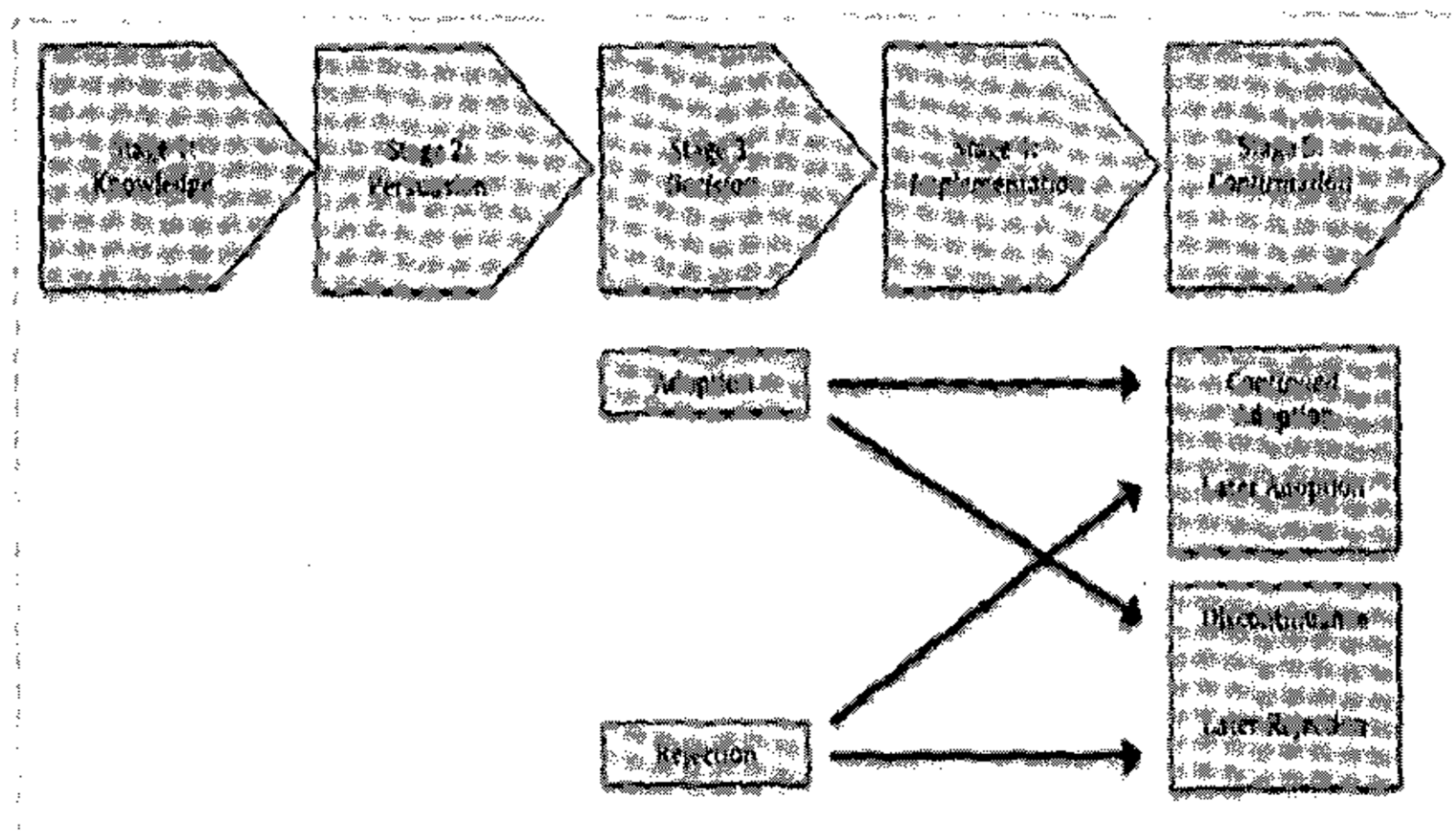


Figure 1: The innovation-decision process (Rogers, 1983)

The model illustrates and helps scrutinizing the stages of e-book adoption from the beginning till adoption or rejection. It supports finding out

the possible ways of how technologies diffuse within a particular group of individuals so as to understand how individuals perceive the technology with possible hurdles for adoption.

Discussion

According to the Rogers (2003) model, the first factor to be investigated was the users' knowledge pertaining to e-books and associated devices used to access them which was ascertained by investigating the extent to which the users were familiar with e-books and what factors supported this familiarity. Knowledge about e-books did not vary across all forty participants. It was found that only 8 (20 percent) students used e-readers for reading e-books with greater knowledge of e-books and access devices. However, all other 32 students have identified themselves as e-book readers though they do not use e-readers for accessing information. Despite the low number of participants who owned an e-reader, they all had much to say about e-readers and e-books, demonstrating their familiarity with the topic. Even though the participants use different devices to access e-books, in the present study, only the most common and frequently used devices were considered. Pattern of usage of devices by the participants is indicated below in the Table 1.

Table 1: Devices used to access e-books

Rank	Device	Number of participants
1	PCs or Laptops	16
2	Smart Phones	10
3	e-Readers	8
4	Tablets	6
	Total	40

Having completed the introductory session for each participants, they were advised to find a point of appropriate level relevant to them on a "Technology Diffusion Graph" to determine their opinion towards use of e-books and their reliance on e-readers/tablets/PCs/laptops/smart phones. The

Roger's model (1983) is generally used to identify the attitudes of users towards their own general speed of adoption in terms of new technology. Accordingly, users of the new technology in the usual course of events, proceed with five phases, commonly defined by subjectivity, in the process of innovation decision when adopting innovations that may be shaped up by the surrounding socio-cultural system and particularly outside agitations.

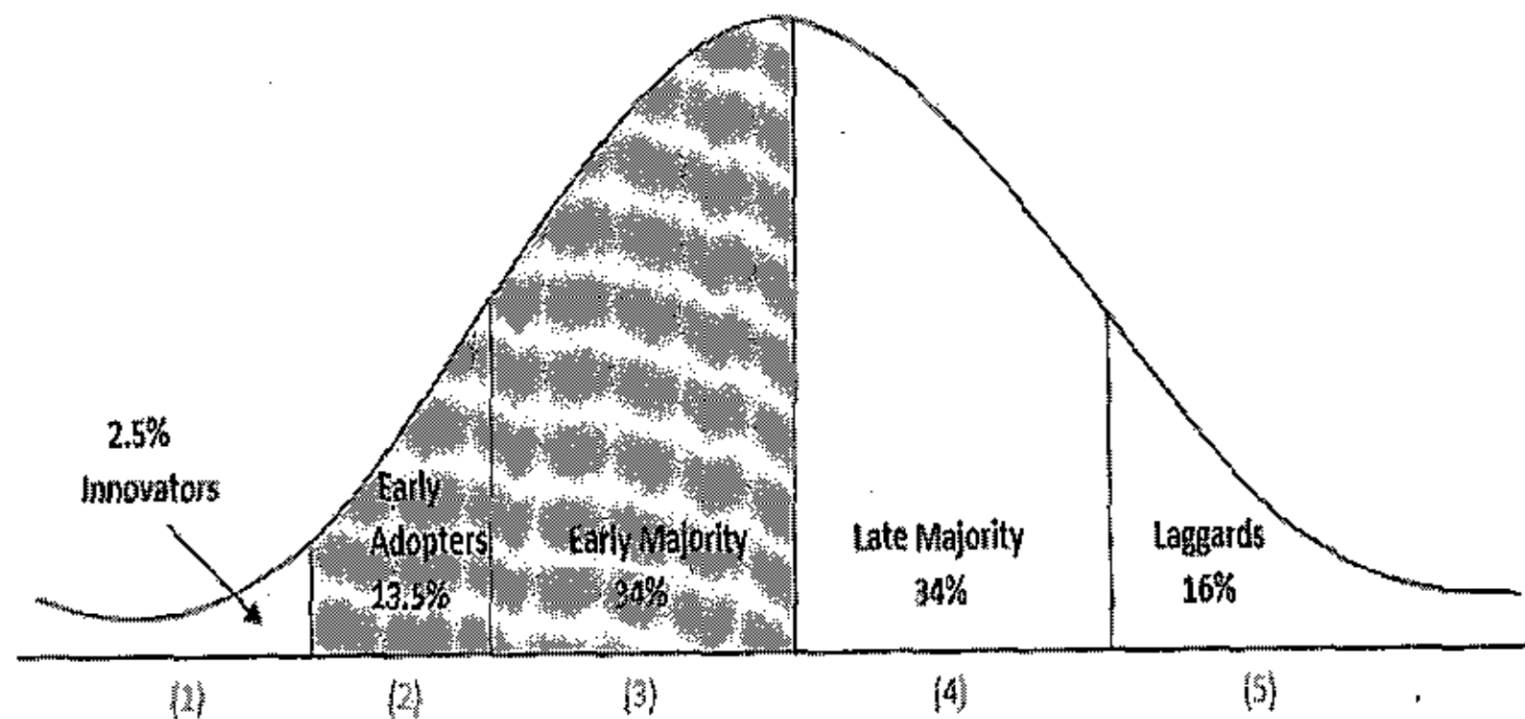


Figure 2: Diffusion of innovation curve

Even though many students do not use e-readers, they use e-books in their personal computers, smart phones or Laptops. However, it was noted that the students who used e-readers and smart phones were more into new technologies and their knowledge about new trends in IT have amazingly greater in comparison with the non e-reader users. Also, use of the technology for other work in their day to day work in e-reader and smart phone users is remarkably higher than those who do not use these two devices. Their knowledge about mobile apps, new equipment, and use of IT for their daily activities were significantly higher compared to the rest. Excitingly, majority of e-reader users were identified themselves as early adopters while two of them marked themselves as early majority. However, all users in the smart phone category identified themselves as early adopters and 6 from PC/Laptop category. Rest of all had selected late majority. Usually early adopters have the highest degree of opinion leadership compared to other segments of adopters. Early adopters generally hold leadership characteristics which facilitates others in their social system to

approach them for advice on the innovation or associated information. They are educated, smart and socially forward compared to others. Therefore, attitudes towards innovations of this group of individuals are much important as they act as role models. However, early majority group adopts an innovation after some time, which is expressively lengthier than the category of innovators and early adopters. Rogers (2003) stressed that although the early majority have a good interaction with all individuals in the social system, their leadership quality is not comparable with early adopters though they still have good interpersonal relationships which support innovation-diffusion process. Laggards are completely different from other categories as they hold little to no opinion leadership. Particularly, they have an aversion to change and they prefer to maintain “traditions” more than technological/scientific advancements.

Interestingly, all participants agreed about both the advantages and disadvantages of e-books and their responses were not significantly different. Many respondents who did not use e-readers and smart phones for accessing e-books were more likely to prefer printed materials as well. However, both categories prefer e-books when they are required to make their assignments and research reports because of some advantages associated with e-books such as searchability, convenience and portability. One participant described the importance as follows:

“Obviously, the increase in availability, searchability and especially in accessibility have greatly supported me for much more information, which can be consulted than ever before. We do not need to go to local library and search materials spending hours and hours and end up with frustrations” (2nd year, Customs student – Laptop user).

Another participant stressed that e-books have the power to provide the answers faster than traditional books. *“I need quick facts! Not stuff taking much time...” (3rd year, Economics student – smart phone user).*

“I buy printed books which I must buy or required to but they are very expensive. Internet provides everything for free! There are excellent search engines combined with pirated sites which leads to download free e-books

absolutely free. I understand its unethical but why should I care about it... I'm just a student with limited resources for my studies" (3rd year, Accounting student – e-reader user).

Finally, students were advised to find out the place where they are acquainted with e-books to be on the “Gartner Hype-Cycle” with the purpose of understanding their attitude and perception towards e-book technology related to usefulness alongside the technological maturity. Hype Cycles provide a graphical depiction of the maturity and the level of technological adoption and applications. It also allows practitioners/researchers to regulate how they are theoretically appropriate to be resolved in real-world business issues and to be exploited by any innovative opening. Fenn and Raskino (2008) have stated that patterns appear so frequently, and it has been named the Hype Cycle because initial enthusiasm and excitement are based almost exclusively on hype. The Hype Cycle can be used in analyzing innovation, including the adoption of e-books in higher education institutions. This observation can be contrasted with the self-classification of students on the technology diffusion graph.

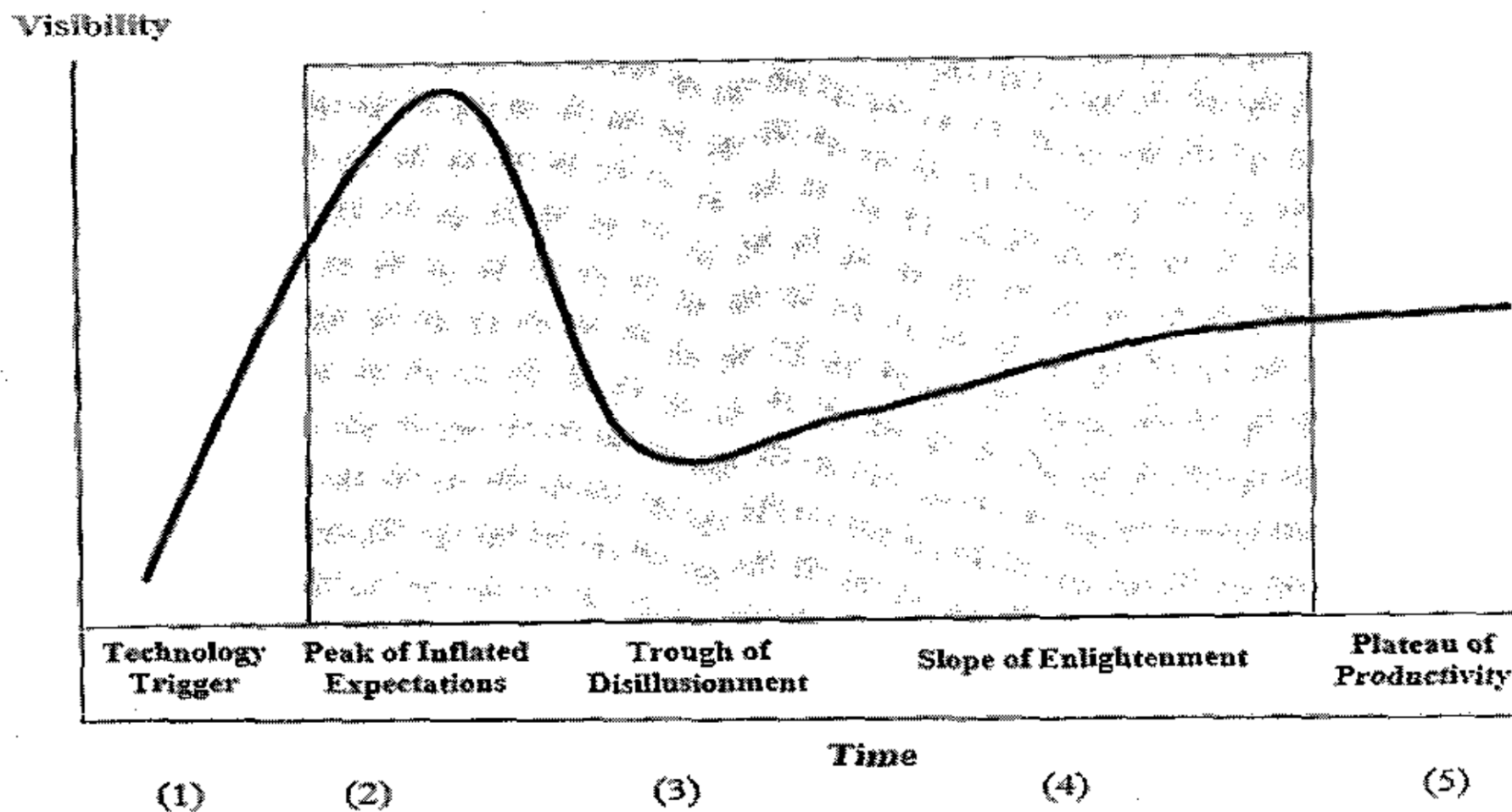


Figure 3: Gartner Hype Cycle

There are five phases in the Hype Cycle. Innovation Trigger instigates at the time that common individuals become aware of the primary hype of any innovation. It may be a newly introduced product in the market

or a scientific breakthrough that may cause a huge excitement and desire. In the second phase, innovators and early adopters start consuming and testing the new innovation though rest of the individuals have fear of being left behind. Then the third phase begins - Trough of Disillusionment. In this phase, people begin to look beyond the initial excitement and hype. During this period, many adopters may firmly accept the new technology or abandon it. Slope of Enlightenment phase is crucial due to many early adopter's experience benefits of adoption. They understand how the innovation is used for their requirements effectively.

The FNU library supports innovation and they have introduced many e-books for the use of their patrons from 2014. Thus, the students have marked themselves in the first, third and fourth phases of the Hype Cycle, the Technology Trigger, Trough of Disillusionment and Slope of Enlightenment. At times, administrators and workforce fall prey to a number of possible pitfalls and traps, that may lead to too early adoption, too early abundance, too late adoption or too long hanging. According to Fenn and Raskino (2008), one of the frequent traps grouped with the hype cycle is the inclination to adopting the innovation too early at the time of hype is peaking. However, the wrathfulness of the innovation is not still certain. At FNU libraries, they pursue innovations that are useful for patrons, primarily students and faculty, while concomitantly trying to avoid the hype. It can be difficult to stay the course when the library has decided to adopt a technology and the hype begins turning negatively. Many participants (28) marked themselves in the Gartner's Hype Cycle as Slope of Enlightenment and they were particularly e-reader, smart phone, PC and laptop users. It was noted that the demand for tablets including i-pads is collapsing as most patrons claimed that these devices are very unfriendly and difficult to use in accessing e-books, reading and later in retrieval etc. Particularly, they found difficulty in personalizing the tablets, problems in sharing and difficulty in handling it due to physical size. Also, it was noted that individual taste is also an important matter of fact for lesser usage as these devices do not support for serious reading. Many participants indicated that although they would not be continuing to use their tablets, they would prefer to read electronic books and other e-materials on their smart phones, e-readers or PCs/laptops. 22 (55%) participants were in the decision stage in the innovation-decision process, the individual choosing to adopt or reject the

innovation. Except four participants (10%), 18 (45%) participants stated that they are in full use of an innovation as the best course of action available. It was apparent that they have adopted e-books but the remaining four participants claimed that using e-books was difficult to track the required information and to download the materials as per their wish, and particularly, that they just like turning paper pages more than e-reading. Thus, they did not want to adopt an innovation and they preferred to use printed books (3 tablet users and 1 Smart phone user). Interestingly, it was found that all 18 e-book adopters had already used e-books specially during trial access period with more resources and many of them had recognized the importance of them during trial periods and had already advised the faculty and librarians to subscribe to those resources because of its importance over traditional printed materials. They were quick adopters as they had a chance to try the innovation in their own situation and then come to an adoption decision. It can be concluded that vicarious e-book trials can speed up the innovation-decision process.

Also, it was noted that PC, laptops and tablet users had more emotional attachments to books compared to the users who do have both these two methods of accessibility. However, it was revealed that the possibility to pick the required materials directly from the Internet had a greater weight on motivation of students compared to the physical libraries, where printed book repositories are available. This motivation is rather difficult to understand whether it is a genuine interest for reading or just for facts to be cut and pasted in their pieces of work even though all participants claimed that it is for genuine reading. This fact needs to be explored in a separate study with a careful design of a scientific experiment.

Surprisingly, smart phone owners were reading 4 times higher number of e-books compared to tablet/PC/laptop users and 2.5 times higher in the e-reader category but the participants in e-reader and smart phone categories did not read the complete books while non-users of them predominately read the complete book or a larger portion of it. E-reader users and also the users who used smart phones to read books were into night reading as well and found that they often read a lot before bed. Also, many students who were in research report or advanced assignment preparation levels would like immediate access to e-publications as much as possible and

it was noted that both groups cut and pasted relevant information for their assignments with the purpose of recasting the ideas and later emphasizing them as their own thoughts. However, the e-reader and smart phone users use many e-books for 'cut and paste' the ideas compared to others but interestingly, they access those books via laptops or PC again for the same purpose, after having confirmed them that these books are relevant. One student expressed,

"I now consult many e-books that were previously inaccessible or unavailable at my library. That means I can browse more sources. I also have a wider selection of choices when searching for resources, I'm required to read. This allows me to cut and paste numerous ideas to put everything together and make my assignment much powerful" (2rd year, Law student, laptop user).

It was also found that the content is an important factor in e-book adoption and e-book users also prefer traditional books for general reading over e-books though they are not opposed to using e-books for general reading. However, interrupted Internet connections, lesser number of e-books, preference for print, limited computers and lack of e-readers were recognized as hurdles for making the library users diverged from the usage of e-books. It emerges as an idea that librarians should try to understand their library users and their inherent characteristics which may influence e-book adoption for reading; a unique practice that should be culturally and socially ingrained not only in their academic life but also in everyday life (Quan-Haase, Martin, & Schreurs, 2014). Some participants in the study described themselves as e-book users but still prefer to obtain a print copy of the e-book for in-depth reading after screening the book initially via electronic devices and if it fits for their requirement. If e-books are not considered useful compared to traditional printed materials, e-book publishers and other related stakeholders must consider this seriously by looking at the aptness of such technologies with user preferences.

Conclusion

The outcome of the study advocates that the products related to new technologies are favourably disposed towards the stimulation of the usage of such products functionally (LaRose & Atkin, 1988; and Atkin & LaRose, 1994). Users tend to adopt technically advanced versions over traditional products predominantly due to convenience. Nowadays many students possess e-readers, laptops, smart phones or similar mobile devices vastly. The integration of Rogers's diffusion of innovations and the Gartner Hype-Cycle approach augmented a new aspect to the current research study by ascertaining user behavior in the process of technology adoption. It was found in the study that individuals typically categorized themselves as "Early Adopters". Users who are well known from long or close association with technologies, applications and benefits in their day to day lives are more apt for the adoption of e-books. Also, through placement on the Gartner Hype-Cycle, it was noted that participants in general, considered their experience with e-books to be in the "Slope of Enlightenment". In essence, all participants except 4 people have realized that e-books still have many advantages but with few disadvantages which need to be resolved, for example, e-books do not appear perfectly on e-readers and smart phone devices owing to the inferior formats. One participant had explained "*I find it easier and faster when searching it in a real book, rather than an e-book*". Eventually, the hindrance about providing awareness of e-books is that, adopters were more aware and they have enough information on using e-readers and smart phones.

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