REVIEW PAPER

Trends in E-book Research

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ABSTRACT

In this study, e-book research articles were reviewed which are published in various library science and non-library science journals. Identifies facets and significant results of e-book research. For this review, literature on e-books published in English language, in 2016 was searched from various databases. The review finds that the focus of current research on e-books is on use. Themes such as e-book collection development and management; search and discovery are also paid more attention to. Use of e-books by children is emerging as a prominent area of e-book research. Results of most of the research on e-books are supportive to each other.

Keywords: E-book use; E-book research; E-book collection development; E-book promotion

1. INTRODUCTION

E-books have now become an integral part of library collections. E-books emerged little later than e-journals, but they have soon become important with reference to library budgets, acquisition, cataloguing, services and usage. Users too are attracted to this format of reading material. Many stakeholders have interest in e-books from different points of view. For example, the publishers and aggregators are interested in e-books as a market commodity. The library professionals are keenly interested in e-books as a new format to serve users and an another opportunity to extend their services. Researchers from many other subject areas too are interested in this new communication format. At this background the author is interested in knowing the current trends in e-book research with reference to topics covered and major findings. Earlier author did review the research on e-book published during 2010[1].

2. OBJECTIVES, SCOPE AND METHOD

This research intends to identify the facets of e-books attended to by the research published during 2016. It also intends to review significant results and their supportive or contradictory nature. To fulfill these aims the researcher searched articles on e-books from LISA, Emerald Insight, Ebsco and Google Scholar databases. 'E-books OR ebooks' statement was used for searching literature. The query was restricted to journal articles published in English language without any geographical limitation. The scope was delimited to January to December 2016. All the above databases together retrieved about 200 article. The retrieved items were deduplicated. In the final reading few articles were sorted out as irrelevant and finally 78 article were identified as relevant and are reviewed here.

3. PURPOSE OF USING E-BOOKS

Different users use e-books for different purposes. For example, Wang and Bai[2] found that undergraduate students mainly used e-books for leisure purpose. Contrary to this the postgraduate students used e-books more for academic purposes. Similarly, Carroll[3], *et al.* observed that overall the use of e-books for academic purpose has increased considerably. Koçak[4], *et al.* also noticed that students preferred e-books while studying. Khan[5], *et al.* and Lewellen[6], *et al.* found that postgraduate students used e-books more than the undergraduates. Carroll[3], *et al.* has observed that general reference books were favoured in e-book format than in print. However, a study of the e-book usage by the academia in an Indian university library found that reference e-books were used very frequently (Nikam & Shivraj[7]). The different national background must be responsible for these variations in results. Inquiring about gender-wise differences in e-book usage Khan[5], *et al.* found that compared with female students, male students (in Pakistan) universities used e-books more frequently. However, Lewellen[6], *et al.* noticed that there is little difference by gender in use of e-books and printed books. Investigating about the correlation, if any, between length of reading and type of book formats preferred, Goertzen and Bakkalbasi[8] noticed that students preferred e-books for discontinuous reading; quick reference, whereas printed books were preferred for continuous or prolonged reading.

Rafiq and Warraich[9] studying e-book usage pattern of undergraduate medical students in Pakistan noticed that most students read e-books for academic purpose but still preferred to read textbooks in print format. Carroll[3], *et al.* found that more students favoured literary works in printed format than in e-book format. Contrary to this the general public favoured fictions in e-book format especially for holidays and did not favour nonfictions in e-book format[10]. It must be specially noted that these are non-academic users whereas Carroll's

respondents were academic users. Asai[11] studied format choice for popular fiction in Japan and found that compared with e-novels, e-comics are popular format.

As far as use of e-books by students of specific subject is concerned Letchumanan and Muniandy[12] found that the mathematics postgraduate students mostly used mobile e-books for study and to find information for their research activities. Jou[13], *et al.* studied use of e-books and APP and found that e-books were used by engineering students in classroom setting to study the principles of mechanical drawing and APP was used for creating mechanical drawings. Librarians often wish to know whether readers in a particular discipline favour e-books or printed books. Knowlton[14] developed a two-step model useful for this purpose. It could be noticed from the above discussions that there is a fair amount of research investigating purposes of using e-books. However, e-books are not used to the desired magnitude in an Indian horticulture and forestry university (Bhat and Ganaie[15]). When enquired whether students like e-books or not the survey of Estelle[16] found mixed reactions.

4. REASONS FOR USING E-BOOKS

Quick to read and easy to manage formats, aesthetics, 'task-technology fit', anywhere anytime availability, user friendliness, etc. are some of the common reasons for using e-books. According to Dean[17], e-textbooks are used because they can engage students and help them succeed in their studies. Ahmad and Brogan[18] observed that academic library users favoured e-books because of familiarity, usability, utility and hedonic attributes. Being able to use even when the library is closed and could be used simultaneously by many users are the other reasons why users preferred e-books (Oliva[19]). E-books are technological products. Okocha[20] applied the unified theory of acceptance and use of technology (UTAUT) model to test the reasons for acceptance of e-books by university students. The author found that performance expectancy, effort expectancy and facilitating conditions influenced student's decision to use e-books.

Liaw and Huang's[21] investigation revealed that interactive learning environments, acceptable screen size, perceived self-regulation, and self-efficacy could positively influence usefulness of e-books as learning tools. Johnson[22] found a correlation between use of e-books and ability to learn. He observed that education students who embrace e-books perceive themselves as abler learners than students who do not. E-books enable to find micro contents from the text. This feature works as a better substitute to index in a printed reference books. Ogden[23] has explained this with the help of electronic version of an 80-year-old Hamilton and Hardy's book entitled Industrial Toxicology.

5. AWARENESS AND USE OF E-BOOKS

For increasing use it is important that users are aware about the e-book titles available, various formats of e-books, different e-book platforms, their scope, search features, etc. Sarjoon and Kabir[24] studied the awareness and use of e-books by the doctoral researchers at the Indian Institute of Science Education and Research and found that almost all the users are aware of e-books and related technologies. However, Wendo and Mwanzu[25] noticed that there is insufficient awareness amongst the university students in Kenya about e-books. These differences about awareness are from two different countries. Awareness and use of e-books should ideally be positively correlated. However, Okocha[20] in case study of a university library found that majority of the students were aware of e-books, but many had used e-books only once. Wang and Bai[2] too found that there was higher awareness but lower adoption of general e-books by the university students in China.

6. REASONS NOT FOR USING E-BOOKS

Findability and accessibility of e-books through library website is the most consistent concerns and barriers to use e-books[3]. Goertzen and Bakkalbasi[8] also observed that availability and accessibility limited by platforms and licenses cause frustrations in the use of e-books. Koçak[4] as well as Rafiq and Warraich[9] recognised that eye fatigue is a reason for not preferring e-books. Nikam and Shivraj[7] recognised that lack of awareness amongst the users is the main hindrance in the usage of e-books. Hobbs and Klare[26] observed that the features in e-books have not enhanced with the expected speed and due to this student continue to encounter issues with interface designs as well as the ability to easily control and manipulate their own copies. Whatever may be the reasons for non-use or less use of e-books, Rafiq and Warraich[9] believed that librarians can play a vital role in minimising the barriers. Seth and Kelly[27] observed that readers feel less connected to book when reading e-books and therefore prefer printed books. They further stated that these findings align with 'self-concept theory' and indicate that printed books are an extension of the self.

7. E-BOOKS COLLECTION DEVELOPMENT

A good e-book collection development policy helps 'to acquire quality e-books at least cost with most suitable terms and conditions and having effective access mechanism'. However, to be effective, an e-book collection development policy needs to be revised regularly. Type and size of library need to be considered while revising e-book collection development policy. Lukes[28], *et al.* describe how two different approaches were adopted for revising e-book collection development policy by small college libraries. In addition to policies, quantitative and qualitative longitudinal studies of students' perceptions help in collection development of e-books[26]. Similarly, Bozarth and Zhong[29] suggested that understanding of users' preferences about e-books does help in collection development. Tri-Agif[30], *et al.* recognised that satisfaction and perceived ease of use are the determinants of continuance intention of using e-books. The authors suggest that these determinants could be used in evaluating and selecting e-books before purchasing.

Financial crunch is a perennial problem for libraries. Particularly, the academic libraries face the problem of rising cost of printed textbooks. Ferguson[31] identified that acquisition of e-books and e-textbooks is a beneficial solution to the problem of rising cost of printed textbooks. According to Ferguson sharing of e-books across departments is another best way to ensure cost-effective use of e-books. Similarly, the University of Buffalo libraries administered a student-

based e-textbook pilot programme to explore a sustainable model[32]. Purchasing multiple e-books and cross departmental collaboration is a solution suggested by Riha and LeMay[33]. Carr[34], *et al.* observed that the rapidly increasing cost of course-adopted texts as well as the evolving models and platforms for acquiring e-books offer libraries new opportunities to support students' learning needs.

Pay-per-view, patron-driven acquisition (PDA) or demand-driven acquisition (DDA), big deals, etc. are some of the tried and tested e-book acquisition models. Each e-book acquisition model has its own merits and demerits. Longley[35] explains that the DDA model is more suitable to small academic libraries. Kont[36] too presented a study of successful adoption of DDA model in a technology university library. DDA model's usefulness for academic library is also explained by Peters[37]. Shapiro[38] elaborated the merits of 'Big Deal' mode of e-book acquisition. Burke and Tumbleson[39] discussed about various e-book pricing models.

Tovstiadi and Wiersma[40] compared multiple e-book platforms and identified that usability, accessibility, continually changing e-book market and platforms are major problems in e-book collection development. In spite of number of benefits, it is challenging to develop an e-book consortial model suitable to all the stakeholders i.e. libraries, suppliers and users. However, the Triangle Research Libraries Network and Oxford University Press did develop a consortial model which is mutually equitable and financially sustainable[41]. Closers and mergers of e-book platforms adversely affect concerned library's collection development. Hu[42] describes a process of finding alternatives when a major e-book database ceases services. E-book collections in libraries must be evaluated by using suitable criteria to assess strengths and weaknesses. Bain[43], *et al.* explained the use of OCLC's World Share Collection Evaluation (WCE) system in evaluating science and engineering e-book collection.

Libraries need to deselect reading material due to various reasons. The experience of replacing the deselected printed books with e-books is narrated by Oliva[19]. Haugh[44] and Lugg[45] stated that libraries need both print and electronic books and therefore, there should be proper coordination in selection, acquisition and management of both the types of books. Acquisition of e-books has attracted special attention of e-book researchers. This has resulted in producing a large amount of research literature over the years. A review of literature on e-book acquisition[46] is an indication of the large quantity and variety of literature on e-book acquisition. The review specifically identified that the researchers have focused on non-traditional purchasing models including PDA and some libraries have preferred pay-per-view or evidence-based selection and some have even preferred the Big Deal model. In general e-book holdings in libraries are growing all over the world. However, with reference to specific subject groups there are variations. For example, Bhat and Ganaie[47] report that e-books are not yet fully incorporated into the North Indian agricultural library's collection.

8. PROMOTION OF E-BOOKS

The variety of formats of e-books, different platforms with varied search mechanism, and the constantly changing nature of e-book databases does create confusion for users. This can affect the use e-books. Garofalo[48] believes that libraries can help users overcoming this problem by explaining them the features of e-book formats and platforms. They can do this by educating users about nature, formats, platforms of e-books. Knowledge of users' perceptions about e-books helps librarians in designing user education programs[26]. It is proven fact that display increase use of reading material. But is it applicable to e-books? A study conducted by Tingle and Tovstiadi[49] revealed that only displays are not effective means for increasing use of business e-books. The authors suggested that increased visibility along with other features may increase the use of e-books. Experiments are constantly made by different libraries to enhance use of e-books. However, there is no guarantee of success. For example, the Douglas County Model in Western Colorado made available e-books in an open source discovery layer based on VuFind but they had disappointing experience. Thomas and Noble[50] report how this situation was improved by moving the collection to another platform named OverDrive. Chou[51] suggest that when students are given time and opportunities to read e-books, they are likely to develop reading habits and strategies. Readers' advisory (RA) service is getting momentum. Anderson[52], *et al.* noticed that e-books are now covered in RA education. Author recommendation system is one of the components of RA service. Zhang[53], *et al.* describe an e-book and author recommender system developed by them. Both these articles indicate that another service facet is getting attached with e-books in libraries.

9. MANAGEMENT AND ILL OF E-BOOKS

E-book holdings management is a labour intensive and time consuming task. However, effective holdings management definitely increases search ability of e-books. This helps in increasing the use of e-books. Zhang[53], *et al.* developed a special e-book and author organisation system called MLSOM (i.e. Multiplayer Self-Organising Map) and OCLC launched an automated holding management system. Using the OCLC's system e-book's holding information can be populated and updated automatically within the World Cat knowledge base without intervention from library staff[54].

E-books are more of common feature in today's college, university and research libraries. However, they are not so common in public libraries. That is why public libraries are highly interested in having better access to e-books in college and university libraries[55]. ILL service will make use of such an access. 'Fill rate' is the major criteria to evaluate ILL service. In general, it is noticed that compared with monographs ILL fill rate is higher for journal articles. Sewell and Link[56] investigated the possibility of increasing the ILL fill rate for monographs. The authors felt that creation of new internal workflows will help in implementing a speedier e-book ILL system. With the growth of e-book collections, their lending is also increasing, and so also the literature on this topic. Alipour-Hafezi and Khedmatgozar[57] presented systematic review of literature on e-lending and identified gaps in research on this topic.

10. SOURCES FOR ACCESSING E-BOOKS

Library professionals have always aimed at enhancing search ability of reading material. With the growth of e-book collections many more efforts are made in this direction. Jin[58], *et al.* transformed and enriched nearly 300,000 e-book records in their OPAC from MARC records to Bibliographic Framework (BIBFRAME) linked data resources. Incorporating e-books into OPAC enables searching. Rai, Samar and Singh[59] report an experiment carried out to incorporate e-books into OPAC through LIBSYS-7. The authors asserted that users get benefitted to a great extent in finding desired e-book through this improved version of OPAC. Similarly, the issues encountered while handling vendor e-book records and best practices such as duplicate records control in Alma (an integrated library system) is described by Chen[60], *et al*. Batch processing is a useful method of cataloguing e-books. Turner[61] mentioned that batch cataloguing or the editing and importing of large batches of vendor-supplied records into the catalogue is increasingly popular. Issues related with cataloguing and metadata of e-books received as legal deposits in a National Library and solutions thereto are discussed by Derrot and Koskas[62].

Clustering and categorisation techniques are useful in organising e-books on a given platform or in an OPAC. Wu and Hsieh[63] investigated user experiences with clustering and categorisation representations of e-books in a public library and found that users who have an explicit idea of what they intend to find tend to prefer the categorisation whereas the hedonic-oriented users tend to prefer clustering interface. Lagace[64] highlights NISO's initiatives for enhancing interoperability among parties in the e-book supply chain. As the number of e-books and their platforms are constantly increasing, it is becoming more and more difficult to find a needed e-book and or specific content from e-books. This challenge of finding needed content from e-books is effectively elaborated by Kleeman[65].

11. E-BOOKS AND CHILDREN

About five years back there was not much research literature on use of e-books by children and other related facets[1]. The present review finds that during 2016 a considerable research has been published on use of e-books by children. What is further noticeable is that the research literature on use of e-books by children covers all segments of children i.e. infants, toddlers, young children, girls, boys etc.

While investigating what encourages children to use e-books Ciampa[66] observed that curiosity, choice and challenge are the three intrinsic motivations that encourage grade 1 children to use e-books. Recognising the value of e-books Ma and Wei[67] observed that talking books or e-books provide multi-sensory stimuli and therefore they should be selected for elementary school students. A study of first to third grade children of a summer reading programme found that the student had positive attitude regarding the use of e-books and they preferred to read e-books than print[68]. The study specifically observed that use of nonfiction e-books improves vocabulary and comprehension and also provides motivation to read. Contrary to these positive sides, Reich[69], *et al.* studied effect of tablet-based e-books on infants and toddlers and suggested that the use of such books should be restricted for infants and toddlers as they benefit more from face-to-face interactions with caregivers. The authors further observed that enhanced e-books with sounds, animations and games can distract young children and reduce learning. We have to remember that these suggestions are not contrary to Ma and Wei[67] because there suggestions are about elementary school students whereas Reich[69], *et al.* suggestions were about infants and toddlers.

Believing that e-book designs could affect young children's learning Wang and Yang[70] carried out an experimental research to know the impact of e-book interactivity design on the learning of Chinese characters by fourth graders. The results showed that, the group reading the e-book with the low level of interactivity (pace-control only) performed significantly better in Chinese character writing, attention, and satisfaction. Kao[71], *et al.* also conducted experiment similar to Wang and Yang[70] and with similar purposes in Taiwan and found opposite results. Kao[71], *et al.* found that the students in the high interaction group performed significantly better. These finding indicate that more such experiments are needed to arrive at generalisations.

12. E-BOOKS FORMATS AND READING DEVICES

Comparisons are made between printed and e-books since the arrival of e-books. Gradually the formats of e-books are increasing (e.g. pdf and fluid format) and improved devices for reading e-books are developed. This has provided scope for comparing reading experiences of different formats of e-books. For example, Zeng[72], *et al.* investigated the influence of different e-book formats and different e-book reading devices on graduate students' reading speed and comprehension. The authors found that students read EPUB i.e. fluid format files faster than PDF files. Students' average reading comprehension was higher when reading EPUB file on smart phones, dedicated e-book reading devices and tablets, while most participants read PDF file faster on laptops. Grover[73] predicted that by virtue of their responsive nature and higher text-to-nontext ratio e-books may only iterate into simpler formats i.e. 'future e-books will exist almost entirely in web application format'.

E-books can be read on desktops, laptops, smartphones, as well as on dedicated e-book reading devices such as Kindle. Availability of low-cost mobile reading devices has created favourable condition for of e-books in India[74]. The author predicts that this will increase e-book acceptance rate in India. Rowberry[75] observed that the Kindle Popular Highlights database contains evidence that readers are re-appropriating common placing i.e. the act of selecting important passages from a text and recording them in a separate location for later re-use, while reading public domain titles on the Kindle. This facility will help in increasing e-book usage Tablets and mobile devices are preferred to Kindle because these are multipurpose devices[3,14,18]. Letchumanan and Muniandy[76] through their systematic review observed that utilitarian, cognitive and affective factors influence the use of e-books via handheld mobile devices. Shim[77], *et al.* studied dedicated e-book reading devices and found that observability is the key stimulator and complexity is the main bottleneck in adopting dedicated e-book readers in Korea. The e-book reading devices

are still evolving and the best one is yet to come. Kubota[78], *et al.* developed a prototype of a 434-ppi 5.9-in reflective liquid crystal display for use as an e-book reader. The authors claim that they achieved eye-friendly reflective liquid crystal display. This could be partial solution to the eye fatigue, a barrier in using e-books.

13. CONCLUSIONS

E-books are an important reading material and as such are of interest to the LIS researchers. Apart from library professionals, researchers from other disciplines such as technology, education, psychology, engineering media, linguistics, commerce, management, publishing industry, etc. too have interest in conducting research on e-books. E-book research articles reviewed here are published in various journals of library science, but most importantly they are published in 17 non-library science journals also. This fact confirm that e-books are truly interdisciplinary phenomenon. From the literature reviewed here it could be concluded that e-books will continue as an important communication medium. At the same time, it has to be remembered that the printed book will also retain its importance. Because as argued by the technologist and media specialists Ballatore and Natale[79], the history and theory of media does not support the idea of disappearance of printed book.

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