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Open Access E-books in Science and Technology: A Case Study of Directory of Open Access Books

Fayaz Ahmad Loan* and Refhat-un-nisa**

*University of Kashmir, Srinagar, Jammu and Kashmir - 190 006, India
E-mail: drfayazlone@gmail.com

**Delhi Public School, Srinagar, Jammu & Kashmir - 190 004, India
E-mail: refhat003@gmail.com

ABSTRACT

The Directory of Open Access Books (DOAB) is a discovery service for open access e-books. It provides a searchable index to peer-reviewed e-books published under an open access business model, with links to the full text of the publications at the Open Access Publishing in European Networks (OAPEN) Library, publisher's website or repositories. The present study aims to assess the current trends of the open access e-books in the field of science and technology available through DOAB. The data was collected online regarding the science and technology e-books in March 2014 for analysis. The results reveal that 307 e-books are available on science and technology through DOAB falling in three categories–monographs (209, 68.08 %), book series (93, 30.29 %) and conference proceedings (5,1.63 %). These e-books deal with eight major subject areas of Science and Technology having 36 sub-fields. The maximum number of e-books is available on General Science (95), Technology & Engineering (54), Earth & Environmental Sciences (50) & Health & Medical Sciences (47). In sub-fields most of the e-books cover Computer Sciences (24), Information Theory (24), General Medicine (20), Mathematics (17), Biology (13) & Geography (11). The authorship trends show that the maximum contribution is by single author (51.14 %) followed by two authors (74, 24.10 %) and three authors (36, 11.73 %). The linguistic assessment shows that 57.98 % (178) of these e-books have been published in English followed in German (88, 28.66%) and Italian (18, 5.86 %) respectively. The publishing trends reveal that 59.93 % (184) e-books have contributed by university presses whereas 40.07 % (123) by other publishing houses around the world. The maximum number of e-books (245, 79.80 %) is available through the Creative Commons (CC) license, whereas 20.20 % (62) e-books are available through comparable institutional licenses.

Keywords: Open access, e-books, electronic books; open access e-books, monographs, directory of open access books, science and technology

1. INTRODUCTION

The origin of e-books can be traced back to the Project Gutenberg started by Michael Hart in 1971. The Project Gutenberg is considered as the first collection of e-books followed by many other projects like the Internet Archive, HathiTrust, Google Books and many others. However, the phrase 'electronic book' is believed to have been coined by Andries Van Dam in 1980 and the first widely available e-books was Random House's Electronic Thesaurus in 1981[1]. The earlier e-books were digital versions of print books. Among the first internet-only publishers of new e-books were Boson Books, Hard Shell Word Factory and Online Originals, all founded in the mid-1990s[2]. The Hard Shell Word Factory has set the first professional standards for commercial e-books and pioneered author-friendly contracts. Online Originals was the first e-books publisher to win mainstream book reviews in The New York Times and a nomination for a major literary prize, the Booker Prize[3].

Gradually, e-books gained more importance in the plans of publishers and subscriptions of libraries. The launching of the NetLibrary, Questia and ebrary in 1999, 2000 and 2001 respectively made thousands of e-books commercially available to libraries and their users[4]. E-books were dependent on technology especially computer for their use and were lacking portability feature like printed books. With the release of the Kindle (an e-books reader) by Amazon in 2007 and the iPad by Apple in 2010, there was a revolution in the use and delivery of e-books. Kindle was designed to access the Amazon website, allowing users to browse, buy and download e-books with this e-book reader without the need for a separate computer[5]. The iPad of Apple was a similar device used to buy and read e-books online from Apple's iBookstore.Presently, due to the technological developments, most of the

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e-books readers are used to buy, browse, view and download not only e-books but other documents as well.

1.1 Pros and Cons of E-books

An e-book, short form of electronic book, is the electronic counterpart of a printed book, which can be viewed on a desktop computer or a portable device such as a laptop, or e-book reader or application. Simply, a book that is in a digital format and that is read on a computer or an e-book reader or application is called an e-book. Reitz[6] defined e-book as a 'digital version of a traditional print book designed to be read on a personal computer or an e-books reader'. In principle an e-books is quite similar to a print book: only the medium is different. For a traditional print book the medium is paper and an e-books is the digital representation of the printed material (print book), the medium can vary from a (laptop) computer to digital e-books reader, mobile phone or even (through a desktop printer) traditional paper. Usually, the content is available in pdf. or html format, but plain text or XML formats are also available. This makes the content much more versatile and flexible than the traditional print book[7].

E-books offer a number of advantages over their print for all stakeholders, i.e., patrons, libraries, authors and publishers. For patrons, e-books offer 24/7 availability, remote access (accessible outside the physical walls of a library), full-text searching, changeable font size, accurate presentation and possession for an unlimited time. For libraries, e-books require no circulation, no shelf space or re-shelving and are never lost, damaged, stolen, or overdue[8]. Further, e-books are easily indexed, catalogued and included in online public access catalogue (OPAC). Readers can also find e-books through search engines (such as Google), library OPAC or the publisher platform which make them more exposed and visible to a larger audience[7]. E-books are also more beneficial for authors as compared to print counterparts. Authors get higher royalty from e-books publishers in comparison to conventional publishers. In addition, authors get more citations which simultaneously increase their *h*-index.

For publishers, e-books never go out of print, and subsequent editions are easily created, modified and distributed without any time delay and extra labour. However, there are many limitations of e-books as well. Walters[9] argues that preservation of e-books is very difficult because it requires long-term maintenance of several distinct elements: texts, file formats, software, operating systems, and hardware. Technological dependence, technological obsolescence, copyright concerns, security issues and plagiarism problems are other challenges that need to be addressed thoroughly.

1.2 Open Access E-books

Open access is a new publishing model which allows its contents to be used by all free of cost. Contents are always freely available anytime (24/7) anywhere to anyone. This model has made very difficult for commercial and business enterprises to retain monopoly on knowledge resources and keep them behind financial walls. It has opened the new doors, gates and ways to access the scholarly information. Open access means 'free of cost open for all'. The Budapest Open Access Initiative (2002) describes open access as 'the literature, freely available on the public Internet, permitting any users to read, download, copy, distribute, print, search, or link to the full-texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the Internet itself[10]. According to Loan[4], 'An open access e-books is a book in electronic or digital form that is available on the public internet free of charge, which can be read on a computer, laptop, or e-books reader.' Thus any e-book which is available on public internet, permitting any user to read, download, copy, print, use, distribute and share for teaching, learning, research or other non-commercial purposes is called open access e-books. These e-books are available in different online knowledge banks like digital archives, digital libraries, digital repositories, databases, and directories. These e-books offer creative possibilities for expanding access to information and bridging the knowledge gap between information rich and information poor nations.

1.3 Directory of Open Access Books

The Directory of Open Access Books (DOAB) was officially launched on July 1, 2013 at the Open Access Monographs in the Humanities and Social Sciences Conference at the British Library in London[11]. However, unofficially it was operating since 2011 and its beta version was launched in 2012. The DOAB is a service of the Open Access Publishing in European Networks (OAPEN) Foundation. The OAPEN Foundation is an international initiative dedicated to open access monograph publishing, based at the National Library, The Hague[12]. DOAB is being developed in close cooperation with Lars Bjørnshauge and Salam Baker Shanawa (Director of SemperTool), who were also responsible for the development of the Directory of Open Access Journals (DOAJ)[13]. SemperTool develops and maintains the DOAB system. Which is a software development company specialising in building digital library technologies,

as well as providing hosting and consulting services. Presently, the company offers a range of reliable and cost-effective software solutions for digital libraries of more than 800 universities in Europe, Africa and the Middle East[14].

The DOAB is a discovery service for open access e-books. DOAB provides a searchable index to peer-reviewed monographs and edited volumes published under an open access business model, with links to the full texts of the publications at the OAPEN Library, publisher's website or repositories[13].

- DOAB is a discovery service for peer reviewed open access e-books
- Aims to maximise dissemination, visibility and impact of open access e-books[15]
- Publishers provide and maintain metadata
- Aggregators can integrate the records into their commercial services[15]
- Libraries can integrate the records into their online catalogues[15]
- Supports open archives initiative protocol for metadata harvesting (OAI-PMH)
- Full-text of these e-books is available on the OAPEN Library or publisher's website or repositories.

1.3.1 Collection

The collection of the e-books in DOAB is growing constantly. DOAB was started in 2011 with 490 e-books and 15 publishers. Presently (February 2015), DOAB provides access to 2730 academic peer-reviewed e-books published by 94 publishers. Looking at the data since the launch in 2011, the collection of e-books and the number of publishers show a steady growth (Table1).

1.3.2 Search and Browse

The DOAB has also a multilingual search and browse facility on its website with basic and advanced search features. In the advanced search, user can search through various fields like title, ISBN, author, keywords, abstract and publisher. DOAB search page also supports the Boolean Operators to refine the search results. Users can also narrow the search results by restricting the search to a particular publisher, license, language and period. Information seekers have the browsing facility on its homepage as well and can browse the e-books through title, subject and publisher approaches. In addition, DOAB provides abstracting service to its e-books collection. Abstracts of e-books are readily available online for readers in order to judge their relevance. Readers can easily download required e-books from the qualitative collection of these open access e-books available through DOAB.

Table 1. Growth of e-books in DOAB (2011-Feb. 2015)

S. No.	Yearly growth	No. of eBooks	Publishers
1.	2011	490	15
2.	2012	703	19
3.	2013	366	18
4.	2014 (1 June)	474	13
5.	2015 (1 Feb)	697	29
	Total	**2730**	**94**

1.3.3 Licenses and Use

The DOAB only lists books that are licensed under the Creative Commons (CC) or comparable licenses. These open access e-books are available under the banner of "free to read and free to share". Readers not only have rights to read, print, download and save only but also the right to share for non-commercial purposes.

The e-books with CC license listed in DOAB are downloaded almost twice (181 %) as compared to e-books with a more restrictive license available in the OAPEN Library in a period of one year from June 2013-May 2014[16]. This is the reason that DOAB includes e-books available through the CC or comparable licenses. Even the e-books available in the OAPEN Library with a more restrictive license aren't included in DOAB.

2. OBJECTIVES

The study aims to analyse the current trends of the open access e-books in Science and Technology available through DOAB. The scope of the study is limited to the open access e-books in Science and Technology available through DOAB. Hence the findings can't be generalised across disciplines and directories.

3. METHODOLOGY

The DOAB was selected as a source for data collection whereas Science and Technology were selected as the fields of study. The required data was collected online during the month of March 2014 and recorded in an excel file for analysis. Later data were analysed using different quantitative techniques and presented in tabular forms to reveal findings.

4. ANALYSIS

4.1 Types of E-books

Three types of e-books are available through the DOAB–monographs, books series and conference proceedings. The maximum number of e-books falls in the category of monographs (209, 68.08 %)

followed by book series (93, 30.29 %) and conference proceedings (05, 1.63 %) respectively.

4.2 Subject Coverage

Total 307 e-books are available on Science and Technology through DOAB covering 8 major subject areas and 36 sub-fields. Maximum e-books are available on General Science (95), Technology and Engineering (54), Earth and Environmental Sciences (50) and Health & Medical Sciences (47) respectively. In sub-fields, most of the e-books cover Computer sciences (24), Information Theory (24), General Medicine (20), Mathematics (17), Biology (13), Geography (11), Public health (8), Agriculture (8) and Civil Engineering (8) (Table 2).

4.3 Authorship Trends

The maximum number of Science and Technology e-books have contributed by authors (297, 96.74 %) whereas a small number by editors (10, 3.26 %). Among the authored e-books, the maximum number are authored by single author (157, 51.14 %) followed by two (74, 24.10 %) and three (36, 11.73 %) authors respectively. The edited e-books also show the similar trend. The majority of e-books are edited by single editor followed by two and three editors respectively (Table 3).

Table 2. Subject-wise publishing of e-books

S. No.	Subject categories	No. of e-books (%)
1.	Agriculture and Food Sciences	21 (6.84)
2.	Biology and Life Sciences	20 (6.51)
3.	Earth and Environmental Sciences	50 (16.29)
4.	Health and Medical Sciences	47 (15.31)
5.	Mathematics and Statistics	17 (5.54)
6.	Physics and Astronomy	03 (0.98)
7	Science (General)	95 (30.94)
8.	Technology and Engineering	54 (17.59)
Total		**307 (100)**

Table 3. Authorship trends in e-books

	No. of ebooks	% of ebooks
Authored e-books		
Single author	**157**	51.14
Two authors	74	24.10
Three authors	36	11.73
Four authors	18	5.86
More than four authors	12	3.91
Total	**297**	**96.74**
Edited e-books		
Single editor	04	1.30
Two editors	03	0.98
Three editors	02	0.65
Four editors	00	00
More than four editors	01	0.33
Total	**10**	**3.26**

4.4 Linguistic Analysis

The e-books in Science and Technology are published in 11 different languages. The linguistic assessment shows that 57.98 % (178) of the e-books have been published in English followed by German (88, 28.66 %) and Italian (18, 5.86 %) respectively (Table 4). Besides e-books in English, German, Italian, Dutch, there are also books in other languages, especially, Russian and French as well.

4.5 Publishing Authority

The publishing trends reveal that out of 307 e-books 59.93 % (184) e-books have been contributed by the university presses whereas 40.07 % (123) by publishing houses around the world.

4.6 Year-wise Growth

The majority of e-books available through DOAB are published from 2005 onwards, mostly in 2011-12 (27.69 %) followed by 2009-10 (22.48 %) and only one e-books has been made analyse before 2000. However, the yearly growth of e-books is showing an increasing trend (Table 5).

4.7 Pagination Trends

The pagination of e-books depict that 36.16 % of e-books have 200-400 pages, 17.59 % have upto

Table 4. Language-wise publishing of e-books

S. No.	Language	No. of ebooks	% of ebooks
1.	English	178	57.98
2.	German	88	28.66
3.	Italian	18	5.86
4.	Dutch	07	2.28
5.	Others	16	5.22
Total		**307**	**100**

Table 5. Year-wise inclusion of e-books in S&T

S. No.	Yearly growth	No. of ebooks	% of ebooks
1.	≥2000	01	0.32
2.	2001-2002	06	1.95
3.	2003-2004	14	4.56
4.	2005-2006	43	14.01
5.	2007-2008	46	14.98
6.	2009-2010	69	22.48
7.	2011-2012	85	27.69
8.	2013-2014 (March)	43	14.01
Total		**307**	**100**

Table 6. Total no. of pages in e-books

S. No.	Pagination	No. of ebooks	% of ebooks
1.	More than 1000	01	0.32
2.	801-1000	02	0.65
3.	601-800	06	1.95
4.	401-600	29	9.45
5.	201-400	111	36.16
6.	Up to 200	54	17.59
7.	Not Available	104	33.88
Total		**307**	**100**

200 pages and only one e-books has more than 1000 pages whereas 33.88 % don't depict the total number of pages (Table 6).

4.8 License-wise Information

The maximum number of e-books (245, 79.80 %) is available through the CC license whereas 62 (20.20 %) are available through other comparable institutional licenses.

5. DISCUSSIONS

The DOAB provides access to three types of e-books in Science and Technology–monographs, books series and conference proceedings. Monographs are available in more number than book series and conference proceedings. These e-books cover almost all the major subject areas of Science and Technology like Agriculture and Food Sciences; Biology and Life Sciences; Earth and Environmental Sciences; General Science; Health and Medical Sciences; Mathematics and Statistics; Physics and Astronomy; and Technology and Engineering and their sub fields including Computer Sciences, Chemical Technology, Environmental Technology, Information Theory, General Medicine, Internal Medicine, Neurology, Surgery, Public Health, Dentistry, Physiology, Psychiatry, Pharmacy, Biology, Zoology, Botany, Agriculture, Forestry, Animal Science, Aquaculture and Fisheries, Nutrition and Food Sciences, Earth Science, Geology, Geography, Ecology, Civil Engineering, Electrical Engineering, Nuclear Engineering, Construction, Manufacturers, Mathematics, Physics, Astronomy, etc. It reveals that the open access e-books are available on almost all branches of Science and Technology through DOAB. There is a need to aware the academic, scientific and technological communities about these e-books in workshops, orientation courses, refresher courses and training programmes for their optimum utilisation. Library and information managers have to play a leading role in this direction.

The maximum numberof S&T e-books have been contributed by authors with almost 50:50 by single and joint authors whereas a small number by editors as well. The S&T e-books are published in different languages, mostly in English followed by German and Italian respectively. DOAB is already providing the abstracting services of its e-books collection. The availability of the abstracts of these e-books in English and other prominent languages can also prove very helpful to library managers and users in order to judge their relevance. These e-books have largely contributed by the university presses and publishing houses of the world. The Amsterdam University Press, Australian University Press (ANU), Cambridge University Press, Manchester University Press, Oxford University Press, Palgrave Macmillan, Springer, OpenEdition Press, etc. are among the many note worthy participating publishers. Further, only those e-books are included in DOAB which are peer reviewed by independent and external experts before publication. Hence, the quality of these e-books can't be challenged at any cost.

The majority of these e-books have been published in the last ten years which is an indication that these e-books contain the nascent thought, not obsolete information. The pagination analysis shows that these e-books are of various sizes, however, the majority is of medium size having upto 400 pages. This shows that these e-books aren't simply pamphlets but well authored and documented e-books. These e-books are available through CC and comparable institutional licenses. These licenses are very important to increase usage of these e-books as they are available under the banner of 'free to read and free to share' for all non-commercial purposes.

6. CONCLUSIONS

The open access movement is growing fast in all directions overcoming the regional barriers and surpassing the disciplinary boundaries. Like journals, e-books also have been started to flourish in all fields of knowledge. The present study is witness to the steady growth of open access e-books in S&T. The emerging e-books revolution offers many opportunities for institutions to enhance teaching, learning and research processes alongwith enriching the collection of their libraries without any budgetary concerns. In preparation for these opportunities, copyright rules, preservation problems, safety concerns, technological issues, cultural challenges, plagiarism and other such matters need to be addressed thoroughly alongwith the developmental stages so that institutions can successfully expand their adoption and use of e-books. international organisations, national bodies, academic institutions/associations/societies, funding agencies, policy planners, authors/researchers/readers and other open access advocates need to join hands in this regard and to make the e-books revolution a real success.

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About the Authors

Dr Fayaz Ahmad Loan is working as Documentation Officer at the Centre of Central Asian Studies, University of Kashmir, Jammu & Kashmir, India. Earlier, he has worked as Assistant Librarian in the University of Chandigarh and Central University of Kashmir. He has published 24 research papers in international/national journals, 5 chapters in edited books,16 conference/seminar papers and 7 newspaper/magazine articles. He has also completed two research projects in the field of library and information science. His areas of reasearch include: Information management, collection development and open access.

Ms Refhat-un-nisa is working as Librarian at Delhi Public School, Srinagar, Jammu & Kashmir, India. She obtained her MLIS from University of Kashmir, Srinagar. Her areas of interest include: library organisation and automation. She has published 4 research papers and 5 conference papers.