Roecker, Fred (2006, March). Guides to the OSU Libraries: Chicago Manual of Style Citation Guide. Retrieved January 5, 2009, from The Ohio State University, Ohio State University Libraries: http://library.osu.edu/sites/guides/chicagogd.php

Rosenberg, Scott (2009). Say Everything: How Blogging Began, What It's Becoming, and Why It Matters (eBook ed.). New York: Crown.

Rozic-Hristovski, Anamarija; Humar, Iztok & Hristovski, Dimitar (2003). Developing a multilingual, personalized medical library portal: use of MyLibrary in Slovenia, *Program: electronic library and information systems*, Vol. 37 No 3, pp 146-157.

RSS Advisory Board (n.d.). Specification History. Retrieved from: http://www.rssboard.org/rss-history

Rubin, H. J. (1983). Applied social research. Columbus, OH: Charles E Merrill. Quoted in Mikkelsen, Britha (2005). Methods for development work and research: A new guide for practitioners, 2nd ed. New Delhi: SAGE Publications.

Sadeh, Tamar & Walker, Fenny (2003). Library portals: toward the semantic web, *New Library World*, Vol 104 No. 1184/1185, pp 11-19.

Salton, G. (1971). Automatic Indexing Using Bibliographic Citations, Journal of Documentation 27, 98-110.

Sanders, Donald H (1988). Computers today, 3rd ed. New York: McGraw Hill.

Sarkar, P. K. (1977). Administration of technical libraries. New Delhi: Sterling.

Satija, Dr. M. P. (1999). Doctoral Research in Library and Information Science in India: Some Observations and Comments. *Libri*, *49*(4).

Saxena, Sanjay (2003). *A first course in computer*, 2003 ed. New Delhi: Vikas.

Schrock, Kathy. Library automation: A buying guide. Available over web at: http://www.techlearning.com/story/showarticle.jhtml?articleid=17602661

Seetharama., S. (1997). Information Consolidation and repackaging. New Delhi, Ess Ess, 1997. pp1- 246.

Sehgal, R. L. (1998). *Computer based information processing technique for libraries*. New Delhi: Ess Ess.

Sehgal. R. L. (2003). Cataloguing practice. New Delhi: Ess Ess Publications.

Sellen, Betty-Carol (1997). What Else You Can Do With a Library Degree: Career Options for the 90s and Beyond, 2nd ed.. New York: Neal-Schuman Publishers.

Sharma, C. K. (1977). University library its management and organization. New Delhi: Metropolitan.

Sharma, Dev Raj. Doctoral research in library and information science.

Sharma, Jagdish Saran & Grover, D.R. (1987). Reference service and sources of information. New Delhi: Ess Ess.

Silberman, S. (2000). The quest for meaning, *Wired*, Vol. 8 No. 2, February, p. 178. Retrieved from: http://www.wired.com/wired/archive/8.02/autonomy.html

Simkins, M. A. (February 1968). Retrieval of Information from the Recent Literature of Medicinal Chemistry, Chemistry and Industry 5, 146-50.

Singh, Kultar (2007). Quantitative social research methods. New Delhi: SAGE Publications.

Singh, Sanjay Kumar (2004). Virtual Library Vs Virtual Reality. Journal of Library and Information Science, Gauhati University, 1(1), 66-71.

Sinha, P.K. (1992). *Computer fundamentals*. New Delhi: BPB.

Sivasubramanian, V. (2002). Virtual Information Centres, Vision of Information Aid. IASLIC Bulletin, 47(2), 107-09.

Somekh, Bridget & Lewin, Cathy (Eds.). (2005). Research methods in the social sciences. New Delhi: Vistaar Publications.

Spear, Martha J. The Top 10 Reasons to Be a Librarian. Retrieved from: http://www.ala.org/educationcareers/careers/paths/top10reasons

Sprigel, William R & Davies, Ernest C. (1952). Principles of business organization and operation. New Jersey: Prantice hall.

Stoffel, Bruce & Cunningham, Jim (2005). Library participation in campus web portals: as initial survey, *Reference Services Review*, Vol. 33 No. 2, pp.144-159.

Strahan, Mike (2008, June). APA Reference Style Guide. Retrieved January 5, 2009, from Northern Michigan University, Lydia M. Olson Library: http://library.nmu.edu/apastyle.htm

Stubbings, R. (2003). MetaLib and SFX at Loughborough University Library, *VINE*, Vol. 33 No. 1, pp. 25-32.

Sullivan, D. (2001). Five principles of intelligent content management, *Intelligent Enterprise*, vol 4 No. 13, pp. 28-34. Retrieved from: http://www.intelligententerprise.com/010831/413feat1_1.shtml

Sur, S.N.& Chowdhury G. G. (1993). A prototype design of a bibliographic database based on CCF using micro CDS/ISIS. *IASLIC Bulletin*, 38(1), 17-37.

Swihart, Stanley J. and Hefley Beryl F. (1973). In computer system in the library. Los Angeles: Melville.

The Library of Congress (2005). LC Portals Applications Issues Group Web site. Retrieved from: http://www.loc.gov/catdir/lcpaig/

The Open University (2018). Web browsing basics. Retrieved November 27, 2018 from: http://www.open.ac.uk/choose/unison/develop/my-skills/web-browsing-basics

The Statistics Portal (2020). *Worldwide desktop market share of leading search engines from January 2010 to January 2020.* Retrieved on May 8, 2020 from: https://www.statista.com/statistics/216573/worldwide-market-share-of-search-engines/

Tian, Oliver (). Enhancing the Bottom Line : Manpower Training and the Return on Investment.

Tian, Oliver ().Enhancing the Bottom Line : Manpower Training and the Return on Investment

Tripathi, S. M., Lal, C and K Kumar (2002). Descriptive questions in Library and Information Science: based on new syllabus for NET (UGC) SLET, SET and other test. New Delhi: Ess Ess.

Tripathi, S.M., Lal, C and K. Kumar (2002). *Descriptive questions in Library and Information Science.* New Delhi: Ess Ess.

Tulic, Martin (2005). Automatic indexing. (Available at: http://www.anindexer.com/about/auto/autoindex.html)

Two-Bit History (2018). The Rise and Demise of RSS. Retrieved from: https://twobithistory.org/2018/12/18/rss.html

Ubogu, Felix N.; Kekana, Arthur & Roberts, Charl (2006). Library subject portals: An investigation of possibilities for the University of the Witwatersrand Library, *Program*, Vol. 40 Issue: 1, pp.27-47. Retrieved from: https://doi.org/10.1108/00330330610646799

UNESCO (1992). CDS/ISIS (Mini micro version: reference manual. Paris: UNESCO.

Ungern-Sternberg, Sara von (). Applications in Teaching Bibliometrics (Available at: http://www.ifla.org/IV/ifla61/61-ungs.htm)

University Grants Commission (1959). University and College Libraries, Containing the Report of

the Library Committee of the UGC and the proceedings of the Seminar on From Publisher to Reader held on March 4-7, 1957, UGC: New Delhi.

University of Southern Mississippi Libraries. (2006, August). APA Style Guide 5th Edition. Retrieved January 5, 2009, from http://www.lib.usm.edu/assets/files/apa-text-version.html

Van Brakel, P. (2003). Information portals: a strategy for importing external content, *Electronic Library*, Vol. 21 No. 6, pp. 591-600.

Walliman, Nicholas (2005). Your research project: A step by step guide for the first time researcher, 2nd ed. New Delhi: Vistaar Publications.

Walt Crawford (2006). Library 2.0 and Library 2.0 (PDF). Cites and Insights. 6 (2).

Warnken, K. (1977). The Directory of Fee-based Information Services 1977. Woodstock, N.Y.: Information Alternative.

Welgus, Barry. Library automation: software functionality issues. Available over web at: http://www.curriculum.ed.au/scis/connections/cnetw02/42automation.htm

Wetzel, K.A. (2002). Portal functionality provided by ARL libraries: results of an ARL survey, June. Retrieved from: http://www.arl.org/newsltr/222/portalsurvey.html

White, Andrew C. (2002). Using heterogeneous components to construct online library portals, *The Electronic Library*, Vol. 20 No. 3, pp. 224-30.

Wikipedia: The Free Encyclopaedia (2021). https://en.wikipedia.org

Yao, Fei; Zhang, Chengyu; Chen, Wu (2015-06-15). Smart talking robot Xiaotu: participatory library service based on artificial intelligence. Library Hi Tech. 33 (2): 245–260. doi:10.1108/lht-02-2015-0010. ISSN 0737-8831

Zhou, J. (2003). A history of web portals and their development in libraries, *Information Technology and Libraries*, Vol. 22 No. 3, pp. 119-28.

Alphabetical Index

Books by Badan Barman

Sl.No.	Title	Publisher	Place	Year
1)	A Comprehensive Book on Library and Information Science	LIS Links	Guwahati	2022
2)	Online Teaching-Learning	Badan Barman	Guwahati	2021
3)	50 Years of LIS Education in North East India	DLISc., Gauhati University	Guwahati	2019
4)	Directory of Teachers and Officers of Gauhati University	Gauhati University	Guwahati	2018
5)	Directory of Library and Information Science Professionals in Assam	LIS Links	Guwahati	2017
6)	Library and Information Science	DVS Publishers	Guwahati	2017
7)	UGC NET Solved Question Paper-1	DVS Publishers	Guwahati	2017
8)	Comparative Librarianship	DLISc., Gauhati University	Guwahati	2017
9)	Public Librarianship and Glorious Heritage of Karmabir Nabin Chandra Bordoloi Library (Reading Hall): Plan for Renovation and Development	Assam Library Association	Guwahati	2017
10)	Popular Person in Library and Information Science	LIS Links	Guwahati	2016
11)	Systematic Facts File in Library and Information Science	LIS Links	Guwahati	2016
12)	Glossary of Abbreviations in Library and Information Science	LIS Links	Guwahati	2016
13)	Directory of Library and Information Science Teachers in India	LIS Links	Guwahati	2016
14)	Library and Information Science	DVS Publishers	Guwahati	2013
15)	Library and Information Science	DVS Publishers	Guwahati	2012
16)	Computer Applications in Library	KKHSOU	Guwahati	2011
17)	Library and Information Services	KKHSOU	Guwahati	2011
18)	Library Management	KKHSOU	Guwahati	2011
19)	Library and Society	KKHSOU	Guwahati	2011

Websites by Badan Barman

Sl.No.	Name of the Website	Website Address	Date of Launch
1)	LIS Links	http://www.lislinks.com	26th February, 2008
2)	Open Access Journals Search Engine (OAJSE)	http://www.oajse.com	1st January, 2011
3)	UGC NET Guide	http://www.netugc.com	26th April, 2011
4)	LIS Study	http://www.lisstudy.com	1st January, 2019
5)	Assam Archive	http://www.assamarchive.com	1st January, 2020

About the Book

"A Comprehensive Book on Library and Information Science (LIS)" contains both descriptive and objective information in Library and Information Science. The descriptive part presents small notes or write-ups or summary in a very simple and easy-to-understand manner on various aspects of the LIS subject which have been arranged course-wise. The objective part presents systematic facts, abbreviations / acronyms / initialisms and scientists / people and their contribution towards LIS. At the end, references and alphabetical index is provided.

A Comprehensive Book on Library and Information Science is, in its true sense, a comprehensive book in a single volume in Library and Information Science. It covers most of the areas of syllabus of Bachelor and Master Degree Programmes of Indian universities in Library and Information Science including UGC NET JRF / SLET examinations, KVS and NVS examination.

This book is the consolidation of contents from previously published 9 books by the same author after thorough editing and revision. It will serve as a textbook and a ready reference source for the students, teachers and professionals in the LIS subject and we hope this will prove to be a valuable possession for our readers.

About the Author

Dr. Badan Barman was born on 26th of January, 1982 in the Nalbari District of Assam, India. He is a teacher in Library and Information Science (LIS) and developer of different online platforms for the LIS professionals in India. His most popular online platforms include LIS Links (www.lislinks.com), UGC NET Guide (www.netugc.com), Open Access Journals Search Engine (www.oajse.com), LIS Study (www.lisstudy.com) and other such platforms. His LIS Links social networking site for LIS professionals in India was developed on 26th of February, 2008. It brought more than 29 thousand LIS professionals together, bestowed them with recent information, provided first-hand solutions of their problems and most importantly provided them with an opportunity to voice their opinions on matters related to Library and Information Science.

He completed BSc (Botany) from Guwahati College with 1st class 15th position in 2003, MLISc from the Department of Library and Information Science, Gauhati University with 1st class 1st position in 2005. He was awarded Ph.D. in Library and Information Science by Gauhati University in the year 2011 for his thesis "Web Resources in Library and Information Science: A Managerial Approach" under the guideship of Professor Narendra Lahkar. He qualified in the UGC NET examination in Library and Information Science of December, 2005 and June, 2006.

Dr. Badan Barman has been working as an Assistant Professor in the Department of Library and Information Science, Gauhati University, Assam since 29th September, 2014 till date. Before joining his present assignment, he worked as an Academic Consultant and then as Assistant Librarian at Krishna Kanta Handiqui State Open University, Assam. He also worked at the Central Reference Library, Kolkata as "Apprenticeship on Lib. & Inf. Science" and as a Research Assistant in the ICSSR sponsored research project "Rural Libraries of North East India: A Machine Readable Database" at DLISc, Gauhati University. For a short period, he also worked at Media Trust, Assam.

Till date, he has completed 1 major research project and 3 minor research projects, authored and edited 18 books on the subject and written 8 articles in journals.

His LIS Links project was included in the 200 Tech Success Stories compiled by the PC Quest magazine, June 2010. He received eNorth East Award 2011 (Jury Special Mention) in the category of "Best Usages of ICT in Education and Learning" in the E-North East Award 2011 held at Kohima, Nagaland (India). He also received KALA National Award for Young LIS Professionals, 5th eNorth East Award – 2014 and North East Social Impact Award 2015 (Special Mention) in the category of Advocacy & Empowerment at NEDFi House, Guwahati, Assam (India) on 28th August, 2015. He was ICSSR, New Delhi Centrally Administered Doctoral Fellow.

₹ 1799.00
ISBN: 978-81-908708-2-5

LIS Links
House No. 8, Taranga Path, Krishnanagar
P.O.: Japorigog, Guwahati-781005, Assam, India
Email: info@lislinks.com

Smart Libraries and Information Management in Digital Environment

Volume II

Edited by
Neena Singh
Sewa Singh

B.R. Publishing Corporation
Delhi - 110 052

Published by:

B.R. Publishing Corporation
425, Nimri Colony, Ashok Vihar, Phase-IV
Delhi-110 052
E-Mail : brpc73@gmail.com

First Published 2022

ISBN 9789391123581 (Set of 2 Volumes)

Printed at Balaji Offset, Delhi

Cataloging in Publication Data--DK
Courtesy: D.K. Agencies (P) Ltd. <docinfo@dkagencies.com>

Smart libraries and information management in digital environment / edited by Neena Singh, Sewa Singh.
volumes cm
Contributed articles.
Includes bibliographical references.
ISBN 9789391123581 (2 vols.)

1. Academic libraries--Information technology--India. 2. Academic libraries--Information technology. 3. Academic libraries--India--Automation. 4. Academic libraries--Automation. 5. Digital libraries--India. 6. Digital libraries. I. Singh, Neena, 1969- editor. II. Sewa Singh, 1946- editor.

LCC Z678.9.A4I4 2022 | DDC 020.285 23

गोविन्द बल्लभ पंत कृषि एवं प्रौद्योगिक विश्वविद्यालय
पंतनगर – 263145, जिला – ऊधमसिंह नगर (उत्तराखण्ड) भारत
G.B. Pant University of Agriculture & Technology
Pantnagar - 263145 (Uttarakhand) India

डा0 तेज प्रताप
कुलपति
Dr. TEJ PARTAP
Vice-Chancellor

Message

I am glad to learn that Dr Neena Singh and Prof. Sewa Singh are bringing out a volume of papers on **'Smart Libraries and Information Management in Digital Environment'**. The book provides a comprehensive look on diverse areas of Smart Library System that shape the 21st Century Libraries in fast developing Digital Environment.

I am sure that the book will throw light on smart technologies and latest developments in library services and information management and provide an opportunity to the Research Scholars, Knowledge Managers, as well as Teachers in Library and Information Sciences to know about Smart Library setup in institutions of higher education.

My best wishes for the constructive academic effort by the Editors in preparing this book.

(Tej Partap)

दूरभाष (कार्यालय) : 05944–233333, 233663 (निवास) 233621, फैक्स : 05944–233500 (कार्यालय), 233833 (निवास)
E-mail : vcgbpuat@gmail.com, Website : www.gbpuat.ac.in

Foreword

In the context of transformation and modernization of social processes, the introduction of information and communication technologies, a new cultural paradigm and further digitalization of society undoubtedly had a significant effect on libraries.

In terms of access to media, competition between them for the free time of customers / users / readers has grown as well as the role and functions of the library have changed. Further digitalization of public life, the Covid-19 pandemic and its consequences, accelerated the process of transferring library activities to digital rails: the digitization of library collections, the formation of new digital services, the introduction of remote and open access technologies, along with training and promotion of digital literacy in order to provide information, cultural, scientific, educational and leisure needs of readers. Automation of processing and accounting of information and services for readers, optimization of tools for managing library collections forced libraries to look for new forms to provide information to readers in order to ensure the viability and competitiveness of library as a social institution that is important to society in rapidly changing digital environment. The further introduction of digital information and communication technologies has led to an understanding of the urgent need to create innovative models of libraries - smart libraries that can combine traditional library forms of work with the widespread provision of electronic information services.

Smart libraries are libraries of the future. They are adaptive, multidisciplinary, multifunctional, cultural and educational platforms, the purpose of which is to facilitate the circulation and development of knowledge and information by providing free access to them. A smart library is a kind of innovative space, a territory of knowledge, focused on the development of digital literacy, intellectual abilities of users, providing free open access to global information resources, databases, digital repositories, traditional book collections; it is an updated library model.

Smart libraries are modern hybrid libraries that combine traditional library services and open access to world information resources, electronic databases using digital tools and services: a single electronic catalogue, online services for ordering literature, e-book lending, mobile applications, QR codes, radio frequency identification (RFID) with stations for self-issuing and receiving literature, a unified database of readers and much more.

A modern smart library becomes not only a reading area or an educational center for readers/users. It is also an updated platform for creativity, where the theatrical performances for children and adults, meetings with famous people, discussions with experts, different clubs, classes, schools of journalism, blogging take place.

The study of the creation and functioning of smart libraries in the world is just beginning. The concept of building smart libraries, topical issues of their functioning in the digital environment: development trends, the formation of a library management system, the creation of digital tools and services, the digitization of resources, priority areas of work, the formation of an individual style, the zoning of information and creative space, the assessment of the quality of electronic services - have become the subject of close attention and comprehension of scholars and practitioners. That is why the collection of scientific articles initiated and collected by Indian colleagues Dr. Neena Singh and Prof. Dr Sewa Singh "Smart Libraries and Information Management in the Digital Environment" has more relevant and significant meaning for our professional community now than ever before. This unique book by leading specialists in the field of information and library science, Indian researchers, colleagues and old friends of the State Public Scientific and Technical Library of the Siberian Branch of the Russian Academy of Sciences (Novosibirsk,

Russia), Dr. Sewa Singh and Dr. Neena Singh will contribute to the creation and functioning of new smart libraries around the world, drawing on the example and experience of practicing librarians. In this book, professional scientists from different countries consider the issues of building and development of smart libraries; summarize the first results of the functioning of such libraries in India, Russia and Nigeria. The book presents the experience of digital library services; it focuses on such topics as modern challenges and information needs of readers, digital literacy of users, the assessment of the quality of electronic services, solution of technical problems (remote access software, the use of cloud technologies, digitization of documents and creation of electronic collections) etc.

Such books are extremely relevant, because they fill the current gaps in scientific, practical and methodological knowledge about the creation, content and activities of innovative hybrid libraries. The book will undoubtedly be in demand in the world of professional library community, among everyone interested in the current state of LIS, opportunities and prospects in development of smart libraries in the digital age.

Dr Irina Lizunova
Director, SPSTL
Siberian Branch of the Russian
Academy of Sciences,
Novosibirsk, Russia
e-mail: lizunova@gpntbsib.ru

Introduction

Traditionally libraries provided access to physical learning resources, most popular being the books and a quiet place to read, but today libraries are evolving into spaces for innovation and creativity and taking on newer roles. The technological developments over the years have contributed immensely to the functioning of the libraries and learning centers worldwide. Today, we speak about connected libraries, sharing information in online communities, web based union catalogues or world cats, open and remote access to library resources, gateways or portals to access subscribed e-resources through cost sharing consortium mechanisms. Libraries are fast changing over their traditional roles, and are now much more focused towards digital resources and smart services using technological interventions and web oriented tools like social medias, QR codes, smart phone devices, etc.

The concept of hybrid libraries have existed in the recent past that focused both on the physical resources and the digital content. Many libraries took the task of digitizing physical resources and making them accessible over library website and digital repositories. Numerous collaborative Electronic Thesis and Dissertation (ETD) repositories emerged at International as well as National level like Shodhganga and Krishikosh in India, Proquest Dissertation and Thesis in North America, DART-Europe, Deutsche Nationalbibliothek in Germany, Thesis France in France, ETD Portal in South Africa etc. We have seen the expansion of digital media and the rise of e-books that have strengthened the digital resources in libraries. The increasing digital

resources are now paving the way for digital libraries in a big way, though meeting the infrastructural requirement and funding have been a big challenge in many developing countries. Most digital libraries that have emerged in different countries have been developed either through projects or special grants from government, never the less it is important to note the changing trends, how the libraries are evolving, the way information is being digitally born or created, digitally processed, stored and made accessible to patrons or disseminated, used or reused to create new knowledge. Considering the online information habits of young students community the information services are being extended through creative and innovative ways leading to smart library system.

The recent pandemic has revealed to the world, the significance and the value of digital resources, digital libraries, and the integration of technology in accessibility and delivering digital content remotely. The academic community also realized, largely the importance of digital learning resources and remote access during the pandemic, when all libraries in academic institutions were physically closed and ceased to offer regular services, smart digital libraries came forward to support the online learning in a bigger way expanding beyond their traditional roles reaching further to their communities through remote access.

Libraries in the 21st centuries are going to be less about physical sources or books and more innovative about smart technology driven services that library staff would provide to their communities. An overview of recent academic library models like Learning Resource Centers, Green Library, Knowledge Centers, etc reveal affinities with the concept of Smart Libraries. As rightly noted by J. Schopfel, Smart Libraries can be described in four dimensions having, smart places, smart people (user community), smart services and smart governance, it is a process of executing library works that is less linear, less organized or structured more creative and innovative .

Smart libraries, hybrid in nature, also focus on design and architecture of their reading spaces, physical environment, good user friendly technical infrastructure, and equipments to support the academic community and improve their learning experience.

Broadly, one may understand smart libraries as synonymous with modern libraries, right in the sense that smart libraries are based on

innovative modern library concept and are technologically driven in their services and infrastructure. They are also adopting new social and technological opportunities and threats, moving forward in their mission.

Smart libraries are built by varied information services willing to interact with each other in an information centric platform for supporting the regular ICT services. Papers on smart libraries largely focus on technological innovation as smart services, such as RFID, Internet of Things, wireless access like WiFi, semantic web, remote assistance and access, use of artificial intelligence and robots, etc to reduce repetitive human intervention in library operations.

The growth of RFID technologies in libraries brought paradigm change in the processes of fast transaction flow and smart experience of kiosk based, self operations like check in, check out of physical books, round the clock book drop experience. The security driven by this technology provided in the experience of commercial malls something innovative for patrons. The RFID technology gave the first a smart library frame work in terms of automation and empowering the user community.

Lately, Quick Retrieval codes popularly known as QR codes have been finding place in libraries as low cost solution to deliver smart phone based services to attract young patrons and also provides value added services and innovative experience to patrons. Smart Libraries have been engaged in providing myriad services like booking group study spaces or research carrels through scanning QR codes. Some libraries are also using QR code to link book trailers posted on authors or the publishers website tapped at the back cover of the book. A QR code to provide video information about the book can also give an interesting experience to the patrons, they can scan these codes to watch the videos of these books and have glance about the content before checking them out.

Smart libraries also have affinities with Green libraries, compared to other places, libraries are relatively clean, though they consume energy, water and produce waste. The concept of Green libraries tries to address the concerns of environment, pollution and saving energy, besides waste reduction, and recycling of papers etc, they are also linked to building designs, natural lights, use of energy saving lighting, and air conditioning devices. Broadly, Green libraries focus on clean

technologies and are embedded in the educational system and every day environmental actions.

Information Literacy and dealing with Fake News in present scenario is an important component of a smart library, novice researchers are overwhelmed with too much information and data and need someone to turn for immediate help to guide them on common challenges and learn skills to be able to identify and evaluate right information sources and develop critical thinking in Smart user community. Several fake news are flooded across social media channels, the librarian role as teachers is inevitable to help its patron identify the right information/news and misinformation.

Since not all users are familiar with digital tools, libraries have to be proactive in developing new online training material or information literacy courses through various e-learning platforms for patrons to learn information literacy skills they require to exploit digital sources from remote locations in digital environment. Libraries may also host their own information literacy courses online through various e-learning platforms to help students to navigate and carry out their academic assignments and scholarly research activities at ease.

Web 2.0 technologies have facilitated the libraries to remove physical barriers for information access and bring library services as close as just to click of a button on smaller devices like smart phones. Social network platforms like Twitter, Facebook, Instagram also plays an important role in connecting and engaging the students with learning resources, especially access to e-resources and also solving their concerns regarding library resources and information requirement. Libraries may use the twitter or facebook pages to address reference questions online from remote locations and resolves students queries besides, provide information about open access resources from publishers and free access to their paid resources or notify useful links to free e-books or digital repositories.

Today libraries worldwide have to reinvent their traditional roles and functions in the new digital eco system in smarter ways as they do not have the exclusive monopoly over providing information access, its management, and support to learning. Some of their informational and support to learning resources roles may be externalized and carried forward by other players and structures.

Therefore, smart library having affinities with technological innovations for smart services is the need of the present times.

In view of the changing face of the library as well as its services, peers in library and information profession in India and abroad joined in our effort, with an overwhelming response, to record the new situations, mark the new developments, and offer their suggestions in the digital environment.

This book makes an attempt through its collection of articles from learned authors across the world to highlight and illustrate the recent relevant examples of and literature about smart technologies and latest developments in library services and information management leading to smart libraries set-ups in different countries.

The book will motivate knowledge managers and information professionals to probe further into how smart libraries can be developed using existing tools and technologies to better serve the user communities of 21st century.

We are immensely thankful to Dr Irina Lizunova, Director, State Public Scientific Technological Library, Siberian Branch of the Russian Academy of Sciences, Novosibirsk and appreciate the efforts of our contributors, some of whom responded to our request at a short notice. Among others we are particularly thankful to Ms. Evgeniya Pshenichnaya, of Russian Academy of Sciences and Dr Helen Byamugisha Librarian of Makrere University, Uganda. We hope that this volume will be accepted by the Library and Information fraternity.

Neena Singh
Sewa Singh

Contents

Part 3
Smart Library : Digital Tools and Services

Part 4
Digitization and Digital Resources for Smart Libraries

Our Contributors

Adhikari, I.P at present is President of Nepal Library Association. After working in various professional positions he retired as Chief Librarian from Tribhuvan University, Katmandu, Nepal. He has contributed various book chapters and papers in national and international journals. He has also written several books in Nepali language. I.P Adhikari got Library and Information Science education from Panjab University, India and Tribhuvan University. He can be contacted at adhikariip@gmail.com

Aswath, Lalitha holds a Ph D degree in Library and Information Science from Mysore University. She recently retired as Prof and Head, Department of Library and Information Science, Bangalore University, Bengaluru. During her long career, she held various responsible positions including Director, UGC-HRDC. Her areas of interest include, Research Methodology, Marketing of Information Products, etc. She has been member of SAP Advisory Committee, Karnataka State Public Library and member of many professional bodies like ILA, IASLIC, IATLIS, SIS, IGNOU Social Science School Board etc. She attended more than hundred conferences/seminars and published 60 papers in national and international journals. She has received many Awards and Honors. She can be contacted at drlalitha.aswath@gmail.com

Babbar, Parveen is working as Deputy Librarian at Jawaharlal Nehru University. Earlier he was Assistant Librarian, IGNOU, New Delhi. He holds MLIS, University of Delhi, and PhD from Rajasthan University, Jaipur. He has taken up projects on Library Automation and Digitisation like CALPI Library for Swiss Agency. He has edited books, and published six papers in national/ international journals and conferences. He has been invited speaker at International M-Libraries Conference at the Open University, Milton Keynes, UK. He is a member of SLA, USA, and its Career Guidance/Employment Committee, Asian Chapter. He has received awards and scholarships including SLA, Bonnie Hilditch International Award, scholarship from Shastri Indo-

Canadian Institute, and IFLA grant. He is associated with several Indian professional associations in various capacities. Dr Parveen can be contacted at parveenbabbar@gmail.com

Baishya, Kankana holds PhD in Library and Information Sciences . She is currently working as Assistant Librarian at National Law University and Judicial Academy, Assam, Guwahati, India. She has been regularly contributing to professional journals and conferences. Ms Kankana can be contacted at baishya.kankana@ gmail.com

Bajpai, Maneesh Kumar holds a PhD in Library and Information Science and a PGDCA. He is In-charge of Library at Dr. Ram Manohar Lohiya National Law University (RMLNLU), Lucknow. With his long professional experience, he has developed state-of-the-art ultra modern Library. He has edited four books and has publications in many National and International journals including book chapters. He is Managing Editor of RMLNLU Journal. He has organized various National Seminars and Training programs. He is University Coordinator for Shodhgangotri/Shodhganga ETD programme and SPARC, MHRD. He is the recipient of 'Best Librarian Award-2018' SPLUP. Dr Bajpai is a life member of various professional bodies like IASLIC, ILA, etc. His interest areas are Web 2.0, Digital Library, Research Ethics, Open Access and Law Librarianship. He can be contacted at manish.nlu@gmail.com

Barman, Badan is working as Assistant Professor, in Department of Library and Information Science, Gauhati University, Guwahati, India. He is founder and Chief Editor, of LIS Links, the first academic Social Network of Library and Information Science (LIS) Professionals in India. Dr Barman is also Director, ICT, of Dr Anamika Ray Memorial Trust, (DARMT) Guwahati. He is General Secretary, Alumni Association, Department of Botany, Guwahati College. He has contributed numerous papers published in professional periodicals and conferences, etc. Dr Barman can be contacted at badanbarman@gmail.com

Chakraborty, Susmita holds a PhD in Library and Information Sciences, from Jadavpur University, Kolkata, West Bengal. She is Professor and Head, Department of Library and Information Sciences, University of Calcutta. She has authored 4 books, 20 book chapters, published 25 papers in various reputed journals, and presented papers at International and National conferences and seminars. Her achievements include Commonwealth Fellow-University College, London, 2015, Member and past Secretary, Standing Committee, IFLA-SET, Netherlands, Past Secretary, SLA, Past Director, SLA, etc. She is associated with various National Professional bodies. She has many Awards and Honours to her credit such as Bonnie Hilditch International Librarian SLA, Boston, 2015 etc. She can be contacted at susmita@caluniv.ac.in

Chakravarty, Rupak is a professor at the Department of Library and Information Science, Panjab University, Chandigarh. He holds Ph.D. from Panjab University, Chandigarh. His areas of research include Open Access, Technology-enabled Library Services, Informetrics, and Free and Open Source

Software, Cloud Applications, Educational Technology etc. He has successfully guided three research scholars and currently seven more are pursuing Ph.D. under him. He has authored more than 60 research publications, published in national and international journals and has delivered more than 100 invited talks at HRD Centres, Skill Development Training programmes, capacity building workshops, conferences, Webinars etc. Dr Chakravarty can be contacted at rupak@pu.pu.ac.in

Christian, Mubofu is Lecturer/Librarian in the Department of Library, Publications and Information Services, Mwalimu Nyerere Memorial Academy, Tanzania. He joined the Academy in 2008 and has been the Head of Department from December 2015 to May 2019 when he joined Ph.D. studies at the Open University of Tanzania. His teaching and research focus is on Knowledge Management, School Libraries, Preservation and Conservation, Information Dissemination and Information Literacy. He is the author and co-author of many research articles published in National and International journals. Mr Mubofu can be contacted at mubofu.christian@gmail.com

Dabas, K. C. holds PhD from G.N.D. University Amritsar besides, M.A (Eco), and LLB. Currently he is Head of Department of Library and Information Sciences and Librarian at Baba Mastnath University Asthal Bohar, Rohtak which he established in 2013. Earlier in his career he worked in various capacities and superannuated as Senior Deputy Librarian in 2020. Dr Dabas has published two Books, 56 research articles in journals, 65 papers published in National and International conferences and seminars proceedings. He has supervised several research scholars including 20 PhD and 20 M.Phil Students. He has also delivered several Radio Talks in addition to his academic assignments. Dr. Dabas can be contacted at krishanchander2013@gmail.com.

Dhiman, Anil Kumar is working as Information Scientist in Gurukul Kangri University, Haridwar, Uttarakhand, India since 2003. He holds M.A. in Political Science, M.Sc. in Botany, M.Lib.I&Sc., M.Sc. in Computer Applications, MBA (IT) and MBA (HR), B.Ed. and Ph.D. Degree in Botany and Ph.D. Degree in Library & Information Science. He is Fellow and Life Members of various professional associations in India and has published more than 260 articles in different journals and edited books, about 218 articles in Library and Information Sciences and 42 articles in Botany. He has also authored 32 books, 23 in Library Science and 09 in Botany. His books are referred in syllabi of various Indian universities. Dr Dhiman can be contacted at akvihsvakarma@rediffmail.com

Domonic, J. is Chief Librarian and Head of Department of Library and Information Science, Karunya University, Coimbatore, India. He has about 28 years of experience with contribution to Higher Education and Library profession. He holds PhD in Library and Information Science, D.Sc. in LIS and Honors in Fellow Institute of Charted Professionals. He was also awarded three Honorary Doctorate degree from the UK, the USA and India. He has published 56 papers in conferences and 65 papers in Journals and contributed 13 books

chapters. He is on Editorial board for nine Journals and eight conference proceedings. He has received many awards such Rajiv Gandhi Gold Medal Award for Library and Information Science Education, best Librarian Award by SALIS. He is presently Advisor for SALIS and Life Member of ILA and IASLIC. Dr Domonic can be contacted at jdom16@gmail.com

Einasto, Olga works at the University of Tartu Library, Estonia. She is Head of Library Services. Dr Olga holds PhD in Media and Communication, and Master of Arts in Cultural Management. She has presented papers at several national and international conferences. She is recipient of IFLA marketing award in the year 2007 and 2013. Her academic interest includes Library Marketing and Management, Library Services and e-Services Quality etc. Dr Olga can be contacted at olga.einasto@ut.ee

Gadhvi, Geeta Girish holds PhD from Banasthali Vidyapith, Jaipur, she is a Senior Associate Professor and heading the Department of Library and Information Science, Gujarat University, Ahmedabad. Dr Gandhvi has 23 years of teaching experience with innovative methods. She has edited one book and has 20 scholarly articles. She has attended national and international conferences and seminars with her profound inputs. She has guided six PhD scholars and many MLIS students. Her area of interest are LIS Education, Knowledge Management, Professional Ethics, Philosophy of Ranganathan etc. She is a Life Member of IATLIS, ILA, IASLIC, ADINET, ASIALA and Gujarat Granthalay Seva Sangh. She can be contacted at drgeetagadhvi@gmail.com

Goria, Sunil holds Ph.D. in Library & Information Science and P G Diploma in Computer Programming and Application. He is Librarian at B.B Ambedkar University, Lucknow. Earlier he was Deputy Librarian at G.B. Pant University of Agriculture and Technology, Uttarakhand. He has published more than 45 papers in national & international journals and conferences including IFLA WLIC. He was awarded Norman Borlaug Fellowship of USDA, USA-2007 at NAL, Maryland, USA and Commonwealth Professional Fellowship, UK-2010. His areas of interests are, Information Literacy, Digital Library, Knowledge Management, e-learning, Semantic Web, Open Source, Agricultural Libraries etc. He is member of Standing Committee, Government Libraries Section IFLA, 2019-2023. He may be contacted at sunilgoria@yahoo.com

Isah, Abdulmumin is a Senior Lecturer in the Department of Library and Information Science, University of Ilorin, Nigeria. He holds PhD from Botswana University and worked as Graduate Research Assistant on the World Bank Research Project at University of Lagos, Nigeria, He has published articles in national and international journals. Currently, he is the Assistant Editor-in-Chief Unilorin International Journal of Library and Information Science. He is a Charted Librarian of Nigeria and a member of many professional associations. His areas of research includes Digital Libraries, Knowledge Organization, and Scholarly Communication. Dr Isah can be contacted at abdulmumin.isah @yahoo.com

Nabi Hasan is Librarian & Head, Central Library, IIT Delhi. Holds PhD in Library & Information Sciences. He is also heading the National Resource in Library and Information Sciences, Ministry of Education, Govt. of India under its ARPIT MOOCs Program. Earlier he served as the University Librarian of AMU, Aligarh. Dr. Hasan has 16 Books/Edited Books and about 150 articles to his credit. He is the First Norman E. Borlaug Fellow from India trained at Cornell University, USA. He is recipient of many awards like Bonnie Hilditch International Librarian Award 2018 USA, SLP-SLA Asian Fellow Award 2019, The Royal Society of Chemistry's Librarians' Choice Award for Dynamic Librarian 2019. Besides Dr. Hasan is also recipient of several Appreciation Awards from heads of different institutions. He is associated with different professional bodies in various capacities like SLA-US. Dr Hasan can be contacted at hasan@library.iitd.ac.in

Jaiswal, Babita is Associate Professor in the Department of Library and Information Science, Lucknow University. She holds Ph.D in Library and Information Sciences from the same university, she was awarded the first Ph.D from this department. She held position of Head of the Department for three years. Her academic writing is the example of scholarly rigor, full documentation and original thinking. She has written more than 50 research papers and articles. She has two books to her credit, which are resources for the students of library and information science. Dr Babita can be contacted at drbabitajaiswal@gmail.com

Kaushal, Mohan Lal holds PhD in Library and Information Sciences from Vikram University, Madhya Pradesh, India and diploma in computer proficiency from NICC, Allahabad. He works as Incharge of the Library. He has played instrumental role in automation of library activates using latest technologies. Dr Kaushal has published more than 14 article in national and international journals and conferences, He is members of professional bodies like DELNET and Indian Library Association. He can be contacted at kaushal1250@gmail.com

Kowsalya, J. is currently a Research Scholar at Pondicherry University, Pondicherry, India. She holds Masters in Library and Information Sciences and is actively involved in research for Doctorates of Philosophy in Library and Information Sciences. She can be contacted at kowsalyachintu97@gmail.com

Kulvir Kaur holds Masters in Economics and Punjabi, Masters in Library and Information Sciences (Gold Medallist) and a Ph.D. from Guru Nanak Dev University, Amritsar, Punjab, India. She is working as Assistant Librarian in Bhai Gurdas Library, Guru Nanak Dev University, Amritsar. Dr Kulvir has published more than 20 research papers in professional journals and has presented papers in several national conferences/seminars. Her areas of interest include Library Classification, Cataloguing and User studies. She is life member of various professional bodies such as ILA, IASLIC, Punjab Library Association etc. Dr Kulvir can be contacted at nirmalkulvir@yahoo.com

Mahendra, D. G. is Librarian at JSS Dental College & Hospital, Mysuru. He holds Masters in Library and Information Sciences from Mysore University. He has seven years professional experience and is currently involved in JSSATEN Institute digital library initiative, using software KOHA and commercial software NETLIB. Dr Mahendra is involved in open source software development for library automation and has skills to handle Open Source Integrated Library Management Software(s) like WINISIS, New GenLib, NetLib & Koha. Dr Mahendra can be contacted at d.g.mahendra@gmail.com

Malekani, Andrew W. is a Librarian at Sokoine National Agricultural Library which is also a university library for Sokoine University of Agriculture. He holds a PhD and Master's degrees in Information Studies from the University of Dar-es-Salaam. Malekani's research, teaching and consultancy interests centers on Information and Communication Technologies mainly in the areas of Information Literacy, IM, KM, especially Indigenous Knowledge Management and Research Methods. He has authored many articles published in various academic journals. Dr Malekani has successfully supervised one PhD Scholar. He has carried out consultancy works and participated in a number of projects. He can contacted at malekani@sua.ac.tz

Malesi, Rodney is Reference and Instruction Librarian at the United States International University, based in Nairobi, Keneya. He holds BSc in Information Sciences from Moi University, Eldoret, Keneya. He has diverse interest in Knowledge Management and Scholarly Communication and has worked with various teams in writing systematic reviews covering diverse themes. He is member of standing committee of IFLA and Librarians Group Cambell Collaboration. Mr Malesi has presented papers at many international forums like IFLA, AFLIA etc. and published papers in national and international journals. He can be contacted at malesi@usiu.ac.ke

Manna, Dibyendu is currently working as a College Librarian in Howrah, West Bengal. He has 14 years of professional experience. He has presented six papers in various seminars and conferences. Besides, he is also a research scholar and pursuing for a Doctor of Philosophy from University of Calcutta. He is life member of Indian Library Association and Bengal Library Association. His area of interest includes Green Libraries, etc . He can be contacted at deba_manna@yahoo.com

Mbughuni, Anna Shangwe is lecturer at CLIM-Mzumbe University, She holds MSc. in Information and Library Management from University of Central England in Birmingham. In her more than 20 years of professional experience she has worked in different capacities as Assistant librarian, Head of Department, Library Science and Information Management and Librarian, Mzumbe University Library. Ms Anna has attended many conference and seminars and has published papers in journals . she is member of IFLA and many library associations in Tanzania. She can be contacted at ambughuni@yahoo.com

Mtega, W. P is Senior Lecturer at Sakoine University of Agriculture, and Librarian at Sakoine National Agriculture Library in Tanzania. He has more than 16 publications in national and international journals and a book to his credit. Mr Mtega areas of interest are Social Network Analysis, Data Mining and Knowledge Discovery, Web Science, Social Computing, Human-Computer Interaction, Information Science etc . He can be contacted at wmtega@gmail.com

Odoi, Nora Naiboka is a Development Communication Specialist turned academician after attaining PhD in Information and Library Science from Uganda's Makerere University. Earlier, she worked in several government and non government organisations like Uganda's Ministry of Information; the International Committee of the Red Cross (IDRC), and Women of Uganda Network (WOUGNET). She worked with IDRC funded communication project on Banana Programme of Uganda's National Agriculture Research Organisation as Development Communication Specialist. She is a Trained Trainer, a Development Communicationist, and a Librarian. She is interested in Participatory Development Communication, Knowledge Management and Less Advantaged Communities. Dr Nora can be contacted at nora.naiboka @kiu.ac.ug

Panda, Subhajit holds a Master degree in Library and Information Science from Panjab University, Chandigarh. He is a Gold Medallist and qualified UGC-NET twice. Currently, he is working as Assistant Librarian at Chandigarh University. Mr Panda has attended some national conferences and also has publications. He is skilled in Digital Literacy, Information Retrieval, Library Management, Book Keeping, and Referencing. His areas of interests are e-Learning, Cloud Computing, Open Access, Web Accessibility, Virtual and Augmented Reality and Metrics Studies. He can be contacted at subhajit.e9641@ cumail.in

Parihar, Shiva is Assistant Librarian in Hidayatullah National Law University, Nava Raipur, Chhattisgarh. Prior to this, she was working as JRF in Banaras Hindu University, Varanasi. She is having experience of more than 10 years as Assistant Librarian. She has written many papers that have been published in various journals of National repute. Her area of interest is research in different facets of Library and Information Sciences, currently she is also working on many research papers. Dr Parihar can be contacted at shivaparihar@gmail.com

Patel, Shikha is a PhD Scholar at B.B Ambedkar University, Lucknow. She has qualified UGC NET/JRF. She has worked as an Internee at Central Library, IIT Delhi and has also worked as an internee at Central Library of Delhi University. She obtained Master's in Library and Information Science from Delhi University. She can be contacted through shikhap106@gmail.com

Rakhmatullaev, Marat is Professor in Department of Information and Library system at Tashkent University of Information Technologies. He holds PhD from Tashkent Polytechnic Institute, and has specialization in Automated

Control Systems. Dr Marat has also accomplished many supporting courses in Modern Library Management and e-Library from TEMPUS NMPLIS, Georgia. Earlier he was Head of Department of Foreign Literature and International Relations at Uzbekistan National Library, Executive Director of Uzbekistan Library Association, and Coordinator of Library Programme of Open Society Institute of Uzbekistan, and National Coordinator of International Library Consortium. Dr Marat is a Fulbright Scholar and recipient of Medal "Friendship" of President of Uzbekistan, He may be contacted at marat56@mail.ru

Rao, P. Venkata is currently working as a Fellow (Knowledge Management) at Mahatma Gandhi State Institute of Public Administration, Punjab, Chandigarh, India. He has over 25 years of experience of working in different types of libraries in Chandigarh. Dr Rao has edited seven books, and has presented and published over 50 papers in national and international conferences and journals/proceedings in the areas of Library management, and Information Technology. Dr Rao also coordinates the implementation and sustenance of ISO 9001:2015 and ISO 14001:2015 standards at MGSIPA, Chandigarh. His areas of interest includes Library Management, Library Technologies, and Training Management. Dr Rao can be contacted at pvrao@punjab.gov.in

Sekhon, Simardeep holds Masters from Guru Nanak Dev University, Amritsar. At present she is working as Assistant Librarian, in Panjab University, Regional Centre, Mukatsar, Punjab, India. Ms Simardeep has presented a number of papers at various national conferences and seminars. She is also a member of various professional bodies in India. Ms Simardeep can be contacted at simardeepsekhon@gmail.com

Selivanova, Yulia G. holds a Ph.D. degree. She has authored many scientific publications, and reports of national and international conferences. She is a member of the Russian Library Association Standing Committee of the section on automation and formats, and represents the interests of the Presidential Library in the organization of Library Assembly Eurasia, working with library communities in the CIS countries. She participated in the development of the State program "LIBNET " from 2007-2015. Earlier she worked at the Presidential Library as the Head of the Department of Linguistic and software support. During her tenure She developed and put into practice the scientific and methodological foundations for creating a new generation of integrated electronic catalogs. She can be contacted at selivanova@prlib.ru

Sevukan, R. holds Ph D in Library and Information Science. He is presently working as Associate Professor, and has about two decades of teaching and research experience. His areas of interest include Library Automation, Networking, Digitisation, Scientometrics, etc. He has published a number of articles in National and International journals, conferences, Dr Sevukan can be contacted at sevukan2002@gmail.com

Sharda, Preeti is currently working as Librarian, at PG Government Girls College, Chandigarh. She holds PhD in Library and Information Science, and has long professional experience of more than two decades with dedication to the profession. She is associated with various professional bodies in India including ILA, and IASLIC. She is closely associated with the Chandigarh Library Association and is instrumental in making it a vibrant body. She has written numerous book chapters as well as research papers published in national and international journals. Dr Preeti can be contacted at sharda.preeti@gcg42.ac.in

Shibu, K. M. is presently working as Assistant Librarian in Pondicherry University, Puducherry, India. He obtained his Ph.D. in Library and Information Science from Pondicherry University and M.Phil. in Library and Information Science from University of Delhi. He worked with British Council Library, British High Commission, New Delhi, and at Aligarh Muslim University as a faculty member. He has published one book and more than two dozens of research articles in various professional journals of national and international repute. Dr Shibu can be contacted at shibukm123@gmail.com

Singh, Gurdev holds PhD. from University of Delhi. He is Librarian at Sri Guru Gobind Singh College of Commerce, University of Delhi since 1991. He has published more than 14 research papers in national and international journals and conferences and has contributed several chapters in edited books. He has published 10 books with national and international publishers. His areas of interest are Digital Libraries and Digitization, Automation, Management of Academic Libraries, and User Studies. He has guided several M.Phil and PhD Scholars. He is life member of DLA and ILA. Dr Gurdev can be contacted at gurdevsingh@sggscc.ac.in

Singh, Neena is Heading University Library of G B Pant University of Agriculture and Technology. She is Gold Medallist and holds PhD in Library & Information Sciences. Earlier she was Incharge, Library at UUHF Uttrakhand. With her 25 years of experience, she has developed state-of-the-art Smart Libraries in two state Agriculture Universities in Uttrakhand. She has also successfully led the transition from print to electronic resources and has been part of e-Granth a collaborative ICAR-World Bank funded project. Dr Singh has presented and published 65 articles in national and international conferences and journals, and is in the editorial board of four journals. Dr Singh has visited several libraries in Europe, Russia, USA, and got trained at University of Applied Sciences, Hanover, Germany. She is member of International Associations like IAALD, USA; COLLNET, Germany; QQML Greece and recipient of many fellowships, awards and grants from BI International Germany, FAO-2010 and IAALD-2013, and has been speaker at international forums like IFLA, QQML etc. nshill6@gmail.com

Singh, Sewa obtained his higher education from Kurukshetra University and Panjab University, Chandigarh from where he earned his PhD in Library and Information Science. He has been a practicing librarian and teacher of

Library and Information Science for about four decades. He has been two times Head, DLIS, Guru Nanak Dev University, Amritsar, and a brief stint as University Librarian, and retired as Professor. He has published about 22 books and more than 180 articles in various national and international journals, including an article in the Encyclopedia of Library and Information Science, edited by Allen Kent et al. He has been associated from time to time with various professional bodies in different capacities, and honoured by many societies and associations including IASLIC. Dr Sewa Singh can be contacted at drsewasingh@gmail.com

Sonkar, Sharad Kumar is Senior Assistant Professor in the Department of Library and Information Science, B.B Ambedkar University, Lucknow. He holds PhD in Library and Information Sciences and a specialization course in IT Applications to Library and Information Services. Earlier he had worked in BHU, Varanasi, DESIDOC, New Delhi; Digital Library, RGUHS, Bangalore; Central Library, Bundelkhand University, Jhansi. He has more than 17 years of professional experience in teaching and research. He has guided PG, M.Phil and Ph.D, scholars . Dr Sonkar has contributed more than 130 papers in national and international journals, books and conferences. He can be contacted at sksonker@yahoo.co.in

Suraweera, Namali is a Senior Lecturer and heading the Department of Library and Information Sciences, University of Kelaniya, Sri Lanka. She holds a PhD in Information Management, Victoria University of Wellington, New Zealand where she worked as a faculty also. With 15 years experience she has contributed over 40 papers to learned journals and international conferences. She has played an instrumental role in establishment of National E-Learning Resource Centre at University of Kelaniya as first Director of NELRC. Dr Namali won Vice Chancellor's award twice and received number of scholarships and fellowships including and IFLA Grants. She is recipient of "Asia Library Leaders Promising Professional Award 2016". Her teaching and research interest include Information Literacy, e-Learning, Multimedia Technologies etc. Dr Namali can be contacted at namali@kln.ac.lk

Taher, Mohamed holds a Masters in Library and Information Sciences from Mysore University, PhD Calicut University, and D. Litt. (History), from B R Ambedkar University. Dr Taher is a Chief Information Officer, at Canadian Multi Faith Federation, Toronto. He is an active researcher, author, and information disseminator. Dr Taher was a Fulbright Scholar, at Rutgers University, N.J., USA, and a Faculty at Seneca College, in Library Information Technician Program. He has many publications like, the Libraries in India-National Developmental Perspective: A Saga of Fifty Years; Job Search the Canadian Way: What Works, What Does Not; Interfaith Literacy Resources in the Index Islamicus: A Bibliometric Analysis etc. He is member of various national and international professional associations. He can be contacted at drmtaher@gmail.com

Tripathi, Alok K holds PhD in Library Science. He has more than 10 years of research and teaching experience in various institutes of India, for imparting

Library Science education and ICT in current scenario. He has delivered lectures in many national and international conferences and received several awards. He has supervised four Ph.D., and more than 80 PG students. Dr Tripathi has authored over 40 peer reviewed articles, and 20 book chapters with international publishers. He has been a member of many organization as well as Library and Information Science Communities. Dr Tripathi can be contacted at aloktripathi2011@gmail.com

Udoh, Inemesit Udom. is Postgraduate Scholar in the Department of Library and Information Science, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria. He holds a *Distinction* in Higher National Diploma in Business Administration and Management, Akwa Ibom State College of Agriculture, Nigeria. He is a certified member of the Association of Accounting Technicians West Africa a subsidiary of the Institute of Chartered Accountants of Nigeria as well as a member of Nigerian Library Association. Udoh is three time winner of the *"Outstanding Academic Achievement and Service"* award from Nto Annang Foundation, Baltimore,USA. He interest areas includes Digital Literacy, Organization of Knowledge, Knowledge Management, and Public Relations in Librarianship. Udoh has published several scholarly articles in both local and international journals. He can be contacted at inemuddarlingdesmart@gmail.com

Verghese, Rekha R is currently working as Assistant Professor and Incharge of the Department of Library and Information Science, Pondicherry University. She started her career as Lecturer (on contract) in University of Kerala in 2006 and joined the Pondicherry University in 2009 as Assistant Professor. Dr Verghese has a work experience of more than 15 years. She has published many articles in journals of international and national repute including the journals listed in Scopus and Web of Science. She has successfully guided three Ph.D scholars in Library and Information Science. She can be contacted at rekhatvm@gmail.com

Verma, Shilpi is a Professor and Head of the Department of Library & Information Science, at B.B Ambedkar University, Lucknow. She has 17 years experience and has guided several PhD, M.Phil and PG students. She has authored and edited 15 books, published 96 papers in international and national journals, seminar, conferences etc. She has organized 19 conferences/ seminars/workshops at national & international level. She is a Trainer Associate of UGC-Programme Capacity Building of Women Mangers in Higher Education. She is convener of two MHRD flagship programmes Ek Bharat & Shresta Bharat and Unnat Bharat Abhiyan. Dr Shilpi is recipient of Excellence in Teaching Award-2017 and Vice Chancellors appreciation Award. She can be contacted at shipoo_lko@rediffmail. com

Visakhi, P is Librarian at IISER, Mohali. She has worked as Chief Librarian, in ICAR, New Delhi. She holds PhD and dual PG Degrees in Computer Science and Library & Information Science. She has 25 years of experience and has handled two World Bank funded projects. She has presented

and published 60 articles in national and international conferences and journals, edited /compiled 10 books and two Journals. She has visited many libraries in Asia and US and got trained by OCLC-Dublin. She is member of National Steering and Negotiation Committee of CeRA, e-Shodsindhu, and IISER Library Consortium. She was member of South Asia, Indian Advisory Committee of International publishers. She is recipient of *Young Information Scientist -2006* and *The Best Citizens of India-2011* by International Publishing House and Asian Sci. & Tech Librarian Award-2018 -by SLA, USA. She can be contacted at visakhi@iisermohali.ac.in

Zhabko, Elena is Russia's leading expert in the field of creating Digital Libraries and Director of Information Resources at the Presidential Library. Earlier she created a new direction in Russian Library theory and practice, and online services for local and remote library users. She developed scientific and methodological foundations for the formation of large digital subject collections with many partner organizations in various fields. Dr Elena has authored more than 80 scientific publications, articles, monographs, and reports at national and international conferences. She has been Editor and Compiler of the Proceedings of the Electronic Library Series. She is on the Board of the Russian Library Association. She has been convener of "Cultural Heritage: Integration of Resources in the Digital Spaces" series of conferences in Russia. Dr Elena can be contacted at zhabko@prlib.ru

How to Cite this Article

APA Citation Style, 7th Edition

Barman, B., & Baishya, K. (2022). E-Resources for Libraries : Pricing Models and Management. In N. Singh & S. Singh (Eds.), Smart Libraries and Information Management in Digital Environment (pp. 553-574). B.R. Publishing Corporation.

Chicago, 16th Edition

Barman, Badan, & Baishya, Kankana, "E-Resources for Libraries : Pricing Models and Management", in *Smart Libraries and Information Management in Digital Environment*, ed. N. Singh & S. Singh (Delhi: B.R. Publishing Corporation, 2022*), pp. 553-574.*

MLA Citation, 8th Edition

Barman, Badan. & Baishya, Kankana. "E-Resources for Libraries : Pricing Models and Management". *Smart Libraries and Information Management in Digital Environment, edited by* N. Singh & S. Singh, B.R. Publishing Corporation, 2022, *pp. 553-574.*

31

E-Resources for Libraries : Pricing Models and Management

Badan Barman and Kankana Baishya

ABSTRACT

This paper aims to explore different dimensions of the E-resources like features of e-resources, pricing model, mode of acquisition and delivery and so on. It is based on the existing literature on the subject and on the authors' cumulative knowledge and working experience. Excluding the content part, an E-resource in no way comparable with its print counterpart. It's a complex subject to understand and has many dimensions, different pricing policy, different acquisition mode and different delivery mode. The present article will be of value to the students and research scholars in understanding the different aspects of the E-resources.

Keywords*:* E-Resources, E-Resources-databases, E-Resources-Pricing Model, E-Resources-Acquisition and Delivery, E-Book Reading Devices

Introduction

E-resource is a short term for Electronic Resource. These are collections of information in electronic or digital format that are accessed through electronic devices, such as a mobile phone, computer, etc. The term e-document or e-text or e-resource may include any document which is in ASCII text format and it may include a website, blog, wiki, discussion forum, discussion group, online journal and so on.

Features of E-Resources

The salient features of electronic resources are as follows:

(i) **Delivered to the User Desktop:** The E-Resources can be delivered to the desktop of a user. The user will have the ability to download, print, or send it to another user document almost instantly.

(ii) **Simultaneous Access:** They can be read by more than one person at a time and can be simultaneously shared with many readers.

(iii) **Extensive Searching Provision:** The text or any part of the document can be retrieved easily, except in the cases when these were represented in the form of images.

(iv) **Incorporation of Multimedia:** They can include multimedia and graphics, in color, at marginal cost.

(v) **Speedy Publication:** They can be published more quickly than paper publications.

(vi) **Interactive in Nature:** They can be interactive or can foster an online exchange of ideas by Email or other provision.

(vii) **Hyper Linking:** Have the ability to make hyperlinks, both internally and to other publications. This means that readers can jump into the references cited in an article.

(viii) **Retrieval of the Article from Indexing and Abstracting Databases:** Articles can be retrieved directly through links from abstracting and indexing databases.

(ix) **Maintenance of Quality:** If there are mistakes in any version of an e-resource, it can be modified with ease.

(x) **Up-to-dateness:** As a particular document can be modified n-number of times with ease, the currency or up-to-dateness of the document can be ensured.

(xi) **Convenience of Accessing the Document:** Convenience of accessing articles any time from the mobile phone / tablet / computer.

(xii) **Provide more Freedom to the User:** The data or information available in E-resources can be easily copy / paste by the user as long as they acknowledge the source.

(xiii) Developing Personal Collection: Ability to create personal collections i.e. favourites, bookmark, etc.

(xiv) Cheaper to Acquire: The E-resources provide access to it at comparatively cheaper prices when we compare it to the printed counterpart. It can also be produced and distributed at low cost since colouring copy or scan copy also does not cost much.

(xv) Cheaper to Store and Maintain: The e-resources can be stored and managed at cheaper cost. Hundreds or thousands may be carried together on one pen drive; approximately 500 average ebooks can be stored on one CD which is equivalent to several shelves' worth of print books.

(xvi) Royalties Generation for Authors: Ebooks can be offered indefinitely, with no "out of print" date, allowing authors to continue to earn royalties indefinitely, and allowing readers to find older works by favorite authors.

(xvii) Zooming Facility: Type size and type face may be adjusted.

(xviii) Backup Copy: A backup can be kept in a remote place so that it is unaffected by flood or fire.

(xix) Speedy Distribution: Distributed instantly, allowing readers to begin reading at once, without the need to visit a bookstore.

(xx) Environmentally Viable: Environmentally viable by cutting down on paper and lumber production, economically viable by cutting down on ink production

(xxi) Preservation: Does not wear over time, no risk of damage, vandalism, etc. on the pages.

Types of E-Resources

E-resources can be categorized based on different factors into the following:

Based on the Thought Content of the E-Resource: Based on the thought content of the E-resource, it can be categorized into the following:

(a) E-book: An ebook also called eBook, ebook, electronic book, is an electronic or digital equivalent of a conventional printed book and is a proprietary file format. Among the first Internet-only publishers of

new ebooks were Boson Books, Hard Shell Word Factory and Online Originals, all founded in the mid-1990s. Online Originals was the first ebook publisher to win mainstream book reviews (in the London Times) and a nomination for a major literary prize (the Booker Prize). Some of the free notable ebook repositories that are available over the web are

(i) Project Gutenberg (http://www.gutenberg.org)

(ii) Open Library (https://openlibrary.org)

(b) E-journal: E-journal is an all-electronic, peer-reviewed periodical in a specific field or in a general field of interest. In the E-journal environment the creation, transmission, storage, interpretation, alteration and replication of electronic text including display takes place in electronic form. Some electronic journals are online-only journals; some are online versions of printed journals, and some consist of the online equivalent of a printed journal, but with additional online-only material.

Some journals are subscription-based, or allow pay-per-view access. An increasing number of journals are now available as open access journals, requiring no subscription. Most working paper archives and articles on personal homepages are free, as are collections in Institutional repositories and Subject repositories.

Most electronic journals are published both in HTML and Portable Document Format (PDF) formats, but some are available in only one of the two. Some e-journals are available over the internet while some others are distributed on CD-ROMs, or by way of email. Some examples of E-journal directories are as follows

(i) DOAJ (https://doaj.org)

(ii) Journals Directory (https://www.journalsdirectory.com)

(c) E-Encyclopaedia: An online encyclopaedia, also called a digital encyclopedia, is an encyclopedia accessible through the internet. Some of the examples of encyclopaedia available over internet are as follows:

(i) Wikipedia: The Free Encyclopaedia (https://en.wikipedia.org)

(ii) Citizendium: The Citizens' Compendium (https://en.citizendium.org)

(d) E-dictionary: An electronic dictionary is a dictionary whose data exists in digital form and can be accessed through a number of

different media. Electronic dictionaries can be found in several forms, including software installed on tablet or desktop computers, mobile apps, web applications, and as a built-in function of E-readers. Some of the examples of e-dictionaries are as follows-

(i) Wiktionary: Free dictionary (https://www.wiktionary.org)

(ii) The Free Dictionary (https://www.thefreedictionary.com)

Reference works like encyclopedia, dictionaries, handbooks, year-book, atlases, maps, etc. are also making their electronic appearance on the web.

Based on the File Format of the E-Resource: A writer or publisher has many options when it comes to choosing a format for production of e-resource. Based on the file format E-resources can be categorized into the following types:

(a) Text File Format: It includes Microsoft Word (.doc or .docx); Text File (.txt), Rich Text Format (.rtf), Portable Document Format (.pdf), and such others. Among the text file formats, .pdf is the most popular one. In PDF format, one loses global searching capabilities, it takes a long time to download large files, and a different method of navigation is required. In addition, users must have the Adobe Acrobat reader installed on their device to access the PDF document.

(b) Image File Format: Image file formats are standardized means of organizing and storing digital images. The image format may include Joint Photographic Experts Group (.jpeg), Tagged Image File Format (.tiff), Graphics Interchange Format (.gif), Portable Network Graphics (.png), Bitmap image (.bmp) and such other formats.

(c) Website File Format: Common Web file extensions include Hyper Text Markup Language (.html), Active Server Page (.asp), Hypertext Preprocessor (previously known as Personal Home Page) (.php), JavaScript (.js), Standard Generalized Markup Language (.sgml), Extensible Markup Language (XML) and Cascading Style Sheets (CSS).

HTML is good for shorter documents, but if one has to deal with a long document then other file formats provide more features. HTML E-resources may be content from a website, blog, wiki, discussion forum, discussion group, online journal and so on.

SGML is better for managing large and complex documents giving greater consistency and information integrity, improved precision

around information retrieval, flexibility for information reuse, and increased longevity of information. SGML files, however, require Panorama or Multidoc Pro reader installations on every public terminal or every PC from which SGML files are accessed.

XML is the most desirable format as it is capable of dealing with large documents and does not require a reader to be installed on the device.

(d) Audio File Format: There are dozens of different audio file formats, standards, and file extensions. The most common audio file formats are MPEG Audio Layer 3 (.mp3), Waveform Audio File Format (.wave, or .wav) and Windows Media Audio File (.wma).

(e) Video File Format: The common vide file formats are Third Generation Partnership Project (.3gp), Audio Video Interleave File (.avi), Flash Video File (.flv), MPEG-4 Video File (.mp4) and Windows Media Video File (.wmv).

(f) Open E-book File Format: The Open eBook Publication Structure i.e. Open Packaging Format (.opf) is a legacy ebook format which was later known as Open eBook (OEB). This was later on superseded by electronic publication (.epub). EPUB is a technical standard published by the International Digital Publishing Forum (IDPF). Now-a-days .epub is considered as the most common format for EBook.

French company Mobipocket launched the .mobi file format in 2000 and it went on to form the basis of its Mobipocket Reader software. Amazon bought the company in 2005 and in October 2016, Amazon finally shut down Mobipocket's website and servers. There are a few key differences between EPUB and MOBI. Most pertinently, .mobi is not open standard and, therefore, is not publicly available. Again, it is supported by all the major e-readers with one exception i.e. the Barnes and Noble Nook, however, cannot support sound or video. The AZW and AZW3 (Kindle Format 8) extensions are Amazon's two proprietary ebook formats. The AZW file format has more features than .mobi, however the later one can be read by using different devices.

Most electronic journals are published both in HTML and Portable Document Format (PDF) formats, but some are available in only one of the two. Some e-journals are available over the internet while some others are distributed on CD-ROMs, or by way of Email.

Databases of E-Resources

A database is an organized set of data stored in a computer that can be searched automatically. It is a self describing collection of integrated records. It is self describing because it contains as part of itself a directory or dictionary of its context. Database can also be defined as a collection of records or a file or a collection of files brought together as a single file commonly accessible by a given set of programmes.

According to John Convey, databases are a collection of records in machine readable form that are made available for searching from remote computer terminals.

A random assortment of data cannot be referred to a database. Databases may be stored on magnetic tape; optical media such as CD-ROM, DVD ROM, and Hard Disk etc. can be accessed either locally or remotely or delivered via the Internet.

Characteristics of Database: A database is an organized, integrated and often inter- related collection of computer based data, records, files or information. The characteristic of a database are as follows

(a) It is an organized, integrated collection of data.

(b) It can be referred to by all relevant applications with relative case and number. So duplication of data can be avoided.

(c) It is a model of natural relationship of the data in the real- world environment.

(d) Database enhances data independence by permitting application programmes to be incentive to changes in the database.

(e) Databases provide facilities for centralized control of accessing and security control functions.

The database approach can be employed wherever storage and manipulation of data are required. It is most useful when relationships between data are numerous and complex and information requirements are subject to change.

Types of Databases: Databases are of the following types:

(a) Bibliographic Database: In bibliographic databases, the data stored comprises input of bibliographical details of a document for identification, storage and retrieval purposes. It is an organized digital

collection of references to published literature, including journal and newspaper articles, conference proceedings, reports, government and legal publications, patents, books, etc. The bibliographic details to a document may include titles, authors, journal names, volume, issues, place of publications, publisher, year of publication, ISBN/ ISSN number, classification number, book number, location keyword, abstract etc. A bibliographical database may be a library catalogue or a database of theses, dissertation, research papers published in technical journals, conferences etc. Many of the world databases are now made accessible to the users by vendors for a fee. Bibliographical databases can be divided into the following categories.

(i) ***Indexing and Abstracting Databases:*** Scopus (https://www.scopus.com), PUBMED ((http://www.ncbi.nlm.nih.gov/pubmed) are some of the examples of indexing and abstracting databases.

(ii) ***Citation Databases:*** The citation databases like Web of Science (https://clarivate.com/webofsciencegroup/solutions/web-of-science), Scopus (https://www.scopus.com), PubMed (https://pubmed.ncbi.nlm.nih.gov) are leading citation databases.

(b) Full Text Database: Full text databases contain the full text of a publication, i. e. provide relevant information directly. Full text database can be of the following types-

(i) ***E-books Databases:*** The Ebooks database contains the full text eBooks i.e. Project Gutenberg (https://www.gutenberg.org), Manybooks (https://manybooks.net), Open Library (https://openlibrary.org), Free-E-Books.net (https://www.free-ebooks.net).

(ii) ***E-journals Databases:*** The E-journals databases like Directory of Open Access Journals (https://doaj.org), Journals Directory (https://www.journalsdirectory.com), etc. contain thousands of e-journal that people can accessed freely.

(c) Databases of Cases, Reports, Judgements: SCC Online (https://www.scconline.com), Manupatra (https://www.manupatrafast.com), AIR Online (https://www.aironline.in), etc. some of the databases of cases, reports and judgments.

(d) Numerical and Statistical Databases: It contains numeric or statistical or survey type data of information to give answers to numeric

queries. For example: Indiastat (https://www.indiastat.com), Child & Family Data Archive (https://www.childandfamilydataarchive.org), etc. are some examples in this category.

(e) Factual Database: Factual database contains directory type data.

(f) Research in Progress Database: It contains description of research in progress.

(g) Databases of E-images: Flickr (https://www.flickr.com), PicSearch (https://www.picsearch.com), etc. are some of the databases of images.

(h) Databases of Audios: Database of Recorded American Music (DRAM) (http://www.dramonline.org), International Music Score Library Project (https://imslp.org), AllMusic (http://allmusic.com), etc.

(i) Databases of Videos: YouTube (https://www.youtube.com), Vimeo (https://vimeo.com), etc.

Evaluation of Database: The evaluation of a database includes the following:

(i) ***Scope:*** The bibliographical database should include full bibliographical information such as ISBN/ISSN number, author, title etc.

(ii) ***Indexing System:*** Which method is used in indexing the database is a prime factor to be considered in evaluation. It should also include whether the indexing is done by manual or by using automatic methods.

(iii) ***Searching Facilities:*** The database should have multiple accesses using various keywords or access points. It should also support Boolean operators.

(iv) ***Vendors Support:*** Whether the vendor of the database has provided rules, regulation and guidance for using the database or not.

Origin of E-Resources

An E-resource may originate from the following:

(a) Produced Simultaneously with the Print Resource: Some ebooks are produced simultaneously with the production of a printed book, though in many instances they may not be put on sale until later.

(b) Produced from Previous Print Resource: Some ebooks are produced from pre-existing hard-copy books, generally by document scanning, sometimes with the use of robotic scanners, having the technology to quickly scan books without damaging the original print edition. Scanning a book produces an image file, which must then be converted into text format by an Optical Character Recognition (OCR) program. Occasionally, an ebook may also be produced by re-entering the text from a keyboard.

(c) Produced only in E-Resource Format: As a newer development, sometimes only the ebook form is produced by the publisher; it is usually possible technically to convert this to a printed book by short-run printing.

Pricing Model of E-Resources

An increasing number of E-resources are now available as open access resources, requiring no subscription. Most working paper archives and articles on personal homepages are free, as are collections in institutional repositories and subject-based repositories. However, in contrast to that, again there are resources which are subscription-based, or allow pay-per-view access. The pricing policy largely depend on the following factors:

(a) Subscription to the e-resource linked to its print counterpart

(b) Number of resources

(c) Number of users / concurrent users

(d) Updates of a resource

(e) Location of use

(f) Way of subscription

(g) Usages or pay-per-view

(h) Duration of subscription

(i) Interlibrary loan provisions

Pricing Based on Subscription of the E-Resource Linked to its Print Counterpart: The pricing sometimes depends on whether the print counterpart of the same resources is subscribed by the library or not. In a survey of 8001 peer reviewed electronic journals conducted

by EBSCO, it was found that 50% of journals are free with their print journals, 34% require additional payment over their print subscription and 16% are available online only without their print counterpart. Overall, 84% of journals require a print subscription to journals as a prerequisite for online access to their electronic version. Based on this, there may be the following possibilities:

(a) Free Access to Electronic with Print Subscription: This was the beginning of the electronic resources when the publishers used to provide free access to the electronic resources provided the institute / individual subscribed to its print counterpart.

(b) Print plus Digital: In print plus digital the publisher requires the purchase of both the formats. The purchase price of both the resources together is generally cheaper than that of purchasing the print and electronic resources individually. However, the price is costlier when compared to the individual subscription to the print and electronic.

(c) Digital Only: The acquirer/licenser has the right to only select and subscribe to the digital version of the resource.

Pricing Based on Number of E-Resources: The pricing is also dependent on the number of ebooks or E-journals contained in a particular database. The publishers generally provide the following pricing options for the libraries-

(a) Selective / Individual Price: The purchase or subscription rate of a selected resource is generally higher than that of bundle price, however, the resources that are purchased or subscribed likely to be more relevant to the library user or community.

(b) Bundle Price / Big Deal: In bundle, the publisher requires the purchase of a specific subject-based collection or group of titles instead of one or more titles individually. In big deal, all the content is made available for a price and not just the content the library has actively selected. In bundle price or big deal, the library may get access to some of the resources which will be hardly used by any user of the library, but the publisher provides access to it.

Pricing Based on the Number of Users: There are some publishers that offer different prices for different categories of users i.e. individual subscription or price, prices for a university subscription or prices for college subscription. The individual subscription is generally cheaper which is followed by a rate for a college and then a rate for a university.

(a) Single User Access: A subscription with single-user access (stand-alone license) authorizes a single user to use an electronic resource from up to a certain number of devices. The license cannot be shared with another user. The single user licenses generally do not support concurrent use from multiple devices.

(b) Multiple User Access: The access to the multiple user or sometimes multiple concurrent users comes with a more price. In multiple user access the publisher of supplier supports a pre-defined or unlimited number of concurrent users to a particular resource.

Pricing Based on Updates of a Resource: Excluding the journals, almost all Ebooks are updated at some interval of time. Sometimes, the pricing also depends on this factor i.e. whether a particular edition is subscribed by the library or along with the particular edition all future editions were subscribed.

(a) Purchased/Licensed Resources: Purchased resources mean one bought some resources and they had the right to use it indefinitely i.e. the license never expired. One may have paid for implementation services, maintenance fees and a support contract, but they never had to pay any more to use the resource.

In purchased resources, the concept of perpetual access comes that means the concept of maintaining continual access to a resource; given the limitations of subscriptions and licensing access. In perpetual license, one usually stuck on the version they have purchased, though the publishing agency may offer an upgrade with a fee.

(b) Subscribed Resources: In the subscription model, one will get new versions of the resources as they're released. So, in subscription mode, one will stay current with the latest version of the resource and have the flexibility in terms of month or year of subscription instead of paying more for an expensive perpetual license.

Back files mean the past issues of journals. The back files are often included as part of current subscription of an electronic resource. However, the back files will not be available upon termination of the current subscription to a journal. There may be archival license / post termination right for subscribed resources and it generally means the provision of keeping copies of the subscribed resources after the end of the subscription period.

Pricing Based on the Location of Use: Based on the location or nature of the use or access the following options can be opened by the publisher.

(a) Accessing from a Single Machine: The price of an E-resources likely to be accessed from a single machine or standalone devices considered to be marginal. This option is hardly available with any publisher and not suitable for the libraries. Generally, some ebook reading devices come with this type of access.

(b) Accessing from the LAN of the Library: The price of an E-resources the access to which is available throughout the campus is higher than that of a standalone machine.

(c) Accessing from Campus: If the resource is accessible through the proxy server then the prices will be even higher than that of access from the LAN of the library. Accessing from campus is generally provided through the proxy server. In most cases, if set-up, this type of proxy server provides campus wide access through LAN and Wi-Fi to the e-resources subscribed by the library. Most of the publishers facilitate campus wide unlimited access to subscribed journals on payment of a fixed amount of platform fee.

(d) Accessing from Remote Location or Beyond Campus: If the access is provided beyond the campus i.e. from home or anywhere in the world, the prices will further go up.

Pricing Based on the Way of Subscription: There are some national level agencies that already negotiated the price of an E-resource or there may be negotiated price by a particular consortium. If the library is a member of that agency or consortia, they can subscribe at that negotiated prices or else they can directly contact the publisher and subscribe to it on their own.

(a) Direct Purchase / Subscribe: In case of direct purchase by a single agency or institute, the price is generally expected to be high in comparison to the purchase through consortia. However, in some cases even some libraries have subscribed to a particular resource at a much cheaper rate than that of negotiated price by a consortium. So, ultimately it depends on the people who negotiate.

(b) Consortia Purchase / Subscribe: In consortia pricing libraries have to accept a predefined package and price. In case of consortia

purchase libraries get much resource with attractive price, but usability is somehow limited. Consortia purchase is good when one wants to hold on to rising costs and at the same time wants to get additional financial support from the state or central government.

Usages or pay-per-view: Publishers and aggregators have started experimenting with models wherein the library users can search a database online for a modest fee, identify articles of interest, and then call up such articles in full-text on a pay-per-view basis.

Acquisition and Delivery of E-Resources

An E-resource may be purchased or subscribed. In case of purchased resources, the library will have the right to use the resources for an indefinite period of time whereas in case of subscribed resources the library is likely to lose access to the resources in the event of the terminal of the period of subscription.

Ways for Acquisition of E-Resources: The e-resources may be either directly purchased or subscribed by dealing with the publisher or the vendor or it may be purchased or subscribed by being a member of any consortia that has already negotiated the price of the e-resource.

(a) Direct Purchase / Subscribe: In case of direct purchase by a single agency or institute, the price is generally expected to be high in comparison to the purchase through consortia; however the reverse can also happen.

(b) Consortia Purchase / Subscribe: In consortia pricing libraries have to accept a predefined package and price. In case of consortia purchase libraries get much resource with attractive price, but usability is somehow limited. Consortia purchase is good when one wants to hold on to rising costs and at the same time wants to get additional financial support from the state or central government.

(c) National Purchase / Subscribe: United States, United Kingdom, and such other countries have arranged national licenses for some of the core publications wherein the price is negotiated at the national level.

Nature of Acquisition: The e-resources may be acquired by the library by making a purchase or it may be subscribed.

(a) Purchased Resources: In case of purchase e-resources the library can get access to the resources for an indefinite period of time through sometimes it may incur additional cost.

(b) Subscribed Resources: In most cases the library loses access to the subscribed resources as soon as it stops the subscription. However, in some cases some publishers may allow the library to get a copy of the resource released during that period for which it has subscribed to it.

Way of Delivery of the E-Resource: Previously, the purchased e-resources were delivered on CD ROM, tape or other portable devices like external hard disk, pen drive and so on. However, now-a-days most of the e-resource purchased was delivered via the internet. The access to the most of the subscribed resources is provided via the Internet.

(a) Delivery of the E-Resource through Physical Medium: Some of the e-resources delivered by the physical medium come with Digital Rights Management (DRM) protected. Though most of the e-resources are now-a-days delivered via the Internet, however, almost all the software packages are still delivered through physical medium.

(b) Delivery of the E-Resource via the Internet: Almost all major publishing houses now-a-days deliver their ebooks and e-journals to their customers via the Internet. In some rare cases on occasion like the subscription of a particular e-resource expired and the library not wanting to renew it further, the publishing house may allow the libraries to retain a copy of those e-resources which were released during the subscription period of the library in some physical devices.

Way of Accessing the E-resources: The e-resources which are subscribed by the library can be accessed by using user id and password provided by the vendor or the access may be IP based or can provide shibboleth, OpenAthens, Google Scholar CASA access.

(a) User ID and Password: Access via login id and a password is less preferred as it presents a number of challenges around dissemination and control of passwords, particularly when a library serves a large user base. However, still a lot of vendors provide user id and password based access to their subscribed resources.

(b) IP Based: Access via IP filtering is usually preferable because it typically provides simultaneous access for multiple users. IP-address recognition also provides access to users via a proxy server allowing authorized library users to access content from outside the physical confines of the library. A proxy server acts as a filter for client information requests where access is stored on a separate server; proxy servers are often used to authenticate users prior to granting access to

licensed content and commercial databases. The library proxy service also enables remote access to e-resources off-campus. Remote access is the provision of accessing and use of library databases outside of the physical library via Proxy servers or other web-based authentication.

(c) Virtual Private Network (VPN): A virtual private network (VPN) extends a private network across a public network and enables users to send and receive data across shared or public networks as if their computing devices were directly connected to the private network. VPN technology was developed to provide access to corporate applications and resources to remote or mobile users, and to branch offices.

(d) Shibboleth Log in: Shibboleth is a single sign-on (log-in) system for computer networks and the Internet. It allows people to sign in using just one identity to various systems run by federations of different organizations or institutions. The federations are often universities or public service organizations.

(e) OpenAthens: OpenAthens is an identity and access management service, supplied by Jisc (formerly known as Joint Information Systems Committee). Identity provider (IdP) organisations can keep usernames in the cloud, locally or both. Integration with Active Directory Federation Services (ADFS), Lightweight Directory Access Protocol (LDAP) or Security Assertion Markup Language (SAML) is supported. OpenAthens for Publishers (SP) software for service providers supports multiple platforms and federations.

(f) Google Scholar Campus Activated Subscriber Access (CASA): Google Scholar CASA is an authentication enhancement that allows individuals to access to their institution's licensed electronic content off-campus through Google Scholar. To activate this, the concerned library as well as the publisher or vendor must participate in Google Scholar. To sign up, they will need an OpenURL-compatible link resolver, such as SFX from Ex Libris, 360 Link from Serials Solutions, LinkSource from EBSCO, or WebBridge from Innovative Interfaces. The vendor will normally ask to fill a registration form that contains the subscriber IPs and the text of the link. They will then augment this information with the electronic holdings, and make this data available to the Google Scholar automatic indexing system. After that the links should appear in Google Scholar within a week or two from the time the vendor makes the data available to the Google Scholar

search robots. Google Scholar also supports several smaller vendors and regional products. When set up, if a user is connected to their university's on-campus network and visits Google Scholar, Google will automatically create an affiliation between that user and their institute. This affiliation creates a seamless authentication flow between Google Scholar and the subscribe resources by the library enabling them to access the subscribe resources off-campus. This affiliation will last up to 30 days and will enable the user to access their institutions content without logging into third-party websites.

Management of E-Resources

Unlike the print resources; E-resources are not visible to the user, so it needs to be managed by different means.

(a) Role of Library Website: The E-resources once purchased or acquired need to be linked with the library website or digital library, electronic library or institutional repository for easy identification and location by the library users.

(b) Role of Library Portal: Through the library portal, the library user can access the resources with much ease. So, all resources that are purchased or acquired must find a place in the library portal.

(c) Role of Electronic Resource Management Systems (ERMS): In 2005, Maria Collins defined the ERMS as a system that "provides a technical service backbone for controlling the entire life cycle of an electronic resource". ERMSs come into two major categories:

(i) ***Module of ILMS:*** ILMS vendors have started to create ERM modules within their ILMS. The ERM module in such cases may include the facility to provide license records and a place to attach license PDFs, creating vendor and platform contact information record types, or linking holdings records for serials collections with database records. Example: Millennium's Innovative Interfaces.

(ii) ***Integrating to a Specific Resource Management Functionality:*** In this category the software is integrated with a link resolver and A–Z list and sometimes with resource budgeting and counter statistics as well. Examples include Serials Solutions 360 Resource Manager, OCLC, and EBSCO ERM Essentials, Ex Libris Verde.

(iii) ***Standalone ERMS:*** Example includes Alma by Ex Libris.

All the above are proprietary ERMS. In the case of open source, CORAL, CUFTS and ERMes are popular one. The CUFTS project was shut down. The University of Wisconsin-La Crosse developed Electronic Resource Management (ERM) Software (ERMes) and later on it itself stopped using it.

(i) ***CORAL:*** CORAL is an open source and free Electronic Resource Management system (ERM) consisting of interoperable modules designed around the core components of managing electronic resources for libraries and other organizations. CORAL was originally developed locally by Hesburgh Libraries at the University of Notre Dame. It has six modules i.e. Resources, Licensing, Organizations, Usage Statistics and Management. Website: http://coral-erm.org

(d) Discovery Services: A federated single search product can simultaneously search multiple databases, including the OPAC, subscription databases, abstracting and indexing databases, and local repositories. One well-known federated search product is Primo from Ex Libris. The other examples include Summon, EBSCO Discovery Service (EDS) and so on.

In case of the E-resources, it revolves around trials, acquisitions, licensing, informing the user through SMS, WhatsApp, Email and others, collection of usage information, getting feedback from users and renewal.

Devices Used for Accessioning E-Resources

Laptop/desktop or mobile devices (Smart Phone/Tablet) and specifically designed device for reading book i.e. E-book Reading Devices can be used to access the E-resources.

An ebook reader is a portable electronic device that is designed primarily for the purpose of reading digital books and periodicals. They are almost similar to the tablet computer. Some ebook readers are library compatible. It means they can be used to borrow ebooks from public libraries. This means that the EPUB and/or PDF formats with digital-rights-management (DRM) protection are supported by the particular ebook. The ebook reader includes Amazon Kindle, Kobo Ebook Reader, Barnes & Noble's Nook.

The software that can be used to read an Ebook includes FlipViewer®, FBReader, Plucker, Acrobat Reader or Adobe Reader, Mobipocket (.prc), Cybook (Bookeen), etc. The following are some of the popular ebook reader (hardware):

(a) Aluratek: Founded in 2006, Aluratek manufactures an assortment of electronic products, namely: eBook readers, digital video camcorders, multimedia players, internet radios, digital photo frames, 3G routers, docking enclosures, USB 3.0, high resolution adapters, USB and multimedia accessories, splitters and switches. Its Libre Ebook Reader Pro exclusively can be used to read ebooks.

(b) Amazon: Amazon.com, Inc. is an American multinational electronic commerce company with headquarters in Seattle, Washington, United States. It is the world's largest online retailer. Kindle, Kindle 4th Generation, Kindle Touch, Kindle Touch 3G, Kindle 3 Wi-Fi 3G (Kindle Keyboard 3G), Kindle 3 Wi-Fi (Kindle Keyboard), Kindle DX 1st Gen White, Kindle DX 4th Gen Graphite, Kindle 2 are some of the popular ebook readers from Amazon..

(c) Asus: Asus is a Taiwanese multinational computer hardware and electronics company headquartered in Taipei, Taiwan. Its products include motherboards, desktops, laptops, monitors, tablet PCs, servers, video cards and mobile phones. Its Ebook reader is: EEE Reader DR-900

(d) Barnes & Noble: Barnes & Noble, Inc. is the largest book retailer in the United States, operating mainly through its Barnes & Noble Booksellers chain of bookstores headquartered at 122 Fifth Avenue in the Flatiron District in Manhattan in New York City. Its ebook readers are: Nook, Nook Simple Touch, etc.

(e) Bookeen: Bookeen is French company dealing with eBooks and Consumer electronics. Cybook Odyssey, Cybook Orizon, Cybook Opus, Cybook Gen3, etc are some of its ebook readers.

(f) Readers bq: Readers bq is a Spanish company dedicated to the design, manufacture and distribution of Ebook readers and tablets. One of its popular Ebook Reader is: movistar ebook bq.

(g) Ectaco: ECTACO Inc. (East-Coast Trading American Company Incorporated) is a US-based developer and manufacturer of hardware and software products for speech recognition and electronic translation. They also make jetBook eBook readers. Its popular ebook reader is JetBook Color.

(h) Kobo: Rakuten Kobo Inc., or simply Kobo, is a Canadian company which sells ebooks, audio books, e-readers and tablet computers. The Kobo eReader is an e-reader produced by Toronto-based Kobo Inc.

Problems with E-Resources

The following problems can be encountered while using the E-Resources:

(a) Copyright Violation: The content can be reproduced, forwarded, modified leading to possible problems with copyright protection and preserving authenticity.

(b) Require Specialized Equipment: The main disadvantage is that, unless the e-resources are also printed on paper, they require specialized equipment for reading.

(c) Incompatible Hardware or Software: The E-resources can be incompatible with the development of new hardware or software.

(d) Health Hazard: Continuous reading of e-resources can be harmful to the eyes.

Conclusion

The e-resources are not simple like that of the print resources. These are available in different forms with different purchasing, licensing and acquisition options. Even its management is completely different than that of the print counterpart. Since the late 1990s, many newcomers to ebook publishing have included most major print publishers. At the same time, many established e-publishers started to offer print versions of some of their titles. Thus the line between the two is fast blurring.

E-books have their own bestseller lists, including those compiled by International Digital Publishing Forum (IDPF) and Fiction wise. They even have two yearly awards for excellence in E-books. The longest-standing and most inclusive of these is the EPPIE award, given by EPIC since 2000. The other is the Dream Realm Award, first awarded to speculative fiction ebooks in 2002.

REFERENCES

Anderson, E. K. (2014). Electronic Resource Management Systems and Related Products. Library Technology Reports, 50(3). Retrieved from https://doi.org/10.5860/ltr.50n3

Center for Research Libraries (2016). National Site License Initiatives. Retrieved from http://liblicense.crl.edu/licensing-information/national-site-license-initiatives/

IFLA (2012). Key Issues for e-Resource Collection Development: A Guide for Libraries. https://www.ifla.org/files/assets/acquisition-collection-development/publications/IFLA_ELECTRONIC_RESOURCE_GUIDE_DRAFT%20FOR%20COMMENT.pdf

Lallaisangzuali (2013). A study on use of electronic resources for teaching and research by the faculty members of Mizoram University. [Unpublished doctoral dissertation]. Mizoram University. Retrieved from http://hdl.handle.net/10603/120460

Mount Saint Vincent University (2020). Electronic Resources. Retrieved from https://www.msvu.ca/academics/library/about-the-library/policies-procedures/collection-policy/electronic-resources/

Earning Revenue through Google AdSense on Websites: A Prospect for Entrepreneurial Avenue for Library and Information Science Professionals

Badan Barman

How to Cite this Article

APA Citation Style, 7th Edition

Barman, B. (2022). Earning Revenue through Google AdSense on Websites: A Prospect for Entrepreneurial Avenue for Library and Information Science Professionals. *Kelpro Bulletin, 26*(2), 1-9. https://kelprobulletin.in/files/1%20(1).pdf

Chicago, 16th Edition

Barman, Badan, "Earning Revenue through Google AdSense on Websites: A Prospect for Entrepreneurial Avenue for Library and Information Science Professionals." *Kelpro Bulletin,* 26, No. 2 (December 2022): 1-9. https://kelprobulletin.in/files/1%20(1).pdf

MLA Citation, 8th Edition

Barman, Badan. "Earning Revenue through Google AdSense on Websites: A Prospect for Entrepreneurial Avenue for Library and Information Science Professionals." *Kelpro Bulletin*, Vol. 26, No. 2, 2022, pp. 1-9. https://kelprobulletin.in/files/1%20(1).pdf

EARNING REVENUE THROUGH GOOGLE ADSENSE ON WEBSITES: A PROSPECT FOR ENTREPRENEURIAL AVENUE FOR LIBRARY AND INFORMATION SCIENCE PROFESSIONALS

Dr. BADAN BARMAN
Assistant Professor
Department of Library and Information Science
Gauhati University, Guwahati-781014, Assam, India
Email: badanbarman@gmail.com

ABSTRACT

The purpose of the paper is to make Library and Information Science professionals aware of the opportunity created by the Internet and to motivate them to think of becoming an entrepreneur, at least by those who are unable to secure any job in the subject. It aims to bring to the surface the hidden earning data and information from websites which are otherwise hard for the general public to find and explore. To do all this, a content-rich website is created using Google Classic Sites and then 3 display and 1 link ad units of advertisement are inserted in between the content of each page of the website through Google AdSense. The tracking code of Google Analytics is also inserted into each and every page to know its level of use. Later on, after eleven years of launching the site, careful and systematic implementation of Google AdSense, the data from Google AdSense and Google Analytics is collected and analyzed to draw conclusions. The result shows that a website with monthly page views of 344331 can generate around $307 by using Google AdSense on their website. From this data, it can be evident that Google AdSense can be a good source of revenue to earn a livelihood at the pace of one's choice of place of work and time. The earnings will again increase provided there is an increase in the users of the website. Library and Information Science graduates and post-graduates can explore this opportunity provided by the Internet to earn their livelihood on their own by launching a website or app of their choice and can think beyond working in the traditional library set-up, and choose to be an entrepreneur. Excluding Google AdSense, there are other alternative solutions through which people can earn revenue by displaying different kinds of advertisements on their websites, all of which are not explored.

Keywords: Entrepreneurship, Revenue Generation, Library Website Revenue, Income Generation from Website, Google AdSense, Google Analytics, Librarian and Internet.

1. Introduction

It is common knowledge that in most cases people hesitate to disclose their income and earnings and when it is related to online earnings it becomes harder to get the proper figure. There are many factors that contribute to it, but not limited to the hesitation of people in disclosing their earnings, the relation of tax with income, fear of disclosure of their own tactics for achieving the same, legal implications including taxation, competition with peers in the niche of their website and such others. Even Section 11 of Google AdSense Online Terms of Service clearly mentioned that the advertisers cannot disclose their click-through rates, though they can disclose the amount of Google's gross payments. Therefore, though there is tremendous growth in the online income-generating avenues and crores of people earning a decent amount, one will be confined to very limited data, information and published papers in this area.

Techno-savvy Library and Information Science (LIS) professionals are aware of these new opportunities for libraries and librarians opened by the Internet. As evident from the widespread use of Google AdSense by the LIS professionals, they also know that they can earn a very good amount by just uploading a video over YouTube or writing a blog post that becomes viral or has a huge reader base. However, data that can estimate the income based on the number of hits or users of web content is hard to find and still remains in the dark for the people who are not exposed to it on their own.

Google AdSense is an advertisement program through which website owners can display text ads, display ads, in-feed ads, in-article ads, matched content ads, link unit ads and such other ads on the website they own or manage and earn revenue from it. "In 2003, Google launched its AdSense contextual ad program and then greatly expanded AdSense, meaning ad serving application. AdSense placements are almost certainly the reason why Google has seen network-derived ad revenue rise so sharply" (Runge, 2014, p. 781). Google's explosive growth and profits are largely based on Google AdSense shares with the content providers who agree to display their ads. In the online environment for people at large, Google AdSense is synonymous with online income.

Google Analytics is a web analytics service which tracks and reports website traffic that includes things such as session duration, pages per session, bounce rate, source of traffic, etc.

2. Review of Literature

Though the Internet is flooded with blog posts on revenue generation using Google AdSense, there are a very small number of research articles in this area. This is because people who are outside this domain cannot have access to this kind of data, and for those people who are associated with all these, for them, publishing this kind of information is a very delicate and sometimes risky issue. It can lead to their Google AdSense account suspension, which will bring an end to their livelihood for the rest of their lives and can bring more competition in the niche in which they are working by revealing their own areas.

Chen and Chen (2010) in their "EC 2.0: Can you get profit by writing a blog? An empirical study in Google AdSense" found that E-Commerce sites can generate revenue through Google AdSense. Adler and Dewi (2019) in their article on web-based business opportunities opined that in the new Internet environment, users can generate revenue by becoming a YouTuber in the form of Google AdSense payments, brand ambassadors, sponsorship and by getting corporate collaboration. Aimiuwu et al. (2012) in their study on "How web search and social media affect Google AdSense performance", found that social capital through social media can increase online revenue through Google AdSense for conventional websites. Fox et al. (2009), in their study on optimizing presentation of AdSense ads within blogs, found that AdSense offered financial rewards to bloggers with relatively little effort. Higher contrast coloured ads are likely to increase click and thereby more revenue generation to the blogger. So, there is no doubt that Google AdSense can be used to earn money online.

Soegoto and Semesta (2018) in their article on "Use of Google AdSense for income generating activity" found that their implementation of Google AdSense on YouTube Channel earned more than US $ 1000 in a single month, i.e. April 1-31, 2017.

In the case of India, LIS Links (http://www.lislinks.com), LIS Quiz (https://www.lisquiz.com), LIS Portal (http://lisportal.com), LIS Cafe (https://www.liscafey.com), LIS News (https://www.lisnews.in), YouthGrowth (https://youthgrowth.in), etc., are some of the website launched by Library and Information Science professionals. As evident from the ads that

appear on the website, all these websites use Google AdSense to monetize their content. However, it is not evident how much amount they are earning through Google AdSense as there is not any literature on this area, neither does the owner of these websites reveal anything regarding their earnings.

The amount which is reflected in the article by Soegoto and Semesta seems to be lucrative enough to motivate the unemployed, under-employed and even employed Library and Information Science professionals to take up the option opened by the Internet. However, all these papers are unable to present the data regarding what amount of page views or traffic or users are needed to earn what amount, so that even before going for it, people can have an estimate of earning that they can think of.

3. Objectives of the Study

The objectives of the study are to

a) Make people aware by way of describing the terminologies used in the context of Google AdSense;

b) Launch a website so that Google AdSense Ads and Google Analytics can be set up on it to have the required data;

c) Analyze the Google AdSense earning data to find the relation between the number of hits or users of a website and the earnings from it.

d) Draw conclusions regarding entrepreneurship opportunities for LIS professionals in this field.

4. Methods

A website regarding the University Grants Commission (UGC) National Eligibility Test (NET) examination was designed and developed using free Google's Classic Sites and it was mapped with a custom domain purchase from Google Domains. The UGC is a statutory organization established by the union government of India. UGC-NET is a test conducted twice in a year to determine the eligibility for teaching positions at the entry level in colleges and universities in India and also for awarding a Junior Research Fellowship (JRF) among the appearing or master degree awarded students. The website basically provides the UGC NET syllabus, old examination question papers and answer keys to the user that can be accessed openly i.e. without any restriction of user id and password or payment wall. By going through the Settings tab, the Google Analytics code was inserted and was later on placed by the system on each and every page of the website. The website as a whole has almost 1000 pages of content. To avoid lifetime account suspension from Google AdSense and to avoid keyword competition from other website owners of the same niche and bringing new competition from the upcoming readers of this article, the website address cannot be disclosed.

Google Sites, presently known as Google Classic Sites, is a wiki-based platform that can be used to design and develop a free hosted website; however, users need to purchase a domain if they want to map their Google sites address with a custom domain. The Google site was initially launched on February 28, 2008. In June 2016, Google introduced a new version of the Google Sites and named it as New Google Sites and thus the older version automatically became the Google Classic Sites.

4.1. Description of the Terminologies Associated with Google AdSense

There are lots of terminologies which are new to a large number of Library and Information Science (LIS) professionals. However, are widely used in the context of Google AdSense. A description of such a few terminologies is given below.

i) Ad Unit: An ad unit is one or more advertisements displayed as a result of a single piece of the ad code.

ii) Display Ads: Display ads are graphical ads that can contain any piece of information related to the advertisement. In the case of display ads, it competes with the text ads to appear in the same ad space and in the race the highest bidder wins. So, choosing display ads instead of text ads can have an added advantage in earning more.

iii) In-feed Ads: In-feeds do not mean a RSS feed. However, it means a list that appears in a similar looking block. An ad unit inside a list of such similar looking blocks of content is called in-feed ads.

iv) In-article Ads: In-article ads are displayed inside the content-rich article and are responsive in nature.

v) Matched Content: Matched content presents a personalized recommendation to the readers for further reading based on topic similarity and among them a few relevant ads are shown.

vi) Link Unit: A link unit is an advertisement slot where it displays a list of topics relevant to the content of the site. In the event of clicking on one of these topics, the users are brought to a Google page that displays ads related to that topic. The user again needs to click on the advertisement to generate revenue for the website developer or owner. The owner won't receive earnings for clicks on the topics but they will be paid in the event of user clicks on any of the ads displayed on the Google-hosted page.

vii) Fixed-sized Ads: Fixed-sized ad units have a fixed height and width irrespective of whether it is viewed on a desktop computer or a mobile phone.

viii) Responsive Ads: Responsive ads are those ads that automatically adapt the size of the ads to fit the space available or page layout or change the screen orientation, i.e. from portrait to landscape on a phone or tablet. It allows the website administrator to support a wide range of devices, i.e., computers, tablets, phones, etc.

ix) Text Ads: Text ads consisting of only text that include a title, one or two lines of description and a website address of the advertiser.

x) Rich Media Ads: Rich media ads are interactive ads that include animated ads, Hypertext Markup Language (HTML), Flash and video ads.

xi) Page Views: A page view means a webpage viewed by the user displaying one or more Google AdSense Ads.

xii) Impressions: An impression is the number of ad units loaded on the user's device.

xiii) Clicks: It means the number of times a user clicked on Google AdSense ads.

xiv) Estimated Earnings: The approximate earnings by the owner of the website that is likely to change after proper verification like invalid clicks or impressions.

xv) CPC: CPC stands for Cost-per-Click and that is the amount of money the advertisers need to pay each time a user clicks on their advertisement.

xvi) Page CTR: CTR stands for Click-through Rate (CTR). The page CTR is the number of clicks on ads divided by the number of page views and then multiplied by 100.

xvii) Page RPM: RPM is an abbreviated form of Revenue per Mille. Mille in Latin means thousand. So, Page RPM means the average earnings of a website per thousand page views. It is calculated by dividing the total earnings by the number of page views received, then multiplying by 1000.

xviii) Impression RPM: The impression Revenue per Mille (RPM) or revenue per thousand impressions means the average earnings of a website per thousand impressions. It is calculated by dividing the estimated earnings by impressions, then multiplying by 1000.

4.2. Google AdSense Set-up on the Website

The basic set-up of the Google AdSense ads that were followed on the website is as follows.

i) Number of Ad Units: A total of three display ads and one link unit ads, making the total ad unit to four ads, were inserted on each page of the website.

ii) Display Ads: On each page of the website, three display ad units of size 728x90 px were inserted.

iii) Link Unit Ads: On each page of the website one link unit ad of 728x15 px was inserted.

iv) Location of the Ad Units: One display ad unit just below the title of an article, two display ad units in the middle of the content and one link unit ad at the last portion of the article where the content ends was inserted.

v) Ad Balance: The ad balance is set at 68% of potential ads.

vi) Blocking Control: No ads were blocked.

5. Major Findings

The findings can be grouped into the following two sections.

5.1. Website Usage Data

As per Alexa, as of the date of writing of this article, the website was placed within 2 lakhs Global Alexa rank and within India, the rank was below 50 thousand. The Google Analytics code was inserted into the website only in 2017. So, the following data is collected by going through the route of Google Analytics Dashboard -> Audience -> Overview from 2017 to 2021. In the generation of reports, the calendar year is selected i.e. 1st January of each year to 31st December of that particular year.

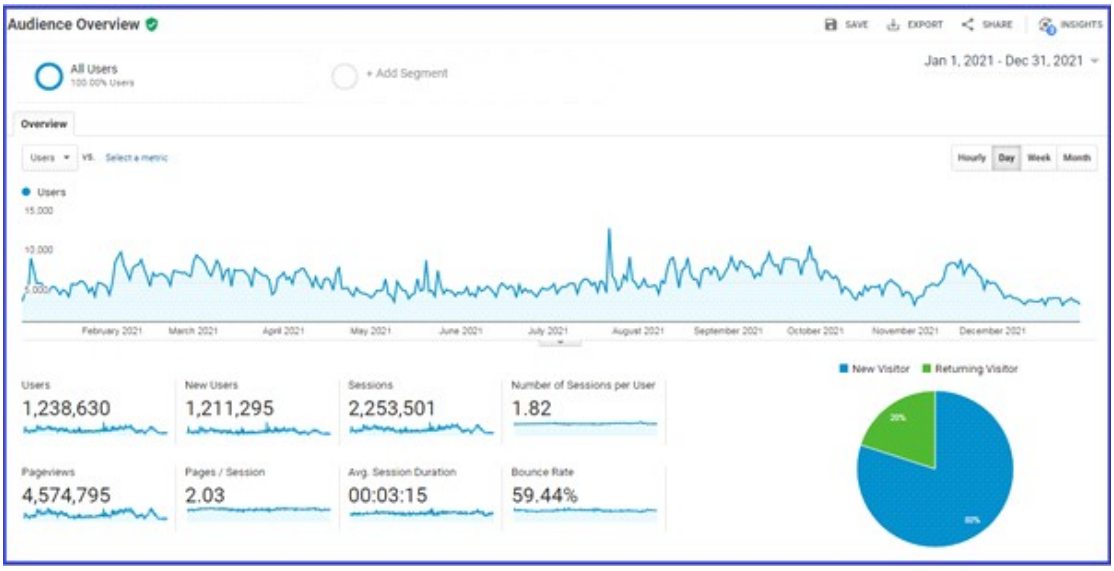


Fig. 1. Screenshot of Audience Overview of UGC NET Guide Website from Google Analytics

Table 1

Audience Overview of UGC NET Guide Website

Period	Users	Sessions	Pageviews	Number of Sessions per User	Pages / Session	Avg. Session Duration
January 1, 2017- December 31, 2017	177,686	345,878	741,851	1.95	2.14	00:03:52
January 1, 2018- December 31, 2018	659,090	1,306,864	2,782,475	1.98	2.13	00:03:31
January 1, 2019- December 31, 2019	1,041,377	2,071,999	4,735,205	1.99	2.29	00:03:30
January 1, 2020- December 31, 2020	1,267,257	2,504,388	5,253,528	1.98	2.10	00:03:25
January 1, 2021- December 31, 2021	1,238,630	2,253,501	4,574,795	1.82	2.03	00:03:15
Average	87,68,08	16,96,526	36,17,571	1.93	2.13	00:03:30

The data clearly indicate that there is steady growth in terms of the number of users of the site over the years, sessions and page views. It signifies that the website has been able to build a reputation over the years. However, average session duration i.e., time spent on the site consistently decreases and it signifies the decreasing attention span of the users over the years. A detailed investigation is needed to find out the reason for the same and it needs to correlate with the behavioural changes happening to people in general.

The data also indicate that on average, a user has 1.93 sessions and in each session they have 2.13 page views. So, a user simply visits 4.11 page views (Average Session x Average Page Views) of the website.

5.2. Website Earning Data

Google AdSense ads use contextual advertising besides others. In contextual advertising, Google tries to identify the central theme of a website, topic or sections, keywords, language and the geographic location of the primary user of the website and then the attempt is made to match these with the probable ads for automatic placement on the website. Sometimes, the user's recent browsing history and such other factors are also accounted for to display an advertisement.

The site's page views, impressions, clicks, estimated earnings were collected by following the route of Google AdSense Dashboard -> Reports -> Overview. In the generation of reports, the calendar year is selected i.e. 1st January of each year to 31st December of that particular year. The website's earning data is present in the USA $ as it is the currency in which the amount is calculated. To make the study more related to the Indian scenario, the user can convert US $ to Indian Rs. In conversion, kindly remember that the currency used to fluctuate every day, not to speak of every month and year.

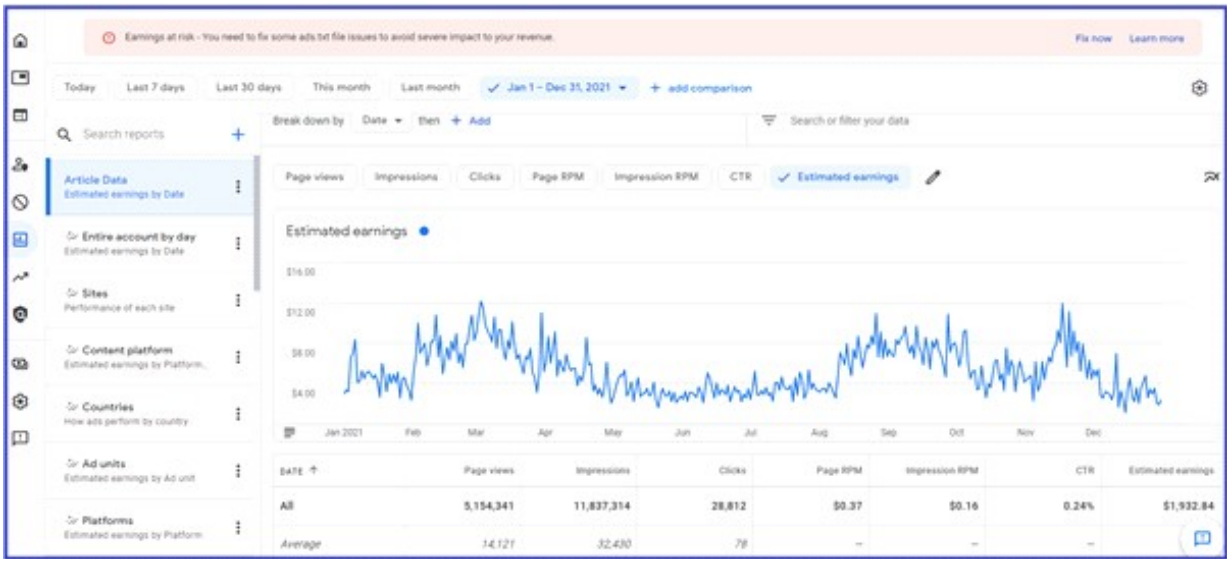


Fig. 2. Screenshot of Different Dimensions of Earning from UGC NET Guide Website from Google AdSense

Table 2

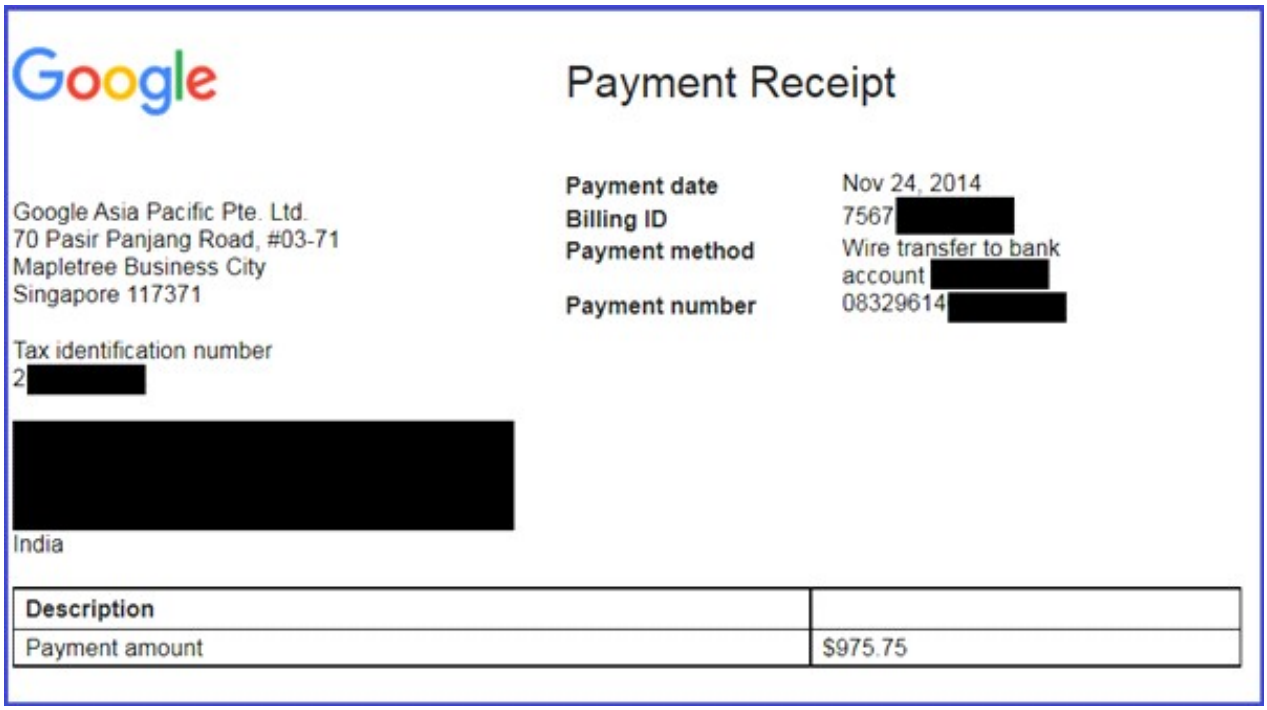
Different Dimensions of Earning from UGC NET Guide Website

Period	Page Views	Impressions	Clicks	Page RPM (In $)	Impression RPM (In $)	CTR	Estimated Earnings (In $)
January 1, 2011-December 31, 2011	1040655	1716215	3632	0.33	0.20	0.35	343.58
January 1, 2012-December 31, 2012	6135590	17309218	86513	0.92	0.33	1.41	5642.05
January 1, 2013-December 31, 2013	6637397	19454038	118424	1.25	0.43	1.78	8270.73
January 1, 2014-December 31, 2014	5415059	16007757	107102	1.61	0.54	1.98	8705.48
January 1, 2015-December 31, 2015	3529099	12099828	79526	1.57	0.46	2.25	5528.41
January 1, 2016-December 31, 2016	1296691	6464362	22205	0.95	0.19	1.71	1235.42
January 1, 2017-December 31, 2017	2077441	10182959	39836	0.83	0.17	1.92	1715.97
January 1, 2018-December 31, 2018	3538164	9212726	44562	0.57	0.22	1.26	2006.44
January 1, 2019-December 31, 2019	5491669	10450623	64987	0.58	0.30	1.18	3162.16
January 1, 2020-December 31, 2020	5657622	11796516	46282	0.39	0.19	0.82	2225.00
January 1, 2021-December 31, 2021	4632405	10624954	26926	0.37	0.16	0.58	1733.07
Total	**45451792**		**639995**				**40568.31**

From 2014-2015, with Google AdSense, the Page RPM has been decreasing over the years. This may be partly due to the increasing number of websites available for the advertisers to display their ads. The same can be said for Impression RPM and Estimated Earnings.

From the data, we can say that on an average, a website can receive $0.06 for each click on their advertisement (Total Estimated Earnings / Total Clicks) and a website with 1000 Page Views can receive $0.89 [(Total Estimated Earnings / Total Page Views)*1000] and to receive $0.89 a website needs 243 individual users (1000 Page Views / Number of Page Views per User from the analysis of data from Table-1). So, by implementing Google AdSense, a website, on average, with 243 individual users, can receive $0.89. This can be a day's earnings or a month's earnings or in a year. Earnings are based on whether the website receives these 243 individual users in a day or in a month or in a year. On average, the owner of the UGC NET Guide website receives $307 each month for the last eleven years and it can be considered as a good income by considering the less effort and time given to the website.

Though the revenue can fluctuate on a day-to-day basis, people who are working in the online environment and have a good number of regular viewers or users are generally able to earn a decent amount throughout the year and are in line with the recommendations provided by Barman & Baishya in their article on "working independently: entrepreneurial approach in library and information science profession".



Google

Payment Receipt

Google Asia Pacific Pte. Ltd.
70 Pasir Panjang Road, #03-71
Mapletree Business City
Singapore 117371

Tax identification number
2[redacted]

[redacted]
India

Payment date	Nov 24, 2014
Billing ID	7567[redacted]
Payment method	Wire transfer to bank account [redacted]
Payment number	08329614[redacted]

Description	
Payment amount	$975.75

Fig. 3. Screenshot of Google Payment Receipt
(Note: Identifying elements are deleted)

Nowadays, Google stops the provision of insertion of new Google AdSense ads code or edited or modified the existing in Google Classic Sites from August 30, 2013 onwards and thereafter one only can delete if he/she wishes so. However, as the Google sites selected for the study started displaying Google AdSense ads from the year 2011, it was uninfluenced by the later decision of Google in scrapping the Google AdSense ads from Google Sites and continuously displaying them till now. However, people are free to use Google AdSense on any other website of their choice provided that website adheres to the AdSense Terms of Service.

6. Conclusion

This paper highlights how much a Library and Information Science (LIS) professional can benefit by writing text of importance to a specific group of users in an online mode in the form of a Blog or Website and harvesting the benefit of Google Adsense in earning their livelihood in the ever emerging opportunity provided by the Internet. The writing skill, if put online, can generate income in the form of Google AdSense payment, sponsorship, or by becoming the brand ambassador of a farm or company and, in many cases, the amount generated can be used to meet the livelihood needs of a person and his/her family and thus he/she can think of working independently. If a library website, digital library or institutional repository and such other online platforms have a huge user base or receive a good number of visits each day, then they can generate their own fund and become self-sustainable by displaying ads through Google AdSense.

References

1. **Adler, J. and Dewi, S. C.** (2019). Web-based business opportunity. *In* IOP Conference Series: Materials Science and Engineering, 662, 2. 2019. https://www.proquest.com/openview/dc0c411acf44a064e96564a22be6303b/1.pdf

2. **Aimiuwu, E. E. et al.** (2012). How web search and social media affect Google AdSense performance. Paper presented at the 18th Americas Conference on Information Systems 2012, AMCIS 2012, 4, 3248-3258. https://www2.morgan.edu/Documents/ADMINISTRATION/CENTERS/IUR/Research/WebPage.pdf

3. **Barman, B. and Baishya, K.** (2015). Working Independently: Entrepreneurial Approach in Library and Information Science Profession. LIS Links Newsletter, 1(1). http://file.lislinks.com/newsletter/lislinks-newsletter-vol-1-no-1-p-2-10.pdf

4. **Chen, K. and Chen, M.** (2010). EC 2.0: Can you get profit by writing blog? An empirical study in Google adsense. Paper presented at the PICMET '10 - Portland International Center for Management of Engineering and Technology, Proceedings - Technology Management for Global Economic Growth, 2346-2352. https://ieeexplore.ieee.org/document/5602060?arnumber=5602060

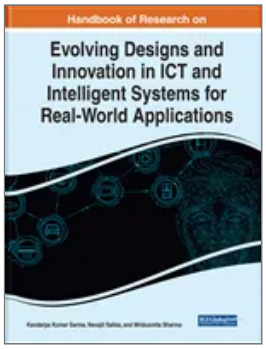
5. **Fox, D. et al.** (2009). Optimizing presentation of AdSense ads within blogs. Paper presented at the Proceedings of the Human Factors and Ergonomics Society, 2 1267-1271. https://doi.org/10.1177/154193120905301822

6. **Google** (2019). Adsense Help. Retrieved from https://support.google.com/adsense/answer/7163190

7. **Google** (2019). Google Adsense Resources: Helpful links for both newbies and gurus to make the most of your AdSense account. Retrieved from https://www.google.com/adsense/start/resources/

8. **Runge, W.** (2014). Technology Entrepreneurship: A Treatise on Entrepreneurs and Entrepreneurship for and in Technology Ventures, Vol. 1 & 2. KIT Scientific Publishing.

9. **Soegoto, E. S. and Semesta, R. B.** (2018). Use of Google AdSense for income generating activity. Paper presented at the IOP Conference Series: Materials Science and Engineering, 407(1). https://doi:10.1088/1757-899X/407/1/012065



A Linguistic Perspective of Assamese Language as Used on Facebook

Seuji Sharma (Gauhati University, India)

Source Title: Handbook of Research on Evolving Designs and Innovation in ICT and Intelligent Systems for Real-World Applications (/book/handbook-research-evolving-designs-innovation/281276)

Pages: 20

DOI: 10.4018/978-1-7998-9795-8.ch013

Abstract

The chapter attempts to look at different themes and issues relating to the use of Assamese language on Facebook. This study examines the changes observed at different levels of linguistic analysis. The users have been seen making some changes at phonological level which is associated with the phonemes or sounds in Assamese. Modifications have also been observed regarding the use of sentence structure as well as phrase structure, and the matters related to these areas have been dealt with at a grammatical level. Since linguistic analysis covers a vast area, some specific domains are being dealt with in this chapter, especially from the areas of phonology, morphology, and syntax.

Chapter Preview

Top

Introduction

Assamese, the easternmost member of the Indo-Aryan family of language (Kakati, 1941, p 1), has widely been used by the users, belonging to Assam, on Facebook, one of the most popular social networking sites in the World. Assam represents one of the highest ethnically and linguistically diverse areas of the North-east India and hence Assamese, as a major language, spoken in Assam, plays the role of lingua-franca among the different speech communities in eastern India. (Goswami& Tamuli, 2003, pp 391-443). The earliest specimen of Assamese language and literature, available in the Charyas and Dohas, is supposed to have flourished between the 8th and 12th centuries A.D. (Das, 2010, p19). From fourteenth century onwards, the Assamese language can be divided into three periods on the basis of the literary style, early period (14th century-16th century), middle period (17th century- beginning of the 19th century) and modern period (early 19th –present times). Different types of prose are seen to have developed in a specific manner which has contributed a lot in the emergence and enhancement of the clear, stable and pure literary form and style of modern Assamese which reflects the uniqueness of the language in its use. Though as a well-established language Assamese has a glorious tradition of elucidating and representing new thoughts and ideas, but the Assamese-speaking population is decreasing precariously. The total population of Assamese speaker in Assam is nearby 13 million which makes up 48.38% of the population of the state according to the Language Census of 2011, whereas in 1971, the Assamese-speaking populace was 60.89% of the total population of Assam. (://www.time8.in/new-decline-trend-only-1-26-per-cent-of-indias- (http://www.time8.in/new-decline-trend-only-1-26-per-cent-of-indias-)). In spite of the fact that the Assamese-speaking population is dwindling alarmingly, a large group of people is still working for the language, nourishing and reflecting their ideas, hopes, aspirations towards social as well as other life- related problems with the help of the language itself. In this era of globalization, like the users of other languages, the users of Assamese language too, have tried to share their views and to participate in different discussions by using their mother tongue. On Facebook, several groups are seen representing the ideas and thoughts of their members in Assamese, both orthographically and linguistically. Some remarkable features are observed which have brought few changes to the grammar of the language and thus a glimpse of newness in the style and form is seen. These types of changes are being observed at all levels of linguistic analysis, i.e. at the levels of phonology, morphology, syntax and semantics. Before going into details, it should be made clear that no drastic change is observed in the use of Assamese in the groups. But still, some widespread usages of some particular features are typical to a large number of Facebook users following Assamese. The striking patterns which seem to be generic for a large group of users of Assamese are discussed under two headings in this paper, first, changes occurring at phonological level are examined, and, secondly, the discussion on the change occurring at grammatical level is taken up in two stages. The first stage focuses on the modification observed at the morphological level, whereas the discussion at the second stage includes different aspects under syntax where changes are being made. Semantic change, i.e. the change

in meaning, can also be observed in some contexts but this is not a common type of change noticed on Facebook. For example, the youths in Assam frequently produce a word *kamʊr*, which means 'to bite'/ 'to harm'. But now-a-days, people are using the same term in two senses: 'to bite/ harm' and 'of an irritating nature', where the vowel phoneme *ʊ* has been replaced with *u*. But words indicating such type of extension in meaning is very few in number and also not available on Facebook. This study, therefore, has been delimited focusing only on the changes observed at the phonological and grammatical levels.

Complete Chapter List

Search this Book: Full text search terms

Reset

CHAPTER - I

ANALYSIS OF CUSTOMERS BEHAVIOR IN M/M/C/K QUEUE WITH ENCOURAGED ARRIVAL AND RETENTION OF RENEGING

Pallabi Medhi

Abstract

Customers by nature are impatient entities. In our fast-paced life, customers desiring service are often required to queue up which induces impatience.The systems lose their potential customers due to impatience which affects the business as a whole. In order to stay ahead in the competition, business organizations introduce various discounts and offers to attract customers. These attracted customers are termed as encouraged arrivals in this chapter.Retention strategies are also therefore the in thing. The review of literature is testimony to various extensions that have been tried with reference to the reneging and encouragement. In today's world, business organizations are constantly striving for the retention of impatient customers. Keeping this aspect in mind, an area of current interest is the retention of reneged customers in Markovian multi-server finite buffer queue with encouraged arrivals. Here, we analyze an $M/M/c/k$ model with encouraged arrival, reneging and retention of reneged customers. Analysis has been carried out for two types of reneging disciplines R_ROS and R_EOS separately. To the best of our knowledge, a focused analysis generating explicit closed form expressions has not been carried out for this model considering all these aspects. The steady-state solution is obtained by Markov process method. In addition to the closed form expression of the traditional performance measures, some freshly designed ones have also been presented. Sensitivity analysis has been carried out to examine the changes in system parameters.

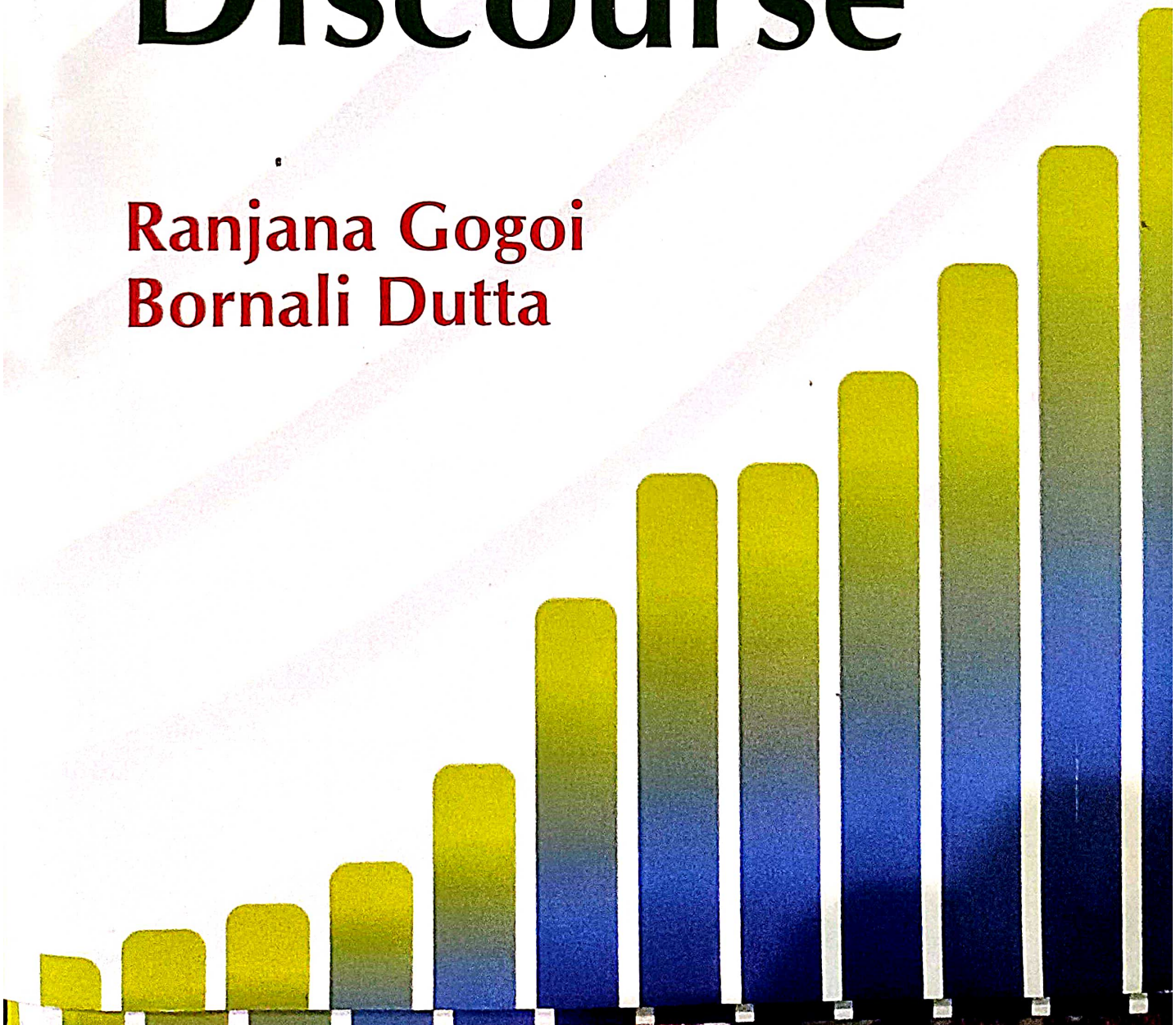
Introduction

Queues or waiting lines arise when the demand for a service facility exceeds the capacity of that facility, that is, the customers

A MITTAL PUBLICATION

Exploring Conventions of Statistical Discourse

Ranjana Gogoi
Bornali Dutta



First Published 2022

ISBN 978-93-90692-62-0

Published and printed by Krishan Mittal for Mittal Publications
4594/9, Daryaganj, New Delhi - 110002, India.
Phone: 23250398, Telefax: 91-11-41564398
e-mail : info@mittalbooks.com
Website : www.mittalbooks.com

CONTENTS

1

FOREST AREA, PRODUCTION AND EXPORT OF FOREST PRODUCTS IN INDIA:

A Study of their Inter-Dependence and Forecasting

SAHANA BHATTACHARJEE AND NANDITA BORAH

1. Introduction

Forest is used to refer to land with a tree canopy cover of more than 10 percent and area of more than 0.5 hectare. It does not include land that is predominantly under agricultural or urban land use[1].Forests in India occupies a significant place in contributing towards the country's economy for it is a major source of natural resources, forest products, provides housing and generates employment for a large section of India's rural population.

As per [2], forest cover refers to all tree patches which have canopy density of more than 10% and area of 1 hectare or more in size, irrespective of their legal status and species composition whereas recorded forest area (or simply forest area) is used for all such lands which have been notified as forest under any Government Act or Rules or recorded as 'forest' in the Government records. The forest area in India in the year 2019 is found to be 76.7 million hectares. In the year 2018-19, 'Agriculture, forestry and fishing sector' contributed 15.87% to India's GDP at current

14

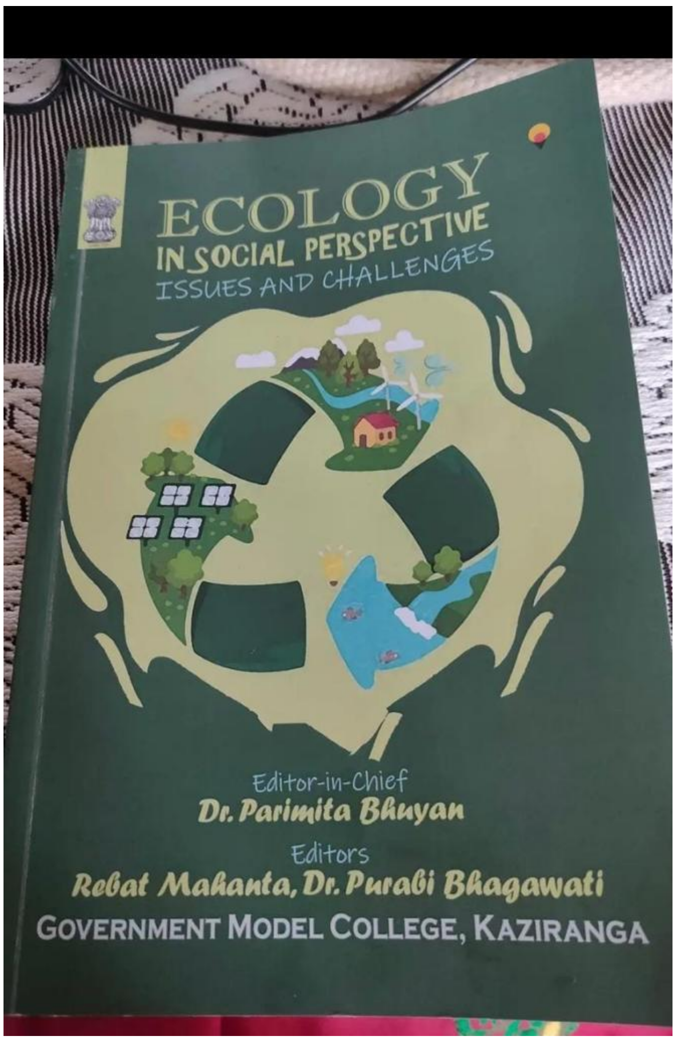
China's Belt and Road Initiative (BRI) and South Asia— Implications for India

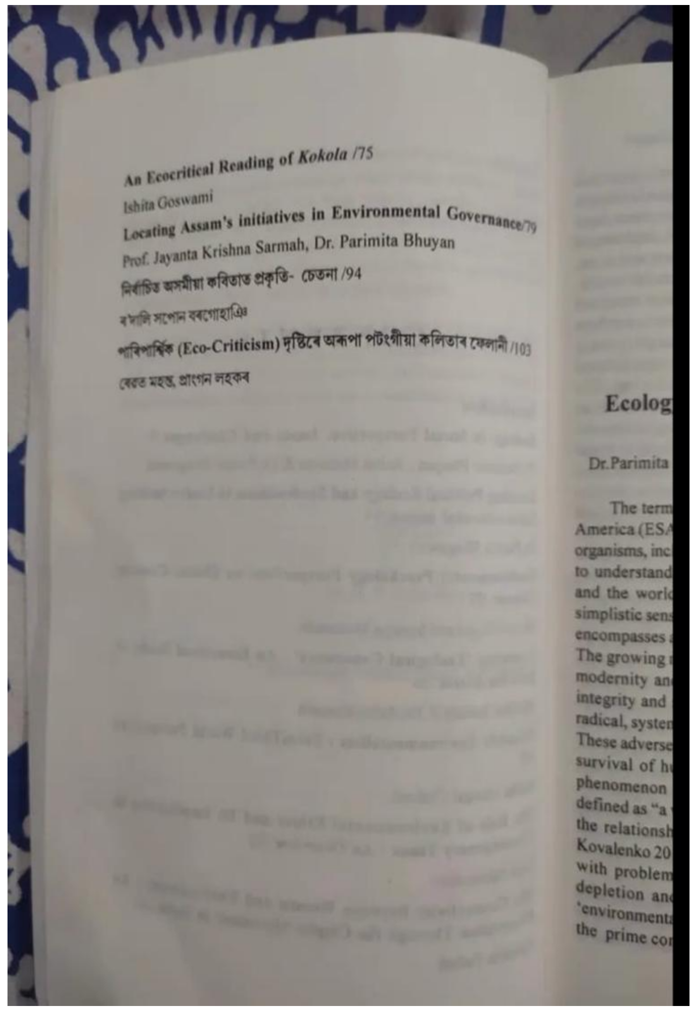
Dr.Shubhrajeet Konwer[*]

Abstract

The enlargement of Chinese sphere of influence in South Asia will have major implications on India's foreign policy. While the COVID -19 pandemic might have slowed down the pace of the Belt of Road Initiative (BRI), its footprints across the globe and South Asia in particular is well entrenched. It showcases China's growing economic prowess; coupled with soft power, China has been able to woo the countries of South Asia under its wings. The Government of India has categorically refused to be part of this grand economic-connectivity architecture. The recent skirmishes of Chinese and the Indian troops (June, 2020) along the Line of Actual Control plummeted relations between the two Asian giants. Furthermore, the growing support of China to the Pakistani establishment and the Taliban regime in Afghanistan has effectively shrouded the China-India relations with distrust. While countries of South

[*] Associate Professor, Gauhati University Guwahati, Assam.
sk489@gauhati.ac.in


ECOLOGY
IN SOCIAL PERSPECTIVE
ISSUES AND CHALLENGES
Editor-in-Chief
Dr. Parimita Bhuyan
Editors
Rebat Mahanta, Dr. Purabi Bhagawati
GOVERNMENT MODEL COLLEGE, KAZIRANGA


An Ecocritical Reading of Kokola /75
Ishita Goswami
Locating Assam's initiatives in Environmental Governance/79
Prof. Jayanta Krishna Sarmah, Dr. Parimita Bhuyan
নিৰ্বাচিত অসমীয়া কবিতাত প্ৰকৃতি- চেতনা /94
ৰ'দালি সপোন বৰগোহাঞি
পাৰিপাৰ্শ্বিক (Eco-Criticism) দৃষ্টিৰে অৰুপা পটংগীয়া কলিতাৰ ফেলানী /103
ৰেবত মহন্ত, প্ৰাংগন লহকৰ

24 Assam
Saffron persists in an ethnic setting

Dhruba Pratim Sharma, Vikas Tripathi, and Dikshita Buragohain

Assam had been largely a INC bastion since Independence, enabled by the forging of a strong base among social groups such as the Muslims and the Tea tribes[1]. The post-2000 period in the state was characterised by more than a decade of INC dominance, marked by the decline of the Assam Gana Parishad (AGP), the strengthening of the BJP, and the emergence of the All-India United Democratic Front (AIUDF) as a strong force among religious minorities, and of the Bodo Peoples' Front (BPF) as the dominant party among the Bodo tribe. The 2014 Lok Sabha polls brought in the BJP as a dominant player for the first time, as the party secured half of the state's 14 seats, with the INC and AIUDF getting three each, and one seat going to an independent candidate. In the assembly elections held two years later, the BJP in alliance with two major regional outfits, the AGP and the BPF dislodged the INC and came to power in the state with the promise of saving the 'nation, land and foundation' (*jati*, *mati*, *bheti*) from 'illegal immigrants'. The stage was thus set for a major contest between forces led by the two polity wide parties in the Lok Sabha elections of 2019. The state witnessed a three-cornered contest in the 2019 Lok Sabha elections, with the INC, the BJP-led NDA, and the AIUDF as the major players. To the extent that the AIUDF put up candidates in only three constituencies that it had won in the 2014 elections, the contest was largely bipolar in most of the constituencies. Kokrajhar was the lone exception which saw the significant electoral presence of minor parties and independent candidates. Though the INC and AIUDF contested on their own, the latter unilaterally restricted its participation to three of its strongholds, announcing that this move was to strengthen the secular camp against the BJP's alleged communal agenda. The INC contested on all seats. The BJP put up candidates in ten out of the state's 14 constituencies, leaving four for its alliance partners, three for the AGP, and one for the BPF. The elections, held in three phases saw large voter turnouts, especially in constituencies with the preponderance of Muslim populations, the highest turnout being in Dhubri at 90.66% and lowest in Lakhimpur at 75.17% (Bhuyan 2019c).

The results of the 2019 election reinforced the growing dominance of the saffron party that gained nine seats, increasing its tally by two from

DOI: 10.4324/9781003159971-24

CITIZENSHIP DEBATE OVER NRC & CAA

Assam and the Politics of History

Nani Gopal Mahanta

24 Assam
Saffron persists in an ethnic setting

Dhruba Pratim Sharma, Vikas Tripathi, and Dikshita Buragohain

Assam had been largely a INC bastion since Independence, enabled by the forging of a strong base among social groups such as the Muslims and the Tea tribes[1]. The post-2000 period in the state was characterised by more than a decade of INC dominance, marked by the decline of the Assam Gana Parishad (AGP), the strengthening of the BJP, and the emergence of the All-India United Democratic Front (AIUDF) as a strong force among religious minorities, and of the Bodo Peoples' Front (BPF) as the dominant party among the Bodo tribe. The 2014 Lok Sabha polls brought in the BJP as a dominant player for the first time, as the party secured half of the state's 14 seats, with the INC and AIUDF getting three each, and one seat going to an independent candidate. In the assembly elections held two years later, the BJP in alliance with two major regional outfits, the AGP and the BPF dislodged the INC and came to power in the state with the promise of saving the 'nation, land and foundation' (*jati*, *mati*, *bheti*) from 'illegal immigrants'. The stage was thus set for a major contest between forces led by the two polity wide parties in the Lok Sabha elections of 2019. The state witnessed a three-cornered contest in the 2019 Lok Sabha elections, with the INC, the BJP-led NDA, and the AIUDF as the major players. To the extent that the AIUDF put up candidates in only three constituencies that it had won in the 2014 elections, the contest was largely bipolar in most of the constituencies. Kokrajhar was the lone exception which saw the significant electoral presence of minor parties and independent candidates. Though the INC and AIUDF contested on their own, the latter unilaterally restricted its participation to three of its strongholds, announcing that this move was to strengthen the secular camp against the BJP's alleged communal agenda. The INC contested on all seats. The BJP put up candidates in ten out of the state's 14 constituencies, leaving four for its alliance partners, three for the AGP, and one for the BPF. The elections, held in three phases saw large voter turnouts, especially in constituencies with the preponderance of Muslim populations, the highest turnout being in Dhubri at 90.66% and lowest in Lakhimpur at 75.17% (Bhuyan 2019c).

The results of the 2019 election reinforced the growing dominance of the saffron party that gained nine seats, increasing its tally by two from

DOI: 10.4324/9781003159971-24

SAGE STUDIES ON INDIA'S NORTH EAST

HINDUTVA REGIME IN ASSAM

Saffron in the Rainbow

Akhil Ranjan Dutta

Administrative History of Undivided Assam (1826-1947)

An Account of British Administration in Assam

Editors
Jatin Hazarika
Dhruba Pratim Sharma

Peer Reviewed & Refereed

ADVANCES IN MEDICINAL PLANT SCIENCES

Volume - 3

Chief Editor
Dr. Anil Kumar

Co-Editor
Dr. A.S. Jondhale

Integrated Publications
New Delhi

Published By: Integrated Publications

Integrated Publications
H. No. - 3 Pocket - H34, Sector - 3,
Rohini, Delhi-110085, India

Chief Editor: Dr. Anil Kumar
Co-Editor: Dr. A.S. Jondhale

Publication Year: 2022

Pages: 137

ISBN: 978-93-93502-28-5

Book DOI: https://doi.org/10.22271/int.book.132

Price: ₹ 747/-

Contents

Chapter - 3

Review on the Potential Role of *Boerhavia diffusa* as a Medicinal Plant

Aashis Dutta and Dr. Manas Das

Abstract

The various side effects of the allopathic medicines have driven the minds of scientists and researchers to shift their focus on the pharmacological characteristics of herbal plants. The present review explores the therapeutic potential of a perennial herb, *Boerhavia diffusa* that has been used in the Ayurvedic and Unani system of medicine. Numerous medicinal properties including anti-oxidant, anti-inflammatory, anti-hyperglycemic, anti-nephrotoxic, cardiotonic, anti-cancer property have been found to be present in the plant that has been primarily attributed to the presence of phytochemical constituents like the alkaloid punarnavine. Thus, the possession of a number of phytoconstituents isolated from primarily the ethanolic and the methanolic extract confers the multifaceted character of being effective against a number of ailments. However, extrapolated studies on the medicinal characteristics of the crude extracts of the herb as well as the isolated compounds are required that might be useful in exploiting the curative property to a whole new extent and as such the herbal treatment of various human diseases like diabetes, renal disease and cancer might thereby reduce the load on allopathic medicine with lesser side effects and present a holistic approach to life, stability of mind, body and environment and stress on health quality instead of disease.

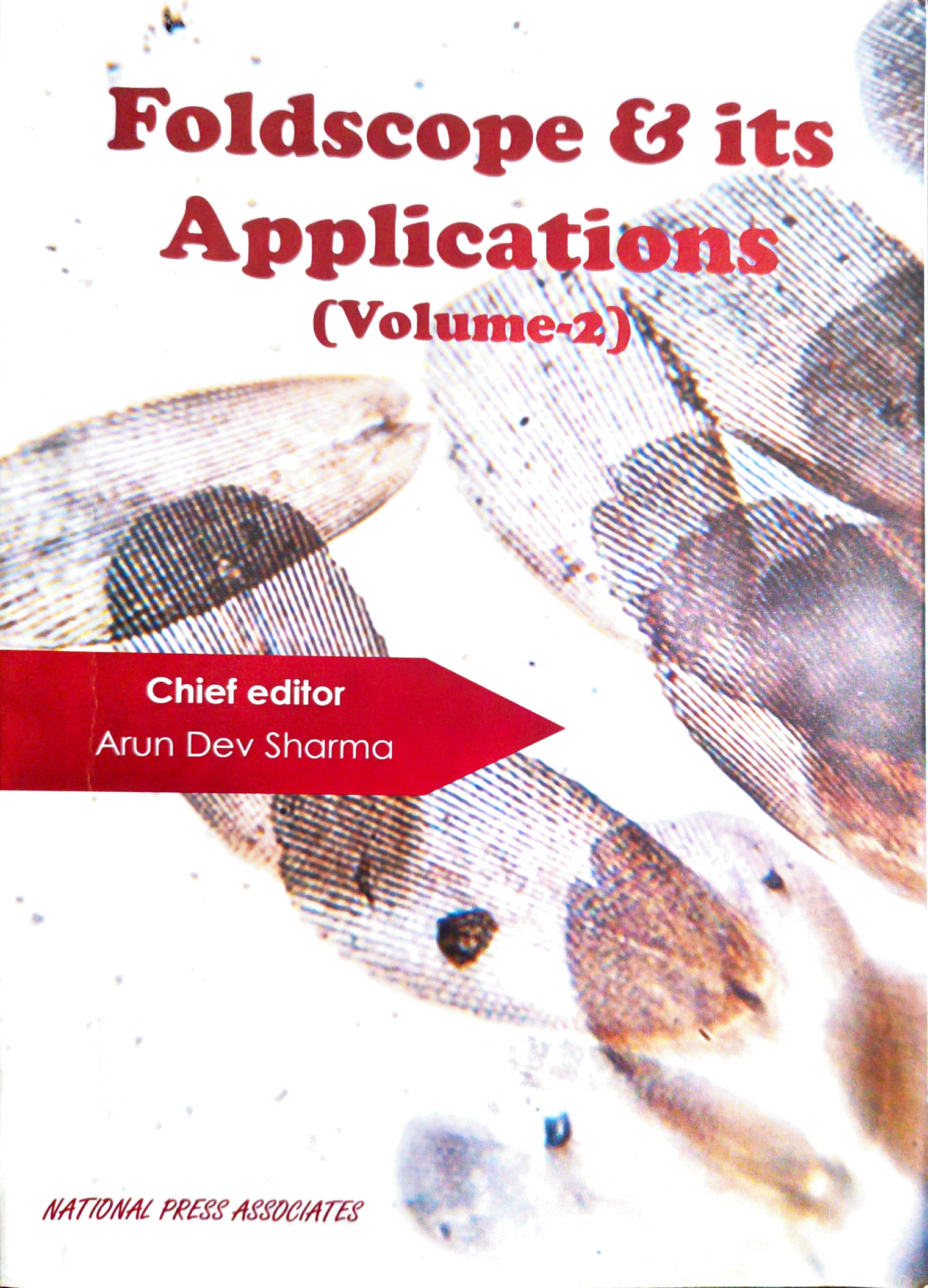
Keywords: *Boerhavia diffusa*, phytochemical constituents, punarnavine, anti-nephrotoxic, anti-inflammatory

1. Introduction

Boerhavia diffusa, a perennial herb belonging to the Nyctaginaceae family is used in Ayurvedic and Unani system of medicine in India and worldwide. The herb has excellent therapeutic features as its various parts have been demonstrated to function as appetizer, alexiteric, eye tonic and is extensively utilized in the treatment of ailments like heart disease,

Foldscope & its Applications

(Volume-2)



Chief editor

Arun Dev Sharma

NATIONAL PRESS ASSOCIATES

Foldscope & its Applications
(Volume-2)

Chief Editor

Arun Dev Sharma

Associate Prof and HOD, PG Dept of Biotechnology, Lyallpur Khalsa College Jalandhar, Punjab, INDIA

Editors

Inderjeet Kaur
Mohan Kale
M Gomathy
Pritam J
Parul Gurjar
Dharmesh Harwani
Tushar Borse
Suchita Gokhale
STV Raghavamma
Mousmi Saikia
KG Sabarinathan
Samriti Dhawan

ISBN: 978-93-90863-51-8

Price: 800-/

Published By:

National Press Associates

Head Office: *C-24, Ground Floor, Panchsheel Vihar, Malviya Nagar, New Delhi-110017, India*
Regional Office: *79, GAD Nagar, Flower Enclave, Dugri, Ludhiana, Punjab-141013, India*
Branch Office: *G-1003, Prakriti Society, Baner-Balewadi Road, Balewadi Pune, 411045 Mharashtra, India*

Email: *npapublishing@gmail.com* | *www.npapublishing.in*
Helpline: *+91-9888934889, 7986925354*

Book Tittle: Foldscope & its Applications (Volume-2)
ISBN: 978-93-90863-51-8
Published By: National Press Associates
PP: 9-16

FOLDSCOPE AS A TOOL FOR ZOOPLANKTON DIVERSITY STUDY IN DEEPOR BEEL (A RAMSAR SITE), ASSAM, NORTHEAST INDIA

*Leena Das **Manas Das

*Animal Physiology and Biochemistry Laboratory, Department of Zoology, Gauhati University, Guwahati

**Assistant Professor, Department of Zoology, Gauhati University

ABSTRACT

A Foldscope is an optical, affordable microscope and can be used as an educational cum research tool. The territory of Assam is presented with a myriad of tectonic lake called as beel. The Deepor Beel is one of the most significant natural, stable wetlands of lower Assam located between 26°06'N and 26°09'N latitude and 91°36'E and 91°41'E longitude covering an area of about 700 ha at present. The present study was carried out to investigate the composition, diversity and distribution of zooplankton community and physico-chemical parameters of the wetlands. A total of 26 species were identified in the sampled Ramsar site. Among these 19 species belongs to Rotifera, 4 belongs to Copepoda and 3 species belongs to Cladocera. The present work indicated that high value of pH, dissolved oxygen and total hardness and small value of nitrate and phosphate is a sign of good quality of water at Deepor beel. Therefore, the present study provides essential information on zooplankton diversity and ecology of the sampled Ramsar site. The advantages and importance of the Foldscope were also discussed and concluded that it can be used as an experimental tool in the study of different zooplankton species.

Keywords: Foldscope, Zooplankton, Deepor Beel, physico-chemical properties.

INTRODUCTION

Visual inspection is the first level evaluation to detect any tiny organisms in the applications. It is used to identify tiny organisms like bacteria and microorganisms as well as larger samples like insects, plants, insects etc. by conventional microscopes like compound microscope, optical microscope and scanning electron microscope (SEM). These techniques require different sample preparation methods, which are more expensive and requires tedious work. To overcome such difficulties, low-cost affordable and handy microscope called foldscope has been invented that are affordable for communities worldwide. In the year 2014, the foldscope microscope was developed by Manu Prakash and his student Jim Cybulski, at the Stanford School of Medicine, Stanford University [1]. Foldscope is an origami new low cost tool paper microscope that developed as an idea to make science more accessible. This microscope is handy as well as water proof and can be assembled from simple components like sheet of paper and a lens compared to conventional microscope [2]. Once assembled, the size of Foldscope is just like a narrow piece of card. The weight of Foldscope is just about 8 grams. The foldscope consists of a kit with multiple lenses that provide magnification from 140X to 2,000X and resolution of 2microns. The foldscope kit contains a punched sheet of cardstock, lens stage, Panning guide, Sample stage, three squared Magnetic coupler, LED magnifier and a diffuser panel, along with a watch battery that powers the LED [3]. The kit also comes with a magnet that can be stuck onto the Foldscope which can be attached to a smart phone, allowing the user to take photographs of the magnification [4]. The Foldscope is operated by placing a sample that can be mounted on a microscopic slide, ultimately turning on the LED and screening the sample while moving and focusing with its thumbs. Holding the Foldscope with both hands and placing the eye close to the micro-lens, the sample is observed. For visualisation of specimen under foldscope uses either natural light or artificial light sources operating on batteries making it useful for field study. Foldscope can also survive in extreme harsh environment, even if dropped from a six-storey building or being thrown in water [5]. Foldscope has an official app and an online platform called the Microcosmos where Foldscope users share their explorations by registering themselves using their email ID and a unique code provided with each Foldscope

ANCIENT AND TRADITIONAL FOODS, PLANTS, HERBS AND SPICES IN HUMAN HEALTH

Ancient and Traditional Foods, Plants, Herbs and Spices used in Cardiovascular Health and Disease

EDITED BY
Rajkumar Rajendram, Victor R. Preedy, and Vinood B. Patel

Ancient and Traditional Foods, Plants, Herbs and Spices used in Cardiovascular Health and Disease

The use of different foods, herbs, and spices to treat or prevent disease has been recorded for thousands of years. Egyptian papyrus, hieroglyphics and ancient texts from the Middle East have described the cultivation and preparations of herbs and botanicals to "cure the sick." There are even older records from China and India. Some ancient scripts describe the use of medicinal plants which have never been seen within European cultures. Indeed, all ancient civilizations have pictorial records of different foods, herbs, and spices being used for medical purposes. However, there are fundamental issues pertaining to the scientific evidence for the use of these agents or their extracts in modern medicine.

There have been considerable advances in scientific techniques over the last few decades. These have been used to examine the composition and applications of traditional cures. Modern science has also seen the investigation of herbs, spices and botanicals beyond their traditional usage. For example, plants which have been used for "digestion" or "medical ills" since time immemorial are now being investigated for anti-cancer properties or their toxicity, using high throughput screening. Techniques also include molecular biology, cellular biochemistry, physiology, endocrinology and even medical imaging. However, much of the material relating to the scientific basis or applications of traditional foods, herbs, spices and botanicals is scattered among various sources. The widespread applicability of foods or botanicals are rarely described and cautionary notes on toxicity are often ignored. These issues are explored in *Ancient and Traditional Foods, Plants, Herbs and Spices used in Cardiovascular Health and Disease.*

Features

- Investigates alternative healthcare paradigms that use traditional dietary foods, plant-derived materials, and extracts to treat cardiovascular diseases
- Provides information on diets, specific agents, and extracts
- Many chapters focus on plant-derived material, providing a historical background, uses, toxicity and cautionary notes and summary points

With contributions from leading international experts, this book is useful for cardiologists, nutritionists, physicians, healthcare workers, food scientists and those working in the food industry, pharmacologists, and research scientists.

FOOD & NUTRITION

CRC Press
Taylor & Francis Group
an informa business
www.routledge.com

CRC Press titles are available as eBook editions in a range of digital formats

978-1-032-10858-2

First edition published 2023
by CRC Press
6000 Broken Sound Parkway NW, Suite 300, Boca Raton, FL 33487–2742

and by CRC Press
4 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN

CRC Press is an imprint of Taylor & Francis Group, LLC

Library of Congress Cataloging-in-Publication Data
Names: Patel, Vinood B., editor. | Preedy, Victor R., editor. | Rajendram, Rajkumar, editor.
Title: Ancient and traditional foods, plants, herbs and spices used in cardiovascular health and disease / edited by Vinood B. Patel, Victor R. Preedy, and Rajkumar Rajendram.
Description: First edition. | Boca Raton : CRC Press, 2023. | Includes bibliographical references. | Summary: "The use of different foods, herbs and spices to treat or prevent disease has been recorded for thousands of years, however, there are fundamental questions pertaining to the scientific evidence for the use of these agents in modern medicine. This book investigates the use of foods, herbs, plants and spices for properties which may be beneficial in the treatment of cardiovascular disease. It provides information on diets; specific agents, items, and extracts; resources; and each chapter focuses on a plant-derived material providing a historical background, uses, toxicity and cautionary notes and summary points"— Provided by publisher.
Identifiers: LCCN 2022060969 (print) | LCCN 2022060970 (ebook) | ISBN 9781032108582 (hardback) | ISBN 9781032115344 (paperback) | ISBN 9781003220329 (ebook)
Subjects: LCSH: Cardiovascular system—Diseases—Diet therapy. | Cardiovascular system—Diseases—Alternative treatment. | Cardiovascular system—Diseases—Prevention. | Heart—Diseases—Diet therapy. | Heart—Diseases—Alternative treatment. | Heart—Diseases–Prevention.
Classification: LCC RC684.D5 A53 2023 (print) | LCC RC684.D5 (ebook) | DDC 616.1/0654–dc23/eng/20230406
LC record available at https://lccn.loc.gov/2022060969
LC ebook record available at https://lccn.loc.gov/2022060970

ISBN: 978-1-032-10858-2 (hbk)
ISBN: 978-1-032-11534-4 (pbk)
ISBN: 978-1-003-22032-9 (ebk)

DOI: 10.1201/9781003220329

Typeset in Times
by Apex CoVantage, LLC

7 *Terminalia arjuna* and Cardiovascular Protection
A Comprehensive Overview

Aashis Dutta and Manas Das

CONTENTS

LIST OF ABBREVIATIONS

DPPH	2,2-Diphenyl-1-Picrylhydrazyl
AP-1	Activator Protein-1
ALT	Alanine Transaminase
ARE	Antioxidant Response Element
AST	Aspartate Transaminase
BNP	Brain Natriuretic Peptide
Cd	Cadmium
CVD	Cardiovascular Disease
CAT	Catalase
CAM	Cell Adhesion Molecule
Col1α	Collagen 1α
Col3α	Collagen 3α
CHF	Congestive Heart Failure
CTGF	Connective Tissue Growth Factor
CAD	Coronary Artery Disease
CK-MB	Creatine Kinase-Myocardial Band
COX-2	Cyclooxygenase 2
DPP-IV	Dipeptidyl peptidase-IV
DOX	Doxorubicin
ET	Endothelin
GSH	Glutathione

DOI: 10.1201/9781003220329-9

As per the CBCS Syllabus

COMPUTATIONAL BIOLOGY AND BIOSTATISTICS

Editors

Pranjan Barman
Malabika Kakati Saikia

Authors

Kishore Sarma
Manas Das
Aashis Dutta

KALYANI