



# **PROCEEDINGS**

**9<sup>th</sup> INTERNATIONAL CONFERENCE  
OF  
UNIVERSITY LIBRARIANS ASSOCIATION OF SRI LANKA  
(ICULA-2018)**



**Academic Libraries as Research Saturation  
Reshaping the Libraries for Tomorrow**

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**Academic Libraries as Research Saturation Centers:  
Reshaping the Libraries for Tomorrow**

**20<sup>th</sup> of September 2018  
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Boralesgamuwa, Sri Lanka.**

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## **International Conferences held by the University Librarians Association of Sri Lanka**

1. **"E-information for Teaching, Research and Learning: Options for a University Consortia"**  
1<sup>st</sup> International Conference of University Librarians Association (ULA) of Sri Lanka, 27<sup>th</sup> and 28<sup>th</sup> May 2005 at Hotel Galadari, Colombo.
2. **"Information Best of Two worlds"**  
2<sup>nd</sup> International Conference of University Librarians Association (ULA) of Sri Lanka, 23<sup>rd</sup> and 24<sup>th</sup> May 2006 at Hotel Galadari, Colombo.
3. **"Libraries in Higher Education : Partners in K4D?"**  
3<sup>rd</sup> International Conference of University Librarians Association (ULA) of Sri Lanka, 8<sup>th</sup> and 9<sup>th</sup> June 2007 at Hotel Galadari, Colombo.
4. **"Libraries as Centres of Excellence"**  
4<sup>th</sup> International Conference of University Librarians Association (ULA) of Sri Lanka, 2<sup>nd</sup> and 3<sup>rd</sup> July 2008 at Hotel Galadari, Colombo.
5. **"Research for Impact (R4I)"**  
5<sup>th</sup> International Conference of University Librarians Association (ULA) of Sri Lanka, 2<sup>nd</sup> July 2009 at Hotel Galadari, Colombo.
6. **"University librarianship : An Academic Challenge and an Opportunity"**  
6<sup>th</sup> International Conference of University Librarians Association of Sri Lanka, ICULA 2010, 14<sup>th</sup> and 15<sup>th</sup> July 2010 at Ceylon Continental Hotel, Colombo.
7. **"Contribution of the Academic Librarians Towards a Knowledge Society"**  
7<sup>th</sup> International Conference of the University Librarians Association of Sri Lanka, ICULA 2011, 16<sup>th</sup> and 17<sup>th</sup> August at Hotel Galadari, Colombo.
8. **"Libraries as Partners of Knowledge Sustainability"**  
8<sup>th</sup> International Conference of the University Librarians Association of Sri Lanka, ICULA 2016, 7<sup>th</sup> and 8<sup>th</sup> March at University of Jaffna.



## Message from the Chief Guest

### Dr. Harsha De Silva

Honorable State Minister of National Policies and  
Economic Affairs & Deputy Minister of Foreign Affairs,  
Democratic Socialist Republic of Sri Lanka



## Message from the Chief Guest

I consider it a privilege to send this message to the University Librarians Association (ULA) on the occasion of its International Conference - ICULA-2018. This year the ULA has organized its 9<sup>th</sup> International Conference for the university librarians as well as other library scholars to share their knowledge and bondage of interlibrary collaboration.

The theme of the International Conference 2018, "*Academic Libraries as Research Saturation Centers: Reshaping the Libraries for Tomorrow*" is timely, appropriate and important for all LIS professionals locally as well as globally, in a context where traditional libraries are encountering an age of digitization. In this era, with the librarians taking up the role of information facilitators, the libraries have transformed into research saturation centers with more facilities, collaboration, consortium, and most importantly, more opportunity to disseminate knowledge widely. Librarians are now presented with the opportunity to utilize modern day technology to add value to libraries, thus, transcending the image and physical boundaries of a "traditional library." This will undoubtedly encourage more innovative ideas and research, with more users navigating information to generate knowledge. With a special focus on developing and sharing best practices, the theme of the conference is an apt theme in the current library landscape.

I hope this research environment will make a good opportunity for all researchers, presenters, and participants to achieve and share their new knowledge on how to reshape the libraries to more accessible research saturation centers.

While congratulating the organizing committee of University Librarians Association of Sri Lanka my best wishes for success and excellence in all your endeavors.





## Message from the Guest of Honour

### Senior Professor Hemanthi Ranasinghe

Dean, Faculty of Graduate Studies,  
University of Sri Jayewardenepura

## Message from the Guest of Honor

It is indeed a pleasure to send this message on the occasion of the International Conference of University Librarians Association of Sri Lanka (ICULA 2018), organized by the University Librarians Association Sri Lanka.

A research conference is a premier forum for academics and professionals from around the world to come together to share their research on a particular discipline. In this regard, the University Librarians Association of Sri Lanka has made an outstanding contribution to the dissemination of knowledge by providing an excellent forum for the academic librarians to come together and share their views in the sphere of Library and Information Science.

As reflected in its theme, *"Academic Libraries as Research Saturation Centers: Reshaping the libraries for tomorrow"*, this conference focuses on present innovations and future developments of the Library and Information Science in Sri Lanka. I am sure that the national and international scholars presenting their research findings will address diverse issues related to the LIS field and thus come out with new insights to benefit university librarians.

I take this opportunity to congratulate the organizers of this important conference, and wish them all the success in their efforts.

**Prof. Hemanthi Ranasinghe**

Dean/Faculty of Graduate Studies

University of Sri Jayewardenepura

## Message from the President, ULA

**Dr. (Mrs.) Nayana Wijayasundara**

Conference Chair, (ICULA-2018)

Librarian, University of Sri Jayewardenepura



## Message from the President

As the president of University Librarians Association (ULA), I am delighted to issue this message. ICULA – 2018 is the 9<sup>th</sup> International Conference organized by our association over the past years.

The theme of ICULA 2018, “*Academic Libraries as Research Saturation Centers: Reshaping the Libraries for Tomorrow*” has been aptly chosen covering many areas of academic libraries. The significance of the conference is tremendous specially, in a context where the common acceptance concerning the role of the libraries has been that of catering to teaching and learning, rather than research. Therefore, a conference of this nature, emphasizing libraries as research saturation centers is both crucial and timely.

ICULA 2018 is enriched with a keynote speech by Associate Prof. Dr. Kiran Kaur from the Department of Library & Information Science, University of Malaya, Malaysia, and many interesting research projects undertaken by our colleagues. Therefore, I earnestly request all of you to actively participate and share your experiences during the day.

I would like to extend my gratitude to our Chief Guest, Dr. Harsha De Silva, Honorable State Minister of National Policies and Economic Affairs and Deputy Minister of Foreign Affairs for gracing the occasion.

And also our sincere gratitude extends to our Guest of Honor, Senior Prof. Hemanthi Ranasinghe, Dean, Faculty of Graduate Studies, University of Sri Jayewardenepura for sparing her precious time to enlighten our audience.

The success of this conference can be attributed to the untiring efforts of the organizing committee led by Dr. Champa N. K. Alahakoon. I thank all members of the committee who worked round the clock; for their commitment and hard work to make this event a success. And then there are our generous and encouraging sponsors, whose financial and programming support were vital to the success of our conference.

Finally, whilst wishing this conference every success, I hope it would be a productive and thought provoking one, and wish all participants an intellectually rewarding experience.

Nayana Wijayasundara, PhD

President

University Librarians Association of Sri Lanka



## Message from the Convener, ICULA-2018

**Dr. (Ms.) Champa N. K. Alahakoon**

Vice-President, ULA  
Senior Assistant Librarian,  
University of Peradeniya

## Message from the Vice-President

I am delighted and honored to be the convener of this 9<sup>th</sup> International Conference of University Librarians Association of Sri Lanka (ICULA-2018). I welcome you all to this most important academic event.

The University Librarians Association of Sri Lanka is strongly believes and identifies that the necessity of having an International collaboration with other LIS professionals in the country to broader the research knowledge in the reshaping of university libraries which suits to the modern university librarianship. Therefore, this international conference aptly provides an open platform to disseminate the modern concepts and research findings in the new areas of research among the LIS professionals all over the country.

The theme of this year's conference "*Academic Libraries as Research Saturation Centers: Reshaping the Libraries for Tomorrow*" has been chosen to address many aspects of university library developments. Altogether, there are 100 full research papers and nine research abstracts and extended abstracts accepted for the oral presentation and the conference will be addressing three sub themes; **Quality Assurance & Enhancement in Libraries, Understanding user needs and information seeking Behavior, and Promoting Libraries in the Age of Digital Media.**

Planning an International Conference is an extensive and untiring effort. As such my gratitude is extended to ICULA-2018 organizing committee. On behalf of the organizing committee, I would like to thank panel of reviewers, and language editors of the conference proceedings for their academic contribution rendered towards ICULA-2018. I also take this opportunity to express my gratitude to all sponsors who have supported in many ways to make this event a great success.

Finally, my heartfelt gratitude is expressed to all invitees' presenters and participants for grassing the event success and I wish them a bright research future.

Champa N. K. Alahakoon, PhD  
Vice - President  
University Librarians Association of Sri Lanka



## Keynote Address



### **Supporting Research Activities : The continuing challenges faced by Academic Librarians**

**Kiran, Kaur**

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Faculty of Computer Science & Information Technology  
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#### **Introduction**

Academic libraries have always been in the forefront in technology adoption. Basic library functions have been the impetus of the development of complex library management systems. When the era of digitization came around, it was library systems that struggled and succeeded in developing digital library system to be incorporated into the library management systems. Soon after open access became the buzz technological innovation. Again libraries adopted systems such as Greenstone, eprints, Dspace to initiate the development of institutional repositories (IR). IRs are a huge success in academic libraries in their support towards scholarly publications, though some developing countries are still struggling to adopt this technology successfully, both technically and in content



development. Yet another demand is now at the academic library doorstep, the research data management (RDM) systems. Academic libraries are now challenged to lead in the advocacy and policy development of RDM. There is an increasing trend for researchers to examine the maturity of research data services to the university community, however many developing countries face the challenges of resourcing, interoperability with existing systems and achieving 'buy in' from researchers. ACRL (2018) reported on its review of trends and issues affecting academic libraries in higher education with regards to political, economic and technology impact on librarianship. There are many areas raised in this report, all of which, though American based, may be of concern for developing countries at different levels of implementation. What is crucial is the fact that the higher education landscape has changed, thus university libraries need continual progression towards meeting the demands of this change.

Hadjinicola and Soteriou (2006) opinioned that there are 3 factors that have had an influence on increased research productivity, one of which is superior library facilities. At that time they were referring to books, journals, databases and the library system, while increased productivity was in number of publications and quality of publications. Though this study is limited to the production and operations management researchers' perception, the empirical results revealed that access to relevant sources of information in a research area enhances the publication productivity of the researchers in that field. Thus, librarians must maintain a good knowledge base of the research areas in their universities and plan and deliver information services and resources to enhance the output of these areas. No library can respond to every new trend in the field (Saunders, 2015), but librarians need to be in the know about these trends so that they may focus their resources and efforts towards prioritizing among the challenges facing them.

The challenges faced by librarians and libraries are many, depending on the current development state of the libraries within their institution. In the following sections, several key issues are presented briefly pertaining to challenges that university librarians need to prepare for in keeping their libraries relevant to researchers.

## **The Librarian**

What do university librarians do to support research activities at their parent institution? The typical answer would be provide support through collection building, search skills training, demonstrate the role of a liaison officer or research support librarians, among others. The more advanced librarians may even take on

the role to provide services for researchers engaging with new models of scholarly communication, research data management and emerging technologies (Blatchford et al., 2015). Traditional roles of 'custodians of knowledge' are diminishing to be replaced by 'collaborators in productivity of research and publication' (Bent, 2016). So where do university librarians start? Firstly, be clear about your commitment. Are you as a university librarian comfortable with your traditional functions or are you committing yourself to elevating the professional librarian as a practicing research partner? Once committed to be a research partner, the university librarian needs to equip him/herself with the right skills and competencies. Each librarian has to assess their own efficiencies and identify areas for improvement. Liaison officer not only offer suggestion on relevant resources to research groups or clusters, but are now to equip themselves with the ability to partner in systematic reviews of the literature. Support not only the information retrieval but also valuable input in the evaluation and selection of materials. Monroe-Gulick, O'Brien and White (2013) discussed about how academic librarians can explore the concept of embedded librarianship to research partnerships at universities. They highlighted some pertinent benefits in involving librarians as research partners: (i) increased knowledge on grant-funded project in research centers – understanding of function can help improve services; (ii) increased understanding of the research trends in the university – results in improved knowledge about research methodologies and also expand the types of user communities to be served.

An issue which needs to be overcome at this point is the librarian's lack of confidence in dealing with academics (Creaser et al, 2014). Faculty perception of librarians has been a research agenda. Oberg, Schleiter and van Houten (1989)'s study concluded that the greater the faculty contact with the library, the higher the rank given to librarians. In their paper they cited Robert Grover and Martha Hale (1988) who suggested that to fulfill successfully their role in the research of others, librarians must come to understand "the paradigmatic structure" of several disciplines, "anticipate the researcher's patterns," participate "in the analysis of data and interpretation of results," and "form partnerships [with researchers] in order to facilitate the research process". Yet 30 years ahead we are still discussing the positioning of librarians in a university, especially the university's research agenda. Librarians are trusted partners within their institutions, frequently referred to by academics for help with their research and career activities ranging from reference management to citation tracking. Yet, most often librarians find themselves to be viewed as purchasing agents! As Jaguszewski and Williams (2013) state, we are now having to focus on 'what users do (research, teaching and learning), rather than

what librarians do (collections, reference, library instruction)' so that librarians can re-position themselves in the university.

## **The Library as a Place**

The university library itself is seen as a physical building. This entity is given much attention within a university's landscape and some universities are world renowned for the beautifully architecture and designed buildings that house the university library. Thus, the library as a place cannot be ignored. One of the most unavoidable changes because of technological advancements is the increasing reliance on digital resources. When users increasingly rely on digital rather than print resources, libraries respond by shifting space usage from stacks to user working and reading spaces (ASU Library, 2017). Space management is the second most important aspect in library strategic planning (Saunders, 2015). In a research university library, the need for comfortable and safe place is superseded by space used for learning commons, research collaborative spaces, research showcase and space for incubator projects.

As researchers increasingly rely on electronic resources, new methods of promoting the use of print materials among researchers must be formulated. This trend of away from open stacks renders a less effective utilization of campus space in the eyes of some administrators, particularly at a time when more demands are placed on such spaces. What can be done is provide highly engaging open stack print collections. Librarians collaborate with researchers to get to know the researchers, what they are currently working on, be involved in information seeking, package information from texts, and be engaged with the researchers. Embedded librarianship for research benefits is to be widely practiced.

Also have a good succession plan. Have the transition from one liaison officer to another smooth and without break in service or lack in service and understanding their needs. Library collection must promote experience. Have a diverse collection and make it known and accessible.

According to Farmer (2015), the mix of flexible and dedicated spaces offers opportunities for concentrated work to support research. Libraries need to conduct needs assessment that can drive renovations and reallocation of library space in support of researchers and their activities. Nitecki (2017) suggests using library spaces as venues for pilot and field testing new technologies and space design before placing the newest innovations around campus or learning environments. A suggestion given by Arizona State Library is to involve users in the development of curation and display of research, this will encourage a sense of investment in the



library's collections. It is hoped that the co-creation of collections will bring new users into the library space, since they will have a personal interest in displays as well. Another interesting approach to assist users to fit within the library community is to consider crowdsourcing data. Library can develop an interface online that allows users to suggest new tags for the materials that they find in library holdings that may be saved to provide a personal view of library collections (ASU, 2017).

## **Privacy and Intellectual Academic Freedom**

The International Federation of Library Associations and Institutions (IFLA)'s statement on Libraries and Intellectual Freedom declares that human beings have a fundamental right to access to expressions of knowledge, creative thought and intellectual activity, and to express their views publicly. A commitment to intellectual freedom is a core responsibility for the library and information profession. The development of library collections in support of an institution's instruction and research programs should transcend the personal values of the selector. In the interests of research and learning, it is essential that collections contain materials representing a variety of perspectives on subjects that may be considered controversial

*"Banning books silences stories. Speak out!"* What does this slogan indicate?

In support of teaching, learning and research, academic library acquisition practices have built collections of resources which represent a wide diversity of opinions and topics including materials deemed controversial or unpopular by some. Academic libraries face censorship, which have research implications. What is your institution's policy on restricted materials? What is your library's policy on banned materials? Does your institution remove or restrict access to library materials and services? People challenged films featuring both pro- and anti-LGBT content? Teen magazines? Selected displays and art exhibits? Selected Authors? Selected politicians? An interesting article by deKerckhove et al. (2015) discusses the rising politicization of science. According to them, researcher or scientist involvement in government policy can lead to conflict in scientific findings. What role can the library play in educating the scientist about intellectual academic freedom?

Closely related to this is the issue of patron privacy. Libraries have deep and longstanding principles of protecting patron privacy. Privacy is essential to the exercise of free speech, free thought, and free association. In a library (physical or virtual), the right to privacy is the right to open inquiry without having the subject of one's interest examined or scrutinized by others. According to the American Library Association, ALA, Confidentiality extends to "information sought or



received and resources consulted, borrowed, acquired or transmitted" (*ALA Code of Ethics*), including, but not limited to: database search records, reference questions and interviews, circulation records, interlibrary loan records, information about materials downloaded or placed on "hold" or "reserve," and other personally identifiable information about uses of library materials, programs, facilities, or services. Research findings, especially breakthrough findings are extremely confidential in the initial stages of the research. Library must negotiate with vendors not to track users when using Internet in the library or when accessing databases and not to sell user data. More than ever researchers in the university must have the confidence and trust in the university librarians to ensure their privacy.

### **Open Science, open access, open data**

Open science is a movement to make science open. In other words it encompasses open access, open data, open source, open standards, even open peer review and open notebook science. All of which was previously well guarded, is now to be made openly accessible and shared. So how does this implicate the university librarians? It is the core business of the library – acquire and disseminate. Stakeholders, including researchers, librarians, publishers, data centers, funding agencies and policymakers, need to work together to build a global infrastructure which will enable research data to be stored, shared, discovered and used to its maximum potential. Librarians need to know and educate researchers on data repositories, dataprofile, in-article data-visualization, research data search engines, alternative metrics, peer-review tools, etc. Librarians as data scientists?

Martin (2015) in her editorial highlights the values the library science profession brings to the data science. These values include: focus on the user, user needs and user behavior, an ethical base, a penchant for collaboration and equal access to all types of information. Some of the activities may include: assessing researcher needs, performing an institutional data environmental scan, designing services based on user needs, recommending file naming conventions, helping a providing assistance with guidelines for clinical research data, offering in-person and online classes on data management, data tools and data visualization software. As librarians increasingly get involved in showcasing their institutions' expertise and experts, promoting and supporting the sharing of open data, managing repositories and curating research data, professional development will need to keep up.

## Conclusion

Future librarians need to position themselves within the academia as collaborators not just service providers. The academia needs help in being guided in the process of accessing, sharing and archiving information and data. As Carol Tenopir (2018) said recently, “we are working for the past, present and the future all at the same time”. So the core roles of the university librarian remains but the actualization of these roles evolves based on the technological changes and the demands of newer trends in scientific communication. It's time university librarians polish their librarian skills, their research skills and their technological skills to elevate themselves into the university research platform and stay relevant, respected and irreplaceable.

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

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### **Abstract**

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

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

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### **Abstract**

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

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

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

## **Introduction**

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

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

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

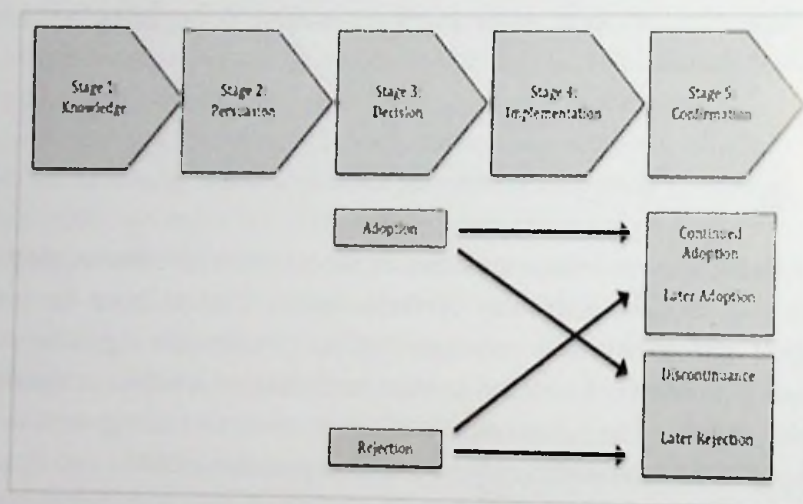
## **Methods**

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



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

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



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

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

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

## **Discussion**

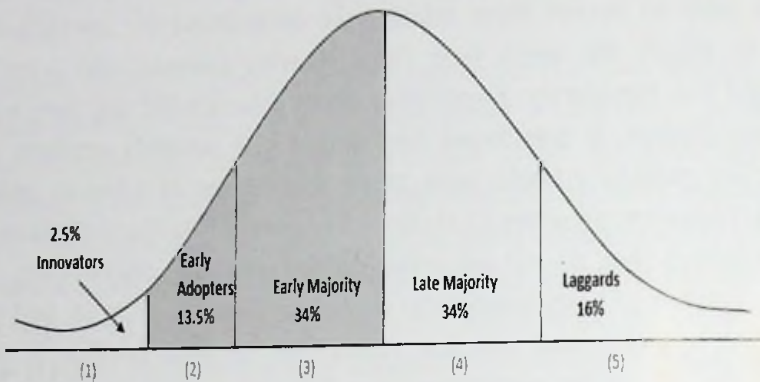
According to the Rogers (2003) model, the first factor to be investigated was the users' knowledge pertaining to e-books and associated devices used to access them which was ascertained by investigating the extent to which the users were familiar with e-books and what factors supported this familiarity.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

**Table 1: Devices used to access e-books**

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

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

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



**Figure 2: Diffusion of innovation curve**

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



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

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

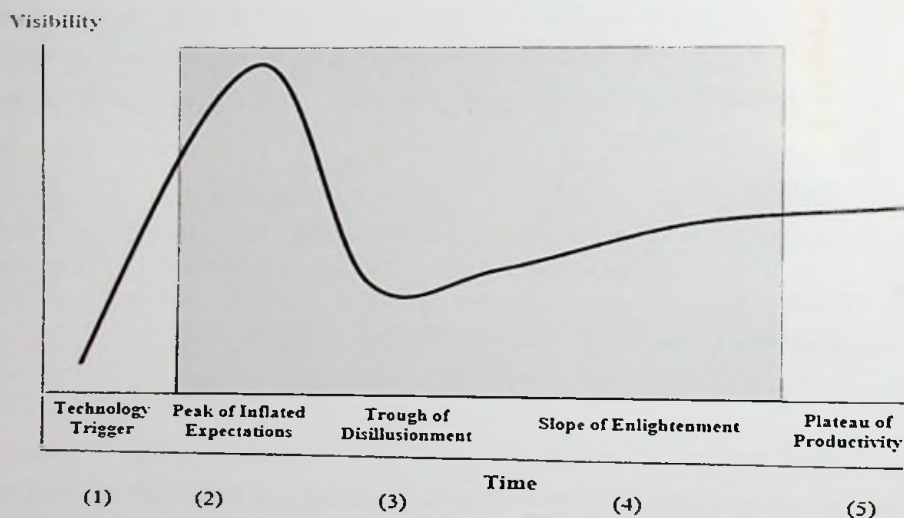
*"Obviously, the increase in availability, searchability and especially in accessibility have greatly supported me for much more information, which can be consulted than ever before. We do not need to go to local library and search materials spending hours and hours and end up with frustrations" (2<sup>nd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

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

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

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

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



**Figure 3: Gartner Hype Cycle**

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

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

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



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

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

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

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

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

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

## Conclusion

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

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## **DETERMINANTS OF USERS' SATISFACTION WITH E-LIBRARY SERVICES IN ACADEMIC LIBRARIES OF SRI LANKA: APPLICATION OF STRUCTURAL EQUATION MODELING (SEM)**

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### **Abstract**

Determining the factors affecting users' satisfaction with different library services is an important aspect of the present library-related research context. Related research findings have been reported by library professionals in their studies to understand their clients' information seeking behaviour patterns and popular information sources used in both conventional and modern scenarios. Therefore, as a better attempt, this study was steering towards the model identification and testing of users' satisfaction by using statistical tools and techniques. The main purpose of the study was to introduce a simple model to measure the users' satisfaction with e-Library services in academic libraries of Sri Lanka. The other purposes of this study were to scrutinize and test the causal relationships between service qualities, perceived service values and users' satisfaction. To carry out the research 03 hypotheses formulated while developing a conceptual model throughout the Structural Equation Modeling (SEM). The proposed model was tested utilizing the information provided by a survey conducted at the Rajarata University of Sri Lanka. The sample size was 285 and the primary data of the study were collected through a structured questionnaire applying 5 points Likert scale on the three aspects of Service Quality, Perceived Service Value and User's Satisfaction. The model was tested using several statistical tests such as Cronbach's alpha reliability test and Confirmatory Factor Analysis (CFA) techniques. Further, a path analysis of Structural Equation Model was conducted to test the hypotheses used in the study.

Findings of the study indicated that there are direct associations between service quality and user's satisfaction and service value and user's satisfaction as well. This study also found that service quality and service value are positively related to the proposed model.

**Keywords:** *Service Quality, Perceived Service Quality, Users' Satisfaction, E-Library Services.*

## **Introduction**

Academic or University libraries are considered as depositories where every kind of information sources would be available. These always have been the service providers supporting the learning and teaching processes of higher education institutions. The services of these entities are mainly utilized by the students, teachers and researchers of those institutes. The library of a university is considered as an integral part of the academic program therefore it is called "the heart of the University".

A common phenomenon is that with their busy schedules, most of the academic library users need to access library facilities efficiently and effectively. According to the Veena and Kotariv (2016) "satisfying the library users has been the key role of academic librarians".

In the new information era, various types of information sources, Electronic Resources are added continually to the library systems in addition to their conventional information sources such as, printed books, and journals. The Internet is one of the main sources of E-resources. The nature of E-resources is its tendency to getting duplicated through many resources. Academic E-journal and bibliographic databases are accepted as trusted sources of information among scholars. Therefore managing a collection of certain amount of these E-Resources has become an essential part of any library context. Kassim (2009) noted this as a challenge among both librarians and users. Therefore, determining of users' perceptions and levels of satisfaction with using e-Library services in the academic library context will be most beneficial. Further, the difficulty in dealing with E-resources due to information overload might be a cause for dissatisfaction among the users.



There are sufficient research conducted on studies examining influential factors regarding users' satisfaction. According to current studies, certain factors have a direct and major impact on users' satisfaction. Therefore using different conditions, time, and individuals, conducting more research on complex factors of users' satisfaction is essential. Investment on the Library has a tremendous impact on student retention, and university ranking, as well as accreditation (Iroaganachia & Nkikob, 2016). Thus libraries must continually articulate their real contributions to the overall mission and objectives of the parent institution to justify or warrant continued investment. According to the Adeniran (2011), "Libraries are established to provide information resources and services to meet users' information needs".

Dominici, Palumbo and Basile (2015) described some direct and indirect influential drivers for users' satisfaction at the academic libraries as; use of the collections, library operation time, advisory service, ILL service, reading room facilities and supplementary services such as e-resources delivery. Consequently, this research aspired to make out the most influential factors of users' satisfaction and moreover their association and also to employ them as considerable sub-structures of university library that would strive for enhancement in library efficiency through providing superior services to their end-users. This study would help university management to uncover the user's requirements, thereby to improve users' satisfaction and the customer service reputation. To achieve this purpose, a Structural Equation Modeling (SEM) approach is applied. The remaining part of the article consists of literature review, methodology of the Study; data analysis with interpretation, findings and conclusion.

## **Review of Literature**

### ***User's Satisfaction***

The terms 'user's satisfaction' or 'customer's satisfaction' can be identified as the major concept found in the marketing literature which can be considered as achieving the maximum level of his or her satisfaction about the goods or service which is the ultimate goal of all business activities. Customer satisfaction is defined as a customer's overall evaluation of the performance of an offering to date (Johnson & Kwak, 2012). Today,

institutions face their highest competition, because they move from a product and sales philosophy to a marketing philosophy, which gives a company a better chance of out performing competition (Kotler, 2000). Overall users' satisfaction brings about more profits for companies and market share increase. Several researchers have pointed out the importance of the principal concern of the service provider to be connected with users by developing a strong user affiliation to meet their potential needs.

### ***Social Sciences Theories of Users' Satisfaction***

In general, there are several reasons which compel consumers to endeavour or to congregate a need. The first reason is the return which gives the customer a sense of relief. The second one is enrichment which leads to feeling delighted. Oliver, Rust and Varki (1997) discuss those need fulfilment attributes by dividing it into three parts:

- 1) Lower - need fulfilment attributes which are known as monovalent dissatisfies and cause dissatisfaction when flowed.
- 2) Higher - need fulfilment attributes which are known as nonviolent satisfies and they will satisfy the customer when present but will not cause dissatisfaction if absent.
- 3) Bivalent satisfies which affect satisfaction and dissatisfaction similarly depending on their presence or absence.

### ***The Theory of Three-Factor***

Morgan and Hunt (1994) report from their initiative study about the theory of three factors of satisfaction.

- 1) "Basic factors – Those are defined as the 'dissatisfies factors' which are least necessities that directed to dissatisfaction if not fulfill, however by fulfilling them, customer satisfaction will not be achieved. Under this, they described the low performance has a greater outcome on overall satisfaction than high performance. The relationship between factor - level performance and overall satisfaction is proportioned.

- 2) Excitement factors - Those are defined as the 'satisfies' which are factors by whose distributing the service provider might increase satisfaction but do not lead to dissatisfaction if they are not delivered. Excitement factors are not in expectation list of customers; instead, they could surprise customers and generate delight in them. The relationship between factor- level performance and overall satisfaction is symmetric.
- 3) Performance factors - Those are defined as the 'hybrids' could bring about satisfaction if performance is high and dissatisfaction if performance is low. There is a linear and symmetric relationship between performance and overall satisfaction."

### ***Association among users' satisfaction, service quality and Service Value***

During the past few decades a significant amount of research has been conducted reporting associations between service quality and users' satisfaction both in marketing and educational sectors. It has also been reported that all the elements of service quality directly influenced the users' satisfaction. Cronin and Taylor (1992) confirmed that the service quality is "an important antecedent of users' satisfaction". Spreng and Mackoy (1996) also pointed out that "higher service quality leads to higher users' satisfaction" while functioning on the model which was developed by Oliver et al. (1997). Fornell (1992) revealed that the higher users' satisfaction is an indicator of high Perceived quality. In consistent with these findings, the researchers have hypothesized the following:

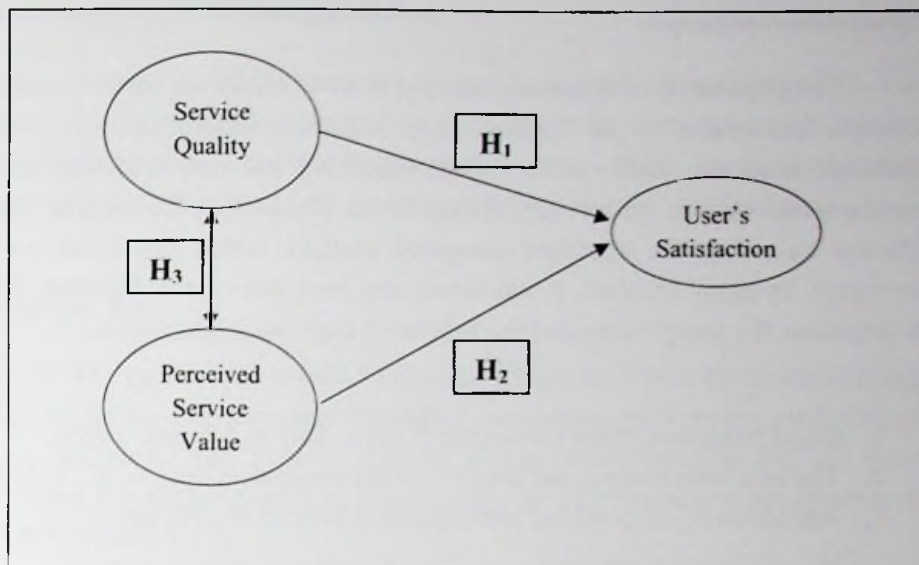
**Hypothesis (H<sub>1</sub>):** There is a positive relation between Service quality and User's Satisfaction.

**Hypothesis (H<sub>2</sub>):** Perceived Service value influence on User's satisfaction

**Hypothesis (H<sub>3</sub>):** There is a relationship between Service quality and Perceived Service Value

Based on the above hypotheses, the following conceptual model was illustrated.





**Figure 1: Proposed Conceptual Model**

## **Methodology**

The study was conducted to test the above model, hence the methodology of the whole process was designed accordingly. The questionnaire was designed with five points Likert scale questions in relation to the above constructs. Using the above proposed conceptual model the current level of the service quality of the e-library services of the library was measured by using the five dimensions (Reliability, Assurance, Tangibility, Empathy, Responsiveness) which has been developed by Zeithaml, Berry & Parasuraman (1996) throughout their SERQUAL model. The level of the user's satisfaction was measured by using the four dimensions (service value, corporate image, loyalty, switching intention) which was adopted from the previous studies conducted by Cronin, Brady & Hult (2000) and Wang, Lo & Yang (2004). Users' expected level of the Perceived service value was measured by using five dimensions (Reliability quality, Assurance quality, Tangible quality, Empathy quality, Responsiveness quality) developed by Zeithaml, Berry and Parasuraman (1996).

### ***Population and Sample***

The population of this study was the users of e-Library services at the Rajarata University of Sri Lanka. They included undergraduates, post-graduates academic staff members, administrative and non-academic staff members and outside researchers. From above population, the sample was selected by using the stratified sampling method which has been used previously by many scholars. It was found that there were several approaches to determine the sample size and the following three were prominent.

1. Good judgment of the researcher (Green, Tull & Albaum, 1988)
2. The available budget and the cost of the research (Green et al., 1988).
3. Attraction of all potential participants (Green et al., 1988).

Therefore, it was considered those factors as well before selecting the sample size. Mohajerani and Miremadi (2012) has used the following formula to determine the sample size for their study.

$$n = \frac{z^2 pq}{e^2}$$
$$n = \frac{(1.96)^2 0.75 * 0.25}{0.05^2}$$
$$n \text{ (Sample size)} = 285 \text{ participants}$$

n = Sample size

z = Level of confidence according to the standard normal distribution

p = Estimated proportion of the population that presents the characteristic

e = Tolerated margin of error

q = 1-p

The researcher of this study decided to accept the above formula of sample size to determine the service quality, Perceived service value and the level of the satisfaction by end users of e-library service of the Rajarata University of Sri Lanka with a confidence level of 95 per cent and with the measured P-value of 75%. Therefore, the sample size of the study was 285.

Data analysis and Interpretation

Statistical techniques were applied to analyse the primary data. The reliability and validity of the survey were tested by using the reliability and validity techniques and other statistical tests were used to obtain more clarity regarding the influence of the selected variables on user’s satisfaction.

Response Rate

The questionnaire with five points Likert scale was distributed among the 350 library end-users and 300 filled questionnaires were returned. Out of those 300 responses, 25 were rejected due to incompleteness and 275 were accepted for further analysis. The overall rate of response of the study was 85.71% (Table 1).

Table 1: Distribution of Sample and Rate of Response

Sample Category	Proportion (%)	Questionnaire Distributed	Responses
Undergraduates	50	175	170
Post-grandaunts	25	88	58
Academic staff members	15	53	51
Administrative staff	5	17	11
Non-academic staff members	3	10	9
Outside researchers	2	7	1
Total	100	350	300
Overall Response Rate			85.71%

Reliability Statistics with Cronbach’s Alpha

Cronbach's alpha is widely used as a measure of internal consistency, that is, how closely related a set of items are as a group. This can be used as a testing tool for the observation of the reliability of the proposed model (Bentler, 2004). There are many arguments in between the accuracy levels of the internal consistency among the scholars. Du Plessis (2010) has concluded that when calculating Cronbach's alpha,the reliability test result exceeding



0.60 will expose the higher level of inconsistency. However, when testing a model using one of the survey data it needs to satisfy the test of reliability having as the standard score ( $\leq 0.70$ ).

Determining the factors which can be used to measure the level of user's satisfaction relevant to the e-Library services, based on the service quality and perceive service value, questionnaire consisted of 14 statements relevant to three constructs; user's satisfaction (5), service quality (4) and perceive service value (5). Table 2 shows Cronbach's Alpha values for selected three constructs and consolidated Cronbach's Alpha value of total 14 items.

**Table 2: Reliability Statistics with Cronbach's Alpha**

Variables	Items	Cronbach's Alpha
Model	14	0.897
Service Quality	4	0.789
Perceived Service Value	5	0.786
User's Satisfaction	5	0.746

Source: Author Calculation by using SPSS 22

As shown in Table 2, the study first computed the consolidate score of 14 items Cronbach's alpha was 0.897. Secondly it computed individual Cronbach's Alpha for each Construct, and the values were; Service Quality (Cronbach's alpha = 0.789, items =4), Perceived service value (Cronbach's alpha = 0.786, items =5) and User's Satisfaction (Cronbach's alpha = 0.746, items =5).

### ***Confirmatory Factor Analysis (CFA)***

Confirmatory Factor Analysis (CFA) is widely used by scholars to verify the factor structure of a set of observed variables. According to the Anderson's and Gerbing's (1988) instructions, it was conducted the Confirmatory Factor Analysis (CFA) to assess the convergent construct validity of the model, by determining the significant t-value of each

construct's estimated pattern coefficient on its posited underlying construct factor using the STATA version 12. The test results are shown as follows;

**Table 3: Confirmatory Factor Analysis Fit Statistic Results**

Measures	$\chi^2$	P-value	RMSEA	GFI	AGFI	NNFI	CFI
Model	25.75	0.175	0.025	0.998	0.95	0.987	0.879
Service Quality	7.845	0.225	0.0012	0.889	0.878	0.952	0.889
Perceived Service Value	6.849	0.232	0.043	0.987	0.960	0.972	0.986
Customer Satisfaction	2.260	0.323	0.026	0.994	0.971	0.997	0.999

Source: Authors Calculation by using STATA

Table 3 depicts CFA test results of the proposed user's satisfaction measurement model. The CFA results provide overall fit indices ( $\chi^2 = 25.75$ ), RMSEA (Root Mean Square Error of Approximation) = 0.025, GFI (Goodness of Fit) = 0.998, AGFI (Adjusted Goodness-of-Fit) = 0.95, NNFI (Non-Normed Fit Index) or TLI (Tucker-Lewis Index) = 0.987 and CFI (Comparative Fit Index) = 0.879. Considering all the parameters of the goodness of model, it supports that the proposed model is reasonably fitted toward the structural model.

**Testing of Structural Equation Model (SEM)**

Structural Equation Modelling (SEM) method is widely used to investigate the hypothesized relationships among the proposed conceptual models which is supposed to test the survey data. This technique enables the synchronized evaluations of multiple regression equations in a single framework. By using the SEM technique, the proposed model was evaluated under the maximum likelihood method. Browne and Gudeck (1992) also have specified that “a model whose root mean square error approximation (RMSEA) is less than 0.05 has a close fit; an RMSEA of less than 0.08 has a good fit.” Chin and Todd (1995) propose that the GFI and NFI should be

above 0.90 and the AGFI be above 0.80 for a good fit while the CFI should also be above 0.90 (Bentler, 1990).

**Table 4: Goodness-of-Fit Results of the study**

Goodness-of-fit statistics		Values	Desired range of values for a good fit
Chi-square test	$\chi^2$	84.10 (P = 0.189)	$p > 0.05$
Degrees of freedom	df	75	$\geq 0$
Chi-square/degrees of freedom ratio	$\chi^2/df$	1.121	1-5
The goodness of fit index	GIF	0.954	Close to 1
Root mean square error of approximation	RMSE	0.065	$< 0.08$
Adjusted good-of-fit index	AGFI	0.925	$> 0.85$
Tucker-Lewis index	TLI	0.91	$> 0.85$
Comparative fit index	CFI	0.895	$> 0.85$
Normed fit index (NFI)	NFI	0.0857	$> 0.85$

Source: Authors Calculation by using STATA

As shown in Table 4, it was obvious that the recommended values of various measures of the proposed model are best fitted for the study under SEM techniques.

### ***Hypnotized Causal Structural Model***

Test of the hypothesis is the prime concern for determination of the user's satisfaction. In order to assess the factors responsible for the user's satisfaction, three hypotheses are developed by the proposed model.



**Table 5: Test of Hypothesis**

<b>Causality Direction</b>	<b>Standardized Path coefficient (P-value)</b>	<b>C.R</b>	<b>S.E</b>	<b>Decision</b>
H <sub>1</sub> : Service Quality → User's Satisfaction	1.85 (0.0025)**	12.50	0.148	Supported
H <sub>2</sub> : Perceived Value → User's Satisfaction	0.685 (0.0125)**	2.665	0.257	Supported
H <sub>3</sub> : Service Quality → Perceived Service Value	0.85 (0.0445)**	4.292	0.198	Supported

Source: Author calculation by using STATA

\*\* At 5% level of significant C.R. = Consistency Ratio, S.E.= Standard of Error

Table 5 depicts summary statistics of the hypothesis of the proposed model (Figure 1). It was apparent from the test statistics that all three standardized path coefficient were significant having P-Value <0.05. It can be concluded from the test of hypotheses that service quality influences users' satisfaction and users' Perceived value in the context of e-library service of the library.

## **Findings &Conclusions**

The research projected to explore the causal relationship between Service Quality, Perceived Service Value and User's satisfaction of e-library facility used by the end users at the Rajarata University of Sri Lanka while testing the proposed conceptual model using reliability measuring & SEM technique.

Initially, it was found that there were strong consistency internally in each and every construct of the proposed model, suggesting that the selected items have relatively high internal consistency.

Nevertheless, the study results revealed that there is strong association among three variables, which was confirmed by the proposed model through the application of Confirmatory Factor Analysis (CFA)

and the hypothesis test using Structural Equation Modeling (SEM) which is widely known as Path analysis.

Statistics of the test of Hypothesis revealed that the developed hypotheses of the proposed model, which are shown in Figure 1, were fully supported and it is concluded that Service quality and Service value have direct relationships with User's satisfaction. Therefore, it is proved that service quality and service value are interlined and has an impact on user's satisfaction eventually.

In order to improve the aspect of user's satisfaction, library management should take care of their end-users' complains and what they usually try to express through suggestions. In order to get feedback from them towards enhanced service quality, management needs to consider conducting user surveys at least once a year, using structured and opened questionnaires.

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## **PRESERVING THE QUALITY OF SCIENTIFIC RESEARCH: PEER REVIEW AND EMERGING TRENDS**

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### **Abstract**

Trustworthy reporting of high-quality scientific research findings is essential because new scientific research projects are designed based on published reports of previous research findings. The formal peer review system, formalized during the 20<sup>th</sup> century, is a time-tested mechanism used to assess the quality of scholarly publications. However, peer reviewing is a qualitative evaluation system based on expert judgment, which inherently involves subjective elements. The traditional closed peer review system, which includes single-blind and double-blind reviewing processes, has been criticized for its secretive nature, biases and conflicts of interests, and other limitations. Therefore, experimentation on opening up of the peer review system, facilitated by technological advances, began towards the end of the 20<sup>th</sup> century in parallel with the move towards open-access publishing. "Open peer review" (OPR) is the umbrella term used for a range of open peer review strategies such as "open identity" (revealing the identities of authors and reviewers to each other), open interaction in peer reviewing, open participation in peer review ("public peer review"), and open post-publication review. Combinations of traditional peer reviewing and OPR are being adopted and becoming increasingly accepted in scholarly communication. These trends suggest that peer review is becoming a hybrid system that integrates features of both traditional peer review and OPR to overcome the deficiencies and limitations of each system. Active participation and collaboration of all stakeholders is critically important in developing and maintaining the robust peer review systems needed to support publication of high-quality scientific research.

**Keywords:** *Peer Review, Closed Peer Reviewing, Bias in Peer Reviewing, Open Peer Reviewing, Public Peer Review, Post-publication Review, Pre-publication Review, Scientific Scholarly Communication.*

## **Introduction**

In scientific fields, any research project is built on the knowledge assimilated through research that preceded it. Therefore, to preserve the quality of research and maintain the credibility and trustworthiness of the scientific knowledge base, the use of robust review mechanisms is critically important.

Peer review is the examination of scholarly manuscripts by independent experts in the field whose comments and suggestions are used to make final selection decisions. The traditional peer review system, which is still in use, is a formal process that takes place before publication. It assesses manuscripts in terms of originality, importance for a specific scientific field, interest to broader readership, and other assessment criteria set forth by each publication venue. It helps editors to make publication decisions, and the feedback from reviewers helps authors to improve the quality of their manuscripts. Peer reviewing is conducted by a small number (typically one to three) of editor-selected experts. Reviewers' names are not revealed to authors or readers and reviewers have no direct interactions with one another or with authors. The peer review process ends with the journal editor(s) finalizing the publication decision.

## **Traditional Peer Review System**

The traditional journal peer review system is a closed system with two major review practices: single-blind and double-blind. In the single-blind practice, the identity of the author(s) is revealed to the reviewers, but the identity of the reviewers is not revealed to the author(s). In the double-blind practice, both authors and reviewers are anonymous. Anonymity of



reviewers is considered important as it allows reviewers to critically and freely evaluate manuscripts without fear of intimidation, which may be especially important for reviewers who are not yet well established in their fields. The double-blind practice is highly valued in competitive scientific fields and in fields with high commercial interest, because it facilitates the assessment of manuscripts purely on their scientific value without bias against authors or author affiliations. However, probably because double-blind review involves taking additional steps to conceal identities of authors, which may be complicated at times, the single-blind practice is most often used in traditional peer reviewing.

Even though peer reviewing is considered a time-tested mechanism to preserve the credibility of scientific publications and has become an integral part of scholarly communication system, it has become the center of spirited debates. Questions have been raised regarding the reliability, objectivity, and transparency of the peer review process and its ability to detect errors and scientific fraud. Delay in publication caused by this process, especially in rapidly developing scientific fields, is a major concern. In addition, there are complaints that the traditional peer reviewing process may sometimes restrict innovative research.

### **Bias in Closed Peer Review Process**

Ideally, manuscripts should be evaluated purely based on scientific value regardless of the identities and affiliations of the participants. However, it may be unrealistic to expect a peer reviewing process devoid of a certain degree of bias because it is mainly based on human judgment. Several types of potential bias have been identified in the traditional peer review system and are described below.

*Prestige or association bias* is associated with institutional relationships. There is a view that researchers at more prominent institutions have a higher probability of manuscript acceptance due to their formal and informal relationships with reviewers. Some study findings revealed the

existence of prestige bias (Ross, Gross & Desai et al., 2006), although Walker, Barros, Conejo et al., (2015) did not find evidence of such bias.

Because women in science, technology, engineering, and medicine (STEM) fields have lower publication rates and success rates for high-value research grants than men, the possibility of *gender bias* against female authors in peer reviewing has been suspected. Although evidence of gender bias in peer reviewing in grant applications has been reported in some studies (Bornmann, Mutz, & Daniel, 2007), other empirical evidence disputes the claim of bias against female authors (Ceci & Williams (2011) (Valkonen & Brooks, 2011).

*Effect of country affiliation* on manuscript acceptance has been examined by several researchers. Tregenza (2002) and Bornmann & Daniel (2009) reported study findings showing strong effects of country affiliation on manuscript acceptance. Link (1996) and Ross et al., (2006) discussed empirical findings revealing bias favoring authors from the United States.

*Bias against authors from non-English-speaking countries* is another concern. Tregenza (2002) showed that acceptance rates at ecology and evolution journals are significantly higher for articles from wealthy English-speaking countries than for those from wealthy non-English-speaking countries. Campos-Arceiz, Primack, & Koh (2015) reported findings of a study showing that manuscripts from China had more rejections and requests for major revisions than those from English-speaking countries. However, Loonen, Hage & Kon (2005) did not find such bias in their study.

Bias against manuscripts describing research findings that contradict reviewers' perspective or expectations is known as *confirmation bias* (Jelicic & Merckelbach, 2002). This kind of bias, if present, discourages testing of new theories and reduces research diversity, thus hindering scientific progress. However, study findings of Sandström (2009) do not support the claim that peer reviewers favor research comparable to their own work.

Peer review *bias against unconventional research* (i.e., “conservatism”) undoubtedly hinders scientific progress by impeding revolutionary research. There are examples of prominent scientific journals rejecting manuscripts related to Nobel Prize-winning research. For example, the description of the citric-acid cycle by Hans Krebs and the “mobile gene theory” presented by Barbara McClintock were rejected by *Nature* (Kilwein, 1999), and the creation of radioimmunoassay (RIA) to measure plasma insulin by Yalow and Berson was originally rejected by *Science* and the *Journal of Clinical Investigation* (Friedman, 2002). Resch, Ernst, and Garrow, (2000) presented empirical evidence showing that reviewers rated studies with conventional treatments higher than studies with unconventional therapies, even if the latter were supported by strong evidence. Minimizing the impact of theoretical and intellectual conservatism in peer reviewing, especially in research grant reviewing, is critically important.

Although scientific research is becoming more interdisciplinary, the existence of peer review *bias against interdisciplinary research* has been suspected assuming that disciplinary reviewers might prefer discipline-specific research. Use of groups of reviewers with relevant expertise instead of just one or two reviewers has been recommended by some journals and institutions to minimize bias against interdisciplinary research.

The potential impact of conflict of interest (COI) on the peer review system is another major concern. The influence of financial COI in biomedical and pharmaceutical fields is a topic vigorously debated within scholarly and public forums. Although financial COIs of reviewers and editors may be widespread and impacts are high, these are probably easily identified and managed than those involving political, ideological, or religious biases.

As scientific disciplines are becoming more specialized and journals and publishers are becoming more multinational, identifying reviewers is becoming increasingly challenging and more journals are adopting the practice of using author-nominated reviewers. This practice has led to



several incidents of scamming of the peer review system in which some researchers, rogue third-party agencies offering services to authors, and even guest editors have been involved. Such scams have used fake e-mail addresses and fake reviewer identities, and even more sophisticated “peer review and citation rings” consisting of names of both fake and real scientists (Ferguson, Marcus & Oransky 2014). Discovery of these incidents have forced many article retractions by several journals published by prominent publishers (e.g., SAGE, Springer, and BioMed Central [owned by Springer]). Based on their study findings, Fang, Steen, and Casadevall (2012) reported that 43.4% articles have been retracted due to fraud or suspected fraud. Failure to detect scientific fraud and serious errors in methodology, manipulated figures, or fabricated data is a criticism against the traditional peer review system.

### **Open Peer Review (OPR)**

The traditional peer review system has been criticized for its lack of transparency and secretive nature, which is sometimes seen as being at odds with transparency and the openness expected in science. Because of these concerns, efforts have been made to find ways to promote open evaluation of scientific research and open up the peer reviewing process. Powered by technological advances, open peer review (OPR) emerged along with open access (OA) publishing in the late 1990s, and the *British Medical Journal* (BMJ)’s decision in 1999 to reveal reviewers was considered a pioneering move (Smith, 1999). This OPR initiative was immediately followed in 2000 by OA medical journals published by BioMed Central (BMC), which published not only reviewers’ names, but the “pre-publication history” as well. Different journals are experimenting with OPR and adopting open review strategies at varying levels. Examination of different OPR strategies and their effectiveness may help in understanding this fast-developing system of peer reviewing.

Revealing the identities of authors and reviewers to each other (*open identity*) is a key feature of OPR. Pro-OPR advocates argue that open

identity will increase accountability and eliminate or minimize unethical practices of reviewers, enable reviewers to get credit for their contributions, and improve review quality. Available empirical evidence supporting the hypothesis that scientific quality of articles improves with OPR are not conclusive. While some studies show no difference in quality (van Rooyen, Delamothe, & Evans, 2010), others report an increase in quality with OPR (Walsh et al., 2000).

An approach of permitting interactions among reviewers, and between author(s) and reviewers (*open interaction in peer reviewing*), is being adopted by some journals. These interactions help authors to improve their manuscripts. Different journals use different forms of interactions; for example, *EMBO Journal* allows “cross-peer review,” actively encouraging referees to comment on each other's reports. The journal *eLife* actively encourages interactions among reviewers and with the editor, and even use online consultation sessions to arrive at mutually accepted decisions related to peer reviewing (Randy, Watt & Weigel, 2012).

Publishing full review reports or summaries as well as interactions with authors (e.g., some BMC journals) and names of reviewers (e.g., *EMBO Reports*) is another OPR strategy. However, some journals publish reviewer reports but maintain reviewer anonymity (e.g., *American Journal of Bioethics*, *EMBO Journal*). The strategy of publishing peer review reports is expected to increase accountability of the peer review process and add transparency by opening it to the wider scientific community. Making available potentially useful scholarly information that otherwise may not be revealed is considered an added benefit. Moreover, publishing reviewer reports may incentivize reviewers by enabling them to get credit. Including review activities in professional records is becoming a common practice. However, a correlation between publishing peer review reports and a higher refusal rate among potential reviewers has been reported by Van Rooyen et al., (2010).

*Open participation in peer review*, also known as “*public peer review*,” includes both invited reviewers (who write reviewer comments) and participants from the wider community (who provide short comments). This process opens up the pool of reviewers to scholars from related disciplines and even members of the public who are knowledgeable about the topic. Journals often use this process as a complement to the traditional review process. Different journals have different policies for public review participation, varying from making it open to anybody (anonymous or registered) or restricting it to individuals from scholarly communities. The main criticism against open participation in peer review is the scholarly proficiency of the participants with respect to the articles being reviewed. This may be a critical issue, especially in highly specialized scientific fields. Motivating individuals to participate in public peer review activities is another issue. According to the findings of a trial conducted by *Nature* in 2006 giving authors the option of submitting their manuscripts for open comments in parallel with the traditional closed-review process, only 5% of authors agreed to display their papers for public comments, and the average number of public comments per article received was low; although some articles received a considerable amount, others received none (Greaves, et al., 2006). Interestingly, based on their study findings, Bornmann et al., (2012) showed that “reviewer comments” by peer reviewers are better than “short comments” by interested members of the scientific community, in achieving the two main expected functions of peer review: manuscript selection and manuscript improvement.

*Open pre-review* is a revolutionary concept in OPR. In the open pre-review system, manuscripts submitted to journals are made immediately available online, usually after a rapid preliminary review, before the start of the peer review process. In 1997, the online journal *Electronic Transactions in Artificial Intelligence* (ETAI) introduced this approach (Sandewall, 2012). In *Atmospheric Chemistry and Physics*, manuscripts that pass through quick pre-screening are being made immediately available as “Discussion papers” in an interactive online journal discussion forum. In the second stage,



manuscripts will go through the traditional peer review process and if accepted, will be published in the journal (Pöschl, 2012); *F1000Research* is another prominent journal that uses this approach. One important benefit for researchers with this system is that they can claim priority in reporting scientific findings.

*Open post-publication review* is another approach associated with OPR. Although the published version is considered as the final version of an article, the status of a piece of research evolves when the final publication is subjected to discussion, providing opportunities to make corrections. In addition, these open discussions of scientific work have resulted in retraction of questionable articles, and the Retraction Watch (<https://retractionwatch.com/>) blogs keep track of these cases. Journals are increasingly offering venues for user comments for their published articles. Other related developments in this direction are taking place; for example, *Pubpeer* (<https://retractionwatch.com/>) a post-publication peer review platform introduced in 2014, claims that their paper comment threads have attracted thousands of viewers (Pubpeer, 2014).

*Non-selective (impact-neutral) review* is a peer reviewing strategy introduced in 2006 by *PLOS ONE*, the first multidisciplinary OA journal. *PLOS ONE* uses peer review only to assess the technical aspects of a study, arguing that its importance or scientific value will be judged by the readers. Other OA journals (e.g., the *Frontiers* journal series, *Biology Direct*, *F1000 Research*, *Giga Science*, *Journal of Negative Results in Biomedicine*, *Open BMJ*, *PeerJ*, and *Science Open Research*) use peer review processes with varying degrees of similarity to non-selective review systems. Walker & da Silva (2015) estimated that major journal series adopting non-selective review published more than 90,000 papers in 2014, and observed that all of these journals were in biomedical sciences.

*Immediate publication with no formal review* is a trend that is especially popular in some disciplines, enabling authors to publish their work on preprint servers and bypass the traditional peer review process. The

preprint server *arXiv* (<http://arxiv.org>), created in 1991, is the best example; it was created for sharing preprints among a group of physicists, but expanded to include other disciplines (e.g., mathematics, computer science, system science, quantitative biology), and its preprint/e-print volume has grown from 304 in 1991 to more than 1.4 million as of July 2018. Preliminary versions of papers can be shared through *arXiv* for community discussion before submitting them to journals for formal publishing; if a paper is accepted by a traditional journal after going through the peer review process, authors can post the updated version on *arXiv*. Although this system works for some disciplines (e.g., physics, mathematics), sharing manuscripts that have not gone through rigorous review process in some disciplines (e.g., biomedical fields) may be unwise or even dangerous.

Undoubtedly, OPR is an evolving phenomenon geared toward opening up of the peer review system to address shortcomings of the traditional peer review system. However, OPR is not equally embraced by all scientific fields; for example, medical disciplines that require high level of transparency are more open to OPR than biological sciences in general, but even within biological sciences, newly emerging disciplines such as bioinformatics accept OPR more than traditional disciplines such as physiology (Koonin, Landweber, & Lipman, 2013), (Moylan et al., 2014). In addition, highly competitive research fields (e.g., molecular biology) are reluctant to accept OPR because of concerns about plagiarism (Dalton, 2001), (Gura, 2002).

Proponents of OPR argue that it would strengthen the scholarly communication system by improving the peer review process; some of the benefits they highlight include discouraging authors from submitting low-quality manuscripts, making it easy to identify scientific misconduct by authors, reducing publication time and thus speeding up the dissemination of scientific information, providing reviewers with opportunities to get credit for their review contributions, and helping outside readers better understand research through open communication exchanges that occur during the OPR

process. However, currently there is no convincing empirical evidence favoring OPR over the traditional closed peer review system.

For the OPR system to be effective, active involvement of the relevant participants—authors, reviewers, journal editors, and members of the scientific community—is essential. However, the reluctance of reviewers, authors, and the scientific community to actively participate in OPR is recognized. It is important to understand the underlying issues related to this reluctance in general, especially because the higher reviewer refusal rate associated with OPR might be a major bottleneck. Reviewers do not get the protection in the OPR system that they get in the closed review system, which is likely a reason for their reluctance in participating. In particular, junior researchers may not be willing to participate in open peer reviewing to avoid complications that may involve with reviewing the work of senior and more established researchers. Journals have adopted different ways to lessen this effect; these include maintaining the anonymity of reviewers of rejected papers (e.g., *Frontiers in Neuroscience*), revealing reviewer identities to authors without publishing them (e.g., *BMJ*), publishing reviewer reports but maintaining reviewer anonymity (e.g., *American Journal of Bioethics*, *EMBO Journal*), and giving reviewers the option of providing their names to authors (e.g., *PeerJ*).

## **Concluding Remarks**

The use of journals to share scientific information began in 1665 with the establishment of the first scientific journal, *Philosophical Transactions of the Royal Society*, and the journal editors of the time were entrusted with the responsibility of collecting, editing, and publishing the work of other scientists. Peer review became formalized in the 20<sup>th</sup> century, when journal editors started seeking the help of outside experts to review manuscripts as the quantity and subject diversity of manuscripts increased, and continued basically unchanged for many decades. Although considered the gold standard for quality control in scholarly publications, peer review was



subjected to heavy criticism for its limitations and deficiencies. However, there are no signs of abandoning the use of peer review; instead, various ways of opening it up, facilitated by information technological advances, are being tested and adopted. OPR will certainly play a major role in scientific scholarly communication in the future. Therefore, thorough examination of its successes, failures, and discipline-specific issues is needed. At the same time, it is encouraging to see various stakeholders experimenting with different strategies of open review, combining them with features of the traditional closed review system to overcome the weaknesses of each and achieving promising successes. These trends indicate that we are moving toward a “hybrid peer review system” that integrates various levels of closed and open features to suit the needs of each discipline. These developments will require the collaborative involvement of all participants—authors, reviewers, members of scientific communities, editors, scholarly publishers, and knowledgeable citizens—to maintain a robust peer review system. Such a system is essential for publishing high-quality scientific research and maintaining the trustworthiness of the scientific knowledge base.

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## **TAKING THE LIBRARY TO PATRON: MARKETING AND PROMOTION OF LIBRARY MATERIALS USING NOTICEBOARD ADVERTISEMENTS**

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### **Abstract**

Underutilization and decreasing budgets have posed an immense pressure on the librarians' role and the public perspective of the library as a vital community center in the society. The question of "why conventional libraries seem underutilized?" need to be raised. Conventional "come and get it" mode of operation for libraries will no longer applicable in the modern liquid social paradigm. Emerging electronic information platforms are pushing the boundaries of the traditional brick type business of the libraries in the age of Google. Conventional libraries need to embark on strive marketing and promotional endeavors to attract more users to the library. Social marketing in the library context better to be outreach and it is totally a non-profit relationship-based movement. Proper adoption of suitable marketing toolkits and a promotional plan may uplift the library from underutilization and shortage of budget allocation from the top management. Librarians should make the patrons aware of the products and services in a manner that they can understand. Present empirical investigation attempts to test the effectiveness of the noticeboard as a promotional medium and to know who knock the physical door of the library. A monthly medical

magazine, "The Doctor" was used to prepare the promotional notice following the A-I-D-A sequence. Promotional notices were displayed on 30 different sites around the campus for one month commencing from 23<sup>rd</sup> April 2018 and a subsequent data collection step was started using paper-and-pencil questionnaire. Results revealed that there was a strong, positive correlation of future willingness to read the magazine with visualizing the notice in the noticeboard, which was statistically significant ( $r_b = 0.780, p = 0.046$ ). This will shed light on the products and service promotion in academic libraries indicating that, promotion through library noticeboards are an effective means of marketing. Transforming the way of libraries operating and a paradigm shift in marketing strategies that were adopted may be needed in order to enhance better utilization of library resources. Cognitive pluralism in the postmodern social context needs to be considered when planning promotional practices in the future. Libraries and the role of librarians should undergo a paradigm shift by taking an intellectual endeavor to promote academic libraries with a new world outlook.

**Keywords:** *Library Promotion, Library Marketing, Noticeboard Marketing, Postmodern Marketing.*

## **Introduction**

Libraries no longer operate with "come and get it" mode and librarians should reach out to the community and make the patrons adequately aware of the services and resources that the library offers (Schmidt, 2007). Reimer (2018) stressed on the need, for moving towards patrons by identifying their needs as well as for keeping the library on business. According to Dr. Ranganathan, all the books (products and services) in a library shall have a reader (Patil & Pradhan, 2014). There are many services provided by libraries with less popularity among its patrons. Creating new services and waiting until people come looking for them to the librarians' doorstep would not work in the modern information landscape. Having a better marketing and promotional strategy, would help librarians to take the library to its patrons or to provide adequate awareness of the services that the library offers (Schmidt, 2007). It will ensure the law of Dr.



Ranganathan, that all the patrons meet the desired service through the library (Patil & Pradhan, 2014). Nicholas, (1998) highlighted the use of personal skills to promote library visiting and promote reading (American Library Association, 2015; Gibb, 2015) in societies. Nicholas (1998) also suggests, "Make a point of visiting [faculty] staff rather than waiting for them to visit you. Or in other words, librarians should keep a close relationship with key players and faculty members of the University. Identify the key players and the people who can and want to help". This author also highlighted innovative ways of promoting libraries by the librarians, using various promotional and marketing strategies such as, giveaways, memorabilia, open-days, specialist seminars, exhibitions, etc. Being a part of the community, it is vital not only to provide the services to meet the diverse needs of patron information, but also to ensure the sustainability of the library and its services. To become the paramount focal point in society, libraries should be spick and span, be adopting more catcher tools; and strategies with a new world outlook. The application of marketing, promoting and advertising is an indication of this ambition of transforming librarians. Adoption and practicing a marketing toolkit could facilitate librarians in bringing the library, its resources, products and services to the patrons, thereby, the required information reaches the patrons in a very short time.

There are many views describing what marketing is? According to Kotler and Zaltman (1971) "Marketing does not occur unless there are two or more parties, each with something to exchange, and both able to carry out communications and distribution. Kotler also mentioned that social marketing is not always targeting a monetary perspective, it's more towards creating relationships, understands what people needs and supply the desired at the best. By extending this idea, Garoufallou, Siatri, Zafeiriou, & Balampanidou (2013) highlighted on identifying and meeting the desires of public, increasing the awareness and usage of products and services of a non-profit organization which then lead to product and services development, hence providing more innovative services to customers. Moreover, Kotler (1979 as cited in (Garoufallou et al., 2013)) reviled that non-profit organizations are opportunistic to differentiate from their peers in the arena while striving to enhance its customer (patron) base which will ultimately enhance the perception and top management commitment. In the meantime,

Brown (1993) stressed on a different dimension of marketing which is challenging the classical scientific marketing theories and concepts in the postmodern social landscape. Brown (1993) suggested a paradigm shift in the marketing strategies and organizations itself with more innovative strategies with a significant cognitive pluralism that totally suits the new world outlook. Meanwhile Potter (2012) elaborated the fact the library marketing is “outreach” and cannot be treated as a general perspective of marketing. People can be made aware in an understandable manner about “what we can do for them” in an understandable language and how they can come to visit the library by physical or virtual means (Nicholas, 1998). Moreover, Lucas-Alfieri, (2015); Nicholas, (1998); and Potter, (2012) suggested a market plan for libraries in their studies. The market plan should assess where you are now (market research), where you are going (objectives) and how you are going to get there (strategies). Promotion, on the other hand, as described by Nicholas (1998) is “informing your users what you do and what you can do”. Promotional activities may enhance the usage, values, research, pedagogical aspects of users and more essentially change the perception of the library. However (Kotler & Zaltman, 1977) described promotion as communication persuasion strategy, which has more deeper meaning than Nicholas (1998). Further, Lucas-Alfieri (2015) suggested a “promotional plan” for a library which is supposed to emerge as a part of the “Marketing plan” of the library. As a summary, marketing can add lot of values to the library and librarians should practice their desired library marketing strategies to promote their product and services to a larger customer base.

Emerging electronic information ecosystem has posed a challenge to the conventional libraries in the Google age, globally (Reimer, 2018 and Schmidt, 2007). With the rapid development of information and communication technology there are numerous versatile and attractive sources and formats for a person to find the needed information (Reimer, 2018; and Schmidt, 2007). However, Universities in underdeveloped countries still need to operate the libraries in the conventional way other than the electronic alternatives. Thus the physical visit to the library still carries a meaning to the society, even in the Google age (Reimer, 2018).

Most empirical studies on marketing and promotion of library and its services are not adequately presenting practical implementations of marketing, often describing the essentiality and concepts of marketing strategies. University of Ruhuna spend about six Million on books and periodicals in addition to the amount dedicated for subscribing online journals annually. When considering the statistics, numbers of borrowings are not up to the anticipated level. Apart from many other extraneous variables, researchers focus on patrons' unawareness of existing library materials as a reason for underutilization of the printed library resources. Thus, a promotional attempt was designed to develop the patrons' interest to read a selected printed material from the library collection. Selected collection of photos and illustrations from different interesting stories and news from a Magazine was displayed in the noticeboards around the University premises. Researchers limited the investigation only to use the *Widayawaraya* ("Doctor," 2018) monthly magazine for the study. It is a medical magazine targeting at medical and non-medical public to help enhance their awareness and literacy in medical issues. It is a publication of common interest, where anyone can read without demographical and knowledge boundaries.

## **Objectives**

Key questions that lead conduct the proposing research is as follows;

- Q1.** What is the frequency of patrons using the selected magazine in the periodical section of the library?
- Q2.** How far the advertising method motivate patrons to come to the library and read the full article?
- Q3.** Whether the noticeboard method is an effective promotional strategy in an academic environment?



### ***Specific Objective***

- To investigate the effectiveness of using noticeboard as a promotional strategy to market products and services of an academic library.

### **Methodology**

The Doctor Magazine provides health bulletins in simple language that the general public can understand. When selecting articles from the magazine, researchers excluded the biases such as gender, age, race etc. and considered only the cases of common interest to the general community. Selected illustrations and photographs from the April, 2018 issue of the “Widayawaraya” (“The Doctor”) medical magazine (Volume 24, issue 04 of April 18, 2018) were cropped and combined together to prepare the notice to be displayed in noticeboards (Figure 1). The illustrations and photographs were related to different news and writings in the magazine. The notice then displayed in 30 main noticeboards around the University premises, including the library, Dean’s office of all the Faculties, all the departments of Faculties and canteens. The chosen magazine was then placed in the periodical section of the library, which is the expected location to find it. Dedicated two personnel were kept at the periodical section to record observational evidence and to distribute the questionnaire designed to gather other empirical data.

A paper-and-pencil questionnaire containing 5-point Likert scale and open-ended questions were administered to collect and learn the attitude of respondents towards using noticeboards to promote reading “The Doctor” magazine. Aims of the investigation were to find the effectiveness of the advertisement and to know how far it stimulated respondents to read the advertised section of the magazine. The study was continued through the entire month commencing from 23<sup>rd</sup> April 2018 (until the latest issue of the magazine is displayed in the library), and all the respondents who read the magazine was considered as test subjects to answer the questionnaire. Obtained data were analysed using a trial version of IBM SPSS version 25, 2018.



Regarding the demographic characteristics of the population, it was observed that most of females (23) approached the magazine while 11 males were recorded at the time of data collection. Most of the respondents were from the Faculty of Science while the Faculty of Technology students visited the magazine least (Figure 2).

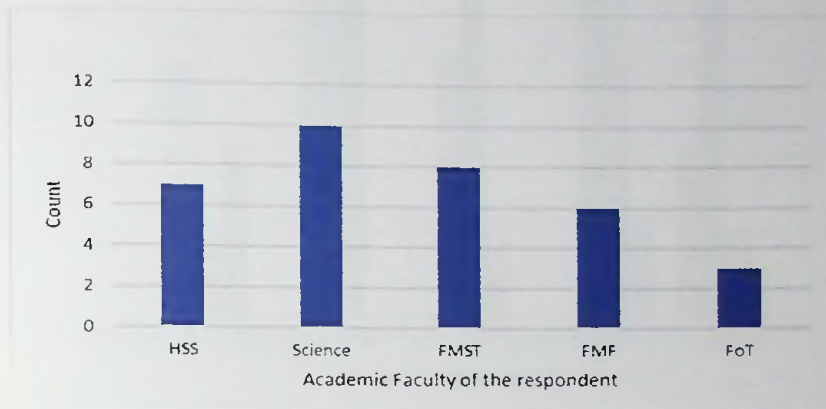


Figure 2: Simple Bar Count of Academic Faculty of the respondent

Reading pattern with the gender was investigated (Figure 3). Reading the magazine was a rare incident in both genders while females marked frequent visits when compared to males.

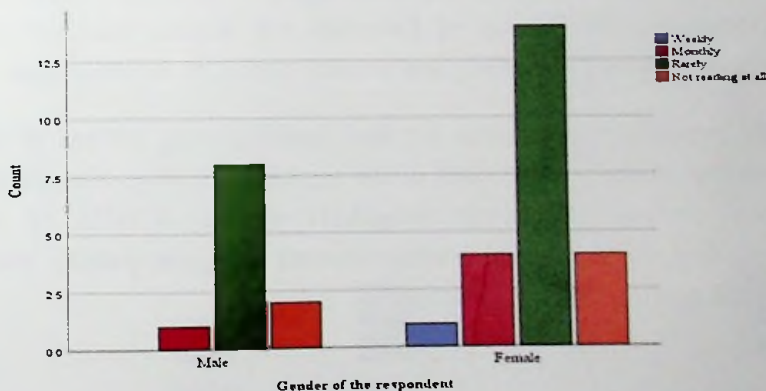
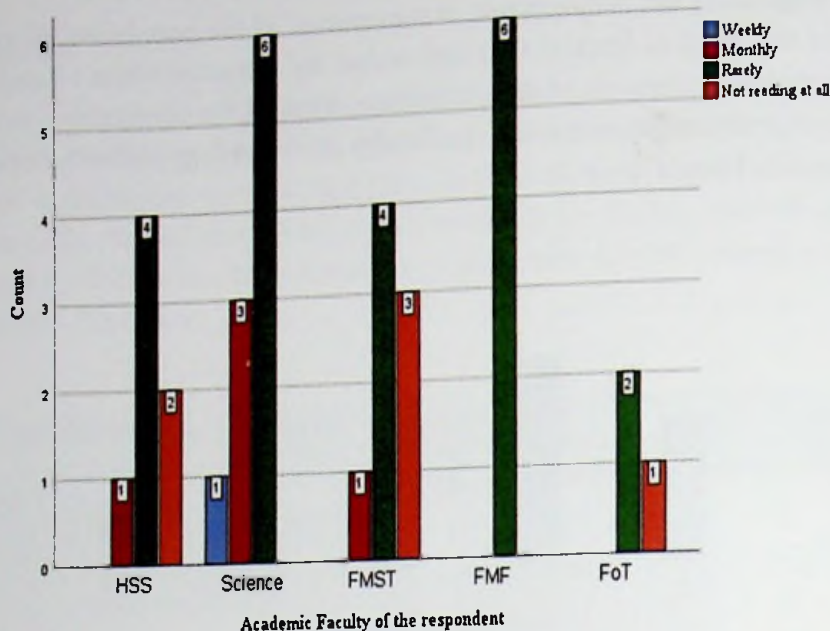


Figure 3: Reading pattern with the gender - What is your nature of reading the Doctor Magazine?

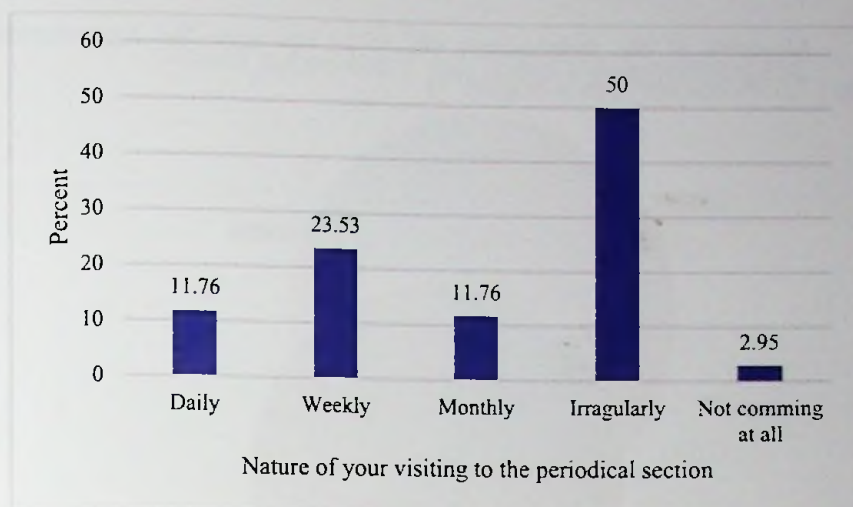




**Figure 4: Reading pattern with the Faculty - What is your nature of reading the Doctor Magazine by the Faculty**

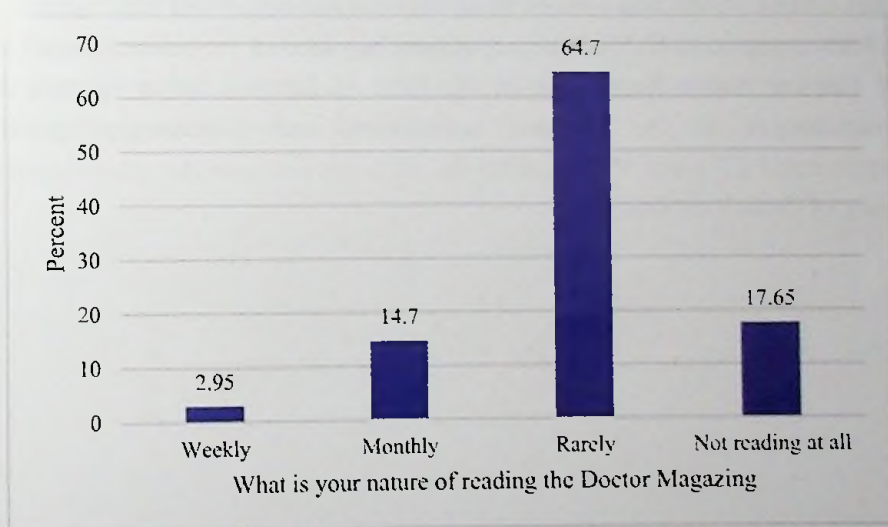
Respondents were compared for their reading pattern with the Faculty (Figure 4). Rare visits to read the magazine was evident in all the faculties. It is observed that visitors from the Faculty of Science, Humanities and Social Sciences and Faculty of Fisheries and Marine Sciences and Technology were among the monthly and weekly visitors to the magazine.

Study population was tested for their usual visiting pattern to the periodical section of the library. Half of the population (50%) who visited the periodical section showed an irregularly pattern. 47.05% of the population visiting the periodical section showed a regular pattern while 2.94% were not coming at all (Figure 5).



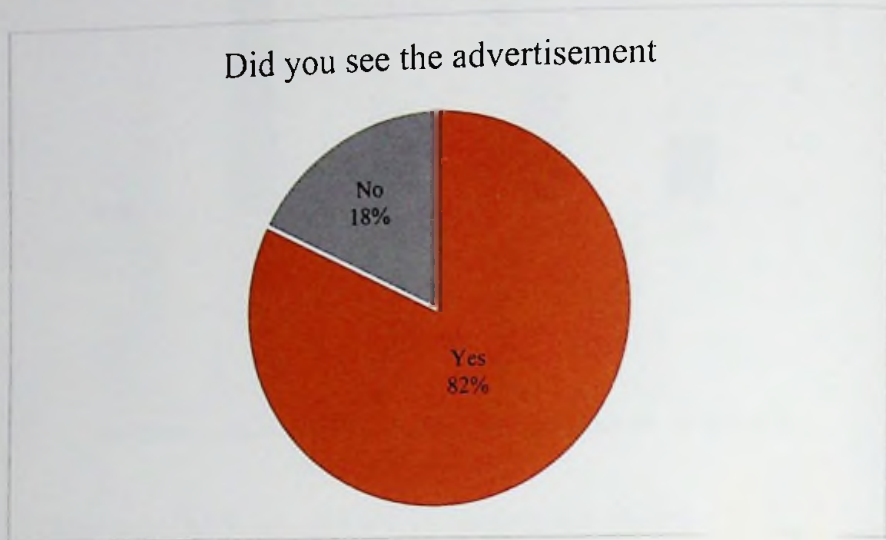
**Figure 5: Frequency of visits to the periodical section**

Figure 6 depicts the pattern of reading the target magazine (The Doctor) by the respondents. Majority of the respondents (64.7%) rarely read the magazine (not as a habit) while 17.65% did not read at all. However, 23.53% of the population referred the magazine weekly or monthly basis, or as a habit.



**Figure 6: Pattern of Reading the target Magazine**

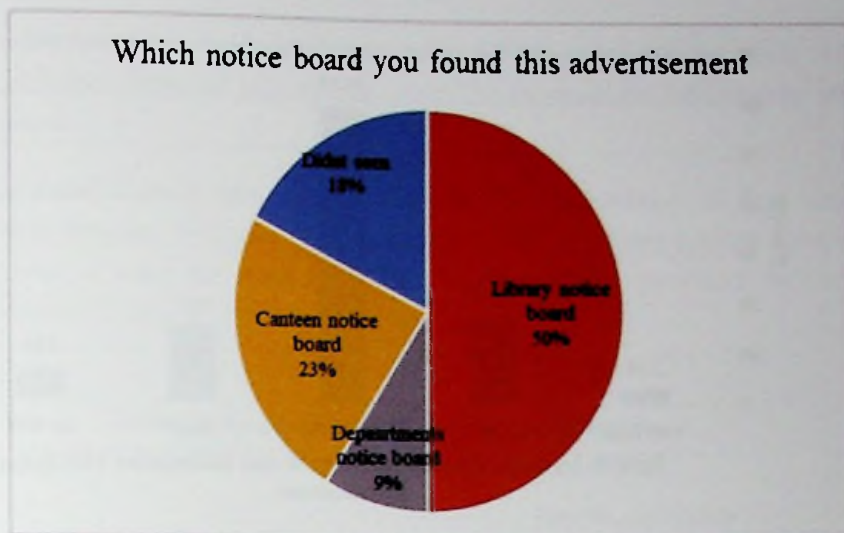
Majority of the respondents (82.35%) has seen the advertisement while 17.65% has not seen it (Figure 7).



**Figure 7: Proportion of respondents who see the advertisement**

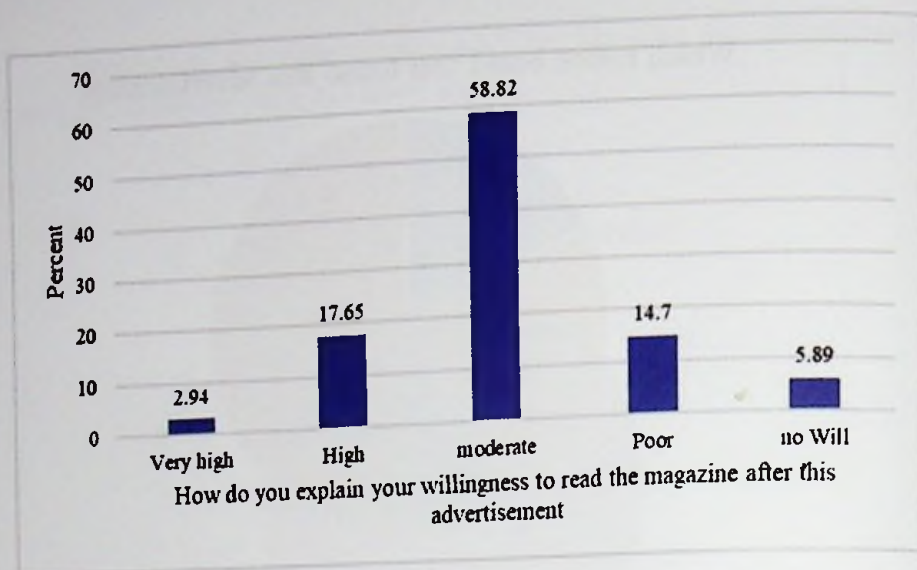
Respondents were asked as to which noticeboard that they found the said advertisement. Half of the population has spotted the advertisement on the Library notice board (Figure 8). Rest of the population spotted the advertisement in the Canteen noticeboard and noticeboards at the Departments 23% and 9% respectively. 18% has not seen the advertisement at any of these locations.





**Figure 8: Notice board preferences**

Respondents were asked to explain their willingness to read the magazine in future, as a result of seeing this advertisement (Figure 9). Nearly half of the population (58.82%) was moderately willing to read the magazine in the future and 17.65% has been highly influenced by the advertisement. 14.7% had a poor willingness to read and 5.89% had no effect by the advertisement to read the magazine. However, a small proportion of the population had a very high influence by the advertisement and they are waiting for the next issue of the magazine to read.



**Figure 9: Willingness to read the magazine in future**

Table 1, depicts the preferences of the respondents who are expecting similar advertisements in future using different modes, such as Social media, Library blogs, SMS, and OPAC notices, along with the notice board.

**Table 1: Future preference to see the advertisement**

Statistics					
	Social Media	Library Blog	SMS	OPAC notice	Notice board
N Valid	34	34	34	34	34
Missing	0	0	0	0	0
Sum	22	8	15	7	31

Most of the respondents (22) prefer the social media as the future advertisement method while 15 among 34 respondents expect advertisements via SMS. Eight (8) and seven (7) among the rest of the population expect to

see the advertisements in library blogs and as OPAC notices respectively. 31 out of 34 respondents are still willing to see the promotional information on noticeboards.

Kendall's tau-b test was used among 34 respondents to find any association between the usual reading nature of the magazine and the future willingness to read the magazine after the awareness provided by the advertisement (Table 2).

Table 2: Kendall's tau-b test for association

Correlations			How do you explain your willingness to read the magazine after this advertisement		Did you see the advertisement
Kendall's tau-b	How do you explain your willingness to read the magazine after this advertisement	Correlation Coefficient	1.000		.046
		Sig. (2-tailed)			.780
		N	34		34
	Did you see the advertisement	Correlation Coefficient	.046		1.000
		Sig. (2-tailed)	.780		
		N	34		34

There was a strong, positive correlation of the future willingness after the advertisement with the respondents who spotted the advertisement at the noticeboard, which was statistically significant ( $\tau_b = 0.780, p = 0.046$ ).

At the same time a cross-tabulation was used to further elaborate the effect of the advertisement on the willingness to read the magazine (Table 3).



**Table 3: Cross tabulation: willingness to read the magazine after the advertisement**

Count		How do you explain your willingness to read the magazine after this advertisement					Total
		Very high	High	moderate	Poor	no Will	
What is your nature of reading the Doctor Magazine	Weekly	0	0	0	1	0	1
	Monthly	1	2	1	1	0	5
	Rarely	0	1	18	3	0	22
	Not reading at all	0	3	1	0	2	6
Total		1	6	20	5	2	34

Table 3 depicts the level of respondents' willingness to read the magazine.

## Discussion

The global research environment is changing rapidly and along with it the role of libraries in facilitating research is becoming important (Reimer, 2018). Marketing the library by adopting desired promotional and marketing practices add more value and meaning to the social role of a library in the Google age. Patrons should be made adequately aware of the products and services that are available through the library. An academic library, as the vital community centre in a University need to have a desired marketing toolkit in order to provide more valuable services to the researchers.

Present study aimed to suggest and promote printed materials among university population through more conventional mode of advertising, the noticeboard. It was evident that the noticeboard could motivate patrons to visit a conventional library in an era of Google and help make the maximum use of the accepted information and information sources directed by the academic librarians. This will accomplish the mission of a library, that each book (and resources) in a library will meets its reader effectively. "Taking the library to the patrons" is a concept that has been successfully

implemented by Singapore National Library. Present attempt is such an initiation to take the University of Ruhuna Library to its patrons.

Promotional activities can be carried out in different forms and mediums depending on the nature of the target audience and on promotional objectives (Nicholas, 1998). Since the scholarly community in the University usually read noticeboards and wall papers, it was decided, in the present research to use the noticeboard as a promotional medium to take the library towards patrons. Figure 1 illustrates the notice that the researchers used to promote reading "The Doctor Magazine". Nicholas, (1998) enumerates the importance of adopting illustrations and pictures in a good quality printout in a promotional material. It will attract the eyes of busy people who are roaming around. It will also ensure the one of Dr. Ranganathan's principles, "save the time of the reader" (Patil & Pradhan, 2014). A good advertisement attracts Attention, arouses Interest, creates Desire and stimulates Action, known as the A-I-D-A sequence (Nicholas, 1998). The figure used in the present promotional try-out (Figure 1) was designed by following the A-I-D-A sequence. It will attract the reader by its applicability to people in common- personal health; a marketing strategy with a post-modern outlook and a common social interest among the noticeboard readers.

Demographically the study population recorded more Female respondents than males and most of the visitors reported were from the Faculty of Science (Figure 2). It may imply that the Science students are more interested towards their health-related aspects. This may be taken into consideration, in future attempts of advertising and promoting and design the promotional campaign accordingly. This suggestion was strengthened by the visiting pattern of the Faculty (Figure 4) where all the respondents from the faculty of Management and Finance were rare visitors to the magazine. These observations propose promoting the magazine among rare visitors and displaying frequent advertisements in different mediums such as SMS, emails, social media and other web 3.0 technologies (Balaji, M. S., B. G., & J. S., 2018). Irrespective of the gender, most of the respondents were rare users of the magazine (Figure 3). When considering the respondents' library visiting pattern (to the periodical section), half of them visited unintentionally. They are not targeting a particular journal or a periodical (Figure 5). Nearly 3% were accidental visitors to the journal section, and

they were only seldom visitors. These are the fraction among the patrons that librarians should guide and invite through promotional and marketing strategies. Therefore, future research to study the true intention of this fraction of the society (52.95%) and to identify better welcoming strategy for them, should be carried out. Rest of the respondents are showing a daily, weekly or monthly visiting pattern. This proportion of the respondents (47.05%) could possibly be the intentional visitors who are expecting a weekly or a monthly publication. New services to attract these library visitors could be introduced so that their purpose of visiting to the library would be enhanced.

When considering the readers of the Doctor Magazine (Figure 6), 14.7% of the population used it monthly among 47.05% of regular visitors to the periodical section (Figure 6). Majority, 82.35% of the respondents are either not reading or rarely reading the Doctor Magazine. Present research was targeting such patrons, who need to get motivated to access library services through promotional actions. The portion of respondents who has seen the advertisement is 83% (Figure 7) and half of them (50%) had found it in the libraries noticeboard (Figure 8). This observation has previously proven by Nicholas (1998) indicating that "The library noticeboard should be in a prominent place" so that most of the people would read them easily. Nearly one forth (23%) of the respondents has found the promotional information in the canteen noticeboard. Thus, the noticeboards in the library and common places such as canteens are more effective places to be used for promotional and marketing practices. Considerable number of respondents (18%) haven't seen the advertisement in any of the noticeboards (Figure 7). These respondents may be either regular visitors to the library or people who are not familiar with noticeboards. It also may be that the physical nature of the notice (Figure 1) may not have been powerful enough to earn their attention.

Alternative promotional medium such as SMS, Library web-based advertisements, OPAC notices, social media promotions can be suggested (Patil & Pradhan, 2014). Target population was investigated to check their preferred alternative medium to see the future advertisements (Table 1). As depicted in Table 1, 22 respondents are willing to see the future advertisement via the social media (22/34) while 15 are willing to receive



SMS alerts. Social media and mobile platforms can be considered as the leading platforms that can be aligned with the library 3.0 chapter, that can grab the intimate attention of modernizing people (Balaji et al., 2018). This may imply that patrons are willing to see updates from their library and that they wish to have it quickly (Vasileiou & Rowley, 2011). Library blogs were not the selection of many respondents (8/34). However, scientific blogs are highly famous among the academic community as an effective medium for exchanging scholarly information (Shema, Bar-Ilan, & Thelwall, 2012). OPAC notices portray less popularity (7/34). However, most of the respondents are still willing to find the promotional advertisements and library updates through the noticeboards (31/34). Thus, the most effective means of updating and promoting library updates and services could be an amalgamation of media such as, noticeboards, SMS, and social media.

Meanwhile table 2 depicts that there is a strong positive relationship between the noticeboard advertisement and the willingness to read the "the Doctor" Magazine in future. This may suggest that advertising in the noticeboard in the library as a marketing and promotion perspective has a considerable impact. Noticeboards are more easy and low-priced means of advertising. The cross-tabulation results (Table 3) simplify the proportion of the respondents who are willing to refer the magazine in future, with respect to their usual reading preference to the magazine. One respondent out of 34, shows a poor motivation from the advertisement. Among the monthly readers, there are four respondents who have been influenced to read the magazine from the moderate level to very high. A considerable number of respondents (18/22) who rarely refer the magazine have been influenced to moderate level of willingness to read the magazine in future. More interestingly respondents who had not read the magazine previously (4/6) has shown moderate to high willingness to refer it in future. As a summary, there were 01, 06 and 20 respondents out of 34, who were motivated very highly, highly and moderately, respectively to read the magazine in future after seeing the advertisement. Reading is a matter (Gibb, 2015). Reading enhances the cognitive pluralism of a community. Non-reading is a disaster to individuals and the society. Recent findings revealed that there is a tendency among young generation to spend much of their time on the internet, mainly with social media and other unwanted online platforms (Stein, 2013). Stein (2013) also reported that younger generation lacks

physical human interactions and general knowledge with respect to their adults. Thus, the necessity of an intellectual endeavor to enhance the reading and closer relationship with academic libraries among the young scholarly community needs to be considered. Librarians has a pivotal role to play in getting the youth engaged in the surrounds of the Library; the centre of knowledge in the University even in the Google age.

## **Conclusion**

It is evident from the results, that the noticeboards are still an effective means of communicating library marketing and promotional information. Librarians need to try and take the library to its patrons and provide proper awareness about the products, services and facilities that they can enjoy through the library.

## **Recommendations and Future Research**

Same promotional strategy can be replicate for several consecutive months with different issues of the magazine, to test the validity and effectiveness of the promotional strategy. Same promotional strategy can be tested with other reading materials, (e.g. Textbooks, journal articles, newspaper articles, multimedia materials, etc.) in the library. Successful method at the end of above tests can be practically applied in the libraries of University of Ruhuna and in any other library, local or international. It is recommended that a pilot study prior to the real promotional attempt to find out the real pattern of usage of library services by the population be conducted. Depending on the results of the pilot survey, librarians have to design and carry out appropriate advertising or promotional campaign to enhance the library use and awareness. Depending on the frequent investigations about the success of the adopting campaign, librarians can change the modes and intensity of advertising to attract more readers to the library. One of the most effective informal media of communication is oral communication. A model research can be conducted to investigate the effect of oral advertisements regarding library marketing and promotion. Further, it is recommended that librarians conduct an orchestration of awareness to the public in a language that they can easily understand, and try to take the

library to its patrons instead of sitting and waiting until the patrons come in search of products and services to their doorstep.

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**INTER LIBRARY LOAN DATA AS A COLLECTION  
DEVELOPMENT AND APPRAISAL CRITERIA FOR THE  
ELECTRONIC JOURNAL DATABASES  
IN THE UNIVERSITY OF SRI JAYEWARDENEPURA**

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**Abstract**

The rising need for research and instructional support from libraries demand an overall development in academic libraries. These libraries may shift their choice of library materials from traditional printed formats of information to electronic versions which are the trend that is rapidly rising. Therefore, it is critical for librarians to practice better assessment and collection development criteria that reflect user needs which could be provided at lower costs in the continually developing electronic market. Accordingly, it will be prudent to dispense with the existing archaic practices of collection development and assessment policies and develop user based collections with big-time scholarly publishers. One such empirical user centered collection assessment technique with lots of benefits, though is currently not in use, is to use Inter Library Loan (ILL) data as a tool. Therefore, this study aims at examining how ILL data can be used in collection development and appraisal criteria for developing electronic journal database in the University of Sri Jayewardenepura. The study was quantitative in nature and it adopted content analytical techniques using

usage statistics and ILL data on electronic journal databases during one-year period from February/2017-2018. Results revealed that the electronic journal database collection is in high demand and satisfies user needs. Statistics on articles in Emerald, JSTOR, and Taylor & Francis databases, which, are subscribed regularly by the University, showed that those are in considerably high demand. There was also a demand for articles of Science Direct and Wiley Online, though not subscribed by the University. It is recommended that subscription to the databases in demand be continued and also the electronic journal database of the university be improved by adding Science Direct and Wiley Online.

**Keywords:** *Inter Library Loan, ILL, Electronic Databases, Collection Development.*

## **Introduction**

Inter Library Loan (ILL) service involves; a library requesting material from another library or, a library supplying material to another library (ALA, 2008). The purpose of ILL is to provide the user with required library materials even when it is not available in the user's local library. The patron is usually required to pick up printed material from the library while electronic version of full-texts of journal articles is forwarded via e-mail. American Library Association (ALA, 1996) defines collection development as "the process of planning, building, and maintaining a library's information resources in a cost efficient and user-relevant manner" (p. 22). Selecting and de-selecting printed and electronic resources is a critical task in collection development in libraries (Biblarz, 2001). Traditionally, there are different collection development methods such as Librarian's or subject specialists' or user's recommendations, and approval plans (Byed, Thomas & Hughes, 1982). However, they seldom represent the demands of the users served. During last decade, most of the libraries when making choice of the content, shifted from print to electronic, especially when it comes to journal articles (Flatley & Prock, 2009). Moreover, in contemporary settings, libraries face the challenge of selecting reading materials out of a massive pool of resources which are not limited to geographical locations or languages. This is an important point to consider in the process of collection development of e-resources.



Since, ILL requests reflect the demand for library materials; it can be used in selecting and de-selecting printed and electronic resources as a means of collection development. This idea has received considerable attention and a number of researchers have analyzed ILL borrowing requests statistics to support collection development (Knievel, Wicht, & Connaway, 2006; Byed et al., 1982; Etschmaier & Bustion, 1997). Therefore, user centered collection development techniques which have not been frequently practiced comprise the majority among the processes. Accordingly, it will be good to contemplate usage-based and demand-based collection development with big-time scholarly publishers. Also, more than 99% ILLs are for e-journal article requests. Therefore, this study is an attempt to analyze the ILL statistics on electronic journal requests to make recommendations on the collection development process of electronic resources in the Library of the University of Sri Jayewardenepura. Internal usage statistics of some electronic journal databases were used to supplement the analysis of ILL data.

## **Background of the Study**

ILL service has become an essential component of any library system largely because it has lots of benefits. Seal (2003) lists out some benefits of an international ILL service. According to his study, the major advantage is having the access to a wide range of global information resources, which are not accessible without ILL service. Also, the users of the service can enjoy fast delivery, without having the distance as a barrier. Also, it is a saving for researchers as there is no cost on literature reviewing, board or travelling. ILL service brings about benefits to acquisition budget too, especially, when ILL is practiced cooperatively among institutions.

ILL service in the Library of the University of Sri Jayewardenepura (USJP) has been in operation from the time of inception of the university. The ILL service of USJP established a dedicated email address for its ILL service (Amaratunge & Wijayasundara, 2016). This has helped improving the quality of ILL service. Improvements include reduced time in sending requests, reduced time in fulfilling requests, and easy access to extended collection with various e-resources subscribed by other university libraries.

A library is a growing entity and development of the collection has also become a duty of a librarian (Fernando, 2007). It has been a long time since academics emphasized the need for written collection development policies for Sri Lankan universities, particularly for university libraries (Ranasinghe, 1995). However, studies have revealed that this requirement has not been fulfilled in Sri Lankan libraries. For an example, Senevirathne (2008) reported the absence of a firm collection development policy in public libraries in Colombo district. Another comprehensive study which covered university libraries (excluding the ones in Northern and Eastern provinces) found that no university library has had a written collection development policy, other than traditional norms used in book selection (Fernando, 2007). The study further reports that researchers have observed negative consequences of not having a proper collection development policy such as, unbalanced collections, unnecessary duplication, unused materials, lack of resources and frustration in users.

Another major concern in collection development is the effectiveness of the traditional top-down, librarian driven acquisition and collection development policy. Studies have shown that patrons using major academic library collections, borrowed considerably low percentage of books largely selected by librarians (Kent, 1979). Trueswell in 1969 applied the Pareto principle into the library collections and found that approximately 80% of the use of books and serials publications in libraries could be accounted only for about 20% of the collection. On the other hand, as Nixon, Freeman and Ward (2010) point out, rapidly increasing ILL figures from various universities and institutions suggests that local collections do not meet the needs adequately. They have further claimed that the need for patron-driven acquisitions, or user-initiated collection development, seem so obvious. Also, ILL service analysis is seen as the major user-initiated tool for collection development by these authors.

Kniveau et al. (2006) emphasizes the importance of using multiple sources of data (e.g. collection size, circulation data, and ILL data) for collection development decisions. Byrd, Thomas, and Hughes (1982) report that several earlier research studies have attempted to use ILL service analysis as a collection development tool (Gallagher, 1981; New & Ott, 1974).

One of the best empirical examples for the potential of using ILL service data for collection development is the "Books on Demand" program (Anderson et al., 2002). This was implemented by the Purdue University Libraries in 2000. Under this program, instead of borrowing books requested through ILL, the libraries purchased selected titles and added them to the collection after used by patrons. After two years, when subject bibliographies were analyzed, 800 titles acquired through the program were compared with titles acquired through normal selection and they found that titles acquired through Books on Demand program were more useful. For example, circulation figures of the Humanities, Social Sciences and Education Library showed that 68% of the titles acquired during first two years of the project, have circulated at least once after returned by the original ILL patron. Also, 42% titles have circulated more than once. In contrast, corresponding figures for titles normally acquired during the same time period were 36% and 16% respectively. Furthermore, in Management Library, all "Books on Demand" titles had at least one checkout, whereas only 48% of the normally selected had circulated at least one time. The bibliographers concluded that this patron-driven program is a valuable complementary collection development tool (Anderson et al., 2002).

Another study which analyzed the Document Delivery Service (DDS) data in an Indian University Library by Saini (2014) found that the research articles in the journals were in high demand. Also, it revealed that departments of History and Economics were the two departments which had the highest shares (75% of total DDS requests). Another study which analyzed ILL services of the North-West University in South Africa during 2006 to 2016 found that, ILL service among libraries in South Africa had generally declined. Also, over 90% of all supplies were from 10 universities, while over 85% of all ILL requests were from 10 universities. These results suggest that there is a core group of universities involved in ILL activities in South Africa. Furthermore, this study found a moderate to strong association between requesting and supplying libraries that suggests that ILL requests and supplies are reciprocated. These studies and empirical evidence suggest that ILL data can give a good insight into the user demands (Bangani, Chizwina, & Moyo, 2018).



It is observed that the current collection development policy for acquiring journals (electronic and printed) for the Library of University of Sri Jayewardenepura has been shifting from traditional top-down management approach to a bottom up, user-centered approach. Earlier, yearly recommendations of Head of Departments were used to decide on which journals to be subscribed by the library. However, this procedure had its own limitations. When the Head of a department is changed, sometimes these recommendations also get changed. Further, it was observed that some journals subscribed through this procedure were not used very much by the students and the academic staff. By considering these issues, as well as those based on the user centered collection development policy of the University, the senate of the University decided on subscribing to journals based on re-shelving records of printed journals and usage statistics of the online/electronic journals from the year 2017. Also, it was decided to discontinue subscription to journals that had not been used (355<sup>th</sup> Senate Meeting Report, Dec 2017). Therefore, it is useful to analyze ILL data for journal article requests, as it gives an idea of the user demands on electronic journals and databases. It is now apparent that the library of USJP is currently moving towards a user-centered collection development approach and it would be an advantage if user demand patterns are identified in ILL service and used as a collection development tool for electronic journals.

## **Research Problem**

The collection of the Library of University of Sri Jayewardenepura (USJP) contains around 250,000 monographs and above hundreds of periodical titles as printed materials/hard copies. Moreover, the library subscribes to many databases such as Emerald, JSTOR, Web of Science Core Collection and Taylor & Francis etc. Through ILL service, requests from internal members of USJP and other universities /institutions are being processed and fulfilled. It has been observed that the number of requests for articles are high and those have been fulfilled mostly through electronic journal databases. As explained earlier, the University Library administration has recently decided to update the collection on usage basis. For this purpose, the ILL service provides a great insight as to what types of journal articles, which journals, what journal databases and in what fields /subjects,

the articles are in high demand etc. Moreover, most importantly, it provides with an idea as to what resources need to be upgraded in order to fulfill the information need of its internal users. Analysis of the nature of ILL requests would assist in collection development particularly in aspects of selection and decision making on materials. This ultimately would save a considerable proportion of annual budget as well as other resources such as library space, server space, and labor/work hours. Therefore, this study will be very useful in several aspects for the Library, USJP.

### **Purpose of the Study**

The main purpose of the study is to examine how ILL statistics can be used as a tool, in collection development of electronic journals at the Library of USJP.

### ***Specific Objectives***

- To examine the ILL statistics on e-journal articles during the years February/2017 to February/2018 in terms of number of requests and the rate of fulfilling them.
- To rank online databases subscribed by the Library according to the user demand on research articles through ILL requests.
- To assess other e-journal collections which are not subscribed by the Library according to the user demand pattern of the internal ILL requests.

### **Research Design**

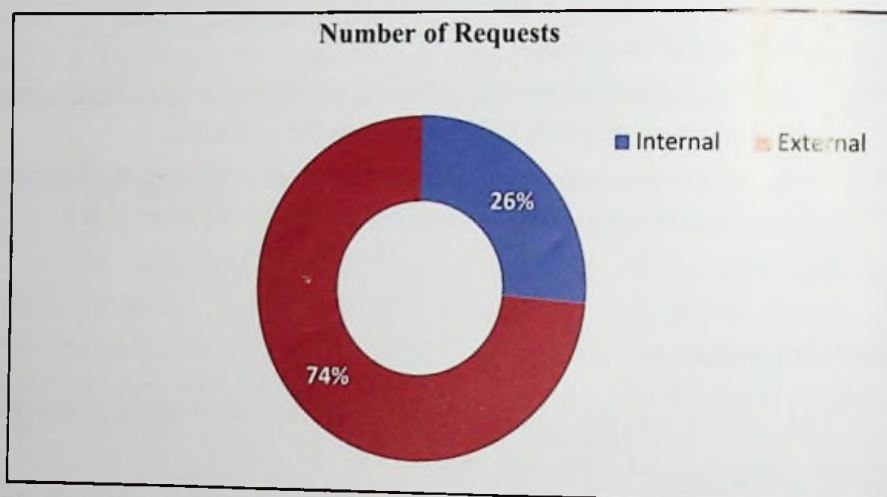
The nature of the study is quantitative and content analytical technique was adopted. The ILL statistics of the Library collected during one-year period from Feb/2017 to February/2018 was quantitatively analyzed. The requests were classified under two types; internal requests and external requests. Internal requests are the requests made by the academics of the USJP. External requests are the requests from universities and institutions other than the USJP. The internal requests were analyzed to make recommendations on collection development and the external requests were analyzed to appraise the current collection of the university in terms of its

value. Also, the internal usage statistics of some subscribed online journal databases were analyzed as a supplementary data. MS Excel 2016 software was used to analyze the data.

## Findings

The number of ILL requests and the fulfillment rate of requests were analyzed. Also, the number of requests and fulfillment rate was calculated for internal and external requests separately. Furthermore, the distribution of article requests from subscribed online databases, as well as from non-subscribed journals was analyzed to compare the demands for articles from different databases.

During the time between February 2017 to February 2018, the library of USJP received 271 article requests. Out of this, 161 requests were fulfilled. The fulfillment rate of article requests was 59%. As shown in Figure 1, nearly three-fourths of the requests were from external sources.

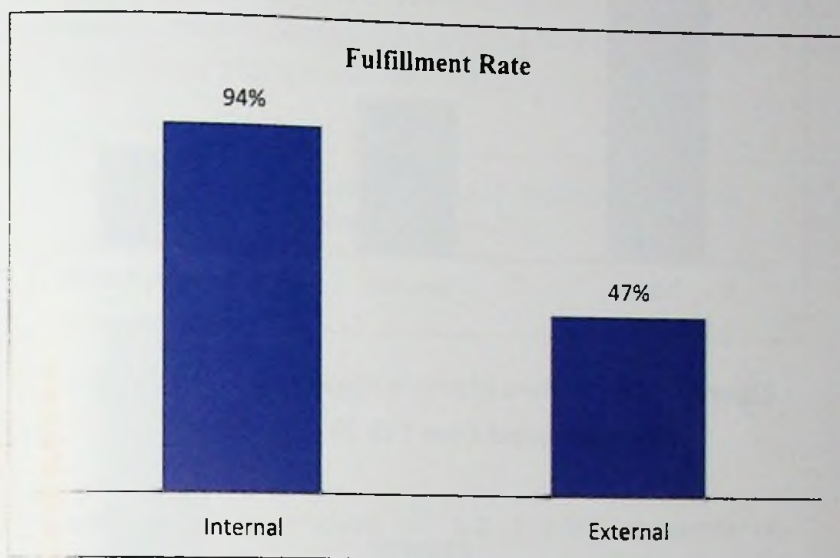


**Figure 1: Distribution of ILL Article Requests Vs the Type of Request during Feb 2017 to Feb 2018**

From all the article requests, only 70 were internal while the rest were external requests. When it comes to fulfillment of article requests, the vast majority of internal requests were fulfilled, while nearly half of the

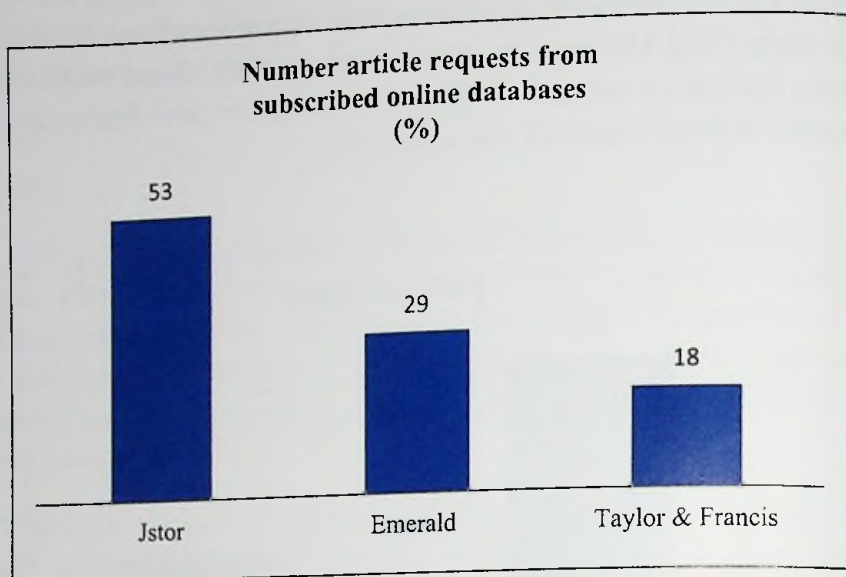


external article requests were fulfilled (Figure 2). Among the article requests, 126 requests were on articles from subscribed online databases of USJP library and 145 requests were on articles from online databases and journals that are not subscribed. These two categories were further analyzed to identify different trends of article requests.



**Figure 2: ILL Article Fulfillment Rate Vs the Type of Request from Feb 2017 to Feb 2018**

As shown in Figure 3, more than half of the article requests from subscribed online databases were from JSTOR. Emerald was the second and Taylor and Francis ranked 3<sup>rd</sup> in number of article requests from subscribed online databases.



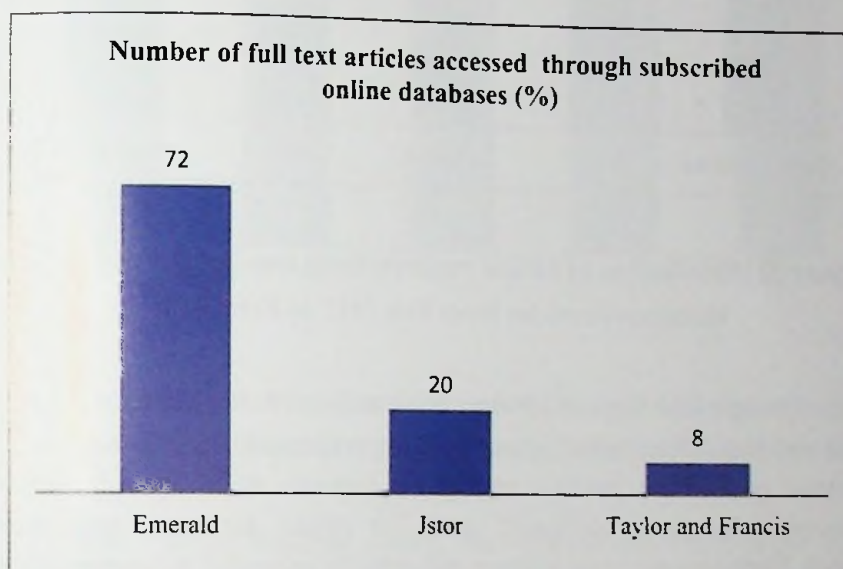
**Figure 3: Distribution of article requests from subscribed online databases from Feb 2017 to Feb 2018**

As shown in Table 1, the vast majority of article requests from subscribed online databases were external requests. Since, these three online databases are subscribed by the university internally the users can access them. So, there is no need to use ILL service for articles which are available through these databases. Although this information cannot be directly used to assess the usefulness of these 3 databases to the internal users of USJP library, it shows that those are in high demand among other universities and institutions. Results reveal that there is a great demand for the current online journal collection of the University.

**Table 1: Distribution of Requests for articles from subscribed online databases**

Type of Request	JSTOR	Taylor & Francis	Emerald	Total
Internal	1	1	2	4
External	65	22	35	122
Total	66	23	37	126

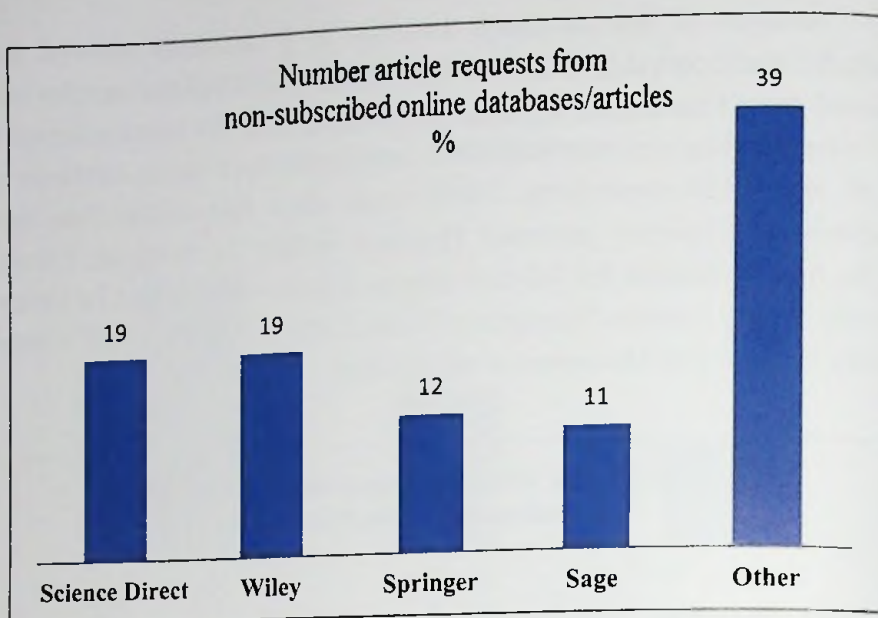
Analysis of internal usage statistics of 3 databases showed that, during the study period (Feb 2017 to Feb 2018), 94190 full text articles were accessed from Emerald by the users of University of Sri Jayewardenepura. The corresponding numbers for JSTOR and Taylor and Francis databases are 26144, and 10128 respectively. These results show that articles from these databases are frequently accessed. However, unlike ILL requests, Emerald has the highest demand for full-text articles (Figure 4). That may be because Emerald mainly contains Management related articles and the USJP's largest Faculty is Faculty of Management and Finance.



**Figure 4: Distribution of internally accessed full text articles from subscribed online databases from Feb 2017 to Feb 2018**

As a single online database, Both Science Direct and Wiley has been ranked as first in article requests from non-subscribed online databases (Figure 5).

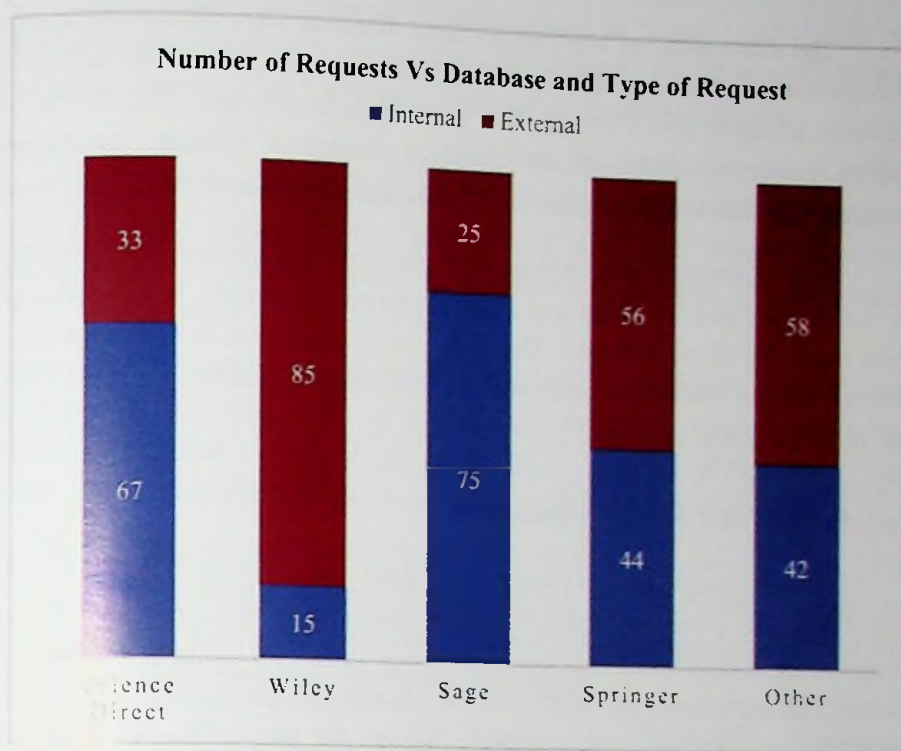




**Figure 5: Distribution of article requests from non-subscribed online databases/articles from Feb 2017 to Feb 2018**

Springer and Sage are ranked third and fourth respectively as single online database. The “other” group is a miscellaneous collection of online databases and online journals among the requests of USJP ILL service. However, this group contained about 30 online databases and online journals. Furthermore, none of them individually exceeded 5 requests during the period of study.

When it comes to article requests from non-subscribed online databases, different databases have different pattern of internal and external requests (Figure 6). A clear majority of requests from Science Direct and Sage are from internal users of USJP library. The vast major of article requests from Wiley is from external organizations. The difference between percentage of requests from internal and external users for the Springer database, is not much.



**Figure 6: Distribution of article requests Vs type of Request from non-subscribed online databases During Feb 2017 to Feb 2018**

The internal requests during the time of the study were further analyzed to find out the pattern of internal article requests. Only four internal article requests were not fulfilled. All of them were from non-subscribed databases/journals. Out of these, two are from Science Direct. An article request from Pakistan Journal of Pharmaceutical Sciences and another article requests from International Journal of Dravidian Linguistics were not fulfilled.

Two thirds of article requests from Science Directs were from the medical field. Out of these, microbiology was the most demanding sub-field of medicine. Articles on Pediatrics also were requested. Other than medicine, there were requests from fields of Education and Information Technology, Sustainable Development and, Business Management.

The main areas of requests on Sage database were Human Resource Management, Economics and Politics. In Springer, the articles in the fields Decision sciences and Osteoporosis were in high demand. The fields of articles requested from Wiley database included Human Resources management, Behavioral sciences, Diabetes, and Business Strategy.

Only 4 internal article requests were there for subscribed databases. An article on Food suppliers and another one on advertising in tea industry were requested from Emerald. The only article requested from Taylor and Francis was on Pathogens and Health. The article requested from JSTOR was on Society and culture.

## **Conclusions and Recommendations**

There is a considerably high demand for articles on JSTOR, Emerald, and Taylor & Francis databases from other universities and institutes. Therefore, it is concluded that the subscription to current collection of online journal databases can be well justified. Based on analysis of both ILL demands and internal usage statistics, out of the three subscribed online databases, the priority should be given to continuation of subscription to Emerald and JSTOR databases.

The online databases which are in high demand and that are not subscribed are Science Direct and Wiley. Also, more than 2/3 of the requests for Science Direct are from internal users. Therefore, it is recommended that Science Direct be given priority when subscribing to new online databases.

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## **A BIBLIOMETRIC ANALYSIS OF SCHOLARLY PUBLICATIONS ON DENGUE IN PUBMED DATABASE**

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### **Abstract**

Dengue is a re-emerging mosquito-borne infectious disease that seriously affects the population all over the world. However, there is no sufficient information on the bibliometric direction of dengue research output globally. Therefore, the main objective of this study is to provide a bibliometric analysis of research publications on “dengue” from 2013 to 2017 based on PubMed Database. The study analyzed the different aspects such as authorship pattern, degree of collaboration, year-wise distribution, language productivity, publication type and geographical distribution of publications on dengue. The research method used in this study was the bibliometric analytical method where the data were analyzed using the bibliometric tool, BibExcel. It was revealed that the majority of publications have been single-authored and the degree of collaboration has been low. Further, it was remarkable that a majority of the contributed research scholars are from United States (36.40%) and England (23.46%). Out of 6095 research publications, the majority (79.05%) of research output has been published as journal articles. In terms of Language, the most used language was English with 96%. Moreover, it was found that the maximum number of publications of year (28.26%) has been published in 2017.

**Keywords:** *Bibliometric, Dengue, PubMed, Degree of Collaboration, Bib Excel, Bibliometric Analytical Method.*



## **Introduction**

Dengue is a mosquito-borne viral disease. According to WHO (2011), dengue has been identified as a rapidly growing and emerging serious public health problem globally, with 2.5 million people at risk and 50 million dengue infections occurring annually. It is estimated that each year 390 million people are affected with dengue, of which 96 million manifests clinically. About 500,000 people with severe dengue conditions are requiring hospitalization, and about 2.5% of those affected are facing death (WHO, 2010). Due to this alarming scenario of dengue across the world, the number of scholarly publications on the topic has been increasing. In this context, a bibliometric analysis can help characterize and measure the international research output of dengue. Bibliometric can be defined as the statistical analysis of publications; a method used to quantitatively analyze academic literature and scholarly communications mainly of journal publications and data deposited in major journal-indexing databases such as PubMed (Mota, e Fonseca, Galina, & da Silva, 2017). During the last two decades, several bibliometric analyses have been conducted to evaluate the scientific research publications in other infectious diseases such as Chikungunya (Vera Polania et al., 2015), Zika virus (Delwiche, 2018), Malaria (Munoz-Carbazo et al., 2015) and Yellow Fever (Bundschuh et al., 2013). It was observed that there were few bibliometric profiles on dengue covering only the specific regions of the world. It is also worth noting that most of the previous studies have assessed the research output retrieved through other databases such as Science Citation Index, Scopus, and Web of Science. However, there were only few studies done using PubMed data to measure the research output on dengue.

In this study, different bibliometric parameters are used to measure the international contribution to research on dengue, covering PubMed data from 2013-2017. The study aims to analyze the literature on dengue through different aspects such as year wise productivity, authorship pattern, language preferred, publication type, and geographical distribution.

## **Objectives of the Study**

In the scholarly literature on dengue available through PubMed database from 2013 to 2017;

- To examine the authorship pattern of the scholarly contributions
- To determine the degree of research collaboration on dengue
- To identify the research productivity by language
- To find out the year-wise distribution of publication and publication type
- To identify the geographical distribution of publications on dengue

## **Review of Literature**

There are few bibliometric studies measuring the scientific research contribution on “dengue” in the published literature available in major indexing databases; Web of Science (WoS), Science Citation Index (SCI), and Scopus. These studies have been conducted during the time period from 2011 to 2015. Further, it was noticed that no sufficient studies have been retrieved through PubMed database as the source of data.

Kavitha and Kavitha (2014) analyzed literature on “dengue fever” available in the database “PubMed” covering the period of ten years from 2003 to 2012, and revealed that single-author research work was much less within the literature on dengue fever during this period. Further, they reported that the highest number of publications, 2807 (41.03%) were from USA, thus becomes the top country with respect to dengue research output. Ho, Siu and Chuang (2016) carried out a bibliometric analysis of dengue research from 1991-2014. The data was collected through the Science Citation Index for this study. The authors aimed to assess the relationship between the burden of dengue and scientific publications and found that most papers were classified under the topics of tropical medicine, virology, infectious diseases, parasitology or immunology. Further, they revealed that the regional specificity of dengue may also influence the bibliometric profile of dengue research.

In order to measure India's contribution to the research output on dengue fever, Bhardwaj (2014) carried out a bibliometric study using the Scopus database covering data from 1973 to 2012. It was revealed that India has the most prominent records in the world on dengue articles and citations to them.

Zyoud (2016) analyzed the dengue research worldwide and in Arab. The data for this study were retrieved from the Scopus database for the period of 1872-2015. It was concluded that the amount of literature related to dengue research has increased over the last decade. Further, it was revealed that the USA, India, Brazil, Thailand, the UK, and France play leading roles in dengue research while Arab region produced fewer publications related to dengue which is of lower quality than in other countries.

Dwivedi (2017), in her study, attempts to make a 3D bibliometric portfolio of global research output on dengue using the data retrieved from Web of Science covering the period 1989-2015. It was shown that Vietnam has the highest quality while India has the lowest quality of dengue research among the leading countries. Furthermore, Taiwan has a higher consistency in research on Dengue, whereas Germany has a lower consistency.

Mota, et al. (2017) conducted a bibliometric and network analysis to map the scientific scenario related to dengue research worldwide covering the period of 1945 to 2014. The results show a significant increase in publications on dengue during the recent years and highlighted virology as the most frequently researched area, and biochemistry and molecular biology as the most central areas of research in the network. Data were retrieved from the Web of Science Core Collection articles indexed in Science Citation Index Expanded.

## **Methodology**

The Bibliometric analytical method was used as the research method for this study. Data were collected using a standardized search approach through PubMed and using the keyword "dengue", from the articles published during the five years, 2013 to 2017. The data was analyzed using the bibliographic toolbox named Bibexcel, which was developed by Olle



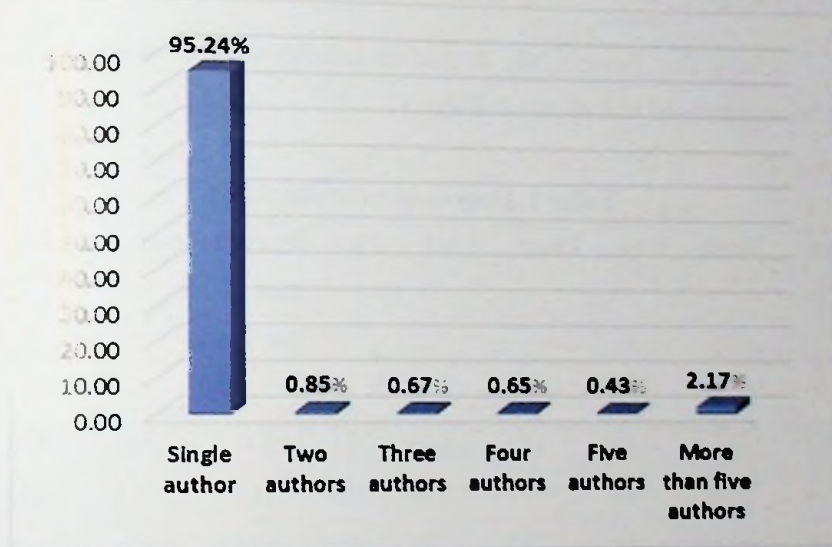
Persson, especially to assist research scholars in analyzing bibliographic data or any data of a textual nature, formatted in a similar manner.

## **Results and Discussion**

Data analysis, findings and discussion are summarized below, in line with the objectives of the study.

### ***Authorship pattern***

Authorship pattern of the research output is presented in Figure 1. It is observed that a total number of 44793 authors have contributed to dengue-related publications during the study period.



**Figure 10: Authorship pattern**

As per the Figure 1, 95.24% of the total articles are single-authored, followed by 2.17% contributed by more than five authors, 0.85% contributed by two authors, 0.67% contributed by three authors, and 0.65% contributed by four authors. The least percentage was recorded by five authors with 0.43%. It is significant that the majority (95.24%) of the articles are by single authors. It indicates that the number of multi-authored publications is much less than that of the single-authored articles.

### **Degree of collaboration**

According to Subramanyam (1983), the degree of collaboration is defined as the ratio of the number of collaborative research papers to the total number of research papers in the discipline during a certain period of time. To measure the degree of collaboration, the formula suggested by Subramanyam (1983) is used for this study.

It is expressed as  $C = Nm/Nm+Ns$ ,

Where C is the degree of collaboration in a discipline. Nm is the number of multi-authored research papers in the discipline published during a year. Ns is the number of single-authored papers in the discipline published during the same year.

Using this formula, the degree of collaboration in dengue research has been measured and shown in Table 1.

**Table 1: Degree of collaboration**

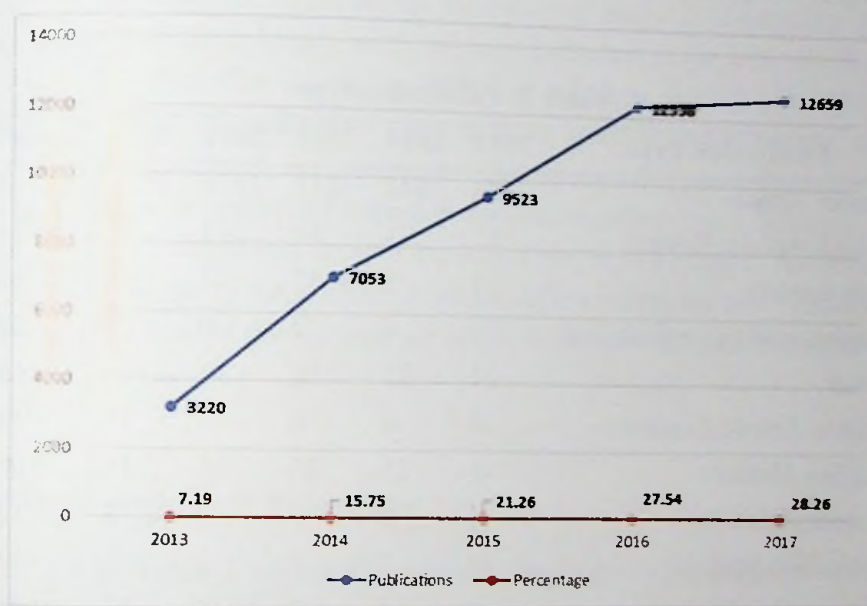
Year	Single	Two	Three	Four	Five	More than five	Total	More than one	Degree of collabor ation
2013	2142	179	153	144	101	501	3220	1078	0.33
2014	6544	96	78	70	50	215	7053	509	0.07
2015	9239	67	37	47	17	116	9523	284	0.03
2016	12171	26	21	18	16	86	12338	167	0.01
2017	12563	11	11	11	10	53	12659	96	0.01
<b>Total</b>	<b>42659</b>	<b>379</b>	<b>300</b>	<b>290</b>	<b>194</b>	<b>971</b>	<b>44793</b>	<b>2134</b>	<b>0.05</b>

Table 1 reveals that the value of the degree of collaboration was 0.33 in the year 2013 and 0.01 in the year 2017. It was observed that the degree of collaboration has been decreasing over the years and the highest was recorded in the year 2013 with 0.33. Further, it is evident that there was a

decline in the degree of collaborations during the five year period. Accordingly, the degree of collaboration in research on dengue is 0.05 which clearly indicates its dominance upon individual contribution over the years.

### ***Growth of literature on dengue***

The Figure 2 depicts the year wise distribution of literature on dengue.



**Figure 2: Year wise distribution of literature on dengue**

According to Figure 2, Total number of articles published during the period 2013-2017 has been 44793. It was found that the maximum number of publications 12659 (28.26%) were published in 2017, followed by 27.54% (2016), 21.26% (2015), 15.75% (2014) and 7.19% (2013) in respective years. The range of publications published annually during the study period is in between 3220 -12659. This clearly indicates the significant increase in the number of research publications on dengue from 2013 to 2017.



Further, it is observed that 55.80% of entire research output has been published during 2016 to 2017, and the balance (44.20%) was published between 2013 and 2015. It is also evident that there is a drastic increase in the number of research publications published through 2013 (7.19%) to 2017 (28.26%).

### ***Publication-wise distribution of literature on dengue***

The Table 2 shows the publication-wise distribution of literature on dengue during the period of this study (2013-2017).

**Table 2: Publication type**

<b>Publication Type</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>Total</b>	<b>%</b>
Journal Article	804	842	815	1079	1275	4818	79.05
Journal Article; Review	67	75	51	143	8	424	6.96
Case Reports	29	76	47	27	56	235	3.86
Randomized Controlled Trial	0	0	0	0	23	23	0.38
Letter	24	22	16	35	22	119	1.95
Journal Article; Comment	0	0	0	3	12	15	0.25
English Abstract	31	35	25	5	10	106	1.74
Historical Article	4	0	3	3	8	18	0.30
Evaluation Studies	36	7	0	2	8	53	0.87
Comparative Study	9	8	2	3	6	28	0.46
Editorial	4	7	5	12	3	31	0.51
Review	0	3	0	17	0	20	0.33
Letter; Comment	0	0	0	19	0	19	0.31
News	8	7	5	11	0	31	0.51
Published Erratum	0	0	6	14	3	23	0.38
Newspaper Article	0	0	0	1	0	1	0.02
Letter; Review	0	0	0	1	0	1	0.02
Journal Article; Retraction of	0	0	0	1	0	1	0.02

Publication							
Clinical Trial	0	10	0	0	0	10	0.16
Biography	0	1	0	0	0	1	0.02
Autobiography	0	1	0	0	0	1	0.02
Congresses	3	0	0	0	0	3	0.05
Research Support	1	0	0	0	0	1	0.02
Comment	26	61	23	3	0	113	1.85
<b>Total</b>	<b>1046</b>	<b>1155</b>	<b>998</b>	<b>1379</b>	<b>1517</b>	<b>6095</b>	<b>100</b>

According to Table 2, total of 6095 scholarly work has been published in different forms during the period of study. It is also clear that the majority of the scholarly work has been published in the form of journal articles (79.05%). The remaining 20.95% of scholarly work is published in different forms of publication types such as journals article review, case reports, letter, abstract, and comments. This implies that journal articles are considered as an important approach for disseminating research output on dengue. Also, noted that despite the low strength-of-evidence, publication types such as case reports, letters, abstract and comments are also considered as important kind of publications for use in disseminating research output on dengue.

### *Research productivity by language*

The Table 3 depicts the research productivity by language of the articles published on dengue.

**Table 3: Research productivity by language**

Language	2013	2014	2015	2016	2017	Total	Percentage
English	1375	1539	1613	1946	1905	8378	96
Spanish	26	28	37	25	19	135	1.55
Chinese	9	9	9	6	5	38	0.44
French	6	3	15	5	4	33	0.38
Japanese	6	2	7	4	1	20	0.23

Portuguese	6	7	4	0	1	18	0.21
Russian	2	4	1	0	0	7	0.08
German	2	10	1	4	3	20	0.23
Turkey	1	0	0	0	0	1	0.01
Czech	1	0	1	0	0	2	0.02
Polish	0	2	6	4	0	12	0.14
French	1	0	10	0	0	11	0.13
Italian	0	2	1	0	0	3	0.03
Dutch	0	2	2	0	0	4	0.05
Swedish	0	0	0	1	0	1	0.01
Multilingual	4	6	10	12	12	44	0.50
Hungarian	0	0	0	0	1	1	0.01
<b>Total</b>	<b>1439</b>	<b>1614</b>	<b>1717</b>	<b>2007</b>	<b>1951</b>	<b>8728</b>	<b>100</b>

Table 3 shows that English (8378, 96%) is the most used language for dengue-related articles found during this study period. The other languages such as Spanish, Chinese, French, Japanese, Portuguese, Russian, and German are used only in 4% of the publications. As shown in Table 3 above, it is evident that most of the publications have been published in English speaking countries and the English is the leading language among research publications on dengue.

### *Geographical distribution of literature*

During the past decades, due to the emergent nature of dengue fever all over the world, the scientific literature has been emerging from almost all the countries of the world. In the present study, all these research publications were categorized according to their country of origin to find out the geographical distribution of research output on dengue during the study period. Table 4 depicts the scattering of research output on dengue all over the world.



**Table 4: Country wise distribution of literature**

<b>Country</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>Total</b>	<b>Percentage</b>
United States	548	603	626	694	697	3168	36.40
England	329	320	377	478	538	2042	23.46
Netherlands	138	167	176	209	174	864	9.93
India	88	113	108	168	103	580	6.66
Switzerland	25	49	49	69	96	288	3.31
Germany	51	50	71	63	57	292	3.35
Brazil	34	51	36	58	53	232	2.67
Japan	14	23	28	25	21	111	1.28
Pakistan	6	11	11	11	17	56	0.64
Canada	18	19	6	15	16	74	0.85
France	12	17	16	21	14	80	0.92
Australia	5	10	9	14	13	51	0.59
China	20	24	24	17	12	97	1.11
Colombia	14	6	16	13	11	60	0.69
Egypt	9	9	6	10	11	45	0.52
Singapore	15	4	4	9	10	42	0.48
Austria	13	11	10	9	9	52	0.60
Italy	6	18	14	9	8	55	0.63
Malaysia	11	15	10	4	8	48	0.55
Iran	4	4	0	9	7	24	0.28
Chile	1	0	5	3	6	15	0.17
Denmark	3	0	1	2	6	12	0.14
Mexico	4	6	7	5	6	28	0.32
Philippines	3	3	3	2	6	17	0.20
United Arab Emirates	1	5	1	6	6	19	0.22
Korea (South)	3	4	3	9	5	24	0.28
New Zealand	5	4	4	6	5	24	0.28

Saudi Arabia	3	1	1	1	5	11	0.13
Spain	2	11	10	8	4	35	0.40
Sweden	6	10	4	15	4	39	0.45
Thailand	21	12	26	2	4	65	0.75
Ireland	0	3	0	1	3	7	0.08
Scotland	0	0	0	4	3	7	0.08
Nigeria	0	0	0	0	2	2	0.02
Argentina	0	1	0	2	1	4	0.05
Bangladesh	2	1	0	0	1	4	0.05
Indonesia	1	1	1	1	1	5	0.06
Papua New Guinea	0	1	0	4	1	6	0.07
Peru	4	3	9	0	1	17	0.20
Puerto Rico	1	0	2	1	1	5	0.06
Sri Lanka	3	3	1	4	1	12	0.14
Turkey	1	1	2	0	1	5	0.06
China (Republic)	0	0	2	3	1	6	0.07
Nepal	0	0	1	0	1	2	0.02
Hungary	0	0	0	1	1	2	0.02
Belgium	2	0	0	0	0	2	0.02
Boca Raton	0	1	0	0	0	1	0.01
Costa Rica	0	1	0	1	0	2	0.02
Czech Republic	1	0	1	0	0	2	0.02
Greece	1	2	2	5	0	10	0.11
Oman	1	0	0	1	0	2	0.02
Ottawa	0	1	0	0	0	1	0.01
Poland	1	4	6	3	0	14	0.16
Portugal	0	1	2	1	0	4	0.05
Romania	1	0	0	0	0	1	0.01
Russia	2	4	1	0	0	7	0.08

(Federation)							
Slovakia	1	2	0	3	0	6	0.07
Uganda	2	0	0	1	0	3	0.03
Venezuela	2	2	1	0	0	5	0.06
Jamaica	0	0	3	0	0	3	0.03
Ghana	0	0	0	1	0	1	0.01
Jamaica	0	0	0	2	0	2	0.02
South Africa	0	0	0	1	0	1	0.01
Washington	0	0	0	3	0	3	0.03
<b>Total</b>	<b>1438</b>	<b>1612</b>	<b>1696</b>	<b>2007</b>	<b>1951</b>	<b>8704</b>	<b>100</b>

Table 4 shows the country-wise distribution of literature on dengue during the study period. As proven by Ho, Siu and Chuang (2016), Kavitha and Kavitha (2014) and Zyoud (2016) in their bibliometric studies, United States of America has lead in publishing the literature on dengue. As shown in Table 4, USA has the highest percentage, 36.40% of published literature. England has the next highest percentage, 23.46% of the total publications, followed by Netherland (9.93%) and India (6.66%). The total percentage of literature on Dengue published by above four countries is nearly 76.45%. The remaining 24% of publications are from all 61 countries. This also reflects the leading role that the USA, England and Netherland play in the research related to dengue.

## Conclusion

The important findings of the study are that, the number of dengue-related publications has considerably increased over the last five years, and multiple-author contribution was low towards the dengue research output during the study period. This has been further tested with the degree of collaboration and it was found to be decreased over the study period. Moreover, it was evident that the USA and England play a leading role in the global research related to dengue. It was also revealed that the English was the widely used language for scholarly work on dengue. It was obvious that journal articles are considered as an important mode of disseminating



research output on dengue. The overall results of this study provide a clear direction for future research scholars who are interested in doing research on dengue. Especially researchers in non-English speaking countries where there is a severe risk of dengue epidemic need to take the lead and encourage research in the field of infectious diseases as it is an important public health problem.

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## **A COMPARATIVE ANALYSIS OF REFERENCE MANAGERS: ENDNOTE AND MENDELEY**

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### **Abstract**

This study compares Reference Managers (RMs) such as EndNote and Mendeley in the aspects such as the capacity to import PDF files and to harvest the bibliographic metadata from PDF files, and the functionalities such as modification of citation style, the necessity of Internet connectivity and features in online applications. The methodology includes testing the capacity to import PDF and harvest metadata by uploading 350 PDF files and testing functionalities by performing the both RMs. Findings showed that Mendeley is far more advanced in capacity to harvest metadata from PDF than EndNote and it imports bulk PDF files quicker than EndNote. However, modification of reference style in Mendeley is a difficult task and it requires the knowledge of XML language while it is comparatively easy in EndNote. EndNote does not require internet connectivity to login while Mendeley desktop requires internet connectivity to login. However, Mendeley enables the users to work on any computer in a networked environment. Although online version of both RMs shares common functionalities, each has its unique features. The EndNote has a feature to find the best-fit journal to publish our manuscript by inputting the title, abstract and references, while Mendeley functions as a social media, facilitates collaboration among researchers of similar interest by creating research networks and searching for funding opportunities. Further,



Mendeley enables sharing, storing and publishing our dataset and access to the dataset.

**Keywords:** *EndNote, Mendeley, Reference Managers, Citation Style (CSL) File, Metadata Harvesting.*

## **Introduction**

Citations of relevant works are an essential part of all scholarly articles. Collecting and integrating these references into a manuscript is a tedious process, and reference management software has facilitated this process to a great extent. Reference management software is a tool for researchers to maintain their references and their bibliographic citation. It is also known as bibliographic software, citation management software, and personal bibliographic file managers (Nashelsky & Earley, 1991).

It helps students, research-oriented professionals, and anyone else sourcing others' material to cite accurately and efficiently. A reference manager (RM) supports researchers in performing three basic research steps: searching, storing, and writing (Fenner, 2010). There are numerous reference management programmes, currently available (Lorenzetti & Ghali, 2013). Although all programs facilitate the capture, organization, and elimination of duplicate records from electronic database searching, they vary with respect to cost, overall functionality, and networking capabilities. There are different types of software packages to manage the bibliographic details of the documents. For instance, Mendeley, EndNote, RefWorks, Zotero etc. It helps researchers find relevant literature, allows them to store papers and their bibliographic metadata in a personal database for later retrieval, and allows researchers to insert citations and references in a chosen citation style when writing a text. However, the choice of an RM depends on the user's needs and workflow of the individual researcher. For example, Undergraduate students are looking for the fastest and easiest option, which lets them collect citations and produce bibliographies. Meanwhile, faculty members need databases with better performances for their frequent use. These should be able to organize and filter citations, and to produce a bibliography. Furthermore, members of research teams would want to make sure that the software allows them to collaborate with colleagues.

As a librarian, it is important to provide information on the features and functions of different Reference Management software to assist researchers, for them to choose the desired one for their scholarly works. Even though, there is several Reference Management software been developed, they are of varying functionality and features. Therefore, the study intended to compare a few important features of Mendeley and EndNote and to assess the functionality of the two software. This study will give overall comparisons of both software in order to determine the best one to be used in the systemic citation process, depending on the users' need.

## **Objectives**

The objectives of this study are to compare;

- The capacity to import PDF files and to harvest the bibliographic metadata from PDF files.
- The functionalities of modification of citation style, the necessity of Internet connectivity and features in online applications.

## **Review of Literature**

The research landscape has changed tremendously since the first Reference Management Software (RMs) was developed in the 1980s (O'Reilly, 2005). Many commercial and open-source citation management programs are now available. Some of them may be listed as EndNote, RefWorks, Papers, Zotero and Mendeley (Kathleen & Hensley, 2011).

EndNote is a software program developed by Thomson Reuters. Its latest version is EndNote X8 and X9 is yet to be released. Licenses can be purchased online for personal or institutional use. It can be installed in personal computers and Internet-based (EndNote Web) version also can be used. With a single user's license, EndNote Desktop program can be installed on three computers of the same user. Visual materials and technical support are provided on the website of the program (Sungur & Seyhan, 2013). According to existing literature, EndNote is used by millions of researchers to locate and download full-text articles from the selected

references, or group of references and it has more than 5000 bibliographic output styles. In EndNote, while writing the manuscript, references are displayed according to the writing rules of the selected journal, and the list of references can be generated. Later the style of these references can be changed in compliance with the writing rule of another journal (Hernandez, El-Masri, & Hernandez, 2008).

Likewise, Mendeley is available in both desktop and web versions, which is produced by Elsevier for managing and sharing research papers, discovering research data and for collaborating online. It also provides Mendeley for Android, through Mendeley Web; an online social network for researchers. It is a free reference manager and academic social network that helps the users to organize and showcase their research and thereby to discover the latest research in the field.

There are several research articles focusing on the comparative analysis of different Reference Management Software. Enormous studies have been conducted by many researchers on different reference management software to check citation accuracy (Dell'Orso, 2010; Zhang, 2012; Sungur and Seyhan (2013); compared and summarized the findings on reference management software such as EndNote and Mendeley in their studies. They stated that presently, Mendeley program has a limited number of journal writing styles when compared to EndNote program. When compared the similarities, as in the EndNote program, Mendeley program also has a PDF reader, and the processing function (Zaug, West, Tateishi, & Randall, 2011). A study by Kathleen and Hensley (2011) concluded that Mendeley includes importation of PDF metadata, automatic naming and filing of documents, the opening of multiple PDF's for reading at once, which are navigable by tab, ability to highlight text in PDFs and finally annotating PDF documents within the PDF reader.

The Literature on Reference Management Software focuses mostly on the technical analysis of the features offered by the software packages. Brahmi and Gall (2006) conducted a research on EndNote® and Reference Manager® Citation Formats Compared to "Instructions to Authors" in Top Medical Journals. In their study, they concluded that both products are used for preparing references for publication and discrepancies were minor in nature and fixable by using the software features for editing output styles.



Further, Cite ULike and Mendeley also let users search the entire universe of references in their respective databases, making them tools for resource discovery. These two products also allow users to assign importance ratings to references and to use these as a sorting criterion (Gilmour & Cobus-Kuo, 2011). A few articles reported exclusively on contrasting, specific functions, such as database query capabilities (Gomis, Gall, & Brahmi, 2008). A significant number of publications provide researchers and professionals with information needed for them to decide on the tool that is best suit their needs. In addition, several authors have provided individual or overall assessments of the tools available, in accordance with several criteria and approaches(William, 2012).A less practical approach has been attempted by Nagelschmidt, who draws the functionalities necessary in an idealized reference management program (Nagelschmidt, 2010).

## **Methodology**

The Mendeley Reference management software was downloaded from the official website of Mendeley ([www.mendeley.com](http://www.mendeley.com)) and thirty-day fully functional trial version of EndNote X8 was downloaded from the official website of EndNote (<http://endnote.com>). Both software were installed in the same desktop with Windows 10 operating system. A set of 350 journal articles of different discipline which had been downloaded from different online databases were uploaded to both software. The processing time to upload PDF files were recorded separately in both cases. Once the uploading is completed, the whole reference library was exported to MS Excel for further analysis. Only the metadata, which are important to create a record were extracted from the reference library. The metadata extracted were; type of source, author/s, year, titles of the article and journal, volume number, issue number, pages and URL/DOI. The metadata which had been imported correctly were counted and recorded against both software. Functions such as modification of reference styles, the necessity of internet connectivity and features of online applications were compared by performing them in both RMs.

## **Results and Discussion**

### ***1. Bulk Import time***

Processing/execution time of a software is an important aspect to determine the performance of the software in view of experiencing quickest response. As such these two reference managers (RM) were checked for processing time. The results revealed that there was a big difference in the time taken to import the folder with 350 PDF files, with a total of 252MB. Mendeley imported 350 files in five seconds and it was around 18 minutes 57 seconds in EndNote at a rate of around 4.5 seconds per MB, while in Mendeley it was around 20 milliseconds per MB.

### ***2. Harvesting appropriate bibliographic metadata***

One of the features in both RMs is that PDF files can be imported to the reference manager, upon which the bibliographic metadata is harvested automatically from the PDF files. This is a very useful feature as most of the researchers download and store the articles as PDF files. There is literature on studies which compare the data capture of RMs but those research lack proper research evidence. However, in this study, it was attempted by analyzing the capability of importing PDF files. The results revealed that both RMs capture the necessary bibliographic metadata but the capability of capturing metadata differs between the two RMs (Table 1). The table shows a significant difference between the two RM software. Mendeley has the highest percentage of correctly imported data than that of EndNote in all the field. The average percentage of correctly imported data of Mendeley is 91.3% and that of EndNote is 29.2%.

Table 1: Import of appropriate metadata by Mendeley and EndNote

Bibliographic metadata	% of import of correct detail	
	Mendeley	EndNote
Identifying the type of source	94.0	30.8
Authors	97.4	30.8
Year	99.1	30.8
Title	96.6	30.8
Journal name	85.8	29.9
Volume No.	91.7	29.9
Issue No.	86.2	24.8
pages	82.9	24.8
URL/DOI	88.2	30.8
Average	91.3	29.2

However, import of complete correct details of all the fields was only 67.5% in Mendeley and 18.8% in EndNote. Gilmour and Cobus-Kuo (2011) reported that Mendeley is much better in acquiring the metadata from PDF files than Zotero. But this study proved that Mendeley is far better than EndNote as well in acquiring the metadata from PDFs.

3. Modification of citation style

Although there are more than 5000 citation styles embedded in both RM, yet there is a necessity to modify or create citation styles. Both RMs have the feature to modify the citation styles. However, modifying or creating citation style is easier in EndNote than Mendeley. In the Mendeley, there are two options to edit the citation styles. One of the options is to directly edit the citation style file (CSL file) from program files in the drive where Mendeley is installed. However, the knowledge of XML markup language is necessary. More information about CSL can be obtained from the official webpage of the citation style language project



(<https://citationstyles.org>) which has been sponsored by reference management software Zotero, Papers and Mendeley. The second option is to use Visual CSL Editor Webpage. This page can be accessed through login and then every single aspect of the style can be edited. However, it is again complicated as there are too much cascading arrangements in every element in the reference.

#### ***4. The Necessity of Internet connectivity***

EndNote is a standalone software and it does not require internet connectivity unless to synchronize the library to cloud server. The user can copy the library of EndNote to switch between computers. However, Mendeley needs the internet connectivity to login into Mendeley desktop and once logged in, then internet connectivity is not necessary for rest of the task unless to synchronize the library to cloud server. However, there is an option in Mendeley that 'Stay signed in', which enable the user to keep, signed in the same computer. The 'Stay signed in' option is useful only for those who use their own PC, but not for those who use computers in computer lab or those who frequently switch the working environment or computers. The later users should login every time, which needs the internet connectivity. Although the need of internet connectivity to login seems to be a barrier to some degree, it gives the advantage to user to access his/her library anywhere in the networked environment, i.e. easy to switch between computers and also help to synchronize automatically every time the user login. There is no need to copy the library as in EndNote.

#### ***5. Online Applications***

Both RMs have their online versions. EndNote online version can be accessible in 'my endnote' webpage ([www.myendnoteweb.com](http://www.myendnoteweb.com)), while Mendeley online is accessible through the same official website ([www.mendeley.com](http://www.mendeley.com)). The online library is the common feature found in both RMs and this is generated by importing the library from their desktop application. In addition to this, there are options for searching and importing references directly from online sources. Moreover, both online versions have some other useful features. The EndNote has a feature to find the best-fit journal to publish a manuscript just by keying information such as title,

abstract and references. Along with the title of the right journal for a manuscript, it also displays its impact factor current and last 5 years, Journal Citation Report (JCR) Category and publisher details.

The Mendeley online while functioning as a social media, it also helps the user to write a post regarding the research related activities, and to create groups with other researchers which enables collaborative research. Whenever the users encounter problems while using Mendeley, they have the option to contact the Mendeley support team for a solution by posting Mendeley online. Moreover, the newsfeed in Mendeley provides the users with suggestions/recommendations for reading by posting newly added related articles based on the articles that the user has saved in the Mendeley Library.

The 'Search' tab in the News feed offers three options for searching; namely 'Paper', 'People' and 'Group'. The option 'Paper' can be used to search for a research article in the Mendeley's Web Catalog; the option 'People' facilitates searching for, another researcher on Mendeley and the option 'Group' finds similar research groups to join or collaborate. Another search option is to look for funding opportunities for research. This is one of the biggest advantages of Mendeley online. This particular search option uses filters such as subject area of research, funding type, country of citizenship, amount, application deadline, applicant type and funder.

Another important and latest feature in Mendeley online is 'Datasets', where a user can store, share, publish and find research data. Although sharing dataset is not a common practice, it will be potentially beneficial to research community (Piwowar & Chapman, 2010) and it facilitates the continuation of research. For example, a researcher can carry out similar studies and compare the results with existing data or can apply different statistical techniques to gain new insights into existing data. At present in Mendeley Datasets, a user can search for 9.0 million datasets from domain-specific and cross-domain repositories. This search option also has different filters such as file types, repository types and sources. Users can also store and publish their research data in the Mendeley online and this might increase the number of citations for their datasets.

## **Conclusion**

The study revealed that both RMs have pros and cons. It can be concluded from this study that the time taken to import bulk PDF files in EndNote is dramatically higher than Mendeley. It is around 4.5 seconds per MB in EndNote while it is 20 milliseconds per MB in Mendeley. There is a marked difference in the ability to acquire appropriate bibliographic metadata from PDF files. The Mendeley is far better in acquiring the appropriate bibliographic metadata from PDF files than EndNote. According to the study, the average percentage of correctly imported metadata in Mendeley is 91.3% and in EndNote it is 29.2%. When comparing the modification of citation style, the EndNote is more userfriendly and does not need much knowledge of any programming language, while in Mendeley it is a difficult task and requires some knowledge of XML markup languages. The EndNote does not require internet connectivity to login in, so that it enable users to work even in the environment where there is no internet. However, there is an option 'Stay signed in' in Mendeley desktop, which is useful only for those who use their PC, to be free from regular login, but not for those who switch the computers frequently. This can be considered as both an advantage and disadvantage. Advantage is that a user can work on any computer, which is connected to internet, while the disadvantage is user cannot login without internet connection. Online version of each of the RMs has advanced features of its own, in addition to similar features. One of the advanced features in the EndNote online is that it enables us to find the best-fit journal to publish our manuscript by inputting the title, abstract and references. The Mendeley online also has some advanced features such as functioning as a social media, facility for collaboration among researchers of similar interest by creating research networks and for searching for funding opportunities, ability to share, store and publish the dataset and to access the dataset free.

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## **IMPACT FACTOR VS. ARTICLE LEVEL METRICS FOR MEASURING THE IMPACT OF SCHOLARLY COMMUNICATION: A COMPARATIVE REVIEW**

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### **Abstract**

The presence of web-based communities is a unique mark of Web 2.0. The web-based feature means that information propagation within each community is highly facilitated, promoting dynamics in view of information exchange. As scholarly communication and publishing models continue to evolve, it is crucial that those involved in the publication and dissemination of research to develop a good understanding of the changing environment in order to identify opportunities to improve how we understand the reach and influence of research. This paper discusses about the journal level and article level research impact indicators, such as Impact Factor (IF) and Altmetric. Also critically discusses the challenges of using IF to measure the real impact of research outcome at article level, advantages and disadvantages of Altmetric as an indicator to measure the impact of research at article level, also the importance of measuring the article level research outcome other than journal level. This comparative review revealed that, article level indicators have a number of advantages over journal level indicator such as broadness, diversity, speed and openness to measure the impact of scholarly communication. It also pointed out that, Impact factor fails to measure the real impact of the individual article because it is based on citation only.

**Keywords:** *Journal Level Metrics, Article Level Metric, Altmetrics, Research Impact and Impact Factor.*



## **Introduction**

As scholarly communication and publishing models continue to evolve, it is crucial that those involved in the publication and dissemination of research progress to develop a good understanding of changing environment. It would help identify opportunities to improve how we understand the reach and impact of research. Within the past few years, a number of indicators to measure the impact of research were identified by various researchers and journal publishers. Outputs of good quality research would result in number of social benefits and recommendations for science policy makers (Williams, 2015).

In recent years quality research output have brought less benefits for stakeholders and also much less positive impact on policy decisions. Policy makers expect researchers to carryout research that would result in output with some value to society (Bormmann, 2013). The trend towards assessment of science has made change in the history of science and it can be described as a progress from one approach to another approach: whereas the first approach in science was characterized by the academic interests of a scientific community, now it has changed to collaboration between science and other areas of society (Gibbons et al., 1994). All policy makers, funding agencies and universities are expected to conduct research in multidisciplinary nature, which is more beneficial for the society.

In the era of Web 2.0, all are naturally connected in the virtual world and various online communities are formed. Recently, the transmission of information within these online communities has drawn more attention of different communities (Lazer et al., 2009). In academia, simply producing influential research is not enough, though scholars are finding it increasingly vital to provide evidence on the research they publish, but need to have an impact, constructively affecting the work in its respective field and beyond. At the same time, journal editors are keen to prove that the research they publish have such an influence, in order to attract new submissions and subscriptions. While academics have used traditional bibliometric impact indicators to track the reach of their work, the rise in alternative digital publishing outlets and venues for research discussion has expanded the scope of research impact beyond citations, and allowing certain questions to arise within academia (Williams, 2015).

Now the trend has changed to measure the author's productivity from Journal level metrics to Article Level Metrics (ALM). Web of Science and Journal Citation Report of Thomson Reuter are using Journal Impact Factor (JIF) and Journal Immediacy Index for citation metrics, which is associated with Science Citation Index (SCI).

ALM not only consider citations which the individual research papers obtained, but also other influences such as number of downloads, social media share, coverage in news media, etc. Present situation reflects that, funding agencies, research institutions and other stake holders of the research community no longer consider the counting number of citations or aggregate/average value of JIF to assess the research productivity of individual scientists.

Rather they have started evaluating impact of research publications or funded research projects very differently. Hence the ALM or Altmetric score for a research paper can be calculated in various ways by considering its usage (downloads, views), peer-review (expert views), citation. Thus, Altmetrics score for a published paper can be measured in different ways by considering its usage (downloads, views), peer review (expert opinion), citations, and online communications (storage, links, bookmarks, conversations) (Das & Mishra, 2014).

This paper discuss about the best way to measure the efficacy of scholarly communication and how the impact indicators can be used to determine the true impact of individual scholars' work.

## **Objectives**

- To identify main indicators to measure research impact.
- To analyze the challenges in using Impact Factor for scholarly communication.
- To identify the benefits of ALM over the use of IF to measure research impact.

## **Scope**

The scope of the study has been based on the literature about the Impact factor and Article Level Metrics within published articles.

## **Research impact indicators**

### **1. Impact Factor (IF)**

“The Impact factor citation data was first derived from the Science Citation Index, a citation index created by Garfield and produced by the Institute for Scientific Information (ISI). ISI was later acquired by Thomson Reuters along with the Science Citation Index, which Reuters grew into the Science Citation Index Expanded. That index is now housed in the Web of Science. Thomson Reuters calculates IFs using the data from all of the journals indexed in the Web of Science” (Williams, 2015).

Academics and researchers are paying more attention to high IF journals than low IF journals, in their research works. This is an evidence to show that IF has become the widely adopted measure for research quality, impact of output and by funding agencies.

Impact Factor for Academic Journals calculates the average number of citations for a published research article (Williams, 2015). It can be frequently used as a measure to find out the relevance of a journal within its field. IF can be measured for a journal using the average number of citations received per paper published in that journal during the previous two years. It also can be measured for five years.

### **2. Article Level Metrics (ALM)**

Now-a-days traditional and citation-based metrics are partially replaced by Article Level Metric or Altmetric. Altmetrics are metrics and qualitative data, which can be considered as a subset of Webometrics that combines the traditional Bibliometrics tools with web (Das et al., 2014). In addition to citations and usage statistics, ALM provides different categories of article level metrics. This shows that, how often an article has been viewed and downloaded, how often an article has been saved in online reference managers, such as Mendeley; how often an article has been discussed in its comments section online, and also in science blogs or in social media; and how often an article has been recommended by other



scientists. These additional metrics provide valuable information than citations. This metrics reflects the influence and importance of social media, academic and social networks collaborations, and also leads to comprehensive visibility, accessibility and readability of the research publications by the authors (Liu et al., 2013).

There are various portals, which use Almetrics. The main ones are Almetric.com, PLoS Article Level Metrics, Impact Story and Plum Analytics also there are other tools that aggregate Almetrics such as, Cited In, Paper Critic, Research Gate, Reader Meter etc. (Das et al., 2014).

### **Challenges of using Impact Factor**

The Impact Factor (IF) is a journal-level metric. It fails to show the true impact of individual scholarly works and the impact of alternative research outputs. Because the IF reflects only the citation impact, it restricts, the extent of impact assessment for selected journals, and also does not consider the relationship it has with other scholarly communications, such as public policy documents or social media and scholarly networks. In addition to citation count, there is a gap between the times of a paper published and its reflection in the journal Impact Factor of the journal.

Researchers and academics expect high impact articles in their field of study quickly. Calculation of Impact Factor of a journal and the time to know the real impact of an article, takes months and years; also IF fails to reflect the clear impact of research on other disciplines and society (Williams, 2015).

Above challenges show that there is an urgent need for an indicator, which can measure the real impact among the researchers and academics in the field, which is consistent with time and interaction with certain parts of the society. Primary need for such indicator is to build productive interaction and effective communication between researcher and societal stakeholders. In addition, scholarly communication should be tested at the article level other than the journal level to measure the real impact of an individual publication. Because of the above challenges faced with IF in measuring the quality of individual scholarly communication, academics have shifted from IF to ALM.

## Benefits of Altmetrics

Most of the publishers included Article Level Metrics in their databases. They present those data in a unique ways. Below figures show Article Level Metrics for an article of most popular online database's. Figure 1 shows the details of Public Library of Science's Article level Metrics, which contain the number of shares, downloads, citations and views.

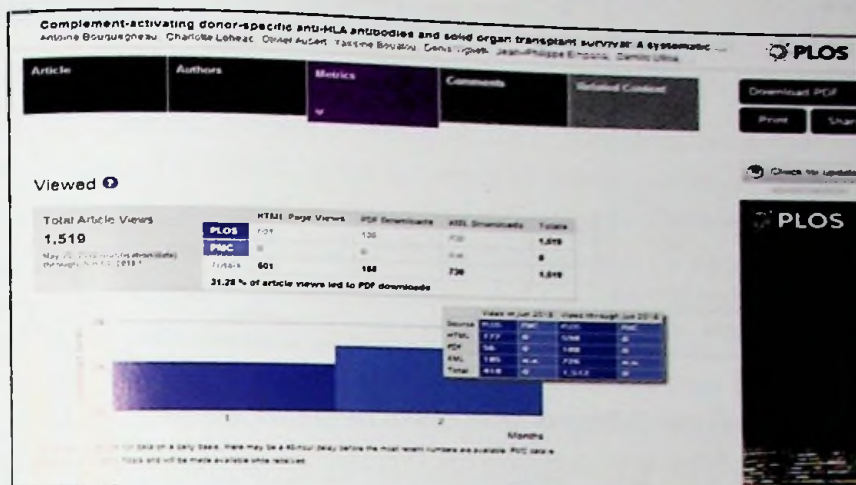


Figure 1: Public Library of Science (PLOS) Article Level Metrics



Figure 2: Springer Article Level Metrics

Figure 2 shows the doughnut picture of altmetric scores, it contains different colours, each colour represents different sources such as, facebook, twitter, linkedin, google+ etc.

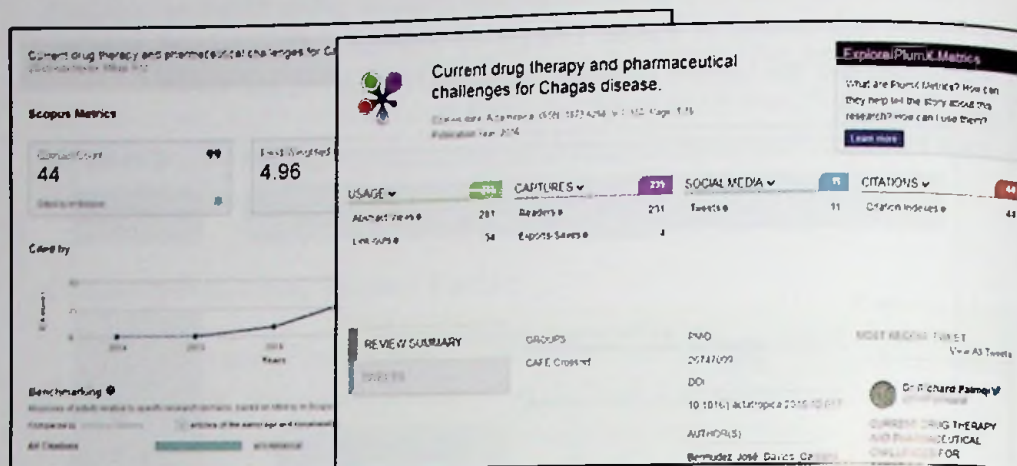


Figure 3: Scopus Metrics and its PlumX metric

Figure 3 depicts the scopus metrics and the PlumX metrics. Scopus metrics combines citations and additional article level metrics, which help benchmark articles. Scopus also includes PlumX Metrics, which provides insights into the ways people interact with individual pieces of research output (articles, conference proceedings, book chapters, and many more) in the online environment. Examples include, when research is mentioned in the news or is being tweeted. Collectively known as PlumX Metrics, these metrics are divided into five categories to help make sense of the huge amounts of data involved and to enable analysis by comparing like with like.

According to above evidence Article Level Metrics has become more effective indicator in the scholarly communication and also it has become more popular among the academic research community. Wouters and Costas (2012) said that, "Article Level Metrics contains number of benefits than Impact Factor, which are categorized below

- (1) Broadness: altmetrics measure impact beyond science.



- (2) Diversity: altmetrics can measure the impact of scholarly products other than papers.
- (3) Speed: altmetrics permit impact to be measured shortly after the publication of a paper (or the completion of other products).
- (4) Openness: as a rule, it is easy to obtain altmetric data”.

### **1. Broadness**

The common benefits of Altmetric cover variety of real impact of research other than Science (Priem, et al., 2011). Altmetrics can deliver more real image of the interest, usage and reach of scholarly products (Fausto, et al., 2012) and also provide various and different forms of impact analyses than conventional metric studies, such as bibliometrics (Waltman & Costas, 2014). Mohammadi, Thelwall, Haustein, and Larivière (2014) revealed that “noticeable percentage of Clinical Medicine papers were read by people who are apparently not academics and that it is an important issue because some articles could be useful in clinical practice even if they are not cited in the literature”. Citation based indicators are evaluated by scientific authors or a research fellows, whereas altmetrics, provide access to the opinions from wider audience, such as professionals, undergraduates, government and interested general public (Hammarfelt & Bjorn, 2014).

### **2. Diversity**

It is not that, Altmetrics is diverse based on the number of data sources (traditional citations includes only the cited reference in journals as data source) but also provides wide range of metrics including peer scientist, publishers, students funding agencies and interested public to evaluate our research product or the output. Nowadays research funding agencies expect not only the number of publications by the research grants but also expect other forms of scholarly products such as how well it was discussed among the peers; downloaded etc which would plays an important role in research evaluation (Piwowar, 2013; Rousseau & Ye, 2013). With reference to evaluating these other products, the proviso imposed by the US National Science Foundation that “only citable and accessible products can “count” is

crucial. These products might be datasets, software, copyrights, algorithms, grey literature, and slides” (Zahedi, et al., 2014).

### **3. Speed**

The main disadvantage of the citation indicators is measuring the real outcome that becomes reliable and valid only few years after publication (Wang, 2013), but Altmetrics, will gives the impact of an journal article (or other products) can be measured just a few days or weeks after it has appeared (Mohammadi & Thelwall, 2014). For example, the results of Thelwall suggested that journal articles “tend to attract more Mendeley readers than citations initially, but the situation reversed after several years”. Priem (2004) states “relatively soon after publication, a paper is read, bookmarked, saved, annotated and discussed within academic circles and by the public”. The quick tweeting or blogging of research results can even assist scientists to secure priority for the results before they are submitted to a journal, on the basis of a preprint (Darling, et al., 2013). Many social web tools offer real-time access to structured altmetric data via application programming interfaces (APIs) (Priem & Hemminger, 2010), with which the impact of a paper can be tracked at any time after publication. Above evidence show how quickly the research output can reach the public and make an impact on other research and public community.

### **4. Openness**

Availability of data is the main problem regarding analyzing the societal impact of a research output. Hence citation indicators are the measured impact based on the data available in multi-disciplinary databases (Web of Science, Thomson Reuters and Scopus), which are not easily accessible and to measure the impact (Bornmann, 2012, 2013).

Altmetric represent an interesting option for measuring societal impact instead of case studies. In particular, free access to this data through Web APIs, which “allow immediate feedback about a large publication set” (Galloway, Pease, & Rauh, 2013) and this means “that data collection is less problematic” (Thelwall et al., 2013). Besides Altmetric data are counted on clearly defined platform and data types.

Furthermore, Priem (2004) discussed, based on Twitter or Mendeley based case studies, that altmetric data is today based on platforms with clearly defined boundaries and data types and the interpretation of results.

### **Disadvantages of Altmetrics**

Altmetric have some positive sides and some negative sides. Here the characteristics were compared with conventional metrics. Haustein (2014) stated, "not everything that is cited has been read, and the relevant publications are not always cited in the correct place in a manuscript".

#### **1. Commercialization**

As commercial providers, they are providing number of different featured services through the social media (Twitter and facebook). It facilitates to communicate with large number of stakeholders through the platform. Bibliometrics and Scientometric are not having this kind of commercialization to cite as much as possible (Haustein, 2014).

#### **2. Data quality**

It is understood that, this will be more favorable towards younger generation and professionals interested in research (Neylon, et al., 2014). Also there is no proper data for an individual who commended and discussed on the social platform.

#### **3. Missing Evidence**

Altmetrics fails to provide the evidence of impact on research output because of scarcity of sophisticated empirical studies on altmetric. According to Haustein et al., (2014) "large-scale studies of altmetrics are rare and systematic evidence about the reliability, validity, and context of these metrics is lacking".

### **Discussion**

The important feature of altmetrics in the assessment of research output is fluctuates. In the present scientific world research become more important for the new interventions. For quality research outcomes, there should be proper evaluation methods. Also quality evaluation will lead to



further improvements and incorporation of other disciplines. A number of research studies have discussed that, article level metrics are important for the evaluation of research impact. The above literature shows number of evidence with positive and negative sides of altmetrics and those should be of concern in the future.

Altmetrics present a massive opportunity for publishers of all sizes to showcase the value and reach of their content. Articles in established journals like *Nature* and *Science* have long been recognized as those that will often receive the most press coverage, and eventually will have high numbers of citations. However, through the application of altmetrics, publishers of smaller journals are also getting the chance to showcase the online activity and attention surrounding their articles, even in less high-profile outlets.

Altmetrics presents an opportunity to get a more holistic view of research impact and influence, by factoring in new methods of capturing and reporting on the online communication and activity surrounding research, in addition to traditional bibliometrics. While scholars have yet to find a reliable impact indicator, the combination of altmetrics and bibliometrics presents an exciting opportunity to get a more accurate representation of the reach and influence of new scholarly outputs.

## Conclusion

Altmetrics is useful and may well be considered reliable. Article-level metrics refer to a whole range of measures that can provide insights into the “impact” or “reach” of an individual article. Whereas the well-known Impact Factor measures citations at the journal level, ALMs aim is to measure the research impact of an article in a transparent and comprehensive manner. They not only look at citations and usage but also include article coverage and discussions in the social web. It could actually represent an interesting and relevant complement to citations. Together with traditional metrics, they could also be a useful tool in guiding decision makers when funding public research. Earlier, it was difficult to measure how quickly a new research concept or theory took hold within the scientific community. Article-Level Metrics opens the door to measures of both

the immediacy and the socialization of an article. One of the important benefits of data Altmetric is that it can be used to benchmark research/work against other research published in our field and we can see where the work of our peers is gaining traction, which is useful in informed best-practice strategies for future outreach activities.

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## **CAREER GUIDANCE SERVICES AS A NEW LIBRARY SERVICE IN ACADEMIC LIBRARIES OF SRI LANKA**

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### **Abstract**

This concept paper introduces career guidance service as a new library service in academic libraries. Selecting a correct career pathway is a critical task in the modern world as many multidisciplinary professional careers are appearing in employment advertisements. It is necessary to make awareness among the university students about the diverse types of employment available for them to make the correct decision. University libraries could guide the undergraduates in selecting a suitable career for them. Principle goal of this article is to discuss the importance of a career related programme for academic libraries, which can offer suitable orientation of material for the students to build up their professional and academic career. As an information provider and organizer librarian can play a noteworthy part in help choosing the appropriate career path particularly in a world, where a variety of opportunities are offered. It is a need of the time to improve the quality of services provided by libraries with respect to career guidance to adapt to the changing situation in academic and professional education as well as dynamic job market. This study assists making university librarians aware and in introducing this new service to help the students/ user communities.

**Keywords:** *Career Guidance, University Libraries, Career Development, Library Service.*



## **Introduction**

The library can provide a different segment of work-related information that the students can use more effectively for the purpose of selecting a career. The Library is a consistent place for information and should be able to deliver career information service too. For the actual dissemination of career information or occupational information the co-operation of the librarian is essential. The librarian can contribute much towards the program as he / she is in the sole position to gather, organize, retrieve and distribute career information material to the users. The library staff also has to be prepared to provide an effective service. If the staff is trained, they can add a noteworthy element to the guidance program. The librarians of western nations are much ahead of us in providing career information to their clientele and in generating awareness and guidance (Moly, 2007).

At present, numerous college and university libraries have their own websites to offer career information. Librarians need to start career guidance information services while adhering to systematic schedules. A suitable environment should be maintained in the library to support the student to invest their relaxation time in browsing and reading the documents and / or Internet related to the objective. The librarians need to build up a separate career guidance collection of electronic and print sources.

Moreover, they should also make use of the Internet to download information sources related to career development. He/she has to be well-informed of the current situation and be educated about career information sources. This groundwork would assist accomplishing the distribution of career information (Anderson-Story, Ternes & Haegert 2015). Librarian can organize discussion groups, invited lectures, and seminars. It is essential for the librarian to associate with students and determine their necessities to retain profiles. Varalakshmi and Moly (2009) studied on the theme of "Career Guidance Service in College Libraries: a proposed model". They characterized the notion of career guidance, which is hundreds of years old.

Manual for Review of Undergraduate Study Programmes of Sri Lankan Universities and Higher Education Institutions (2015) stated that;

*"The Faculty/ Institute ensures that the students are provided with training opportunities to acquire 'soft skills'/'life skills' required to succeed in the 'world of work' through regular career guidance programmes conducted by the Career Guidance Unit (CGU) of the University, and by embedding those skills into the curricular activities"*

The University Grant Commission of Sri Lanka, allowed by Segment 4(2) of the Universities Act No. 16 of 1978, as and when compulsory assigns Standing Committees for precise determinations, involving of such powers and with such members, functions and duties as may be determined by the Commission. The Standing Committee on Career Guidance is instructed to supervise the activities and programmes concerning significant parts as follows;

- i) Career guidance and 'soft skills' development,
- ii) Industrial placement program and
- iii) Promotion of ethnic and social cohesion and harmony in universities.

The primary system of this exploration is desk investigation. Desk Research is built on secondary information. This research incorporates looking for data using present resources, for example, the Internet, statistical publications and statistical reports. In this exploration it refers to recognizable proof and investigation of information that has just been accumulated and published. Further, examining where the effectively accessible such sorts of career guidance unit exists in university library field can be explored.

## **Changing role of Librarians**

The fundamental duties of libraries such as organization, collection, conservation, preservation and dissemination of information, user's request and their information seeking behavior are changing in this digital environment. Academic librarians play diverse and dynamic roles in the university. Librarians in all segments of an academic library wear numerous diverse hats and provide many services to patrons (Verma, 2015). The developing environment of forthcoming characters of librarians have transformed over periods as custodians, information managers, information officers, knowledge managers, data professionals and relationship workers.

## **Librarians as a career Guidance Service Provider**

Academic libraries can make an effort to inspire users to share learning, and in addition, creation of information from a diversity of information resources, share and communicate information among the users. They can also make available purpose-designed spaces for group discussion and interaction. Numerous academic libraries have sustained their virtual presence of library in addition to the physical library space (Smith, 2016). Consequently, the library needs to keep up with fundamental collections of career information sources in print format. It is essential to have career guidance information sources on the Web too. In addition, the collections must be refreshed day by day with the sources like magazines and newspapers. The librarian needs to maintain and create vital documents like ready reference documents with career related information for quick dissemination.

This information ought to be arranged in an effective manner for the proper utilization. Librarians should organize book exhibitions on career connected sources of systematic foundation, i. e. at least once in a year. Lectures and career related talks also can be organized at the same time, in libraries to educate more students. This will help the students who were unaware of such services provided by the library to get to know about such services. Digital displays can also be used as supportive items to make aware the students about such services. Computerized displays can be placed on all



floors of the library building. Additionally, digital displays can be used to update information regularly.

Moreover, librarian can collect career information from electronic, print, audio/visual, and web based sources. This information can be arranged in special files/folders to provide easy access to students. Librarians can assist students by arranging aptitude tests, mock interviews counseling sessions, seminars, discussion groups, and so on. If a library has developed a Career Guidance Cell/Unit, the librarian should be a dynamic member of the same. Subsequently, librarian can be a member of the career guidance unit in the university by serving them to acquire the needed information. If possible, a career counselor can be appointed to guide students under Career Guidance unit. University should assemble a blog or portal on WWW for giving career related information. Hyperlinks should be established with other career and recruitment related websites. Molly (2007) defined the tasks of librarians as career guidance service providers as follows:

1. Librarians have to start the important service of providing training on information literacy skills to students. This training should be carried out with the aim of educating them to retrieve, search, evaluate and make use of precise information at the correct time, for a correct purpose. Therefore, librarian has to engage in extra workload of career guidance with commitment besides the steady schedules.
2. Librarian can produce a user-friendly environment to inspire the student to spend their leisure time in the library.
3. The librarians have to improve and organize a separate career guidance collection with the use of print and electronic sources. They should also introduce use of the Internet services to download important career-related information sources.
4. Librarian has to be well-informed of the present problems and be up-to-date with career information sources. This preparation will help him/her to accomplish well in distributing the career information.

5. Librarian has to work in relationship with staff members of the career guidance unit in the university. He /she can organize invited lectures, organize seminars and discussion groups. Then He /she can organize various seminars for career information.
6. Librarian can bring together career information from print, audio/visual, e-learning electronic and web-based sources and maintain special files/folders for easy access by students.
7. Librarian can develop e-learning packages of digital video and audio, images, text and other materials related to career guidance.

Fourie (2004) expressed that;

*“librarians should pay high attention more on emotional characteristics and skills such as enthusiasm for lifelong learning and new roles, Will-power, assertiveness, creative thinking, self-confidence, innovativeness etc.*

Lynch (1994) also reported;

*“career related information appears in a variety of media. Collecting, organizing and disseminating such scattered information need appropriate planning and the use of modern technology”.*

Information is the fundamental unit of education and career guidance. Information should be the principal force in progressing knowledge about the job market, about the self, about training opportunities and education. Libraries need to make spread their services to cater to specific career requirements of precise groups. As information provider and organizer libraries can play a key role in career guidance activities of universities, developing a physical administrative set up. Librarian should undergo training for himself/herself to conduct effective guidance service. Further, Dash (2015) opined that to efficiently perform this role in the guidance program, the librarian should:

1. Familiarize him/her with the services of the guidance program.
2. Secure and file unbound occupational and educational information.
3. Maintain an "occupational shelf" for bound materials.
4. Make the library a laboratory for pupils seeking guidance materials.
5. Acquaint counselors and teachers with new guidance materials reaching the library.
6. Cooperate with administrators, counselors, and teachers in making the library a service point for knowledge acquisition and career development.

## **Conclusion**

The notion of career guidance is centuries ancient nevertheless it got momentum in the modern higher education atmosphere owing to the influence of technological and globalization expansions (Moly, 2007). As a final point, it can be expressed that quality career information services are of great importance to overcome any issues amongst instruction and universe of work, where libraries needs to assume a vital part to cross over any barrier. For the actual distribution of career guidance information, the librarian should be well-informed with the methods of selective dissemination and current awareness service of information. Then, it would be easy for him/her to deliver career information through newspapers, magazines, electronic media, and job magazines. The career information services can be useful to students who are in search of jobs. In present days it is required to deliver the right information to the right user, or job searcher specially in the presence of an overflow of information.



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**ROLE OF THE CAREER GUIDANCE ON EMPOWERING THE  
STUDENTS WITH POOR RESULTS IN THE GCE/AL AND O/L  
EXAMINATIONS:  
(WITH SPECIAL REFERENCE TO NATIONAL YOUTH CORPS  
TRAINING CENTER IN SRI LANKA)**

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**Abstract**

The General Certificate of Education (GCE) Advance Level (AL) and Ordinary Level (OL) examinations can be considered as the main bar examinations that Sri Lankan students face during their school periods. A large number of students sit for these exams every year, and the percentage of failures has been considerable. However, those candidates who have poor results opt aimlessly to find a job and enter the world of work. In this scenario, they are compelled to compete with people who have higher educational and other extra qualifications. If they have the right guidance, they will also be in a position to try for a proper job opportunity. However, they need to be qualified first, before looking for a proper job. Therefore, empowering them to be succeeded in their lives is an important and necessary task. Identifying this situation, the government of Sri Lanka introduced a new entity for this purpose in the year 2002, under the Ministry of Youth Affairs and Skills Development. The National Youth Corps Training Center (NYC) is one of the most successful of it. It introduced 'career guidance' as a core subject as well as a core service. Therefore, the present study examines the role of the Career Guidance service in empowering students with lower results in the General Certificate of Education (GCE) Advance Level and Ordinary Level examinations. Empowering such people is a timely and essential social requirement. Therefore, this research mainly focused on how to empower such students through the career guidance service. The study was conducted using a survey method. A questionnaire was administered to collect data from 100 students

representing 3 different youth corps training centers in Sri Lanka. According to the study, Career Guidance was a great help for these students in reducing the defeatist mentality and empowering to think positively and act accordingly. Especially the advice and guidance required for a successful economic activity without getting stumbled into the workplace in the world of work.

**Keywords:** *Empowering, Career Guidance, Skills, Youth Corps Training Center, Advance Level and Ordinary Level Examinations.*

## **Introduction**

When preparing people for entering the world of work, career guidance plays one of the most important roles. It helps find the most desirable job for the student in facing the prevailing competition in the global economy and this would make the life meaningful and productive (Tongai, 2015). When finding a job with low educational qualifications is difficult, the career guidance would help the students to choose the perfect path. Particularly through career guidance, a person will be able to identify his aspirations, qualifications, skills and needs. It will also help the person to understand himself and what he really needs. The career guide officer provides students with the knowledge to work and learn about planning and making decisions. Such services also provide the opportunity to gather information about the working world, help migrate gradually to the working world. And it also provides counseling to identify career path.

The Empowerment of those groups is essential since they are the younger generation and the future labor force in the country. It can be achieved in several ways. According to business dictionary, Empowerment is based on the idea of giving (employees) skills, resources, authority, opportunity, motivation, as well as holding them responsible and accountable for outcomes of their actions, which will contribute to improve their competence and satisfaction.

The National Youth Corps has given this kind of encouragement to the youth to empower themselves.  
(<http://www.businessdictionary.com/definition/empowerment.html>).



Under the Parliament Act No. 21 of 2002, and under the purview of the Ministry of Youth Affairs & Skills Development, the National Youth Corps provides this immense service to those students who have low qualifications. With the aim of boosting discipline, leadership and personality of the youth spread out throughout the country, the annual training of the National Youth Corps comprises 02 six month sessions, and is effectively implemented with the annual education plan, well linked with the relevant syllabuses: (<http://www.youthcorps.lk>) in subjects such as,

- Squad Drill & Physical Education
- Vocational Guidance & Management of Life Skills
- Personal Leadership & Enhancement of Psycho-Social skills
- English and Tamil Languages
- Information Technology
- Aesthetic Appreciation

## **Objective**

- To study the Role of the Career Guidance Service on empowering the students with poor results in the General Certificate of Education (GCE) Advance level and Ordinary Level examinations

## **Specific Research Objectives**

- To examine the role and importance of the career guidance
- To observe the kind of service of the National Youth Corps to the trainees

## **Statement of the Problem**

How to empowering the students with lower results in the General Certificate of Education (GCE) Advance level and Ordinary Level examinations through Career Guidance.

## **Limitation of the Study**

With an island wide network of 45 centers, the network covers almost all the provinces in Sri Lanka. But this study aims to include only three training centers namely Attanagalla, Gampola and Kegalle. Usually, 50-100 trainers are trained at each center. But the questionnaire sample was selected randomly from above three centers and comprised 100 trainees. The scores of this sample were limited to ensure the validity of the tools of the current study.

### ***Sample size and sample techniques***

The sample was selected on the basis of non-probability technique. Since the study was based on training programmes and career guidance subject, a purposive sample was applied.

The researchers have selected 100 respondents as a representative sample of people with grater knowledge of the problem at hand. The smaller sample also reduces the margin of error for the study. The survey research required research tools and most significantly the questionnaire.

## **Data Presentation**

Data were presented in the form of charts and tables and this data was converted to percentages in order to show the ranking of various elements. Both explanatory and descriptive statistical analysis was applied to analyze data, the descriptive statistical analysis paves a way to give a general overview of the finding of the study, and it describes the situation. The researchers used Microsoft excel and Microsoft word to draw tables, charts and graphs. Tools such as tables and bar-graphs were used in the presentation of results.

The total number of respondents was 100. Out of which 37 were males and 63 were females representing three centers; the percentage of male respondents was higher than the female respondents. According to this research they are in age group of 16 to 24 years. Minimum age was 16 years and maximum was 21 years.

**Table 1: Education level of respondents**

	Ordinary Exam		Advance Level		Total
	pass	Fail	pass	fail	
Male	07	24	0	6	37
Female	21	34	3	5	63
<b>Total</b>	<b>28</b>	<b>58</b>	<b>3</b>	<b>11</b>	<b>100</b>

According to the research a majority of respondents, 58% failed O/L exam. Out of this, 24% are male and 34% are female. Only 28% of them have passed the Ordinary Level exam and out of them 7% are male and 21% are female. 11 % of them claimed that they have failed the Advanced Level exam out of which 6% were male and 5% were female. While another 3% of female claimed that they have passed Advance Level.

### ***Empowering through the Career Guidance***

The questionnaire used for the study contained questions about the National Youth Corps and the Career Guidance provided by it. It was composed of about 20 questions focused on the results of the career guidance service:

- Provide information on educational and employment market (job market)
- Awareness on new job search techniques
- Proper guidance for identifying desires and tastes
- Guidance for finding employment opportunities in the areas of interest.
- Awareness on career paths for relevant job
- Providing advices to improve their qualifications in line with employment opportunities
- Provide mental strength for self-esteem
- Performing and encouraging various activities to enhance self-confidence
- Encouraging advancement through well-known characters
- Encourage to take responsibility of themselves in making the right decision on themselves.



## Conclusion

The government of Sri Lanka introduced a new concept called Career Guidance in the year 2002, to help empower the youth of the country. The most successful outcome with this concept was the establishment of The National Youth Corps Training Center (NYC), under the Ministry of Youth Affairs and Skills Development. The NYC provides services to young people between the ages of 18 and 28 including Career Guidance. The NYC has greatly assisted these age groups, especially those with low educational and professional qualifications. They have to enter the world of work and have to find a job and compete with highly qualified people. And they are the most active labor force in the country. Therefore, empowering such people with knowledge and skills is mandatory. Career guidance would be helpful for them as a subject and as a service. Examining the role of career guidance provided by NYC was the objective of the study. Therefore, the relevant questionnaire was based on the usefulness of the Career Guidance service. And it also explored how the targeted groups were empowered through the Career Guidance. The trainees reported on the services and guidelines provided through the career guidance and they said that they were satisfied with the service. It was indicated that they were deeply affected mentally by the poor results obtained at their examinations, and therefore they were under mental stress; with low self-esteem in them, and that the counseling and guidance provided by the National Youth Corp Training Center helped relieve them immensely. Further, the majority thought that it would be very beneficial and would be a great service if such a career guidance program could be introduced during the school years.

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## **PRODUCT/SERVICE DIVERSIFICATION POTENTIALS IN UNIVERSITY LIBRARIES OF SRI LANKA**

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### **Abstract**

Constant innovation of technology and changing of consumer behaviour along with social attitudes have made customer-needs are diverse and variety seeking. In an economic point of view, this 'Turbulence of Environment' has created a huge competition among entrepreneurs and therefore, many companies today utilize various strategic applications to their businesses to win this competition. This move is also common to the Library and Information Service sector and today we find users having many options for information seeking other than the library. University libraries today face severe budgetary restrictions from their parent organizations and declining user interest towards the conventional services they provide. Librarians are compelled to respond to the issues of retaining user-interest and finding cost recovery avenues as survival potentials. Like other business companies, university libraries have to apply innovative strategies to expand the market share. One of these strategic applications is to diversify their products /services in accordance with the diversity of user needs.

The purpose of this paper is to examine how far the university librarians in Sri Lanka have attempted possibilities of product/service diversification in their libraries and discuss of the potential framework to help them apply the diversification strategies in the university library sector. A questionnaire based survey was used in the study and an online

questionnaire (Google Form) was emailed to 98 library professionals who were attached to UGC governed public universities and appeared in the ULA membership list-2016. 51 professionals of university libraries have responded and three of them were removed due to anomalies of filling in the questionnaire. 48 responses were considered in the analysis. The response rate was 52%.

The questionnaire was aimed to check the already available services, possible services and impossible services against a list of services determined from literature review and through the professional experiences of the author. The checklist included three categories of services: directly related library services, indirectly related library services and unrelated services. Commonly expected services from any university library such as lending of print materials, reference service, providing access to e-resources etc. were considered as directly related services while indirectly related services were the services which are not compulsory, but could be provided by the library. For example, Lending of computers/laptops, Information Literacy courses for students, Providing Entertainment facilities (Films, music, game etc.) etc. were considered as indirectly related services. Unrelated services were the non-information services that can be provided as additional services by the library for cost recovery or profit earning purposes. This included 23 activities including Doctors channeling service, maintaining Tea/coffee/Nescafe/Kiosks/snack bars attached to library, Hall/Auditorium lending etc.

Results indicated that as an average directly related services of the library were available (68%) or possible to provide (22%) by 90% libraries. Indirectly related services were available in 41% libraries and were possible by 29% libraries while 30% libraries were unable to implement them. Unrelated services were available in 13% libraries and 18% of librarians perceived them as possible in their libraries. However in average 69% of librarians perceived this as impossible. Interpretation of the study reveals that university librarians are mostly strict to the directly related library services and are quite concerned about indirectly related services. Although there are many avenues to diversify their directly or indirectly related services to serve diverse needs of users, only a few librarians have concentrated on such diversification strategies. Unrelated services, which



have cost recovery potentials, were very poorly implemented. Capability issues such as capital restrictions, technological barriers, lack of interest and support from higher authorities, lack of entrepreneurial view among librarians and reluctance to take risk in unrelated services were seen as issues in implementing service diversification strategies in university libraries. It can be concluded that university libraries in Sri Lanka can easily diversify their services with directly and indirectly related services so that they can retain users with the library and convince the university administration with the fact that the library can actively participate in achieving of university objectives. The few examples of unrelated service diversification indicate that it is not impossible for libraries to contribute in revenue earning and cost recovery from their services. It is recommended to invest on training librarians on areas of entrepreneurship, creative thinking and leveraging of resource capabilities. Further studies should be conducted to explore the situation in other types of libraries and to incorporate their experience to the university sector.

**Keywords:** *University Libraries, Product/Service Diversification, Diversification Potentials, Strategic Application, Information Marketing, Library Entrepreneurship.*

**GREEN OPEN ACCESS VS. COPYRIGHT INFRINGEMENT:  
AN ASSESSMENT OF SELF-ARCHIVING IN  
SELECTED INSTITUTIONAL REPOSITORIES OF  
SRI LANKAN UNIVERSITIES**

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**Abstract**

Self-archiving, also known as Green Open Access (OA), refers to the practice of depositing articles in an OA repository, where it can be accessed free of charge. Green OA was initially enabled through Institutional Repository (IR) with the purpose of maximizing articles' accessibility, availability, usage, and citation impact. IR has now become the most important platform as it supports for promoting open access (OA) in the academic environment. Thousands of projects have been initiated in the world with the purpose of developing IRs. Sri Lankan universities have also been implementing IRs since 2010. There are currently, 12 universities in Sri Lanka where IRs have been implemented. The preliminary survey revealed that some IRs exist without a clear policy on their role among the scholarly community. There are significant factors to be considered in the successful operation of IRs especially in terms of copyright workflow. Green OA policy is one of the significant factors that directly associated with IRs when uploading the full-text of journal papers in line with copyright. This paper tries to describe the provisions and benefits of green OA policy in making full-text of journal papers freely available on IRs and the copyright infringement practices on IRs. In particular, the main objective of this paper is to determine the degree to which full version of papers uploaded to IRs is reflected in selected Sri Lankan Universities which are in compliance with journals - policies based on the SHERPA/RoMEO colours. In this study, only 10 IRs which had access facilities during the study period were selected. Each IR contained thousands of deposits. The selected IRs were

examined in early July 2017. A random sample of 250 journal articles which were available in full – text in the IRs of 10 universities was examined. The content documents in IRs included research papers, symposium or conference papers, book chapters, books, past papers, and grey-literature etc. Only the research papers published in journals were considered as suitable for this study. The author recorded each deposited article by checking its self-archiving status. 137 articles (54.8%) found in the IRs were open access and appeared in hybrid journals or OA journals. Of the 250 full papers included in the analysis, 113 (45.2%) were non – OA. Of these 33(29.2%) were preprint, 19 (16.8%) were post – print and 61 (53.9%) were publisher's PDF version. It is important to note that 73 (64.6%) out of above non OA 113 articles available in IRs were found infringed copyright and publishers' policy. The study observed that major infringement cases were related to the publisher's PDF version available in the IRs, while most of the journals allowed some form of self-archiving (Green, Blue, and Yellow journals). The study recommends making a national policy for implementing IRs in terms of copyright workflow in order to avoid infringement practices. This will support library professionals to re-define their strategies in the operation of repositories and its development.

**Keywords:** *Copyright Infringement, Institutional Repositories. Open Access, Self-Archiving, Sri Lankan Universities.*



**MOVING FORWARD BY LOOKING BACKWARD:  
3RS MAKE DIFFERENCE OVER THE NOVICE'S INDUCTION IN  
ACADEMIC LIBRARIES: A CASE STUDY AT  
WAYAMBA UNIVERSITY**

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**Abstract**

In these novel energetic surroundings, the University Librarians are leaving away from traditional librarian's role and become informational teachers and designers. The university library induction programmes have been restructured adapting "3Rs; Reduce, Reuse, Recycle" and the Wayamba University Library Network (WULN) developed its induction programme, applying Backward Design Model for achieving output based student centered learning. The study mainly focused on assessing the effectiveness of Backward Design Model application to the induction programme with the specific objective of exploring the effectiveness of the Scavenger Hunt Library tour of students to familiarize with the range of services and facilities that the library offers. Case study method was used as research method. Two questionnaires and observations were used as data collection tools. The entire population was all the 1<sup>st</sup> year students (177) who were registered in the Faculty of Applied sciences (FAS), Wayamba University of Sri Lanka (WUSL). The sample was 84% (participants of the programme) of 1<sup>st</sup> year students of FAS. "Scavenger Hunt" orientation model was adapted in the self-guided tours of the library. Ninety-nine percent participants indicated that the Scavenger Hunt and other activities helped them to become familiar

with the library, staff and the space. While 55.4% highly agreed and 38.9% agreed with library classification system as a user-friendly system, 47.3% agreed and 41.4% highly agreed with hands-on experience as the most useful facility to support their academic carrier. The study concluded that the Backward instructional designs are beginning to witness expected outcomes of the programme. Hence, it would be possible to adapt 3Rs and scavenger hunt orientation model without any problem. The 1<sup>st</sup> year students enjoyed fun activities and getting familiarized with the physical layout of the library and its services and facilities. The 3Rs was useful to a). Reduce library anxiety of beginners, boredom and obstruction of librarians. b). Reuse successes of previous activities, practices and methods c). Recycle the factors followed in the session to sustain programme goals and outcomes. Hunts allowed novice to engage in all practical activities individually and be familiarized with library and staff within a short period than previous year. The study recommended using innovative models to design library induction programmes effectively and providing more opportunities to engage in practical activities individually (during the library tour) to adapt successfully to friendly library environment.

**Keywords:** *Backward Design, Library Induction, Orientation Models, Scavenger Hunt, University Libraries.*

# **A STUDY ON E-RESOURCES IN INDIGENOUS MEDICAL EDUCATION: A CASE STUDY IN THE INSTITUTE OF INDIGENOUS MEDICINE, UNIVERSITY OF COLOMBO SRI LANKA**

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## **Abstract**

In broad sense, e-learning (electronic learning) can be defined as teaching and learning by the use of any electronic media such as radio, television, telephones, CDs/DVDs, e-books, websites, Learning Management Systems (LMS) etc. But the term 'e-learning' is most commonly used for the use of computers and the Internet in teaching and learning. In Sri Lanka, most of state universities use electronic learning systems for delivering learning content and for student evaluations in addition to classroom teaching. Specially most of the medical faculties use LMS to distribute course materials and submit student assignments.

It is important to know how Electronic Resources (E-resources) are being used in higher educational institutions, which offer degrees related to indigenous medicine (Ayurveda, Unani & Siddha) and identify the problems faced in improving ICT applications in indigenous medical education.

The objectives of the study were to find out the existing E-resources used by those institutions and level of usage; to find out the students' perception towards the use of E-resources; and to find out the factors affecting, challenges and barriers for using E-resources in indigenous medical education.



Out of four state university affiliated institutions offering indigenous medical degrees in Sri Lanka, the Institute of Indigenous Medicine (IIM) affiliated to the University of Colombo was selected for this study. At the time of the study, the institute was planning to implement an LMS (<http://lms.cmb.ac.lk/iim>) and planning to introduce the LMS first to 3<sup>rd</sup> year students. A sample of 80 third year students (out of 150) following Ayurveda (BAMS) degree was selected. A structured questionnaire was used to collect data. Seven hypotheses were developed in order to know whether gender, knowledge level of English, and level of teacher's assistance have impacts on usage pattern of E-resources. ANOVA was used for hypotheses testing.

According to the findings search engines (80%) and websites (60%) were the mostly used e-resources. E-books (35%), Audio/Video CDs/DVDs (20%) and online scholarly databases (5%) were the other used e-resources. Currently the institute does not subscribe to any scholarly databases. The majority of the students (54%) use e-resources more than 3 hours per week. Students use e-resources mostly for getting additional information (74%), for assignments (68%) and for downloading course materials (56%). Thirty six percent of the students use e-resources for research. The students have a positive perception towards e-learning. However, they have a moderate feeling about the motivation from their academics towards using e-resources.

According to the results of hypotheses testing there is no any affecting factor for usage of e-resources and perception ( $p>0.05$ ) among the independent variables considered (gender, knowledge level of English, and level of teacher's assistance in e-learning). These findings were contradictory to the findings of previous studies conducted in foreign universities.

Cost of hardware and software (69%) and lack of physical resources (55%) were the major barriers in implementing e-learning. Full implementation of the LMS, subscribing to scholarly databases, conducting training programs to students and academic staff, inclusion of web based teaching and assessments to the curriculum are the major suggestions to improve e-learning in the institution.

**Keywords:** *E-learning, Indigenous Medical Education, Learning Management System, Institute of Indigenous Medicine, Information and Communication Technology.*

## **NEED FOR MACHINE READABLE CATALOGING STANDARD LEVELS FOR AUTOMATION OF UNIVERSITY LIBRARIES IN SRI LANKA**

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### **Abstract**

The adoption of Manual Cataloguing to machine-based system is called Machine Readable Cataloguing (MARC). Use of computers for cataloguing purpose began in 1960 and MARC I, MARC II, Universal Machine Readable Cataloguing - UNIMARC and MARC 21 are some of the catalogue standards, which were evolved later. MARC 21 and UNIMARC were developed by Library of congress, International Federation of Library Associations and other institutions.

Lack of a proper level of MARC standard was identified as the major problem behind this research study. The objective of the study was to identify the need for a MARC Standard level that can be applied to automate University Libraries in Sri Lanka. The methodology of the study was through a Survey design based on Simple Random Sampling. The population was library staff of university libraries in Sri Lanka. 5 out of 15 University Libraries were selected purposively to conduct the research. A structured questionnaire was administered to 5 university librarians, 15 senior assistant librarians, 10 assistant librarians, 5 cataloguers and 25 library assistants obtain primary data. In addition, discussions, interviews, observations and Online Public Access Catalogues were used for primary data collection. 56 out of 60 in the sample responded to the questionnaires.

Open Source and Commercial Integrated Library Management system software were used in 15 University Libraries to automate their libraries in Sri Lanka. Out of 5 University libraries which were selected, 3 university libraries use KOHA; the other two libraries use ALICE FOR WINDOWS and LIBSYS. Libraries using KOHA adopt MARC 21 on

rudimentary level while other libraries apply their own inbuilt standards based on the Library Software. It was revealed through OPAC searching and questionnaires that there was no proper MARC standard followed or no proper levels have been applied. Only 07 fields of MARC have been commonly used for automation by University Libraries. The MARC fields are LEADER (000), MAIN ENTRY-PERSONAL NAME (100), TITLE STATEMENT (245), PUBLICATION, DISTRIBUTION (IMPRINT) etc. (260), ADDED ENTRY ELEMENTS (KOHA) (942), KOHA FULL CALL NUMBER (952\$o) and BARCODE (952\$sp). Other MARC fields have been used differently based on their library automation software.

80% of the library sample endorsed that a proper MARC standard system should be introduced for use in university libraries. According to discussions, interviews and observation, possibility to include bibliographical information of local publications such as Ola leaf manuscripts, need for a Union catalogue for university libraries, ability to retrieve information quickly, adapting library standards to one standard and making scientific information in a uniform manner among universities were pointed out by library staff as factors supporting the establishment of a uniform MARC standard for university libraries. It is proposed that a uniform MARC standard system should be established within libraries of professional institutes and organizations in Sri Lanka. Therefore, National library and documentation services board, Sri Lanka Library Association and University Library Association should collectively consider taking the lead.

**Keywords:** *Standards, Library Standards, Library Cataloguing Standards, Machine Readable Cataloguing, Library automation, Library Automation Software.*



**INDIGENOUS MEDICINAL KNOWLEDGE IN PALM-LEAF  
MANUSCRIPTS COLLECTION AT THE LIBRARY OF  
UNIVERSITY OF SRI JAYEWARDENEPURA**

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**Abstract**

There is much evidence supporting that ancient ancestors of Sri Lanka had developed much glorious technology thousands of years ago before the emergence of modern technology. Their technology, traditional knowledge, creativity and things they did in everyday life perfectly embodied their intellectual knowledge. These include life experiences and oral tradition, which are called “indigenous knowledge”. Indigenous knowledge brings what they have seen; the things that were heard; and the teachings of elders learned by generation after generation. From generation to generation, indigenous knowledge was inherited from the native community of their ancestors. Accordingly, the native community as well as indigenous knowledge is an interconnected phenomenon. Indigenous knowledge mainly consists of two components: recognized knowledge and unacceptable knowledge. After the emergence of civilizations, the knowledge recognized by scholars and society was transferred into books, which is considered as recognized knowledge.

The characteristics of indigenous knowledge in the book of *Best Practices on Indigenous Knowledge*, a publication of UNESCO (2002:12-13) are as follows:

- Indigenous knowledge is location and culture specific
- Indigenous knowledge is the basis for decision making and survival strategies
- Indigenous knowledge is not systematically documented
- Indigenous knowledge concerns critical issues of human and animal life; primary production of human and animal life, natural resource management
- Indigenous knowledge is dynamic and based on innovation, adaptation, and experimentation
- Indigenous knowledge can be oral and rural in nature

It is clear that indigenous knowledge is diverse. Our old ancestors did not forget writing it on palm-leaf referring to autochthonous knowledge. Among the aggregation of indigenous knowledge written in this manner, the collection of palm-leaves manuscripts in the library of University of Sri Jayewardenepura, which is being conserved, is important.

On the other hand, indigenous knowledge has evolved from man's practical life-styles and therefore can be considered as a means of understanding their life based on this knowledge. Moreover this indigenous knowledge includes everything from Agriculture, Arts and crafts, Food and nutrition, Housing, Irrigation, Medicine, Folk beliefs to Forest lore which could be used simply to describe the day-today lives of the people without much effort.

Therefore, it is important to bring out the indigenous knowledge included in palm-leaf manuscripts, as it will facilitate using them whenever necessary. This study is an attempt made to analyze the content of the palm leaves collection in the library of the University of Sri Jayewardenepura.

The specific objectives of the study are to categorize the palm leaves collection according to the subjects and conduct a content analysis on medicinal palm-leaves manuscripts. The study is qualitative in nature and it adapts the content analytical technique using the secondary data included in the medicinal palm-leaves manuscripts collection in the Library of the University of Sri Jayewardenepura.

The palm-leaf manuscripts collection of the University of Sri Jayewardenepura comprises of 20 manuscripts, which were numbered from 1 to 20 for analytical purpose during the study. There were 18 palm-leaf manuscripts on indigenous medicine and they were considered for the content analysis. These included manuscripts written in Sinhala and Sanskrit languages, which are composed as both prose and verse.

These include same treatment methods for variety of physical and psychiatric illnesses in consistent with different medicine. Treatment methods are Churana, Guli, Kalka, Nasna and Vireka etc. It also included some recipes on treatment methods, such as, Churana (Choorna is a dry powder made by crushing and powdering the herbs), Guli (tabloids), Kalka (Kalka is made by crushing the herbs and plants to make a paste), Nasna (medicine inhaled through the nose) and Vireka (purgative) for various diseases mainly fever, worm infection in children (ringworm), toothache, boils, stomachache, cough, strangulation, diarrhea, rickets, hypochondria, catarrh and headache.

In addition, some remedies and medicines for human skin diseases and all kinds of snakebites; as well as elephant diseases and treatments have been identified.

According to the content analysis, various prescriptions for some major diseases of human, treatment methods and medicines, as well as all snake toxins, treatment methods and medicines; also elephants' diseases, treatment methods and medicines could be identified. Therefore, it reveals that the Library of the University of Sri Jayewardenepura has a valuable palm-leaf manuscript collection on indigenous medicine.

**Keywords:** *Diseases, Indigenous Knowledge, Medical Treatment, Palm-leaves, University of Sri Jayewardenepura.*



## **HEALTH INFORMATION NEEDS OF PREGNANT WOMEN DURING THE PREGNANCY PERIOD**

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### **Abstract**

Pregnancy is a precious period for a woman. Pregnant women undergo many physiological, psychological, physical and social changes throughout the pregnancy period. During this period, access to health-related information is vital, since decisions and changes would affect the mother as well as the unborn fetus. The study will provide a guide to plan effective health education programs to meet the real needs of pregnant women. The paper presents the results of a preliminary study on assessing information needs of pregnant women. The study examined mainly the sources of health information used by pregnant women, topics of information they need and the barriers for effective use of health information by the pregnant women.

Descriptive survey method was used and the subjects for the study were pregnant women who attended the antenatal clinic in Jaffna named Hamshiya clinic. The data was collected by the researcher through administering a questionnaire. A random sample size of hundred women was selected for the study. All the participants were Tamil speaking pregnant women, as the majority of the people living in Jaffna are Tamils. Data

collected through the questionnaire was analyzed with SPSS (20.0) software using descriptive statistics.

The response rate of the study was (n=81) eighty-one percent. The study revealed that all the participants needed information on various topics during the pregnancy period. With regard to the sources of information, family members or friends were the main source of information for majority (n=78, 96%) of the pregnant women in the study. It was followed by Midwives (n=59, 73%); antenatal clinics (n=52, 64%); doctors (n=46, 57%) and internet (n=39, 48%). Seventy nine percent of the participants (n=64, 79%) reported that they needed information about pregnancy complications. It was followed by both nutrition and the development and growth of fetus, which was 47% (n=38). Exercise during pregnancy was the least needed information (n=07, 09%) among the given choices of topics. Newborn care (n=72, 89%) and the complications during childbirth (n=58, 72%) were the mostly required information with regard to the childbirth. Pregnant mothers responded that lack of availability of information (n=52, 64%) was the major barrier in accessing information. It was followed by language barrier which was 40% (n=32).

Pregnant women mainly depend on family members or friends as a source of information. They need different topics of information during pregnancy period. Complications during pregnancy and childbirth are the mostly needed information by the participants in this study. Existing information sources are not enough to meet the needs of the pregnant women. The study suggests that pregnant women need updated and easily accessible information especially in their mother tongue, which is Tamil. The findings of the study including identified barriers in accessing information should be taken into consideration when planning programs to provide health information to meet the needs of the pregnant mothers. It is recommended that an in depth study using a large sample size be carried out to reach a conclusion with a generalized outcome.

**Keywords:** *Health Information Needs, Information Sources, Pregnant Women, Information Use.*

**A STUDY ON THE AWARENESS OF REFERENCE SOURCES  
AMONG THE UNIVERSITY STUDENTS:  
WITH SPECIAL REFERENCE TO  
UNIVERSITY OF SRI JAYEWARDENEPURA**

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**Abstract**

Reference materials are the sources, which provide facts or finite pieces of information. These can be general or more subject-specific. Reference sources provide general background information (definition, notes, specific details), assistance in selecting research topics and quick access to important factual and statistical information. Reference materials include almanacs, and books, dictionaries, encyclopedias, glossaries etc. Many reference materials are available online and are accessible through links from library catalogs or websites. However, many valuable reference sources are still available only in print format. Reference materials can be arranged alphabetically, topically, or chronologically in the library. Reference sources are designed in a manner that it is informative therefore is referred to find particular pieces of information quickly rather than reading it from beginning to end. They are designed to provide key information emphasizing facts. These reference materials are normally kept in the reference collection of the library, kept separated from circulating materials because of its important role in providing information for research. These materials are meant to be kept in the library all the time, so that it will be available for every user whenever it is needed as a reference source.

The researcher has observed that the undergraduate students who constitute a greater percentage of library clientele use to ask questions for which the answers could be found in reference sources of the library. Furthermore, reference sources are always left unused while students cluster round other shelves looking for other categories of information sources such



as text books and journals only. The researcher has also observed that the number of reference materials found on reading tables for daily shelving is always very low. The main hypothesis of this research is that the undergraduates are not making best use of reference sources mainly due to their unawareness of the availability of these resources in the library.

Hence, this research posits a study on the awareness of the reference sources among the university students, with special reference to the University of Sri Jayewardenepura.

The purpose of the present study is an attempt to assess the level of awareness about reference sources among the university students. A Survey method was used for this study. The data were collected using a structured questionnaire. The selection of the sample involved fifty (50) undergraduates from the University of Sri Jayewardenepura. Due to the time and other constraints, it was necessary to limit the sample for fifty Students in the University. In order to give a fair chance to all, 50 Students were selected to administer the questionnaire using the simple random sampling method.

The analysis of data revealed the following major findings. Students do not have skills to identify reference sources. According to the survey results, it is only 26% of students have identified reference sources as a research tool that could help them with their studies or projects. Students do not have a proper idea about the importance of the reference sources. According to the findings, 20% of students needed reference sources to find some specific information, definition or statistics; others did not use reference sources for that kind of information. Students do not have a clear idea on the printed reference sources or the electronic reference sources. According to the findings, 28% of the respondents identified Credo reference and Oxford reference online as electronic reference sources; but they were used to refer a number of reference sources for their general information needs and studies such as Almanacs, Bibliographies, Encyclopedias, Biographical sources, Dictionaries, Directories, World books, Atlas, Gazetteer, Bibliographies Thesaurus, and Year Books.

**Keywords:** *Reference Sources, Library Science, Reference Questions, Reference Collection, University Students.*

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