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Digital Resource Management in Modern Libraries

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ABSTRACT :

The paper explains how the Digital Resources are kept/managed in present day libraries i.e., modern libraries and what are the vital skills are required for the Librarians for smooth and efficient functioning of the library. In short, digital documents are easy to access and it can also be accessed remotely. In other words, Digital libraries are called Virtual Libraries.

Key words:

Digital Libraries, Digital Resources, e-Resources, Management of Digital Resources

Introduction :

Digital resources are defined as digital, electronic, streaming video, audio recordings, CDs, DVDs, VHS recordings, and subscription databases. Digital Resources are defined as material (data/or programs) encoded or manipulated by computerized device. (AACR-2000) Electronic resources refer to those materials or services that require a computer for access, manipulation, or reproduction including, but not limited to, numerical, graphical and textual files, electronic journals, bibliographic or full-text databases and Internet resources.

According to Barker, there are three types of documents used in digital resources.

1. **Static** : Static are the most basic, they contain fixed information and never change their form (such as traditional online data).
2. **Dynamic** : Dynamic documents also contain fixed information but also able to change their outward form, the way embedded materials if presented to users (such as multimedia, CD-ROMS)
3. **Living** : Living documents are able to change their form (outward appearance) and this embedded information. (such as information on the web, for example, An Article which can be edited and updated).

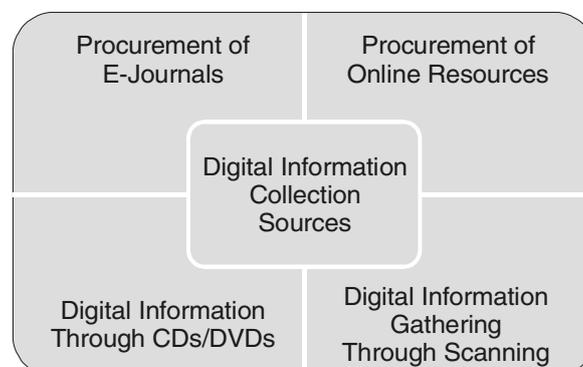


Figure 1 Sources of Digital Information

Procurement of E-Journals :

An electronic journal is a periodical publication which is published in electronic format, usually on the Internet. Electronic journals have several advantages over traditional printed journals.

DOAJ (Directory of Open Access Journals) :

DOAJ is a community-curated online directory that indexes and provides access to high quality, open access, peer-reviewed journals. DOAJ is independent. All funding is via donations, 40% of which comes from sponsors and 60% members and publisher members. All DOAJ services are free of charge including being indexed in DOAJ. All data is freely available.

J-GATE :

J-Gate is the most comprehensive database & gateway to access research information from over 56 Million journal articles with access to 11 Million Full Text articles covering multiple subject domains.

J- Gate @ Consortia :

Launched in 2001 by Informatics India Limited, J-Gate is an electronic gateway to global e-journal literature. J-Gate provides seamless access to millions of journal articles. The J-Gate platform is fronted by a simple, intuitive, and easy-to-use interface, and also gives users complete control over search filters. By allowing users to access content from a wide variety of publishers on a single platform, J-Gate exponentially increases journal usage.

A search platform is available with a resource-sharing facility for members of the consortium. This product is customized for coverage of Consortium subscribed journals as well as member library subscribed journals. A customised service developed and delivered to a library consortium for the exclusive access and use of its registered closed-user-group members only, who desire to share resources and infrastructure through an agreement.

- A single cloud based database containing journal articles available through the consortia and the libraries of all the participating members Online Journal Access Catalogue (OJAC).
- Resource sharing platform for all journals, to all the faculty and students of institutes creating one single gateway to the library subscribed journals.
- A metadata framework for the entire consortia at one single place on the cloud accessible to all the participating members.
- Bibliographic access to all journal holdings of all the members on one single platform.
- Customization made possible for Journal coverage as desired by the consortium, Resource-sharing features as defined by the customers, User interface within the features and functionalities of J-Gate.

J-Gate @ Specialty :

A specialized database devised with a specialized approach to journal content indexing, catering to subjects that require specific Journals for their respective fields. This extension of J-Gate has journals indexed to meet the needs of all the subsets of each specialization and includes all its features and functions.

J STOR :

JSTOR (short for Journal Storage) is a Digital Library founded in 1995 originally containing digitized back issues of academic journals. It provides full-text searches of almost 2,000 journals. As of 2013, more than 8,000 institutions in more than 160 countries had access to JSTOR;^[5] most access is by subscription, but some of the site's public domain and open access content is available at no cost to anyone.

The above-mentioned journal portals are important gateway for acquisition of journals to educational and research institutions. Journals are available in Digital issues and it can be accessed at any time and at anywhere. In the above portals, open-access and cost pay journals are available. In addition to the above portals, the journal issues can also be purchased from leading journal publishers like EBSCO, PUBMED, SCOPUS, etc.

Access :

JSTOR is licensed mainly to academic institutions, public libraries, research institutions, museums, and schools. More than 7,000 institutions in more than 150 countries have access. JSTOR has been running a pilot program of allowing subscribing institutions to provide access to their alumni, in addition to current students and staff. The Alumni Access Program officially launched in January 2013. Individual subscriptions also are available to certain journal titles through the journal publisher. Every year, JSTOR blocks 150 million attempts by non-subscribers to read articles

Procurement of Online Resources :

The resources those are accessible via the Internet and World Wide Web. In general, web pages and documents on the internet that provide useful information are known as online resources. While an online resource is archetypal data and educational in nature, any support software available online can also be considered a resource. Materials, notes, timetables, notice, etc., available online for reading.

An online book is a resource in book-like form that is only available to read on the Internet. It differs from the common idea of an e-book, which is usually available for users to download and read locally on a computer, smart-phone or on an e-reader. Quora, Amazon, Jain Book Agency, Snapdeal.com, Infibeam.com are the leading online book sellers in India.

Newspapers are also available online and it can be accessed through internet from anywhere and at any time. The leading online newspaper providers are New York Times, The Atlantic, Asia Times Online, BBC Online, CNN, etc.

In addition to the newspapers and books, theses and dissertations are available online from leading online publishers like ProQuest, Shodganga, EBSCO, PQDT, British Library ETHOS, etc.

Digital Information through CDs/DVDs :

DVD (an abbreviation of **digital versatile disc**) is a digital optical disc storage format invented and developed in 1995. The medium can store any kind of digital data and is widely used for software and other computer files as well as video programs watched using players. DVDs offer higher storage capacity than compact discs while having the same dimensions.

Storing Digital Image Files on DVD :

Copy digital photo files onto a DVD by using computer's DVD burner (this figure shows an external DVD burner). A DVD can store more digital images than a CD, and DVD burners have largely replaced CD-only burners in most computers.

DVDs: The pre-recorded kind of DVDs come with stuff already written to them. One can view what' is stored in DVD,

but cannot erase the stuff from and then rewrite to them.

DVD+RW and DVD–RW discs: Can be written to, erased, and written to again.

Compact disc (CD) is a digital optical disc data storage format that was co-developed by Philips and Sony and released in 1982. The format was originally developed to store and play only sound recordings (CD-DA) but was later adapted for storage of data (CD-ROM). Several other formats were further derived from these, including write-once audio and data storage (CD-R) rewritable media (CD-RW), Video Compact Disc (VCD), Super Video Compact Disc (SVCD), Photo CD, Picture CD, CD-i, and Enhanced Music CD. The first commercially available audio CD player, the Sony CDP-101, was released October 1982 in Japan.

Data Storage :

CD data are stored as a series of tiny indentations known as “pits”, encoded in a spiral track molded into the top of the polycarbonate layer. The areas between pits are known as “lands”. Each pit is approximately 100 nm deep by 500 nm wide, and varies from 850 nm to 3.5 μm in length. CD-ROM capacities are normally expressed with binary prefixes, subtracting the space used for error correction data. A standard 120 mm, 700 MB CD-ROM can actually hold about 737 M. In comparison, a single-layer DVD-ROM can hold 4.7 GB of error-protected data.

How CD Retrieve data?

CD players use laser technology to read the optically recorded data in the form of Bits and Pits on a CD. About 20000 or more tracks are found in a CD’s recording surface. The distance between the tracks, the pitch, is 1.6 μm . A CD is read by focusing a 780-nm wavelength (near infrared) semiconductor laser through the bottom of the polycarbonate layer. The change in height between pits and lands results in a difference in intensity in the light reflected. By measuring the intensity change with a photodiode, the data can be read from the disc. The digital information is defined as the length of pits and distance between them. The pits and reflective surface represents logic 0 and logic 1. The pits and lands themselves do not directly represent the zeros and ones of binary data. Instead, Non-return-to-zero, inverted (NRZI) encoding is used: a change from pit to land or land to pit indicates a one, while no change indicates a series of zeros. There must be at least two and no more than ten zeros between each one, which is defined by the length of the pit.

Digital Information Gathering through Scanning :

An Image Scanner often abbreviated to just Scanner is a device that optically scans images, printed text, handwriting or an object and converts it to a digital image. Digital Cameras can be used for the same purposes as dedicated scanners. When compared to a true scanner, a camera image is subject to a degree of distortion, reflections, shadows, low contrast, and blur due to camera shake. Digital cameras offer advantages of speed, portability and non-contact digitizing of thick documents without damaging the book spine. As of 2010 scanning technologies were combining 3D scanners with digital cameras to create full-colour, photo-realistic 3D models of objects.

A scanner is an electronic device which can capture images from physical items and convert them into digital formats, which in turn can be stored in a computer, and viewed or modified using software applications.

Simple page images or elaborately marked-up text begin the transformation from analogue to digital by scanning or digitally photographing the original text. For many digital projects, scanning will turn out to be one of the easiest tasks. Operating a flatbed scanner is not much harder than using a photocopier. Put down the document, press a button on

computer or scanner. At least with that one page; the instructions from there become more like shampooing: Lather, Rinse, Repeat. Consumer digital cameras that capture at least three megapixels of data can work equally well although they tend to be slower to set up and harder to frame precisely over a page or book.

Document Imaging Management workflow automation can help to:

- remove paper from processes and workflows
- streamline business processes
- increase staff efficiency and productivity
- meet and reduce risk for organization

Now-a-days lot of hard copy documents are scanned and those scanned documents are saved either into pen-drive or CD and they can be forwarded through mail as separate attachment and this reduce rather than feeding a document into a computer. The contents shall be directly sent to the expected destination. It is a kind of reproduction of document.

Review of Literature:

1. Manoj Kumar Sinha and Awadhesh Singh Gautam describes in the study Electronic Resource Management in University and Institutional Libraries of India in Changing Environments: An Overview describes that ICT has brought the revolutionary changes in the functioning of libraries and information centres. The impact of ICT including WWW and Internet is visible in every walk of life. The libraries are not the exception. Due to electronic publishing, many e-resources in the form of e-journals, e-books and on-line / off-line databases are being published. The academic libraries especially colleges and universities libraries have been procuring these resources for their libraries. Due to escalation in the cost of learning resources both printed and e-resources and financial problems the academic libraries are facing, the consortia models are being adopted and experimented for the procurement and access to e-resources by the colleges and universities. The first part of paper describes about the e-resources, its characteristics, advantages, formats, issues and challenges for managing e-resources in the university and institutional libraries whereas the second part deals with a brief account of collection development policy guidelines, criteria for selection and evaluation of e-resources , pricing models for e-resources. At the end of the paper some suggestions have also been given for the optimum utilisation of e-resources.
2. Nilratan Bhattacharjee and Awadhesh Singh Gautam in their study Best Practices for Managing E-Resources in Academic Libraries explains that Libraries functions as an essential central component in an education system. It plays an important role in an academic institution. In twentieth century, rapid development of the Information Communication Technology (ICT) has revolutionized each and every filed and Library and Information Centres (LICs) is one of them. ICT has changed the academic libraries in terms of collection, organization and services. The traditional concept of acquiring information is gradually replaced by accessing information online. The collections of modern libraries are not restricted to print media only but libraries actively archiving the electronic resources due to its diverse nature like eco-friendly, time saving, cost saving, multi access, facility to access without physical presence in libraries etc. The developments in ICT have changed the users' expectation from the academic libraries in different ways. Demand of the library users have changed and they prefer electronic resources more than the print resources. E-Resources represent an increasingly important component of the collection building activities of

libraries and library environment has been leading towards digital/electronic library. But still libraries are facing many problems in managing these e-resources. This paper discusses the concept of e-resources, various types of e-resources, advantages and disadvantages of e-resources.

This paper also describes the best practices in managing e-resources for maximizing its utilization in academic libraries and information centres with the help of modern technologies.

3. Shariful Islam & S K Mamun Mosotofa in their study *A Review of Digital Resources among different types of libraries in Bangladesh* briefed that a library without digital resources is like a king without a kingdom. But sad stories continue in most of the developing countries specially the night mares is a reality for the libraries of Bangladesh. Most of the libraries (including national, public, academic, special) in Bangladesh have no electronic/digital resources or very limited resources. In this reality, aims of this paper are to explore the present status of digital resources in different types of libraries and as expected the findings were shocking. As this paper was based on secondary resources, the findings shows that there were no digital or electronic resources available at the collections of national and public libraries, some digital resources were found in case of special libraries and a notable number of resources were found in the academic and university libraries though still the collections need to be increased in numbers, in that regard this paper concludes with some specific guidelines to increase digital resources in university libraries.

Modern Librarians Need Digitally Savvy Librarians :

The emphasis on digital data and collaborative space also frees up librarians to focus on one of their most traditional responsibilities: helping to increase student literacy.

In today's campus culture, librarians are integral to ensuring students have a solid understanding of the digital resources they are using for academic work. For example, librarians can help students get better at identifying credible resources and thinking critically about the information they find, two skills that many young scholars need to develop.

These and other changes are also influencing the way that institutions teach the next generation of library professionals, with the aim of better training them for the new demands of modern libraries. A new library science programme will create education models that define the library as a research lab and help future librarians navigate the complex tasks of supporting researchers.

In higher education, 21st-century **librarians are seeing a redefinition of their roles, moving from stewards of physical information to educators on digital literacy.** Institutions are also taking a new look at library buildings, which are becoming less about offering a refuge for quiet, independent study and more about creating opportunities for creativity and collaboration.

On most campuses, librarians are still the caretakers of academic information. It is simply that the format of that **information is moving increasingly toward digital.** To support modern research, libraries will need to offer students access to the digital versions of scholarly research, much of which now includes complex data sets and visualization.

Libraries also need to increase students' ability to access digital resources.

Managing Digital Resources in Libraries will update working knowledge of :

- online resources

- open archives—their uses and their history
- the Digital Millennium Copyright Act, the First Sale Doctrine, and the Fair Use Doctrine—and their implications for librarians
- e-journal cataloguing and e-journal management software
- electronic collection development and management
- personal digital assistants
- digital licensing agreements
- electronic searching systems, including ELIN@, Electronic Journal Finder, Pirate Source, OPAC, and cold fusion databases

Creation and Management of Digital Resources :

One of the very first steps for effective utilization of digital resources is to implement automation in libraries. The primary requirements of generating digital resources are enlisted below:

- Library operations should be made computerized
- Internet connections and computer networking facilities should be present in information resource centre
- High end workstations with CD/DVD read/write capability, printer and scanner facility,
- Multimedia facility must be installed
- Remote access to library resources should be provided to end users.

Digital Library Management :

The digital library is a user-based library service that entirely connects users to the information they need electronically, regardless of source. Management of a digital library differs from the management of a traditional library in many ways. “Factors such as distance from users, specific product/service delivery mechanisms, technology, and organization must be planned and managed differently, but the underlying concepts of customer focused management are not profoundly changed” (Powell, 1994, p. 260). The three major problems facing by library professionals in management of digital library services are cost recovery, copyright issues, and training. In the digital age librarian should be determine that the way to recover the constant costs incurred by the technologies used to run the digital library through increased funding or charging users. While copyright issues are dealt with, no copy written material can be placed in a digital library. Constant training requires a commitment of money and time, yet is the most important change a manager can make to guarantee the success of the digital library. These issues must not be avoided, and managers should require to re-think on traditional management strategies. In order to handle these and other problems and successfully manage a digital library, managers require new tools and a new technology.

Steps for Management of Digital Resources

Infrastructure planning: It needs IT components, Furniture, space etc. Information resource planning

Information accessing methods and techniques

Methods to be adopted for Information Resource Development

Manpower

Financial backup

Digitization :

Digitization is the process of creating digital resources from printed one by a set of process like scanning, indexing, storing and retrieval. Before starting a digitization project, factors like selection of materials to be digitized, cost involved, in-house or outsourcing method to be adopted, hardware & software to be used, storage media, file format etc. are to be scrutinized thoroughly.

Optical Character Recognition (OCR) :

To make the digitized textual document, full-text searchable by the users, here the need of application of OCR comes. The accuracy of OCR depends on various factors like nature of the original document, scanning method applied, nature of printing of the textual document.

Metadata :

For the retrieval and preservation of digital resources, metadata is an essential element. Metadata was first used to indexing the digital resources and then come to the area of digital preservation. Gradually, the concept of metadata harvesting has come to study and research of metadata. The protocol like OAI-PMH (Open Archives Initiative- Protocol for Metadata Harvesting) is the result of Open Archive Initiative, which was developed to retrieve metadata between open archive repositories and to give the facility of open access of digital resources to the users.

OAIS reference model :

OAIS (Open Archival Information System) reference model (2003) of International Standard Organization (ISO) was a major initiative of digital preservation metadata. OAIS reference model identifies the functions in the long-term storage of and access to digital resources. These functions include acquisition and processing, archival storage, preservation planning, access, data management and administration of the archive. The OAIS model includes an information model to support the management and preservation of digital resources. This model has been used as the basis of preservation metadata initiatives. OAIS reference model was developed by the 103 Consultative Committee for Space Data Systems (CCSDS). It is a framework for understanding and applying concepts needed for long term digital preservation. It is also a starting point for a model addressing non-digital information. The model establishes terminology and concepts relevant to digital archiving, identifies the key components and processes prevalent to most digital archiving activity and proposes an information model for digital resources and their associated metadata. The OAIS reference model can be applied at a broad level to achieve handling digital image files, born-digital objects. The OAIS reference model enjoys the status of a de facto standard in digital preservation. It provides a high-level overview of the types of information needed to support digital preservation that can broadly be grouped under two major umbrella terms called Preservation Description Information (PDI) and Representation and Descriptive Information (RDI).

There are several preservation metadata formats. Two popular preservation metadata formats are discussed below:

PREMIS:

PREMIS (Preservation Metadata: Implementation Strategies) is a sponsored group of the OCLC and the RLG composed of more than thirty international experts in preservation metadata. It aims at to – (i) Define a core set of implementable broadly applicable to preservation metadata elements, supported by a data dictionary; and (ii) Identify and evaluate alternative strategies for encoding, storing, managing and exchanging preservation metadata in digital archiving systems. The PREMIS data dictionary is a comprehensive, practical resource for implementing preservation metadata in digital archiving systems. It defines implementable, core preservation metadata, along with guidelines and recommendations for management and use.

METS :

Metadata Encoding and Transmission Standard (METS) is an XML schema developed by the Digital Library Federation (DLF) and maintained by the Library of Congress (LoC). The objective of METS is to provide an XML based document format for encoding metadata that supports the management and exchange of digital objects among repositories. The METS schema is not prescriptive about what metadata elements have to be included. However, in order to sustain interoperability, METS endorses specific XML schemas for a number of metadata element sets. A METS document consists of seven sections, to carry the various types of metadata related to the access and management of digital objects.

Types of Metadata :

Metadata can be categorized into the following three main categories based on the function for which it is used.

Descriptive metadata: It includes bibliographic description consisting of keywords or subject descriptors.

Structural metadata: The elements within the digital resource that facilitate navigation. The table of contents, index etc. are structural metadata. **Administrative or technical metadata:** It includes date of creation, version, file format, compression technology etc. It is vital for long term collection management. There are two other subsets of administrative metadata – preservation metadata and rights management metadata which are sometimes listed as separate categories of metadata. Rights management metadata contains intellectual property rights and preservation metadata contains information needed to manage the preservation of digital resources.

Administrative or technical metadata: It includes date of creation, version, file format, compression technology etc. It is vital for long term collection management. There are two other subsets of administrative metadata – preservation metadata and rights management metadata which are sometimes listed as separate categories of metadata. Rights management metadata contains intellectual property rights and preservation metadata contains information needed to manage the preservation of digital resources.

Selected Metadata Schemes Various metadata schemes are being used by different user depending upon their requirements. Some of the popular and common metadata schemes are discussed below. **Dublin Core (DC):** The name of Dublin Core (DC) metadata is evolved from the place Dublin, Ohio in USA where a workshop was held in 1995 to develop a metadata scheme and its element set to describe web resources. DC metadata scheme consists of 15 elements – Title, Creator, Subject, Description, Publisher, Contributor, Date, Type, Format, Identifier, Source, Language, Relation, Coverage, and Rights. DC metadata can be classified into two types – Simple or unqualified and complex or qualified according to the refinement made in the elements. All elements of DC metadata are repeatable and optional and can be put in any order.

MODS (Metadata Object Description Schema): Derived from selected elements of MARC 21, MODS is expressed in XML schema language. MODS elements are simpler to apply than MARC 21 and are richer than Dublin Core.

EAD (Encoded Archival Description): The EAD Document Type Definition (DTD) is a standard for encoding archival finding aids using Extensible Markup Language (XML). The standard is maintained in the Network Development and MARC Standards Office of 87 the Library of Congress (LC) in partnership with the Society of American Archivists.

LOM (Learning Object Metadata): LOM was developed by IEEE Learning Technology Standards Committee (LTSC) to enable to facilitate search, evaluation, acquisition and use of learning objects, for instance by learners or instructors or automated software processes. This multi-part standard also facilitates the sharing and exchange of learning objects by enabling the development of catalogues and inventories while taking into account the diversity of cultural and lingual contexts in which the learning objects and their metadata are reused .

TEI (Text Encoding Initiative): TEI is a consortium which collectively develops and maintains a standard for the representation of texts in digital form. Its chief deliverable is a set of guidelines which specify encoding methods for machine-readable texts, chiefly in the Humanities, Social Sciences and Linguistics. Since 1994, the TEI guidelines have been widely used by libraries, museums, publishers and individual scholars to present texts for online research, teaching, and preservation. In addition to the guidelines themselves, the consortium provides a variety of supporting resources including resources for learning TEI, information on projects using the TEI, TEI-related publications, and software developed for or adapted to the TEI .

Metadata creation Informational professionals, creator of the digital resources is involved in creation of metadata. The creator of a digital resource or the technical staff involved in digitization of a document assigns the basic structural and administrative metadata. Metadata can be created either manually or automatically. The professionals involved in the management of digital library or digitization input the metadata in a defined format manually, while in automatic process metadata is extracted from the digital resources. There are various types of tools for creation for metadata. They are as follows

Templates: Templates are predefined sheets which provide an outline of schema elements where metadata values can be entered and it will generate a formatted set of the elements and their respective values.

Mark-up tools: Metadata elements and values are generated in XML or SGML Document Type Definitions (DTD) by the mark-up tools.

Extraction tools: Metadata is extracted from the analysis of textual digital resources automatically by extraction tools.

Conversion tools: These tools translate one metadata format to another format.

There are many soft-wares available for automatic generation of metadata. Some of them are DC-dot, Dublin core generator etc. DC-dot was developed by Andy Powell, UKOLN (UK Office for Library and Information Networking), University of Bath. It retrieves a Web page and automatically generates Dublin Core metadata, either as HTML tags or as RDF/XML suitable for embedding in the ... section of the page. DC-dot copies resource “identifier” metadata from the Web browser’s “address prompt,” and harvests “title,” “keywords,” “description,” and “type” metadata from resource META tags. If source code metadata is absent DC-dot will automatically generate “keywords” by analysing anchors (hyperlinked concepts) and presentation encoding such as bolding and font size but will not produce “description” metadata. DC dot also automatically generates “type,” “format” and “date” metadata and can read source code programming that automatically tracks date.

Interoperability and Metadata Harvesting :

After the rapid growth of e-publishing, the number of digital repositories of various educational, research institutions are also increasing. The accessibility of these vast and diverse resources is a very difficult task. The lack of interoperability is one of the most significant problems that digital repositories are facing today. In general, interoperability is the ability of systems, organizations and individuals to work together towards common or diverse goals. “Interoperability is a broad term, touching many diverse aspects of archive initiatives, including their metadata formats, their underlying architecture, their openness to the creation of third-party digital library services, their integration with the 89-established mechanism of scholarly communication, their usability in a cross-disciplinary context, their ability to contribute to a collective metrics system for usage and citation, etc.” Sompel & Lagoze (2000). In the technical arena, it is supported by open standards for communication between systems and for description of resources and collections, among others.

The evolution of Open Archives Initiative- Protocol for Metadata Harvesting (OAI-PMH) is one of the solutions to overcome the problem of lack of interoperability. The OAIPMH was designed to facilitate the technical interoperability among distributed digital repositories and archives. It provides an “application independent interoperability framework based on metadata harvesting that can be used by a variety of communities who are engaged in publishing content on the Web” OAI (2002). The objective of OAIPMH is to develop a low-barrier, lightweight framework to facilitate the information discovery of content in distributed archives. OAI-PMH has two main components: Service Provider and Data Provider. The Service Provider sends request to the Data Providers for sending the required information regarding metadata and the records. It uses HTTP as internet protocol to send and receive the metadata information from Data Provider to Service Provider. Again, XML is used for encoding and exchanging information and qualified and simple DC as metadata scheme. But it also supports EAD, METS, etc. Arc, Cite-base, METALIS, NCSTRL, O-AIster, etc. are some software which support OAI-PMH.

One of the most widely used metadata harvester software is the Open Harvester Systems (OHS) which is a free metadata indexing system developed by the Public Knowledge Project (PKP) through its federally funded efforts to expand and improve access to research. PKP-OHS allows creating a searchable index of the metadata from Open Archives Initiative (OAI)-compliant archives such as sites using Open Journal Systems (OJS) or Open Conference Systems (OCS).

Many LICs are using PKP-OHS worldwide. In India, PKP-OHS is used by SEED of IIT Delhi which has currently 6176 papers from 4 archives indexed in it. The University of Glasgow Open Archives Harvester is also using PKP- OHS which has 3059 papers from 4 archives indexed in it.

Digital Library Software :

To organize and give the user a proper platform to browse, search and access to different digital resources digital library software is used. Many proprietary as well as free and OSS (Open Source Software) software are available to build digital library. Among these, OSS has gained popularity among the information professionals in building digital repository around the world.

D-Space :

D-Space is designed by MIT in collaboration with the Hewlett-Packard Company. DSpace architecture supports the participation of the schools, departments, research centres and other units typical of a large research institution. As the requirements of these communities might vary D-Space allows the workflow and other policy-related aspects of the

system to be customized to serve the content, authorization and intellectual property issues of each. Supporting this type of distributed content administration coupled with integrated tools to support digital preservation planning makes D-Space well suited to the realities of managing a repository in a large institutional setting.

CDS-Ware :

CDS-Ware is maintained and made publicly available by CERN and supports electronic preprint servers, online library catalog and other web-based document repository systems. CDS-Ware was built to handle very large repositories holding disparate types of materials including multimedia content catalogues, confidential and public sets of documents, etc.

E-prints :

The University of Southampton develops the Eprints software for managing large institute oriented digital archive for scholarly objects. Eprints worldwide installed base affords an extensive support network for new implementations. The size of the installed base suggests that an institution can get it up and running relatively quickly and with a minimum of technical expertise.

Fedora :

The Fedora digital library software is based on the Flexible Extensible Digital Object and Repository Architecture (Fedora). The system is designed to be a foundation upon which full-featured institutional repositories and other interoperable web-based digital libraries can be built. Jointly developed by the University of Virginia and Cornell University, the system implements the Fedora architecture adding utilities that facilitate repository management. The system's interface comprises three web-based services – a management API that defines an interface for administering the repository, operations necessary for clients to create and maintain digital objects in the repository and a streamlined version of the access system implemented as an HTTP-enabled web service.

My-CoRe :

My Core grew out of the MILESS project of the University Of Essen. The My -COre system is now being developed by a consortium of universities to provide a core bundle of software tools to support digital libraries and archiving solutions (or Content Repositories, thus “CoRe”). The bundle is designed to be configurable and adaptable to local requirements, without the need for local programming efforts. The core contains all 94 the functionality that would be required in a repository implementation, including distributed search over geographically dispersed repositories, OAI functionality, audio/video streaming support, file management, online metadata editors etc.

Institutional Repository :

Any digital resource generated by an institution can be captured and made available through intranet to the users of a particular institution locally and through internet globally. This repository is popularly known as Institutional Repository (IR) worldwide. The above different proprietary and OSS are available to create an institutional repository.

File Format :

One of the critical issues to be considered while creating, storing, and preserving digital resources is file format. Storage space required to store, deliver via intranet or internet, and long-term accessibility of the digital resources depend upon what file format is chosen for the digital resources.

While choosing file format for long term digital preservation, Guercio & Cappiello (2004) suggested some criteria to be evaluated. They are as follows –

Openness :

To fulfil this criterion, a file format has to be OAIS compatible; support all internet protocol, support metadata, support authenticity information, data integrity has to be guaranteed, and data backup must be simple.

Portability :

A file format should be independent of hardware and software platform. Besides the above two the qualities that should be checked in file format selection, are low space cost, robustness, simplicity, highly tested, loss-free, supports metadata, etc. Based on the selection criteria, they suggested file formats for long term preservation of three mostly used types of digital resources – textual, image, sound and video type of digital resources.

File Formats for Digital Preservation

Sl.No.	Type of File	Format suggested
1	Text	Unicode (ASCII), XML and PDF/A
2	Image	raster: standard TIFF for master copies (no-compression, high resolution), JPEG for safety copies or distribution vector: CGM, EPS, DXF, SVG
3	Sound	compression less WAV (PCM-coding)
4	Video	MPEG

Security of Digital Resources :

All the pains of digitization project, or setting up an IR by an institution may go in vain or the institution may be all at sea by losing everything; if we consider only the issues like digitization, digital preservation, metadata etc.; but overlook the vital issues of security of the digital resources like IPR (Intellectual Property Rights), DRM (Digital Rights Management), access management, etc.

Management of Digital Resources :

It is a tough challenge to manage the digital resources for the LIS professionals. With a variety of format, availability of different protocols to organize, different hardware and software platform to use, different acquisition modes, different pricing policy, IPR issues, access management of these resources have made it really a challenging job.

Digital Reference Service :

The concept of rendering reference & information service has changed significantly after the appearance of the digital resources and their growing popularity among the users. The concept of reference service has come to fulfil the need of giving reference service to online particularly to the users of digital resources.

Digital Preservation :

Long term access of digital resources is a major drawback, although digital resources have many advantages over printed

resources. The fast improving technology has made it difficult to preserve the hardware and software accessibility of digital resources. That is why; digital preservation is one of the most vital topic in digital resources management. Digital preservation has become difficult due to the following factors –

Diverse Forms: Digital resources have several forms. Some digital resources can be converted to printed form and vice versa. But there are some resources like web pages for which the case is different. So, the nature of digital objects creates problems in digital preservation.

Hardware/ Software obsolescence: Digital resources need specific hardware and software to access them. But the rapid change in hardware and software technology is a threat to digital preservation.

Fragility of storage media: The storage media like optical and magnetic media deteriorates quickly due to heat, dust, humidity, etc. This fragile nature creates problem in digital preservation.

Strategies of Digital Preservation :

The preservation strategies for digital resources may be long-term or medium-term or short-term. To preserve digital resources, a single strategy will not work for all types of digital resources and conditions. Arora (2001) referred to the following 13 strategies for digital preservation given by Claire Tristram.

Bit-stream copying: Taking the back-up of digital resources is bit-stream copying. It is not a long-term strategy of digital preservation.

Refreshing: To face the problem of decay of storage media it is applied. It is simply copying digital resources from one storage media to another same type media.

Technology preservation: In technological preservation, the technological environment required to access the digital resources which include operating system, application software, media drives, etc. are preserved.

Digital Archaeology: In this strategy, specialized techniques are used to recover the content of the digital resources from damaged storage media or from obsolete hardware and software environment.

Analogue backups: Analogue backup in durable media like taking good quality printout or creation of microfilm of the digital resources can help to preserve it without losing the quality of the digital resources.

Migration: In this strategy, the digital resources are transferred periodically from one hardware/software configuration system to another system. This process is applied to preserve the integrity of the digital resources and to keep the resources accessible in the changing hardware/software system.

Replication: Multiple preservation strategies are represented by replication. For example, LOCKSS (Lots of Copies Keeps Stuff Safe) supports a system which allows libraries to collect, preserve and provide their users with access to material published on the Web. The system applies the replication process. Another process called peer-to-peer data trading comprising archiving sites is used to handle data for reliable replication.

Reliance on standards: To rely on a well-recognized format and reject proprietary and less used standards will help to upgrade the standards to work it on changing environment. This strategy is called reliance on standards.

Normalization: In this strategy, digital resources of same type are preserved in a particular selected format, which is believed to be the best for the longevity and preservation of the resources.

Canonicalization: It is a method which is proposed to verify that the converted form of a digital resource from its original form has or has not lost its fundamental properties.

Emulation: Here, a special kind of software called emulator is used to translate instructions from the original software to run the digital resource in a new platform of hardware/software.

Encapsulation: A digital resource combined with its metadata like reference, provenance, fixity, context information reduces the possibility of running the resource in different environment. This is what is done in encapsulation.

Universal virtual computer: It is imagined that a type of programme will imitate the computer environment for any digital resources called universal virtual computer.

Management of digital resources is the need of the hour for the LICs in the context of use of Information and Communication devices. Many university libraries of India are not able to manage digital resources in proper perspective, especially in respect of the areas like selection, organization, access management and in the preservation of the digital resources.

Digital resources have become an indispensable part of a modern university library. The latest up-to-date and new information on various fields are available in the digital form to the readers before the printed form. Printed resources reach the user after a time gap from their date of publication. Digital resources management is a very vast area of interest for study and research especially for the LIS professionals of India.

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Information Use Pattern of Libraries by Students of Government Colleges in Tamilnadu : A Study**Dr. K. R. Senthilkumar**Librarian, Nehru Institute of Engineering and Technology, Coimbatore

ABSTRACT :

Information usage studies are like part of library professionals from twentieth century to identify the effective usage of information resources available in their libraries. This study investigates the information use pattern by the students of 22 Government College Libraries in Tamil Nadu. A well structured questionnaire has been formulated and distributed among the students of Government colleges in Tamil Nadu in order to ascertain the information use pattern i.e. purpose of visit to the library, purpose of use of information sources, access and use of e-journals, preferred file formats, and role of library in promoting information resources. In total 700 questionnaires were distributed among the students of 22 government arts colleges in Tamil Nadu and 682 filled in questionnaires were received back. Findings recommends that guidance in the use of library resources and services is necessary and web searching and retrieval skills be organized at regular intervals to help students meet some of their information requirements.

Keywords:Information Seeking Behavior, Library Resources, ISB, Digital Environment and Govt. College, Documentary Delivery.

Introduction :

Information is power. It is a vital source for human beings for living a prosperous life on the earth. The process of information acquiring, using and implementing known as information seeking behavior. Information seeking behavior (ISB) is a favorite subject of research by library and information scientists. ISB is an important part of user studies which studies the formal relationship between the use of information systems (**Chavan, 2014**).

Wilson (2000) defines information seeking as ‘the purposive seeking for information as a consequence of a need to satisfy some goal.

Elavazhagan and Udayakumar (2013) examined the exposure and measured the extent use of e-resources by the faculty members and research scholars of BITS, Pilani, Hyderabad campus and confirmed that the e-resources are time saving, easy to use and handle, more informative, preferred, flexible and effective.

Government Colleges in Tamilnadu : An Introduction

At present, out of the 686 arts and science colleges in Tamil Nadu, only 80 are government colleges where only a nominal amount is collected as the tuition fee. Today Govt. college’s is a unique “A” Grade Accredited by NAAC with CPE status which offers bachelor’s general course in Science, Humanities and Business studies besides these courses it offers Post graduate courses in Mathematics and Computer Application Sciences and many courses.

Review of Literature :

Human Information Behavior **T.D. Wilson 2000**, the aim of this paper is to review some of this research and to point to findings that enable the system designer to put the design process in the wider context of the user in the organization.

Dhyani (1974) conducted a survey of 100 readers at Rajasthan University library, Jaipur. The study revealed that generally the readers showed interest in using the library at the college level. However, only a few made use of the library at the university level.

Objectives of the current study :

The main objectives of the study are:

1. To explore the information seeking behavior of the students at Govt. Colleges in Tamilnadu
2. To determine the students level of satisfaction.
3. To find out the awareness and use of library resources by the students.
4. To study how far the faculty are library dependents.
5. To know the main purpose of information seeking behavior.
6. To ascertain users opinion regarding usefulness and adequacy of information sources and services.

Methodology :

The Target in the study was students at Govt. Colleges in Tamilnadu. This study investigates the information use pattern by the students of 22 Government College Libraries in Tamil Nadu. A well structured questionnaire has been formulated and distributed among the students of Government colleges in Tamil Nadu in order to ascertain the information use pattern i.e. purpose of visit to the library, purpose of use of information sources, access and use of e-journals, preferred file formats, and role of library in promoting information resources. In total 700 questionnaires were distributed among the students of 22 government arts colleges in Tamil Nadu and 682 filled in questionnaires were received back. The users with overall response rate 94%. 18 questionnaires were rejected due to incomplete information.

The data gained from the responses were analyzed, classified and tabulated to understand student's information seeking behavior and information needs by employing statistical methods.

Data Analysis :

1. Type of Students

Questions like name, gender, and educational qualification were asked, Undergraduate student out of 628 respondents, 471 (75%) were male and 157 (25%) were female, and Post graduate student 36 (67%) were male and 18 (33%) were female

Table 1 indicates 92% respondents are undergraduate students followed by 8% Post Graduate students.

Type of Students	Undergraduate	Percentage	Post Graduate	Percentage
Male	471	75%	36	67%
Female	157	25%	18	33%
Total	628	100%	54	100%
Overall	628/682	92%	54/682	8%

Table 1. Type of Students

2. Frequency of Library Visit :

Respondents were asked whether they visit library daily/weekly/monthly. As shown in Table 2 the majority of students 12% visit the library daily followed by 16% of students visit library weekly while 3% come library monthly. It indicates that library is being used by the students mostly.

Frequency	Respondents	Percentage
Daily	264	39%
Weekly	352	51%
Monthly	66	10%
Total	682	100%

Table 2 Frequency of Library visit

3. Purpose of Library Visit :

In response to this table 3 indicates that 60% students borrowing study material, 20% uses reference material for completion of projects/ assignments, 4% uses the online databases/ journals for completing research work, 10% came to General Purpose and 6% have other purposes like reading newspaper and internet surfing to know new arrivals.

Purpose	Respondents	Percentage
Borrowing Study Material	409	60%
Reference Material	136	20%
Online databases/ Journals	28	4%
For General Purpose	68	10%
Newspaper / Internet	41	6%
Total	682	100%

Table 3. Purpose of library visit.

4. Inspiration to make use of the Library :

Table 4 reveals that the majority of respondents make use of library for completion of their degrees i.e. 45%, 27% make use for availability of materials, 15% for easy access of materials, 5% because of their reading habit and 8% of respondents for atmosphere.

Makes to use the library	Respondents	Percentage
Completion of degree	307	45%
Availability of material	184	27%
Easy access of material	102	15%

Reading Habit	34	5%
Atmosphere of the library	55	8%
Total	682	100%

Table 4. Inspiration to make use of the Library.

5. Time spend by respondents in library

Table 5 represents majority of respondents spending time 1 to 2 hours in library i.e. 35%, 25% spend 15 to 30 minutes in the library. 30% respondents spend less than 15 minutes and least number of respondents spends more than 2 hours.

Time	Respondents	Percentage
1 to 2 hours	238	35%
15 to 30 minutes	171	25%
Less than 15 minutes	205	30%
2 hours or more	68	10%

Table 5. Time spend by respondents in library.

6. Methods of searching information

In response of methods of information seeking table 6 represents that subject experts, library and internet are the most reliable sources for seeking their information, while friends/ colleagues are less used by students for seeking their information.

Sources	Respondents	Percentage
Subject experts	307	45%
College Library	205	30%
Internet	102	15%
Friends/ Colleagues	68	10%
Total	682	100%

Table 6. Methods of information seeking.

7. Satisfaction of user in library service.

Table 7 indicates that borrowing facility, reference books, journals/project reports are being utilized mostly while e-resources are used marginally. It shows that there is a necessity to create awareness among users to use e-resources.

Sources	V.Good	Good	Fair	Poor
Borrowing Facility	460	150	50	22
Reference Service (Current Awareness Service)	40	120	460	62

Journals & Reference Books	137	200	235	110
Project Reports	80	188	221	193
Issue /Return	250	301	78	53
Indexing services	45	100	167	370
Abstracting Services	60	145	190	287
Translation Services	14	20	55	593

Table 7. Use of Library Sources & Services

8. Purpose of using information

Table 8 shows that in response of purpose seeking information that to keep up-to-date, Completion of degrees, for career development and projects/assignments by the respondents. Problem solving and general awareness are another purpose of seeking information which have less preference.

Purpose	Respondents	Percentage
To keep-up-to date	464	68%
Completion of degree	477	70%
For career development	375	55%
Preparing Project reports/Assignments	273	40%
General awareness	239	35%
Solving the problem	171	25%

Table 8. Purpose of Seeking Information.

9. Problems faced in using Library.

Table 9 indicates that during library visit 25% respondents found that there is lack of latest information material according to their syllabus, 40% Aware but don't know how to use of e-resources, 15% Insufficient Computer Systems for accessing e-resources, 10% respondents are facing the problem that opening hours are not sufficient, 5% are lack of knowledge for how to search in OPAC and 2% Comments that library staff are not helpful, 3% of respondents do not have time. On the basis of findings a collection development policy & users awareness programme are necessary for maximum utilization of the library.

Problems	Respondents	Percentage
Lack of latest information material	171	25%
Aware but don't know how to use of e-resources	273	40%
Insufficient Computer Systems	102	15%
Opening hours are not sufficient	68	10%

Lack of knowledge for how to search in OPAC	34	5%
Library staff not supportive	14	2%
Don't have time	20	3%

Table 9. Problems faced in using Library.

Findings and Suggestions :

In this study 682 respondents of Govt. Colleges in Tamilnadu were surveyed which investigates that library services are being utilized. Students use variety of information sources for their academic purposes. Books and internet are considered mostly. Students perceived that library plays an effective role in meeting their needs and one of our main findings was that the use of e resources within institutions is extremely varied, and often the most innovative uses and users are not supported centrally. Indeed, in many institutions there is a lack of communication between IT service departments and other personnel who are responsible for the pedagogical aspects of e learning. It was also noted that there was little awareness of e-resources available in the library. Majority of the respondents are accessing internet using mobile phones but few access the internet in library and internet café.

Suggestions :

In the light of findings of the study following suggestions are made to improve the effectiveness and quality of library and improve the user satisfaction level.

1. Govt. Colleges in Tamilnadu library needs to promote awareness and use of electronic information resources.
2. The library needs to increase general & reference collections to fill the needs of the students.
3. More number of reference sources in different languages should be included in the collection of the library.
4. Need of initial orientation workshops and ongoing seminars for students to train them in using resources so that utilization of resources and services is maximized.
5. In library computer networks should be developed and access of e-resources should be available.
6. Need to concentrate on proper book shelving and its preservation.
7. Document Delivery services should be increased.

Conclusion :

The issue of quality in higher education has become more paramount now and to achieve this goal for a library to develop itself with a rich information collection and build a best collection of electronic resources and information services for its users. We are living in a digital world. The evidence is everywhere. Some of these outstanding and valuable resources are freely available on internet' (Singh, 2003).

E resource use is a high priority for institutions; there are one main problem that are holding back the wider utilization of these technologies. Firstly, within institutions uneven skill sets of personnel, and a lack of internal dissemination of e resource use findings, means that the adoption of these resources, which might have already been trialed in one subject area, is slow to spread to other areas.

The fast growth of the information and communication technology and electronic resources has changed the traditional

method of research, storage, retrieval and communication of scholarly information. It is concluded that the Government college libraries need to be upgraded with more e-resources and digital infrastructure to meet the increasing information requirements of the readers.

Study could find the limitations pursued by the users in the Government College in Tamilnadu towards information access. Such as lack of knowledge in computer handling browsing the e-journals, limitations of internet access speed the attitude of library staff and power fluctuations.

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Authorship Pattern and Collaborative Research in Natural Disasters

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ABSTRACT :

The study presents the trends in authorship pattern and authors collaborative research in Natural Disasters with 1461 articles during the period 2009-2018. The study found single author has contributed 336 with (22.9 %), Multi authored articles are dominant i.e. 1103 (75.4 %). The mean value for the overall degree of collaboration for the 2009-2018 is found to be 0.77, the collaboration index increased from 2.67 in 2009 to 3.07 in 2018 with an average of 2.04. The collaborative co-efficient for the year 2009 is 0.49 which increased gradually to 0.54 in 2018 with an average of 0.33. The most prolific author is Noy, I. who published 19 publications followed by Laplante, D.P. published 10 publications. Collaboration with another Institution stood first place in levels of collaboration with 531 (36.34%).

Keywords:

Authorship Pattern, Natural, Disasters. Collaboration Index, Degree of Collaboration.

Introduction :

The scheme and the productivity of the author are the important parameters for studying citations analysis. Generally authorship of the article or document as become important for scientists and researchers in order to make out the author productivity and authorship pattern, the analysis of

nature of research collaboration in research activity is prime factor. Price has used the distribution of the number of collaborators for paper to study the collaboration in an invisible college. It is assumed that there is a strong relationship between the number of documents and the average number of authors per card. The author studies are also descriptive bibliometric studies focused on models of paternity. Describe the characteristics of the author e-paternity of articles and degree of collaboration of a specific group of authors.

A **natural disaster** is a major adverse event resulting from natural processes of the Earth; examples are floods, hurricanes, tornadoes, volcanic eruptions, earthquakes, tsunamis, and other geologic processes. A natural disaster can cause loss of life or damage property and typically leaves some economic damage in its wake, the severity of which depends on the affected population's resilience, or ability to recover and also on the infrastructure available. An adverse event will not rise to the level of a disaster if it occurs in an area without vulnerable population. In a vulnerable area, however, such as Nepal during the 2015 earthquake, an earthquake can have disastrous consequences and leave lasting damage, which can require years to repair.

Methods and Materials:

The data has been extracted from SCOPUS international multidisciplinary database for database for the present study and the following search strategy has been used in the combined field of Title, Abstract & Keywords. TITLE (*natural*

AND *disasters*) AND DOCTYPE (*ar*) AND PUBYEAR > 2008 AND PUBYEAR < 2019

Review of Literature:

Kanekar & Siddiqui (2018) have analyzed the trends in authorship pattern and authors collaborative research in Rainwater Harvesting with a sample of 959 articles during the period 2007-2016. Multi authored articles are dominant i.e. 878 (91.5%). The mean value for the overall degree of collaboration for the 2007-2016 is found to be 0.91, the collaboration index increased from 2.7 in 2007 to 3.59 in 2016 with an average of 2.75. The collaborative co-efficient for the year 2007 is 0.64 which increased gradually to 0.68 in 2016 with an average of 0.58. The total average number of authors per paper is 3.81 and the average productivity per author is 0.26.

Balasubramani & Kohila (2018) analyze the Authorship pattern in big data research output. It aims to analyze the performance of scientists in contributing research output either individually or collectively. The bibliometric analytical technique was used to examine this topic for a period of 1998- 2017. This study has observed a total of 10641 publications in big data research over a period of twenty years. Overall, 27900 authors contributed in 3193 journals with 10641 records of the publications from 7463 number of institutions that were located in 109 numbers of countries.

Mishra & Ramesh (2018) Have found the authorship pattern and degree of collaboration in business research with 89259 publications and 180226 authorships during 1998 to 2017 extracted from SCOPUS database. An average author per paper is 2.18. Bibliometric methods are used to get the results. It reveals the dominance of multi authorship over single authorship since 2005. The degree of collaboration during the study period is 0.6 and it has been increasing over the study period. Researchers in this area are showing their interest in collaborative/ team/ group research than solo research.

Objective of the Study :

1. To identify the authorship pattern of Natural Disasters Research.
2. To identify the year-wise degree of collaboration.
3. To identify the Collaboration Index.
4. To identify the collaboration coefficient.
5. To identify most prolific contributors.
6. To identify Distribution of Level of Collaboration

Data Analysis:

The study aims at to ascertain the Authorship pattern, Collaborative measures and level of Distribution in the field of Astrophysics during the period 2009-2018.

Table 1: Authorship Pattern :

No. of Authors	No. of Papers	%	Cumulative %
Single	336	22.9	22.9
Two	353	24.1	47
Three	305	20.8	67.8

Four	200	13.6	81.4
Five	94	6.43	87.8
Six	66	4.51	92.3
Seven	39	2.66	95
Eight	24	1.64	96.6
Nine	14	0.95	97.5
Ten 4	0.27	97.8	
>Ten	4	0.27	98.1
Unidentified	8	0.54	98.6
Total	1461	100	100

Table 1 identified Number of authors range between 1 and More than 10 Out of 1461 papers, a single author has contributed 336 with (22.+ %), (25.1) % of papers were published with two authors 353, 20.8% of papers were published by three authors (305), 13.6 % of the contributions were published by four authors (200), 6.43 % of the contributions were published by five authors (94), 4.51 % of the contributions were published by six authors (66), 2.66 % of articles were produced by seven authors (39). 3.14 % of articles were published by more than seven authors (46). Remaining 0.54 % of contributed by unidentified author 8.

Collaborative Measures :

Measures of collaboration to show the trend towards multiple authorships in a discipline, many studies have used either the mean number of authors per paper, termed the CI by Lawani (1980) and the proportion of multiple authored papers, called Degree of Collaboration (DC) by Subramanyam (1983) as a measure of the strength of collaboration in a discipline. Assuming that these two measures were seems to be inadequate, Ajiferuke et al. (1988), who derived a single measure that incorporates some of the merits of both of the above. Ideally, it is desired that a quantification of collaboration should have a value between 0 and 1, with 0 corresponding to single authored papers, and 1 for the case where all papers are maximally authored, i.e. every publication in the collection has all authors in the collection as coauthors. All the above mentioned formulas to find the collaboration coefficient (CC) value have one or other demerit. To overcome some of the demerits of previously explained measures, and propose a simple modification of CC.

Degree of Collaboration :

The Degree of Authors Collaboration is shown in Table No. 2. Various methods have been proposed to calculate the degree of research collaboration. Here in this study the formula proposed by Subramanyam (1983) has been used.

$$C = \frac{NM}{Nm + Ns}$$

The degree of collaboration

Where,

C = degree of collaboration

NM = number of multi author

Ns = number of single author

$$C = \frac{NM}{336 + NM} = 0.77$$

Thus the degree of collaboration (C) 0.77

So, in the study the degree of collaboration during the overall 10 years (2009-2018) is 0.77.

Table 2: Degree of Collaboration

Year	Single Author (NS)	Multi Author (NM)	TotalNM+NS	Degree of Collaboration
2009	23	45	68	0.66
2010	29	61	90	0.67
2011	26	85	111	0.76
2012	39	122	161	0.75
2013	36	123	159	0.77
2014	32	139	171	0.81
2015	26	135	161	0.83
2016	43	109	152	0.71
2017	42	133	175	0.76
2018	40	173	213	0.81
Total	336	1125	1461	0.77

Table 2 Degree of Collaboration of authors by year-wise falls between 0.66 and 0.81 with an average of 0.77 during the study period. From 2009 to 2018, it has been increased gradually. The multi author articles are higher and predominant than single author.

Collaboration Index :

The simplest of the indices presently employed in the literature is the Collaboration Index, CI, which is to be interpreted merely as the mean number of authors per paper.

$$CI = \frac{\sum_{j=1}^A jf_j}{2a}$$

It is a mean number of authors per joint paper. For this analysis, we have omitted the single authored papers which is

equal to 1 always. To determine the mean number of authors per joint authored paper, the following formula has been used.

Table 3: Collaboration Index

Year	Single Author	Two Authors	Three Authors	Three & above authors	CI
2009	23	14	15	16	2.67
2010	29	23	23	15	2.4
2011	26	31	19	35	2.97
2012	39	41	33	48	2.56
2013	36	38	33	52	3.14
2014	32	39	42	58	3.49
2015	26	43	29	63	3.55
2016	43	31	26	52	3.16
2017	42	41	37	55	2.93
2018	40	52	48	73	3.07
Total	336	353	305	467	2.04

Table 3 shows Collaboration index (CI) that is a measure of mean number of authors per paper, CI among the years 2.67 (2009) and 3.07 (2018) with an average of 2.04; indicating the trend towards multi-authorship publications in the field of Natural Disasters literature.

Collaborative Co-efficient :

The patterns of co-authorship among different countries have been examined by making use of Collaborative Coefficient (CC) suggested by Ajiferuke et al (1988). The formula used for calculating CC is given below:

$$CC = 1 - \frac{\sum_{j=1}^A \left(\frac{1}{j}\right) f_j}{N}$$

Where F_j = the number of j authored research papers

N = total number of research papers published and

k = the greatest number of authors per paper.

Table 4: Collaborative Co-efficient

Year	Single Author	Two Authors	Three Authors	Three & above authors	CC
2009	23	14	15	16	0.49
2010	29	23	23	15	0.42

2011	26	31	19	35	0.50
2012	39	41	33	48	0.50
2013	36	38	33	52	0.52
2014	32	39	42	58	0.55
2015	26	43	29	63	0.56
2016	43	31	26	52	0.37
2017	42	41	37	55	0.51
2018	40	52	48	73	0.54
Total	336	353	305	467	0.33

Table 4 identified collaborative co-efficient for the year 2009 is 0.49 which increased gradually to 0.54 in 2018 with an average of 0.33. According to Ajiferuke, CC tends to be 0 as single-authored papers dominate and near 1 tends to be co-authored papers dominate. The mean value is 0.33 which indicates the better collaboration rate among the authors.

Table 5: Most prolific contributors

Sr. No	Name	No. of Contributions	Rank	Sr. No	Name	No. of Contributions	Rank
1	Noy, I.	13	1	18	Lowe, S.R.	5	7
2	Laplante, D.P.	10	2	19	Vezzali, L.	5	7
3	Heir, T.	9	3	20	Zhao, S.	5	7
4	Yamamura, E.	8	4	21	Arnberg, F.K.	4	8
5	Li, N.	7	5	22	Botzen, W.J.W.	4	8
6	Toya, H.	7	5	23	Cadamuro, A.	4	8
7	Wu, J.	7	5	24	Dancause, K.N.	4	8
8	Cavallo, E.	6	6	25	Davidson, R.A.	4	8
9	Elgbeili, G.	6	6	26	Huang, C.	4	8
10	Galea, S.	6	6	27	King, S.	4	8
11	King, S.	6	6	28	Strobl, E.	4	8
12	Skidmore, M.	6	6	29	Trifiletti, E.	4	8
13	Zhou, Y.	6	6	30	Versari, A.	4	8
14	Chen, C.W.	5	7	31	Wang, J.	4	8
15	Hallegatte, S.	5	7	32	Weems, C.F.	4	8
16	Klomp, J.	5	7	33	Wu, W.	4	8
17	Komac, B.	5	7	34	Xu, S.Y.	4	8
				35	Zorn, M.	4	8

Table 5 shows that the most prolific authors are Noy, I. who published 13 articles followed by Laplante, D.P.. Published 10 articles; Heir, T.. contributed publications, Yamamura, E. contributed 8 publications respectively.

Table 6: Distribution of Level of Collaboration

Level of Collaboration	Papers	%	Cumulative %
Collaboration with another Institution (same country)	531	36.34	36.34
Collaboration within the same institutions	343	23.47	59.81
Without Collaboration (Single authored)	330	22.58	82.39
Collaboration with International Institutions	249	17.04	99.43
Unidentified	8	0.54	99.97
Total	1461	-	100

Table 6 identified the distribution of different levels of collaboration among the authors of the papers. It shows that the highest number of paper of Collaboration with another Institution 531 (36.34%) followed by Collaboration within the same institutions, Without Collaboration (Single authored), and Collaboration with International Institutions with 343 (23.47%), 330 (22.58%), 249 (17.04%) respectively.

Conclusions :

Authorship pattern and productivity are the important parameters in order to study Authorship Pattern. Study is based on 1461 articles during the period 2009-2018. It provides the Authorship pattern. The main objective of the present study is to understand the paternity model e collaborative research in the field of Natural Disasters using the data collected by Scopus database. The scheme of paternity and collaborative research are important aspects of dating analysis. In the field of science and technology, the growing trend in more paternity and collaborative research is well established. For various bibliometric studies. The necessary scientometric measurements have been used for meet the objectives of the study. It has been revealed by this study that more articles dominated this field of research.

A high percentage of multi-authors. The articles of two authors are published more in number, followed by those of a single author, the third Author's articles. The degree of collaboration is high and could be attributed to Interdisciplinary nature of research.

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A Study of Chester Barnard's Four Spheres of Morality

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ABSTRACT :

We surround ourselves with information that matches our beliefs; we also loyally support some people in our life because of our morality. But, loyalty should never be used to mask certain basic ethical values such as honesty, trustworthiness, responsibility. People feel uncomfortable when they are work out from their moral frame. Chester Barnard's four spheres of morality very beautifully explain the fact.

Keywords :

Chester Barnard, Morality, The Functions of Executive, Four Spheres Commitment to Private Life, Commitment as Economic Agent, Commitment as Company Leader, Responsibility beyond Firm's Boundary.



Chester Barnard has authored a great book titled 'The Functions of the Executive' which presents a theory of cooperation and organization. This book was published in 1938. The book is noteworthy for its focus on how organizations actually operate without bothering much for people's ethical and moral frame. The fact is that our daily life is peppered with moral decisions. Each person has his/her set of morals and principles. An ethical leader shows respect all members of the team by listening to them attentively, valuing their contributions, being compassionate. It goes without saying that anyone

who is ethical will also be honest and loyal. The Functions of Executives book is considered as one of the first books to focus on leadership from a social and psychological viewpoint.

Barnard's philosophy and thought processes in writing the book were characterized by humanism, empiricism, speculative philosophy and analysis of the contrasting nature of individualism and collectivism. There are four levels of social responsibility which managers need to practice: economics - the responsibility of the business to be profitable; the responsibility to meet the legal obligations—businesses must comply with the law and regulations; companies have a responsibility to act ethically and morally and to choose the action that do not harm the environment.

Barnard was a student of Harvard University between 1906 and 1909 where he majored in economics. However, he did not obtain a degree. He joined AT & T Corporation and rose through the ranks. Barnard became president of New Jersey Bells which was founded in 1904 as an AT&T's arm serving southern New Jersey, named Delaware and Atlantic Telegraph & Telephone Company. Barnard served the company as President between 1927 and 1948. At New Jersey Bell, Barnard enjoyed "long hours of self-absorbed reflection and study. He spent long hours and days studying and jotting his observations about how managers perform their duties and how their decision making depends on their core character.

He has described that morality is deep rooted in human beings and it touches four spheres of any person's professional and personal life.

The Commitments to Private Life : This the first sphere of morality. In this part Barnard describes the manager's duties and obligations which are usually stated as intangible yet universal principles. Always tell the truth, keep your promises, never hurt others, be good to everybody these morals are taught to us from childhood. Individuals get puzzled when it comes to organizational role to be played by them; many people disagree about the origins of these moral duties. Such principles, however, offer only an abstract, mitigated view of philosophers. The morals are very complex to practice. It comes in way in a person's commitments, ideals and aspirations. Morality is a man-made concept that is defined by the society you live in; it is subjective.

Yet hard moral choices are at times unavoidable for many people in positions of power. How do you fire a friend, someone you have grown up with for years? How do you evaluate performance of one of your relatives who works under you? How to violate an employee's privacy with a drinking problem, for example how to intervene in his private life to get him help which he badly needs? Can you be at peace when your company's product will be misused by some customers and hurt innocent people? You have clear conscience; you don't like to pay bribe, but you are forced to pay bribe to get a work done for your company. These and so many more examples describe the personal life sphere of an executive. Executives are always struggling to clear moral dilemmas while doing their jobs.

It is very difficult for a person to choose between right and wrong and especially when he is forced to choose the wrong. When there are only two options and neither of which resolves the situation in an ethically acceptable fashion, an honest person's peace of mind gets disturbed. In such cases, societal and personal ethical guidelines can provide no satisfactory outcome for the chooser.

The Commitment as Economic Agent : the second sphere of morality in a manager's life is the role of an economic agent. Managers need to create profits for the organization. An executive works to improve economics of a firm. The management of the firm and his superiors often remind him to serve in the interests of shareholders. What is realized rarely is that the manager is loaded with so many other responsibilities to stick in the framework created by the organization; he

is responsible for legal, financial, HR, marketing etc. The ties between the owners of a company and the managers who act as their agents are unavoidably moral. Shareholders entrust their assets to managers, and managers promise, implicitly to work for the shareholders' interests. Like any other promise, this relationship of trust carries strong moral weight. Moreover, this obligation is strengthened by the duty that all citizens have to obey the law. For the sake of profits on few occasions managers compromise on their values which disturb their personal lives.

For any business, the profit motive is the main motivation of firms. Firms continue business so as to maximize their profits. Mainstream microeconomic theory is based on the ultimate goal of a business is to make money. Stated differently, the reason for a business's existence is to turn a profit. The profit motive is a key tenet of rational choice theory. Managers are committed to doing business profitably. If a situation arises where the manager needs to weigh right versus wrong in a decision wherein wrong will give more economic benefit, the manager experiences ethical dilemma. But, the economic agents tend to pursue what is in their business's best interests. Accordingly, businesses seek to benefit themselves and/or their shareholders by maximizing profits.

Commitments as Company Leader: This is the third sphere of responsibility which exists because employees and managers are members of organizations which is compared to human body and therefore it is said that organizations do not have permanent status. In the wake of new economy, where value comes increasingly from the knowledge of people, and where workers are no longer undifferentiated cogs in an industrial machine, management and leadership are not easily separated. People look to their managers, not just to assign them a task, but to define for them a purpose. And managers must organize workers, not just to maximize efficiency, but to nurture skills, develop talent and inspire results.

Managers need to act as per situation; there is no permanent style of leading leaders must manage show as per demand of a situation. They need to show lot of flexibility while managing challenging and difficult situations. They need to command, demand, inspire, prompt, mentor, guide, coach, sell ideas, take part, act, build, and sometimes even reprimand. Often the leadership style may change as per need of the hour

The late management guru Peter Drucker was one of the first to recognize this truth. He identified the emergence of the "knowledge worker," and that created profound differences the way business world started organizing.

The fundamental sustaining style of leadership is that there is no 'best' or 'worst' style of leadership. Effective leadership is task-relevant, and the most successful leaders are those who adapt their leadership style maturely. Matured leaders set high but attainable goals; they are willing to take responsibility for the task. They are best learners; they learn from each situation and mold themselves.

Responsibilities beyond Firm's Boundaries: it is natural to think that executives' responsibilities stop at their organization's boundaries. But firms do not exist in vacuum. And they have complex relationships with government agencies, labor unions, with strategic alliance partners, distributors, customers, suppliers, and even competitors. Globalization has blurred national boundaries. This organizational reality creates a new and enormously complex sphere of responsibilities for managers. Again, the central issue is power. Just as business executives have enormous influence over the people inside their company, they have the power to create influence outside their company because of their operations and sometimes their destinies which are tangled. In Japan, West Germany, and other countries, groups of large and small firms are clustered in the form of cartels, keiretsu (a conglomeration of businesses linked together by cross-shareholdings to form a robust corporate structure) and other confederations. America, despite its ideological preference for the Adam Smith

model of small-firm competition, is home to many of the largest firms in the world, and they, too, are surrounded by vast cadres of suppliers and customers and often have close relationships with many government agencies.

For the sake of clarity I would like to give an example of global firm Nike. NIKE owns no factories for manufacturing its footwear and apparel, which make up ~88% of its revenues. Instead, manufacturing is outsourced to third parties because of the cost advantages of doing so. Most raw materials in NIKE's supply chain are sourced in the manufacturing host country by independent contractors mostly existing in Asian countries.

Conclusion : Globalization has stimulated changes in all aspects of human endeavor. Therefore, everywhere, people, institutions, roles, statuses, organizations etc., are changing. Changes are therefore inevitable consequence in any organization. It has been argued that change is the very essence of the environment in which an organization operates. A change is any deviation from normal situation and its management requires special skills to weather the change.

Most people get confused with their faulty thinking of unethical behavior; they think that "bad" people do "bad" things and "good" people are ought to do "good" things. This good-bad tagging of people that we do misleads us in most situations. The moral dilemmas of managers are many. They keep battling conflicting moralities among different spheres of responsibilities. Each sphere is, in many ways, a nearly complete moral universe comprising of its own world of commitments, human relationships, strong duties, norms of behavior, personal aspirations, and choices that bring happiness and suffering to others. When a manager faces problems simultaneously in different spheres of commitment, he faces the hazards of breaking down and committing big blunders which costs billions; Chester Barnard has warned in his book.

**Use of Electronic Resources by the Faculty Members of Management Institutes in Jalgaon, Khandesh:
A Critical Study**

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ABSTRACT :

The study is based on use of E-resources by faculty member of management institutes in Jalgaon city according to their classification & present status of institute's libraries and to know the availability of electronic resources and to understand the awareness for faculty members about of electronic resources and their suggestions for major enhancement of use of electronic resources. The author also focusses on the various e-resources use in the management libraries by students and faculty, their impact of research projects and faculty knowledge development.

Keywords :

E-resources, Management Libraries, Digital Resources.

Introduction :

As counterpart, a resourceful library stands to connect, capture, preserve and access an universe of knowledge of nation's interest using emerging technologies, the library saturates information through information technology services that is consortia, web designing, networking, open access archival, intelligent-automation. These services support a large community of users in accessing large quality of quality resources with minimum cost and maximum benefits. Yeates has surveyed one of the recipients responded that "Library should always be the place to gain, discover and improve one's knowledge. [Yeates, 2001]

The role of electronics resources in the libraries has changed worldwide, no longer the keeper of books but the provider of information and learning opportunities. This point is made in a Ugandan study in 2000: A library is not a shrine for the worship of books, but ought to be a 'material room' of ideas, a workshop for creativity. [Parry,2000]

Objectives :

The study is based on use of E-resources by faculty members of management institutes in Jalgaon city and the objectives are:

1. To Study present status of management institutes libraries in Jalgaon.
 2. To know availability of Electronic resources in the libraries under study.
 3. To understand awareness of faculty members about electronic resources.
 4. To suggestions suitable major for enhancement of use of electronic resources.
-

Hypotheses :

In view of the objectives of the study, the following hypotheses have been formulated.

1. The present status of libraries of management institutes under study is satisfactory.
2. E-resources are available in the libraries in the study of the faculty members.
3. Faculty members are aware of various e-resources available in their respective Libraries.
4. Most of the faculty members of management institutes use e-resources.

Scope & Limitations of the Study :

The present study is only confined to 4 libraries of management institutes in Jalgaon city, i.e. Institute of Management & Research, Jalgaon, G. H. Raison Institute of Engineering and Management, Jalgaon, Godavari Institute Of Management & Research, Jalgaon, Motion Institute of Management Studies (MIMS), Jalgaon.

The study confined to availability of e-resources & use of e-resources by faculty members of management institutes in Jalgaon city.

Methodology :

The study used questionnaire- based survey method, for data collections. The study population is four Institute in Jalgaon city and total 175 faculty member and librarian. The faculty are selected randomly and questionnaires distributed among them.

This study three colleges are fill the questionnaire but the Motion Institute of Management Studies (MIMS), Jalgaon not fill the questionnaire the author focuses only three institutes. (Satpathy, S. & Rout, B., 2010).

Review literature :

The study focused on the use of UGC-INFLIBNET's NLIST with the purpose to ascertain what extent the NLIST and other resources are being used in College arena. This study is to evaluate the use of NLIST amongst Faculties, Research scholars and Students under the University of Mumbai region. The study revealed that most of them use NLIST for Research and scholarly communications. (Ashwani, K. & Prakash, P., 2010)

In the Discussion, the University Library & Information Centers are playing a prominent role in procurement, organization, preservation of resources and providing access to the research scholars. This paper explains the importance of Inter Librarian Loan facility in 25 University Libraries and also discusses about J-Gate. (Babu, S. K. & Ramiab, C.K.2010)

In this paper libraries play a vital role in the present social environment and providing various services to the user community with the advent of new modern technology. (Kanediya, P. K. & Akari, A. K., 2009)

Need of E-Resources:

Many of the electronic books or electronic publishers 'web sites freely permit and encourage readers to provide feedback on works, often directly to the author rather than to the 28 publishers. Nevertheless, users may establish their own accounts, charge services to credit cards or pay by prearranged method, and have requested material delivered directly to them by fax, e-mail, etc. Nevertheless, the emergence of e-books and e-journals followed the widespread adoption and use of electronic mail, list servers and discussion groups to disseminate information quickly to large audiences. (Chowdappa,

N., Chandrasekar., 2009).

Name & Establishment year of Management colleges used e resources

Sr. No	College Name	Establishment year
1.	KCES's Institute of Research & Management Jalgaon (KCES's IMR)	1986
2.	G.H. Raisonni institute of Engineering & Management Jalgaon (G.H.R Mgt.)	2000
3.	Godawari Institute of Research & Management Jalgaon. (GIMR)	2008
4.	Motion institute of management studies, Jalgaon. (MIMR)	2010

If you consider the establishment of the above college. The Jalgaon city Management College has been established in the 1980's, if you consider the Establishment of the above college. More than one & three colleges have been established in the 2000 to 2010 decade. But the KCES's IMR is the oldest of all of them.

Automation Package :

Particular	KCES's IMR	G.H.R Mgt.	GIMR
Name of Automation Package & Year	SOUL (2008)	SOUL (2006)	Handmade (2013)

From the above Library of college have SOUL automation package in the year of 2008, 2006 & one college has handmade automation package. it depends on comfortability & cost of package. That is most of the college are used the SOUL software.

Networking :

Particular	KCES's IMR	G.H.R Mgt.	GIMR
LAN facility	YES	YES	YES
INTERNET facility	YES	YES	YES
Dial up	YES	YES	NO
Leased Line	NO	NO	NO
BVSAT	NO	NO	NO
V-SAT	NO	NO	NO

From the above table, it appears that all the college library has LAN facility & Internet facility, only two college have use dial up networking also.

E-Resource in college Library :

E – resources Name	No. of library
J- GATE	21
DELNET	1
N-LIST	1
EBSCO	0
NATIONAL DIGITAL LIBRARY	0
IEEE	0
COMPUTER SOCIETY OF INDIA	0
NATIONAL STOCK EXCHANGE	0

From the above table, most of the colleges have use the J-GATE, DELNET & N-LIST e-resources because it is mandatory to AICTE & faculties and students also use and their research requirements and also cost is low to other resources.

E-Resources spend in a week :

Details	No. of Faculty members
01 hrs a week	15
2-3 hrs a week	13
5-6 hrs a week	11
7-9 hrs a week	26
10-20 hrs a week	11

From the above table, we can see the how many hours' faculty members spend to use e-resources in a week, 15 faculty members are spend time with e-resources for 1 hours a week, 13 faculty members are spend time with e-resources for 2-3 hours a week, 11 faculty members are spend time with e-resources for 5-6 hours a week ,26 faculty members are spend time with e-resources for 7-9 hours a week, 11 faculty members are spend time with e-resources for 10-20 hours a week

Frequently used location of e-Resource :

Details	No. of Faculty Members
At College/Institute	51
Internet café	17
At home	12
At other place	5

From the above table, it appears that highest 51 faculty members of e-resources use e resources from at college / Institute, 17 from internet café, 12 from home, 5 from another place e resources use by faculty members.

Problems Encountered while using the e-resources :

ITEMS	No. of Faculty Members
Difficulty in finding relevant information	17
Low access speed	27
Technical problem	14
Hung system	28

From the above table, major problem face by the 28 faculty members hang System & 27 faculty member's problem face by low access speed, 14 faculty Members face technical problem & 17 faculty member's problem face by difficulty in finding relevant information.

Conclusion & Suggestions :

Major conclusion of the research paper is :

- The use of e-resources fulfils the needs of the Faculty members. Faculty Members are satisfied with the services they offer through E-resources.
- While Faculty members studying, e resources are also being used & some good changes in their studies are felt.
- The more use of E resources by Faculty members.
- The faculty members mostly used e-books & e-Journals with Compare to conventional documents because its time saving.
- E resources has influenced to the academic efficiency with Dependency on the e resources has increased.
- In the college, expert persons have been appointed to Provide information related to use of E resources to the faculty members.

Suggestions:

Major Suggestions of the research paper is :

- Study on the use & usability of e-resources by the faculty members needs to be made on regular basis.
- Infrastructure facilities such as extension of LAN connection with all departments, procurements of cd mirror server, etc. should be developed.
- The speed of internet needs to be increased for quick access to the available e resources.
- The Library needs to arrange various orientation & training Programmes for faculty Members for the optimum use of available e resources.

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**Awareness and Use of the Digital Resources:
A Case Study of Chetana's H. S. College of Com. and Eco. Mumbai**

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ABSTRACT :

Digital library resources are an important aspect of the modern library concepts. Access of digital resources and services has become an important and commonly accepted tool for researchers, teachers and students. Digital libraries play a vital role in terms of ease in accessing information. Chetana college libraries are the earliest in Mumbai area to opt for the Digital Resources. Survey data based on structured questionnaire covering 130 degree college students are analyzed and presented. The study observes that while the awareness about the digital resources is widespread, their use is limited. The resources are mainly used for examination related purposes more than knowledge-expansion. The survey highlights the need for creating awareness about the possible other use of online resources for a more effective use of available e-resources. Utilisation of digital resources should be given adequate attention.

Keywords :

Digital resources, Digital services, Chetana's H.S. College

I. Introduction :

Advancements in Information Technology facilitate libraries in shifting their activities from the use of predominantly print media to digital resources. The aim of the academic institution in the digital environment is to provide right information to the right user in the shortest time possible. In the digital library, information is stored in digital form and access is provided through a computer. Thus, a digital library can also be called an electronic library. In recent times a large variety of resources are being published in electronic form. This poses a challenge to libraries relating to their organization and dissemination in an effective way. The article is divided into seven sections. The first provides a background of the Chetana College Library and the resources available therein. Section II provides a brief introduction to the Digital Resources and their advantages. Section III provides the objectives of the present study. The scope and limitations of the study are discussed in Section IV. Followed by the methodology in Section V. Section VI provides the data analysis and Section VII concludes.

The present study seeks to explore the issues related to the use of digital resources in Chetana College, located in the suburb of Mumbai. The Chetana's college library established when the college started in 1970. This library is set up with a grant, and is named as Shri Mansukhlal Chhaganlal Library. Situated in the ground floor of the college building, it is divided into four sections i.e., the Reading Hall, Stacking Area, Home Issue Counters, and the Faculty Area. Library has a rich collection of more than one lakh print books, and also subscribes to 75 print and some online e-journals.

The library made a significant progress during the last few years and it started Digital collection of CD/DVD, free e-books and journals. An important asset in the library is its membership of UGC N-List for the last many years. College library also started the Library Portal named as chetanalibrary.webs.com. This provides library Web-

OPAC service and study materials, e-questions papers of previous years, and syllabi for different courses offered by the college, among others. The website also provides information about the different activities that the library conducts on regular basis for the benefit of the students.

II. Meaning of Digital Resources :

A digital resource refers to any resource, which is in digitized form. In other words, it is a material which can be read and scanned by means of electronic media. The main advantage of digital resources is that they do not require separate physical space for storage in a library as these can be stored in a computer either locally or remotely.

III. Objectives of the Study :

The present study covering the Chetana Library aims at the following :

1. To identify the users' awareness and use of digital resources services available in the library by the degree college students.
2. To study the purpose of using digital resources and services by the users. And,
3. To assess and examine the impact of digital resources on the degree college student.

IV. Scope and Limitations

The scope of the present study is limited to understand the awareness and use of digital resources by the Third Year students of Chetana's H.S. college of Com. and Eco, Smt. Kusumtai Chaudhari college of Arts, Bandra (E), Mumbai 400051.

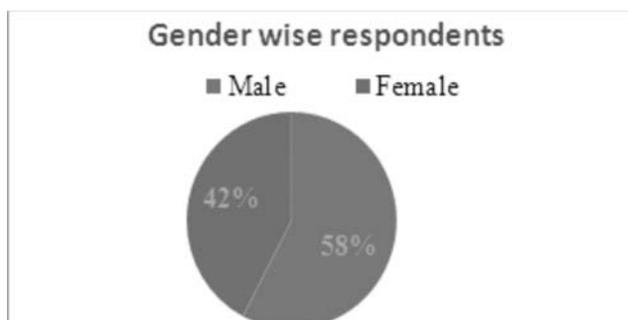
V. Methodology

The study used questionnaire- based survey method, which is a popular method for data collections. The study population consisted of Third Year degree college students which include B.Com, B.A, and students of Self- Finance Courses like BMS. BMM. BAF,etc.A total of one hundred and thirty (130) students are selected randomly and questionnaires distributed among them.

VI. Data Analysis and Interpretation

The data collected from the questionnaire were checked and entered on to Ms Excel spreadsheet to derive descriptive statistics percentage ect. The findings of the study were synthesized and presented in figures, diagrams and in narrative forms in the following paragraphs.

1.1 Gender wise respondents

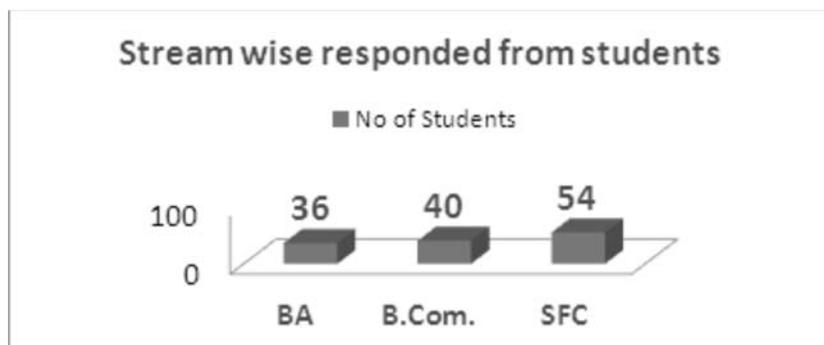


The Gender-wise classification of respondents of third year students of Chetana's college is show in the graph 1.1. The gender wise classification of respondents revels that the position of respondents is 75 (58%) male students and 55 (42%) female students.

I.I Gender-wise users responded

It is found from the above study that the male students are responded more than female students.

1.2 Stream- wise responded received from the Students. Figure 1.2 reveals that stream wise responded received for the 130 students. It is found that self- finance student 54, Degree College B.Com.40, Degree College B.A.36.

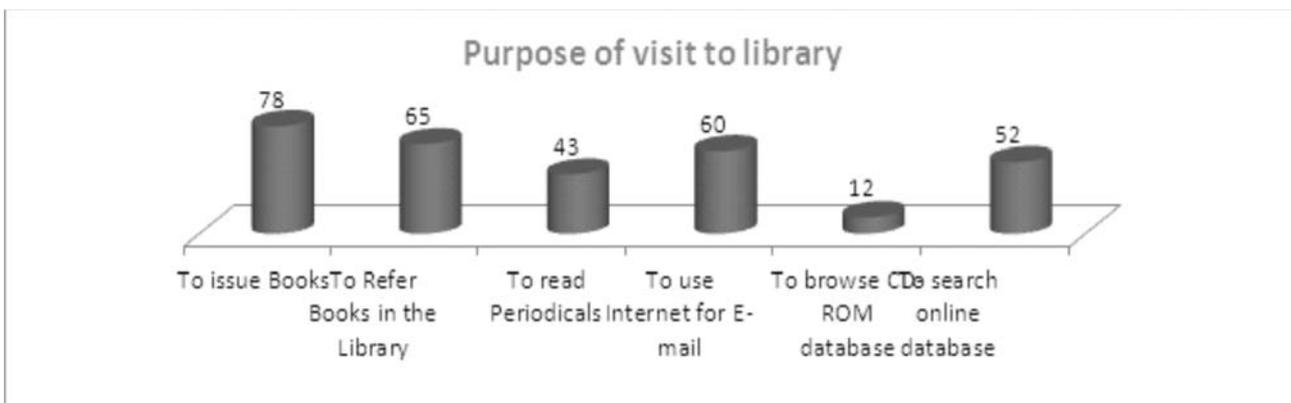


I.II Stream wise reopened of the Students.

Data of the survey clearly indicate that the Self fiancé students responded received is higher than the B.Com and B.A Degree college students.

1.3 Purpose of visits to the library

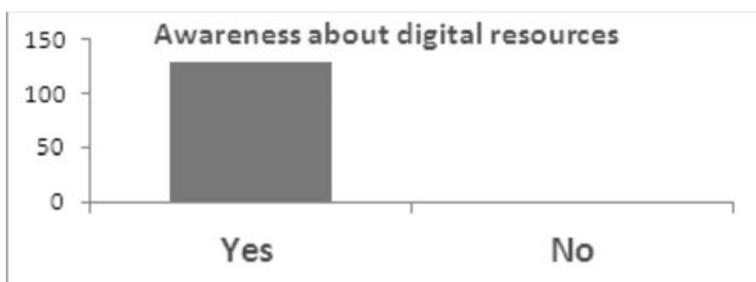
The above table reveals that 78 student visits to the library for the issue a book, 65 refer books in the library, 60 to use the internet for the mail and 52 search online databases and 12 students only to browse CD-Rom.



I.III Purpose of visit to library

It is clear from the above data that the majority of the student visit to the library to issue books only and to refer the books in the library only. 50% students are visited to the library for the internet and online database.

1.4 Aware about the Digital Resources available in the library



The above table reveals the awareness about the digital resources available in the Chetana's H.S. College library

I.IV Awareness about Digital Resources

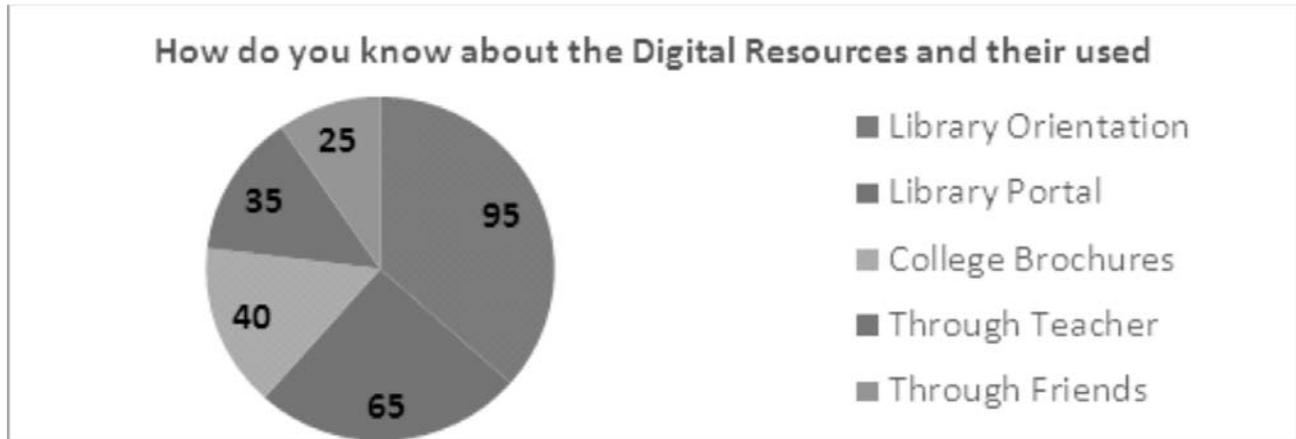
The above data clearly indicate that the all 130 (100%) Degree college student are aware about

the digital resources available in the Library.

1.5 How do you know about the Digital Resources and their used?

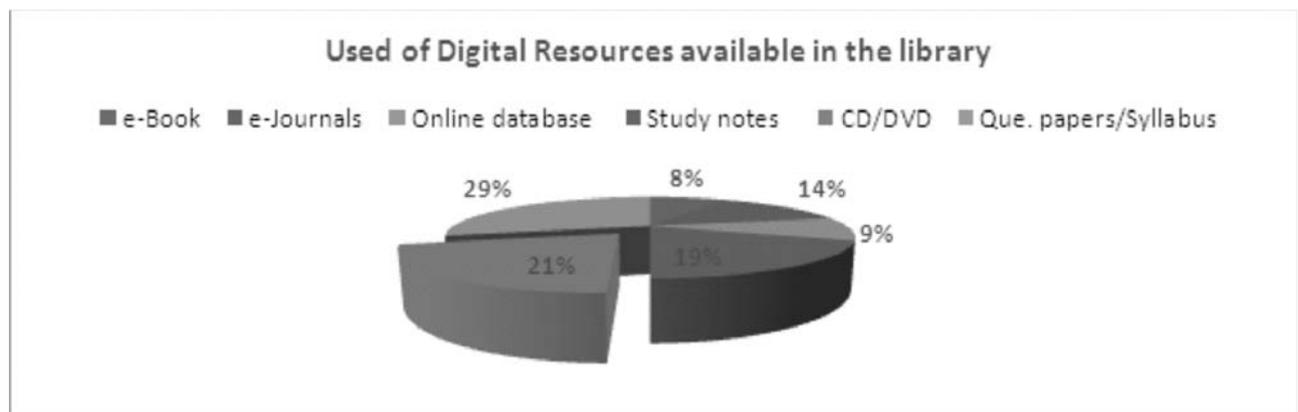
The below figure clearly show that the 95 student know about the digital resources available in the library and how to used that resources for the Library Orientation program and 65 students know about the digital resources and their used from the Library Portal .

I.V How do you know about the digital resources and their used?



1.6 Use of Digital resource available in the Library :

Figure provided indicate that the 75 students used online question papers and syllabus, 55 students are using CD/ DVD for the study purpose, 50 students are using online study notes are available on the library portal, there is less number of students are using the e-books and e- journals.



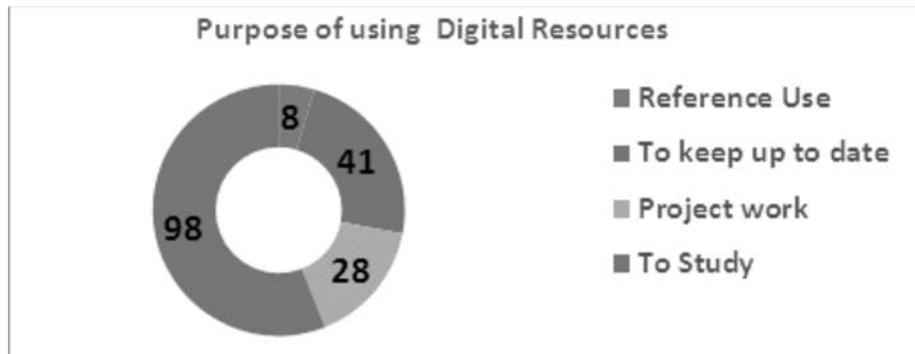
I.VI Digital Resources available in the library

The results of the study indicate clearly that more students are using-question paper and syllabus than the e-book and e-journals.

1.7 Purpose of using Digital resources :

The figure below shows that 98 students use digital resource in the library for the study purpose, 20 students for the

project work, 41 students use digital resources for the upgrade knowledge, 8 are using for the reference purpose only.

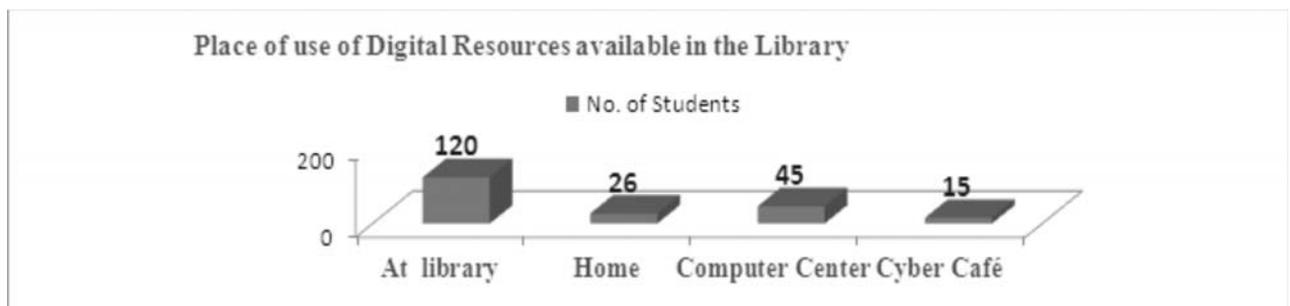


I.VII Purpose of using Digital Resources

It is further observed that most of those students accessing the digital resources are also the students who visit the library more regularly during the course of the academic year.

1.8 Place of use of Digital Resources available in the Library

The figure clearly show that ninety student of the college library use digital resource at the library itself. Forty-five students responded that the computer center of college is used to access the digital resource. Twenty-six students access the digital resources at home and 15 students access the digital resources at the cyber cafes.

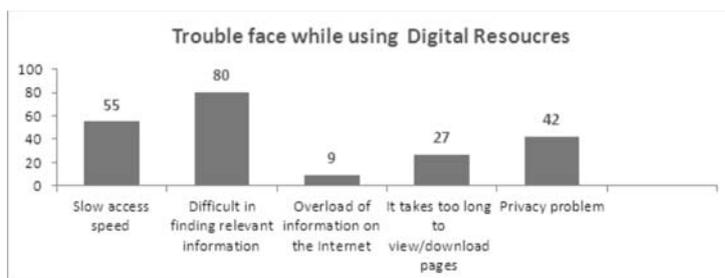


I.VIII Place of use of Digital Resources available in the Library

It is evident from the about study that majority of the student accessed the digital resources at library only.

1.9 Problems Encountered by the Students at the time of using Digital Resources

Figure reveals that 80 student said that there is Difficult in finding relevant information, 55 student say that there is slow access of speed, 42 student are say that there is privacy problem in digital resources , 9 student say that there is overload of information on that internet.



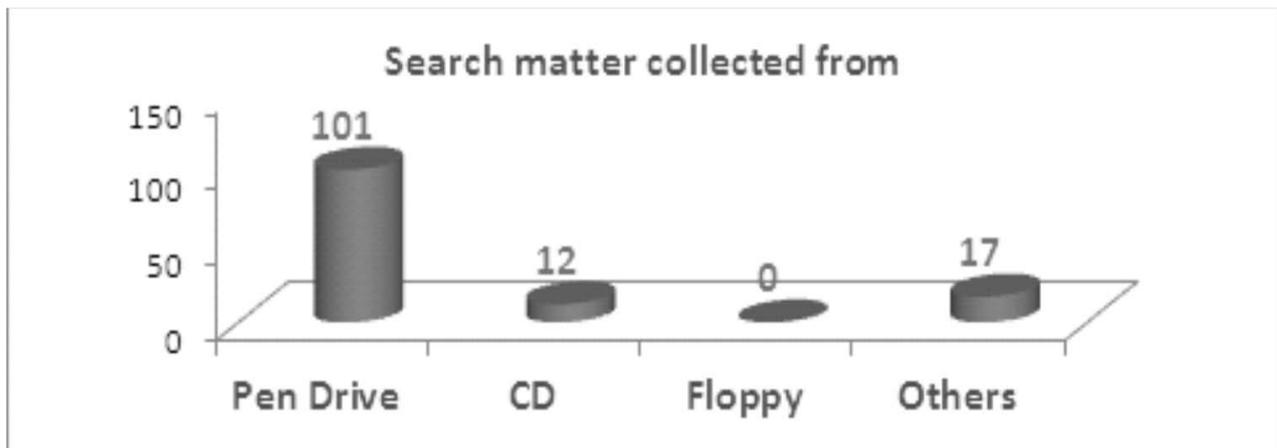
I.IX Trouble face while using Digital Resources.

The result of the survey clearly indicate that student are using digital resource but facing some of problem, finding right information , slow access speed, privacy problem. So that college librarian should take some workshop about the use of

digital resources.

1.10 Search matter collected from which device

The data reveals that 101 students said that search matter colligated on the own Pen Drive and 12 student on the CD, whereas 17 students said that used other device for the carried.



I.X Search matter collected from

The result shows that most of the students use pen drive for the saving the search matter.

1.11 Are you satisfied with the Digital Resource facility?

The below graph indicate that the 95 student are fully satisfied with the digital resource facility, 10 students are partially satisfied with this facility, 17 are not satisfied and 08 have not given are answers.



I.XI Satisfaction with facility.

The above data reveal that the college students are satisfied with the digital resource facility available in the library,

Conclusion and Discussions :

We are living in the digital age; users have their information needs. College students are aware of the computer technology and the digital resources available for their study purposes. Digital resources have become popular and are frequently

used. They can enable innovations in teaching and they increase knowledge. The ability to use digital resources efficiently depends on basic computer skills, knowledge of what is available and how to use it. The present study collected opinion about for the third year degree college students, and all the students are having the required awareness and knowledge about the digital resource available in the library. It is noted that students are not using these facilities regularly. It is also observed that some orientation about the use of these resources should be provided by the library staff. This should include the use of e-books and e-journals and how to use the different type of database to search for the information required by the students.

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Scientometric Analysis of Plastic Waste Management Research in India (2014-2018) : A Case Study

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ABSTRACT :

The study is based on research literature as covered by Web of Science, between the years 2014 and 2018 in the context of contributions of the scholars, authorship pattern and per capita productivity of authors and the like with a slant to India, as a nation. The present study belongs to the second level namely, the general scientific level of methodology and is concerned with Scientometric analysis of research literature output in Plastic Waste Management Research in India.

Keywords :

Scientometrics, Plastic Waste Management Research, Degree of Collaboration.

Introduction :

In this study analysis of data collected for the identified period. The investigation is a Scientometric analysis of research Plastic Waste Management Research and a sum total of 727 records were obtained from the Web of Science for five calendar years spanning from 2014 to 2018.

According to J.M. Tague-Sutcliffe (1992) “Scientometrics is the study of the quantitative aspects of science as a discipline or economic activity. It is part of the sociology of science and has application to science policymaking. It involves quantitative studies of scientific activities, including, among others, publication, and so overlaps bibliometrics to some extent.”

Plastic Waste Management and Recycling :

Less than 20 percent of plastic waste can be recycled by simple remolding. However 80 percent of the plastic waste generated can be recycled only through Pyrolysis and Hydrolysis. Plastics recycling technologies have been divided into four general types primary, secondary tertiary and Quaternary. Primary and secondary method of recycling are physical methods of plastic recycling, whereas tertiary method of recycling is chemical method of plastic recycling. Quaternary method of recycling is combustion of plastic waste which is not allowed in most of the developed and developing countries.

Objectives of The Study :

The main objectives of the present study are as follows:

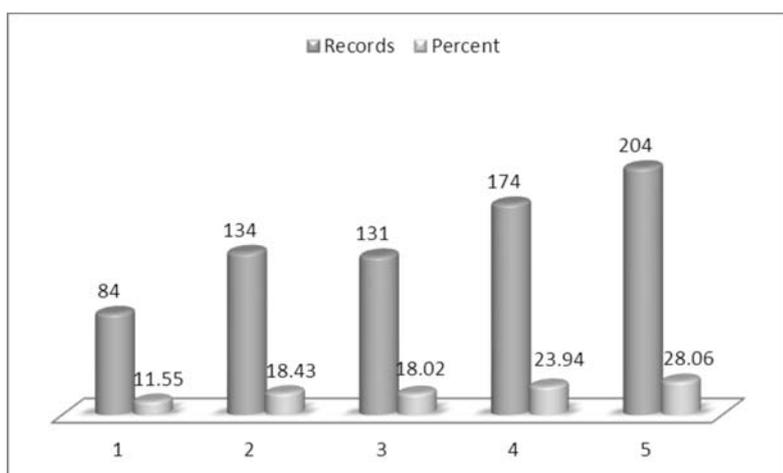
- Year wise distribution of Plastic Waste Management Research
 - Authorship Pattern – Year wise Distribution
 - Distributions of Types of Authorship
 - Trend Analysis in Plastic Waste Management
 - Degree of Collaboration – Year wise Distribution
-

Table – 1: Year wise distribution of Plastic Waste Management Research

S. No	Year	Records	Percent
1.	2014	84	11.55
2.	2015	134	18.43
3.	2016	131	18.02
4.	2017	174	23.94
5.	2018	204	28.06
	Total	727	100.00

(Source: <https://login.webofknowledge.com>)

(Figure – 1: Year wise distribution of Plastic Waste Management)



The above table displays the year wise distribution of research productivity in Plastic Waste Management Research in Indian for a period of five years from 2014 to 2018. The total publication count is found to be 727 and the maximum output occurred in the year 2018 numbering 204 and this formed 28.06 percent of the total output. The least count of the total output was in the year 2014 with 11.55 percent. It is inferred that the Plastic Waste Management Research in Indian articles are slightly increased year by year.

Table – 2: Authorship Pattern – Year wise Distribution

Number of Authors	2014	2015	2016	2017	2018	Total
1	25	41	39	50	55	210
2	15	26	28	34	41	144
3	14	24	25	28	39	130
4	21	28	27	42	45	163
5+	09	15	12	20	24	80
Total	84	134	131	174	204	727

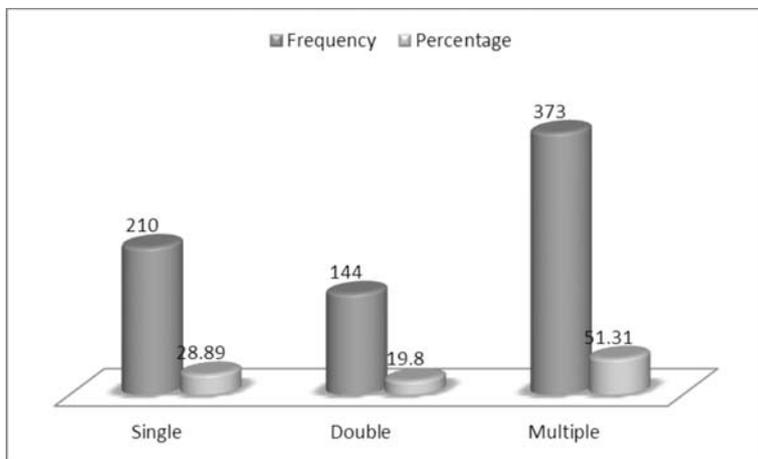
Year wise distribution of author groups and their publication count over a period of five years revealed interesting results.

Single authored papers shows growing trend from the year 2016 to 2018 the maximum productivity was 55 in the year 2018. Regarding two (Joint) authored publications, the maximum output recorded was 41 with performance during 2018.

Table – 3: Distributions of Types of Authorship

S. No	Type of authorship	Frequency	Percentage
1	Single	210	28.89
2	Double	144	19.80
3	Multiple	373	51.31
Total		727	100.00

(Source: <https://login.webofknowledge.com>)



(Figure – 2: Distributions of Types of Authorship)

Authorship is identified under the traditional types namely, Single, Double and Multiple categories. The above table reveal that distribution of types of authorship, it is found that, multiple authors formed 51.31 percent of the total research output, while double authorship formed 19.80 percent. Single authorship had a score of 28.89 percent. Further it is found that multiple author ship was dominant.

Table – 4: Trend Analysis in Plastic Waste Management

S. No	Year	Count (Y)	X	X ²	XY
1	2014	84	-2	4	-168
2	2015	134	-1	1	-134
3	2016	131	0	0	0
4	2017	174	1	1	174
5	2018	204	2	4	408
Total		727	0	10	280

Straight Line eqn. $Y_c = a + bX$

Since “x = 0

a = “Y/N = 727/5 = 145.40; b = “XY/”x² = 280/10 = 28.00

Estimated literature in 2025 is when X = 2025 – 2016 = 9

$$= 145.40 + 28.00 * 9 = 145.40 + 252 = \mathbf{397.40}$$

From the results of the calculations it is found that the future trend of Plastic Waste Management research output by trend analysis may show up an increasing trend in the year 2025. Hence the conclusion is that the rate of growth is positive in trend analysis in Plastic Waste Management research.

Table – 5: Degree of Collaboration – Year wise Distribution

S. No	Year	Single Authored	Collaborative Authorship	Degree of Collaboration
1	2014	25	59	0.70
2	2015	41	93	0.69
3	2016	39	92	0.70
4	2017	50	124	0.71
5	2018	55	149	0.73
	Total	210	517	0.71

The analysis of data for single and Collaborative authored papers revealed the fact that single authored papers suffered a declining trend while Collaborative authored papers recorded an increasing trend. In recent decades there has been an increasing trend towards collaboration in research in almost all pure as well as applied sciences. Subramaniam deduced a formula for calculating the degree of collaboration as

$$C = Nm / (Nm + Ns)$$

where C = extent of collaboration

Ns = number of single authored papers

Nm = number of multi authored papers

Thus the percentage of collaboration can be arrived at by applying the formula $C = Nm / (Nm + Ns) \times 100$.

The analysis of the extent of collaboration of Plastic Waste Management research reveals the following facts.

- Degree of collaboration had an initial value of 0.69 percent in the years 2015 and this increased to 0.73 in the year 2018.
- There was a decline in the single authored papers and an increase in Collaborative authored papers.
- The result evidenced in the application of *Subramanian's formula* corroborated the results obtained in this investigation through regression analysis.

Conclusion :

In the context of Indian Research and the development of Science is India earning its leadership qualities in Research and Development in the India in Plastic Waste Management research. It is possible that the overall performance of a country may be better, though it may lose the competition in selective areas.

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Electronic Thesis and Dissertation Contributions in Shodhganga by Universities in India : A Study**Dr. Subash Pundalikrao Chavan**Director, Knowledge Resources Centre, SNTD Woman's
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ABSTRACT :

Conducted the study on Electronic Thesis and Dissertation Contributions in Shodhganga by Universities in India. At present, there are 10 non-agricultural universities of Maharashtra listed in UGC website signed MOU with INFLIBNET to contribute their theses on Shodhganga. There are totals 23523 e-thesis was uploaded and Savitribai Phule Pune University has contributed highest 9725 (41.34%) e-thesis. The majority of 19342 (82.22%) E-Thesis Submitted to Sodhaganaga in English language. University of Calcutta 11528 (15.75%) is on 1st rank regarding the top ten Universities in India to uploaded Ph.D. Theses in Shodhganga.

Keywords:INFLIBNET, ETD, Shodhganga, Repository, UGC

1. Introduction :

India is one of the greatest countries in the world in terms of human resources. Since independence, the country has obtained a steady growth in the field of higher education and research. Many Indian education institutions have gained global reputation by their quality and unique research outputs. India has 48 Central Universities, 399 State Universities, 126 Deemed Universities and 334 Private Universities. The research productivity from these higher education institutes acquires much for the development of the country. The University Grants Commission has made a unique facility called "Shodhganga" an online reservoir of theses. (Panneerselvam, 2015).

2. University Grants Commission (UGC) :

The University Grants Commission (UGC) was established on 28th December 1953 and became a legally organization of the Government of India by an Act of Parliament in 1956. The main aim of University Grants Commission (UGC) is to coordination, determination and maintenance of standards of teaching, examination and research in university education. Thereafter University Grants Commission (UGC) introduced six centers at Pune, Hyderabad, Kolkata, Bhopal, Guwahati and Bangalore to control the region-wise education system in India in 1994 and 1995. Now the head office is locating at Bahadur Shah Zafar Marg in New Delhi. Major Activities and Functions of University Grants Commission (UGC) are providing funds and that of coordination, determination and maintenance of standards in institutions of higher education, Determining and Maintaining Standards of Teaching, Examination and Research in Universities, Allocates Grants to the Universities and Colleges out of its own funds for their Development or other general purpose.

3. Information and Library Network (INFLIBNET) :

It is a major National Programme Initiated by the University Grants Commission (UGC) of India in March 1991 with its Head Quarters at Gujarat University Campus, Ahmedabad. Major Activities and Services of INFLIBNET include automation of academic libraries and information centers, creation of union databases of resources (IndCat) available in academic libraries, promote resource sharing among academic libraries and promote information access and transfer.

Inflibnet centre on behalf of the UGC has taken-up a number of new initiatives for the benefit of the academic community. These initiatives include i) **Shodhganga: a reservoir of Indian Theses and Dissertations;** ii) Shodhgangotri: a repository of synopsis submitted to the universities for registration under Ph.D. programme; iii) OJAS@INFLIBNET: An open access journal publishing platform; iv) Shibboleth-based access management system; v) Open source software R & D; vi) InfoPortal: A comprehensive gateway to all Indian electronic scholarly content; vii) e-PG Pathshala: e-content for PG Courses and viii) Measuring Research Output of Indian Universities.

4. Shodhganga: A Reservoir of Indian Theses and Dissertations :

It is digital repository of theses and dissertations submitted to Indian universities and it is maintained by Inlibnet center which is an autonomous Inter-University Centre of the University Grants Commission (UGC) of India. The research students, universities can submit their theses through “Shodhganga” project. The full text of all the documents submitted to Shodhganga is available to read and to download in open access to the academic community worldwide. The repository has a collection of 226467 full text theses and 6450 synopses. The Shodhganga repository was created consequent on the University Grants Commission making it mandatory through regulations issued in June 2009 for all universities to submit soft copies of Ph.D. theses and M.Phil dissertations to the UGC for hosting in the INFLIBNET. Universities are necessary to sign an MOU with the INFLIBNET Centre to take interest in the Shodhganga project. 451 Universities have signed a Memorandum of Understanding {MOU} with INFLIBNET. Universities can also get funds from UGC for setting up Institutional and ETD repositories.

5. Scope and Limitation of the Study :

The scope of the present study is limited to 10 non-agricultural universities of Maharashtra. This study covers the uploaded ETD at Shodhganga repository up to May 2019. The present study is limited to only Maharashtra state Universities.

6. Objectives of the Study :

The main objectives of the study are to:

- Find out the total number of e-thesis submitted to Sodhaganaga.
- Find out university wise e-thesis submitted to Sodhaganaga.
- Study the year wise growth and development of e-thesis.
- Classify the language wise e-thesis submitted to Sodhaganaga.

7. Methods and Materials Used

The Present study covers the 23523 doctoral theses records available in Shodhganga from 10 non-agricultural universities of Maharashtra as on 06/05/2019. The doctoral theses was collected from Shodhganga databases hosted by INFLIBNET <http://shodhganga.inflibnet.ac.in> in which is an major source of doctoral thesis that are submitted to various universities in India which come under the Shodhganga Inflibnet.

8. Data Analysis

8.1 University Wise E-Thesis Submitted to Sodhaganaga

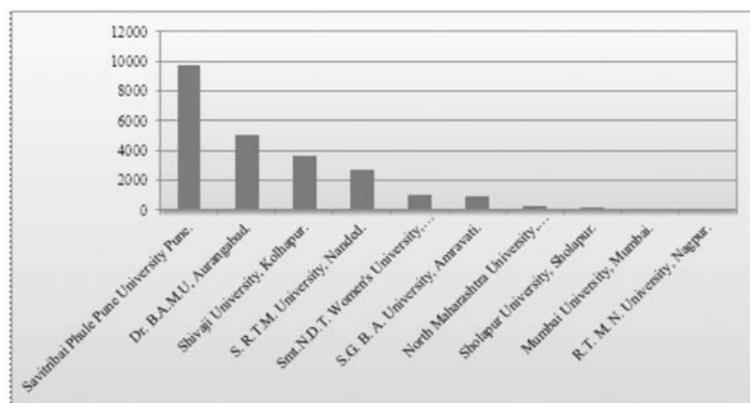
University Wise E-Thesis Submitted to Sodhaganaga. The collected data is given in Table No.1 and Figure No. 1.

Table No.1 University Wise E-Thesis Submitted to Sodhaganaga

Sr. No.	Name of the Universities	No. of Thesis Submitted	%
1	Savitribai Phule Pune University Pune.	9725	41.34
2	Dr. B.A.M.U, Aurangabad.	5041	21.43
3	Shivaji University, Kolhapur.	3606	15.32
4	S. R.T.M. University, Nanded.	2673	11.36
5	Smt.N.D.T. Women's University, Mumbai.	1009	4.28
6	S.G. B. A. University, Amravati.	947	4.02
7	North Maharashtra University, Jalgaon.	277	1.17
8	Sholapur University, Sholapur.	182	0.77
9	Mumbai University, Mumbai.	62	0.26
10	R.T. M. N. University, Nagpur.	1	0.00
	Totals	23523	100

Figure No.1 University Wise E-Thesis Submitted to Sodhaganaga

Table and figure no. 1 shows the number of submitted of e-theses by the Maharashtra state university India in



Shodhganga and resolved that all 10 universities of Maharashtra State submitted total 23523 theses in Shodhganga (as on 09/05/2019). Savitribai Phule Pune University submitted 9725 (41.34%) theses and secured 1st rank, Dr. Babasaheb Ambedkar Marathwada University submitted 5041 (21.43%) theses & which are in second highest submitted followed by followed by Shivaji University, Kolhapur 3606 (15.32%), S. R.T.M. University,

Nanded 2673 (11.36%), Smt.N.D.T. Women's University, Mumbai 1009 (4.28%), S. G. B. A. University, Amravati 947 (4.02%), North Maharashtra University, Jalgaon 277 (1.17%), Sholapur University, Sholapur 182 (0.77%), Mumbai University, Mumbai 62 (0.26%) and R.T. M. N. University, Nagpur submitted only 1 theses in Shodhganga.

8.2 Year Wise E-Thesis Submitted to Sodhaganaga :

Year Wise E-Thesis Submitted to Sodhaganaga. The collected data are given in Table No.2 and Fig. No. 2.

Sr. No.	Name of Universities	1951 - 1959	1960 - 1969	1970 - 1979	1980 - 1989	1990 - 1999	2000 - 2009	2010 - 2018	Totals
1	Savitribai Phule Pune University Pune.	122	525	873	2015	1465	2586	2139	9725
2	Dr. B.A.M.U, Aurangabad.	0	9	63	171	889	1918	1991	5041
3	Shivaji University, Kolhapur.	0	15	190	436	773	1153	1039	3606
4	S. R.T.M. University, Nanded.	0	0	0	0	57	997	1619	2673
5	Smt.N.D.T. Women's University, Mumbai.	0	2	43	96	229	286	353	1009
6	S.G. B. A. University, Amravati.	0	0	1	12	53	196	685	947
7	North Maharashtra University, Jalgaon.	0	0	0	0	0	10	267	277
8	Sholapur University, Sholapur.	0	0	0	0	0	0	182	182
9	Mumbai University, Mumbai.	0	0	0	0	2	7	53	62
10	R.T. M. N. University, Nagpur.	0	0	0	0	0	0	01	01
Totals		122 (0.51%)	551 (2.34%)	1170 (4.97%)	2730 (11.60%)	3468 (14.74%)	7153 (30.40%)	8329 (35.40%)	23523 (100.00%)

Table No.2 Year Wise E-Thesis Submitted to Sodhaganaga :

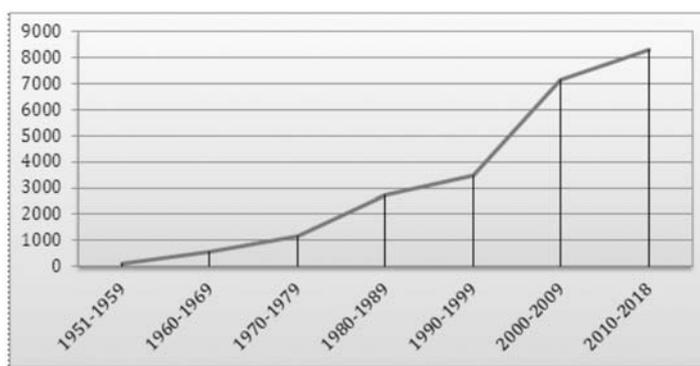


Figure No. 2 Year Wise E-Thesis Contribution to Sodhaganaga

Table no. 2 shows the Year wise growth and development of the doctoral theses by Maharashtra State University in Shodhaganaga. There are total 23523 Theses submitted. This table shows that the highest number of 8329 (35.40%) thesis submitted in 2010-2018. Second position goes to the

year 2000-2009 this year 7153 (30.40%) thesis submitted. Third rank goes to the year 1990-1999 this year 3468 (14.74%) thesis submitted. Fourth rank goes to the year 1980-1989 this year 2730 (11.60%) thesis submitted. Fifth rank goes to the year 1970-1979 this year 1170 (4.97%) thesis submitted. Sixth rank goes to the year 1960-1969 this year 551 (2.34%) thesis submitted and lastly seventh rank goes to the year 1951-1959 this year 122 (0.51%) theses submitted.

8.3 Language Wise E-Thesis submitted to Sodhaganaga

Table No. 3 shows the language wise E-Thesis Submitted by the Universities of Maharashtra in Sodhaganaga. There are nine languages mentioned in the table respectively English, Marathi, Hindi, Kannad, Gujarati, Sanskrit, German, Pali and Urdu. The majority of 19342 (82.22%) E-Thesis Submitted to Sodhaganaga in English language. Researchers have given preference to English language for research followed by 624 (2.65%) Marathi, 160 (0.68%) Hindi, 02 (0.00%) Kannad, 05 (0.02%) Gujarati, 03 (0.01%) Sanskrit, 02 (0.00%) German, 01 (0.00%) Pali, 06 (0.02%) Urdu and 3378 (14.36%) E-Thesis Submitted to Sodhaganaga in other language.

Table No. 3. Language Wise E-Thesis Submitted to Sodhaganaga

Sr. No.	Name of Universities	Language Wise E-Thesis Submitted to Sodhaganaga										Totals
		English	Marathi	Hindi	Kannad	Guajarati	Sanskrit	German	Pali	Urdu	Others	
1	Savitribai Phule Pune University Pune.	8416	230	51	0	0	3	2	1	0	1022	9725
2	Dr. B.A.M.U, Aurangabad.	3696	66	25	2	1	0	0	0	0	1251	5041
3	Shivaji University, Kolhapur.	3429	55	8	0	0	0	0	0	0	114	3606
4	S. R.T.M. University, Nanded.	2060	167	51	0	0	0	0	0	3	392	2673
5	Smt.N.D.T. Women's University, Mumbai.	688	20	14	0	4	0	0	0	0	283	1009
6	S.G. B. A. University, Amravati.	622	61	8	0	0	0	0	0	2	254	947
7	North Maharashtra University, Jalgaon.	252	3	1	0	0	0	0	0	0	21	277
8	Sholapur University, Sholapur.	116	22	2	0	0	0	0	0	1	41	182
9	Mumbai University, Mumbai.	62	0	0	0	0	0	0	0	0	0	62
10	R.T. M. N. University, Nagpur.	1	0	0	0	0	0	0	0	0	0	1
Totals		19342 (82.22%)	624 (2.65%)	160 (0.68%)	02 (0.00%)	05 (0.02%)	03 (0.01)	02 (0.00%)	01 (0.00%)	06 (0.02%)	3378 (14.36%)	23523 (100.00)

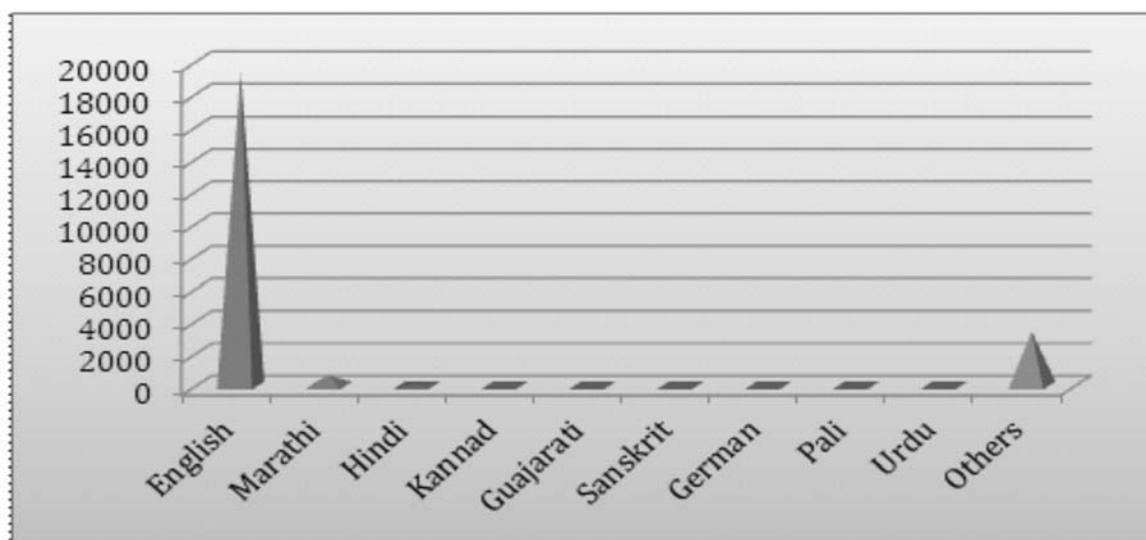


Figure No. 3. Language Wise E-Thesis Submitted to Shodhganga

8.4 Top Ten Universities

The Shodhganga is the largest Ph.D. Thesis Database in India. The INFLIBNET has started a very best practice for motivation to Indian Universities regarding uploading of their theses in Shodhganga. It is also started by the INFLIBNET to release Top Ten Universities whose are contributed their maximum Ph.D. Theses in Shodhganga. As per source <http://shodhganga.inflibnet.ac.in/> the top ten universities in India is presented in the Table No.4.

Table No. 4 Top Ten Universities (As on date 07/05/2019)

Sr. No.	Top Ten Universities in Shodhganga	Theses Uploaded	%
1	University of Calcutta	11528	15.75
2	Savitribai Phule Pune University	9725	13.29
3	V. B. S. Purvanchal University	8034	10.98
4	Anna University	7981	10.90
5	Aligarh Muslim University	7619	10.41
6	Panjab University	7243	9.89
7	University of Madras	5950	8.13
8	Dr. Babasaheb Ambedkar Marathwada University	5041	6.88
9	Gauhati University	5040	6.88
10	Manonmaniam Sundaranar University	5006	6.84
	Totals	73167	100

The table no. 4 seen the University of Calcutta 11528 (15.75%) is on rank 1st rank followed by Savitribai Phule Pune University 9725 (13.29%) is on rank 2nd rank, V. B. S. Purvanchal University 8034 (10.98%) is on rank 3rd rank, Anna University 7981 (10.90%) is on rank 4th rank, Aligarh Muslim University 7619 (10.41%) is on rank 5th rank, Panjab University 7243 (9.89%) is on rank 6th rank, University of Madras 5950 (8.13%) is on rank 7th rank, Dr. Babasaheb Ambedkar Marathwada University 5041 (6.88%) is on rank 8th rank, Gauhati University 5040 (6.88%) is on rank 9th rank and Manonmaniam Sundaranar University 5006 (6.84%) is on rank 10th rank. Out of 226561 Ph.D. Theses which is uploaded by all Indian Universities it is observed that the contribution of top ten universities were 73167 (32.29%) number of theses. (Source <http://shodhganga.inflibnet.ac.in/>)

9. Major Findings

1. Present study covers the 23523 doctoral theses records available in Shodhganga from 10 non-agricultural

universities of Maharashtra as on 06/05/2019.

2. Savitribai Phule Pune University submitted 9725 (41.34%) theses and secured 1st rank.
3. Highest number of 8329 (35.40%) thesis submitted in 2010-2018.
4. The majority of 19342 (82.22%) E-Thesis Submitted to Sodhaganaga in English language. Researchers have given preference to English language for research.
5. Top Ten Universities in India seen the University of Calcutta 11528 (15.75%) is on rank 1st rank followed by Savitribai Phule Pune University 9725 (13.29%) is on rank 2nd rank.

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