TRANSFORMATION OF LIBRARIES FROM ANCIENT TO 21ST CENTURY

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ABSTRACT: - *The Paper Deals with Transformation of Libraries from Ancient times i.e book were in the form of tabloids and written on paper and in 21st Century the Books are transformed to electronic format and available on the internet.*

KEYWORDS: Libraries, Cloud, Internet.

INTRODUCTION

It is the spoken language that comes before written. The progress of civilization compels human beings to search for alternative and they evolved the concept of writing. In ancient times teaching and learning process was done through spoken language. Scholars used to teach orally and students used to memorize. At later stage wood, papyrus, copper plates, parchment, clay tablets, and animal hides were used for writing. Gradually there appeared a stage where libraries came out of the shackles of rulers and after the invention of printing press, rolled in the hands of general public. Private collections of kings, scholars and scientists resolved and finally settled in the center of learning. Public Libraries and National Libraries gained momentum and many countries of the world established libraries. One of the most significant accomplishments in the history of library is the innovation of ICT that has brought radical change in the field of education. Libraries transformed from traditional to modern. Technical set-up and the entire information handling got renovated. The Internet proved a massive source of information and enormous amount of information generated and accessed throughout the world. Mentioned below are the brief details of transition of libraries from traditional to ICT era.

HISTORICAL BACKGROUND OF ANCIENT LIBRARIES

In ancient times, there was no difference between a library and a record room. Librarians were treated as custodian of that recording room. Books were not for the general public and treated as royal treasure for kings and emperors. It served as archives, sanctuaries for sanctified lettering and reservoirs of literature and records. Earlier written knowledge was on clay tablets and there was no existence of books. "A temple in the Babylonian town of Nippur, dating from the first half of the 3rd millennium BC, was found to have a number of rooms filled with clay tablets, suggesting a well-stocked archive or library. Similar collections of Assyrian clay tablets of the 2nd millennium BCE were found at Tell el-Amarna in Egypt." (Encyclopedia Britannica, 2016) Numerous incidents occurred in thehistory of world libraries which is difficult to mention. Instead, the researcher felt apt to mention five amazing ancient libraries of the world.

The Library of Alexandria

The great library of Alexandria is the most famous library in the world, where scholars around the globe came for knowledge and shared philosophies. "The library was located within the grounds of the Royal Palace in Alexandria, Egypt and was built around 295 BCE by Ptolemy I. The library was a complex with shrines dedicated to each of the nine muses, lecture areas, observatories, a zoo and living quarters. It was

thought to house the works of great scholars and writers including Homer, PlatoSocrates. The library's destruction is most commonly thought to have happened in 48 BCE when Julius Caesar Caesar Caesar ordered his men to set fire to the ships, however, the fire got out of hand and destroyed many buildings including the library." (Koekoe, 2015). a port city in northern , and occupied Alexandria. When tried to leave the port town, Egyptian ships trapped him.

The Library of Ashurbanipal

The Royal Library of Ashurbanipal is founded and entitled after the king Ashurbanipal. He was the king of Neo-Assyrian empire 630 (B.C). He was an ardent accumulator of texts and tablets. "British Museum archeologists discovered more than 30,000 cuneiform tablets and fragments at his capital, Nineveh (modern Kuyunjik). Alongside historical inscriptions, letters, administrative and legal texts, thousands of divinatory, magical, medical, literary and lexical texts were found. This treasure-house of learning has held unparalleled importance to the modern study of the ancient near the east ever since the first fragments were excavated in the 1850s." (British Museum, No date).

The Library of Pergamum (Pergamon)

The Library of Pergamum (also Pergamon) was an enormous ancient library that was situated in the Greek city of Pergamon located on the shores of Anatolia or modern day Turkey founded

around 197-159 BCE by King Eumenes."Parchment (*chartapergamena*) was said to have been developed there after the copying of books was impeded byPtolemy Philadelphus' by banning the export of papyrus from Egypt. Parchment proved to be more durable than papyrus and so marks a significant development in the history of technical advances in the dissemination of knowledge. The library was bequeathed with the whole of the kingdom of Pergamum to the Roman people in 133 BC, and Plutarch records an allegation that Mark Antony gave its 200,000 volumes to Cleopatra VII, to become part of the Alexandrian library." (Encyclopedia Britannica, 2016)

The Library of Constantinople

Around 357 CE Constantius II (son of Constantius I) the Emperor of Byzantine (now Istanbul) had created the Imperial Library of Constantinople. The Library may have held one hundred thousand (100,000) volumes one of the largest collections of that period. The Emperor was worried about the deteriorating condition of the texts which were written on papyrus scrolls (Papyrus scrolls were made from a grassy plant) so that many Judaeo-Christian scriptures could be copied from papyrus to parchment or vellum. "For almost a millennium, the Imperial Library (established during the reign of Constantius II, which lasted between 337 to 361 CE) kept the Greek and Roman literary tradition alive and accessible. Fire, unfortunately, proved its undoing on two different

occasions. One incident in 473 destroyed around 120,000 texts and the Fourth Crusade in 1204 eventually finished the job." (Online College, 2016)

The Celsus Library

The Celsus Library located in Ephesus (modern day Turkey) was built in 110 CE by Gaius Julius Aquila to memorialize his father Tiberius Julius Celsus Polemaeanus (governor of the province of Asia, who had been from 105 to 107 CE). The monumental tomb was beneath the ground floor and there was a statue of Athena (Goddess of Wisdom). "The interior of the library measured 16.72m by 10.92m and was paved with decorated marble. The walls were lined with niches for the storage of scrolls. Running around the interior wall at second storey level, was a railed balcony giving access to higher level niches. In order to reduce humidity and create a more stable interior temperature (which would have damaged the precious texts within the library), empty niches were constructed inside the walls. The interior also contained a large alcove which contained a statue, probably of Celsus. In 262 CE the library was destroyed by fire during a Gothic invasion. However, the façade survived and repairs were made to the library in the 4th century CE and a fountain added in front." (Cartwright, 2012)

Ancient Universities in India

India is a very rich country as compared to civilizations of the world. The Indus-Valley

civilization is a place of higher learning and a center of intelligence. The scholars of Indian origin were themselves librarians known as memory libraries. Memorizing of Ramayana and Mahabharata the two great epics proves this. There are many ancient libraries in India which show our teaching and learning skills. In ancient India there are many ancient libraries were discovered among the most prominent are the Taxila and Nalanda Universities. Other ancient libraries of India are also discussed below.

Taxila

"Taxila lies in the northwest of Rawalpindi (Pakistan). It was the capital of the Buddhist kingdom of Gandhara and a center of learning. It came under Persian rule and in 326 BC was surrendered to Alexander the Great. Taxila is known from references in Indian and Greco-Roman literary sources and from the accounts of two Chinese Buddhist pilgrims, Faxian, and Xuanzang. According to the Indian epic Ramayana Bharata, the younger brother of Rama was an incarnation of the Hindu god Vishnu. The city was named after Bharata's son Taksha, its first ruler. Takshashila was an early center of learning dating back to at least the 5th century BCE. Takshashila is considered a place of religious and historical sanctity by Hindus and Buddhists." (Nickel, 2010)

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Nalanda

"The Nalanda University, which by 450 A.D. became a renowned seat of learning, its fame spread beyond the boundaries of India. Nalanda near Patna grew to be the foremost Buddhist monastery and an educational center. Hiuen-Tsang and I-Tsing stayed and studied here. Information on the Nalanda University Library is also found in the Tibetan accounts, from which we understand that the library was situated in a special area known by the poetical name the Dharmaganja, (Piety Mart) which comprised three huge buildings, called the Ratnasagara, the Ratnodadhi, and the Ratnaranjaka of which the Ratnasagara was a nine storied building and housed the collection of manuscripts and rare sacred works like Prajnaparamita Sutra and other. The library at Nalanda had a rich stock of manuscripts on philosophy and religion and contained texts related to grammar, logic, literature, the Vedas, the Vedanta, and the Samkhya philosophy, the Dharmasastras, the Puranas, Astronomy, Astrology, and Medicine. The University of Nalanda and its library flourished down to the 12th century A.D. until Bakhtiyar Khalji sacked it in 1197-1203 A.D. and set fire to the establishment of Nalanda." (Bhatt, 1995)

Other Ancient Libraries in India

"Further centers include Odantapuri, in Bihar (circa 550-1040), Somapura, in Bangladesh (from the Gupta period to the Muslim conquest), Jagaddala, in Bengal (from the Pala Period to the

Muslim Conquest), Nagarjunakonda, in Andhra Pradesh, Vikramasila, in Bihar (circa 800-1040), SharadaPeeth, in modern Kashmir, Valabhi, in Gujarat (from the Martrak period to the Arab raids), Varanasi in the Uttar Pradesh (8th century to modern times), Kanchipuram, in Tamil Nadu, Manyakheta, in Karnataka, Puspagiri, in Orissa and Ratnagiri in Orissa. In Sri Lanka, Sunethradevi Pirivena, a center of Buddhist learning in Sri Lanka, founded circa 1415 AD." (AICTE, 2014)

TRANSFORMATION OF LIBRARIES FROM TRADITIONAL TO CLOUD

The ancient period suggests that libraries were used by Kings, Monarchs, Emperors, Scholars, and Scientists and it was not for the ordinary people. It was a custom and a symbol of pride for the wealthy people to have their own private libraries. Libraries have been destroyed by wars, fires, and floods, but they have been restored and expanded an obligatory and treasured repository of knowledge. In 1450, Johann Gutenberg was the first European who invented movable type, Printing Press and started printing Gutenberg Bible. The invention becomes a medium of mass communication which altered the society. The printing revolution broke the barrier of learning which was only restricted to an elite group of the society. It was for the first time that restricted information reached to general people which gave rise to revolutions, freedom of expression and the building of civilized society.

The traditional library is based on the collection of printed reading material. The management of traditional library is not able to provide pinpointed services to their users and confined within physical boundary. In the decade of 1980s, computer was introduced in the library, which was helpful in house-keeping operations i.e. acquisition, cataloging, circulation, serial control, documentation, and information retrieval, which is termed as semi-automation of all library functions. In the 1990s, most of the libraries started using computerized acquisition, circulation, CAS, SDI, OPAC services and machine readable catalog called as automated libraries. But the holdings are same as that of a traditional library. When automated libraries started procuring or converting physical texts in electronic format and give access through network they were known as electronic libraries. Mostly of the electronic media is used for storage, retrieval and delivery of information. The electronic library has changed its holdings from print to electronic form. Libraries with both physical and digital collections are referred to as hybrid libraries. Digital Library is a later stage of the electronic library. In a Digital Library, high-speed optical fiber cables are used for LAN and the access is over a WAN that provides a wide range of the Internet-based services i.e. audio and video conferencing, etc. A majority of the holdings in a digital library is in the computer-readable form and also acts as a point of access to other on-line

resources. In the past few decades, there was a drastic improvement in ICT. The practices and processes of almost all endeavors got affected. The libraries are progressed tremendously in this age of ICT exponentially. Due to rapid growth in data on the Internet where the storage capacity is under the scanner, a new technology called Cloud Computing came to surface. This technology is basically a subscription based service and gives a solution to all Information Technology related problems. The models of cloud computing help the library to secure its data and gives complete access whenever needed. Phase-wise developments of libraries are explained below in detail:

- Traditional Library
- Automated Library
- Electronic Library
- Hybrid Library
- Digital Library
- Virtual Library
- Cloud Library

Traditional Library

In earlier times there wasn't a concept of library and books existed in record rooms, storehouse, and archives legal, historical, and religious works preserved in wood, papyrus, copper plates, parchment, clay tablets, and animal hides, kept in scrolls. After the revolution of the printing press, libraries emerged in the middle of the 20th century. The biggest disadvantage of traditional library is the stored books degrade over a period of time

and there was always the fear of theft and book mishandling. In the absence of computer, traditional libraries were handled manually; required lot of man power and time to carry different activities. Development of book collection was done through 'Books in Print', a catalog of suppliers, suggested by teachers, users, and library committee. Organization of information was a tedious job, a librarian was supposed to index the document properly so as to facilitate its users to locate. Negligence of this task will not only waste the time of the user and the location of the book will not be identified. Most of the libraries divided their collection of the bases of subject headings. In many libraries books were cataloged according to the title, author, and subject based. For the location of books, a number of tools were utilized such as library catalog, Bay Guides, Bibliographies. For classification of books various classification systems were available. It was a subject experts job or a person who knew classification system well. The most important activity of a library is lending books and for that Newark and Browne systems were in practice. Preparing bibliographies for the most time-consuming job for library professionals it required constant up-gradation and efficiency to manage it. Up-keeping of microfilms and microfiche in traditional set-up was quite an expensive job and required separate room and a professional person to handle.

Automated Library

Library Automation denotes to the automation of library systems such as Acquisition, Circulation, Serial Control, and OPAC which was otherwise handled manually. It also meant a technology that minimizes human intervention in the handling of the processes

or systems. This job is done with the help of computer applications and software. The automation of the library helps to provide services efficiently, accurately, adequately, and economically. Library automation became mandatory due to growing information and shrinking space. With automation, the library can deliver information quickly such as bibliographic records of material, repetition of the technical processes, access to information without delay, multiple searches, barcode printing, CAS and SDI services, and Inter-Library Loan. It has a capacity of handling large data and information and does not get obsolete, resource sharing and networking of libraries help to share data online, the delivery of information and retrieval becomes easy, and geographical barriers can be overcome with the help of automation of libraries

Electronic Library

The "Electronic Library" synonymously refers as "Digital Library", and "Virtual Library". When printed material is converted into an electronic format it is called as an electronic resource and when it get accessed through a library it is known as electronic library. The electronic library is accessed through network, CD-ROMs, magnetic discs, and through Internet. The storing and copying of information is done through downloading or through master file. The rising use of information including electronic media forced libraries to go for transformation and to convert their holdings into electronic format. Through network and links, libraries can get connected with the electronic collections of other libraries. Resource sharing becomes easy and information can be handed over to its users without any delay. The acquisition, preservation, organization and access to information in electronic format are permanent and long lasting. The electronic library helps reducing cost and unnecessary purchase of study material.

Hybrid Library

Libraries with both physical and digital collections are called as hybrid libraries. It mirrors the transitional state of library, which neither is fully printed nor fully digitally converted. It provides services in a mixed-mode more particularly in a co-ordinated way so that with the help of electronic and paper an enforced service can be provided to theend user. Most of the libraries of the world fall under the category of hybrid library. Copyright laws do not allow libraries to digitalize their entire collection and to subscribe to online resources (books and journals) is very expensive. Hence, most of the libraries adopted the hybrid pattern rather emphasizing on the electronic library, although the advantage of

electronic library is far superior to the hybrid library.

Digital Library

A digital library is a library in which information is stored in digital format and accessible through computer locally or remotely. "Digital libraries are organizations that provide the resources, including specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities" (Digital Library Federation, 2011). The functions and advantages of digital library includes access to information of any size to users without boundaries, supports multimedia along with text, accessibility through the Internet or Intranet, hypertext links for quick access, advanced searched, merge with other digital libraries, and universal retrieval, 24 x 7 availability, multiple access, and longtime preservations.

Virtual Library

As the word virtual stands for something that exists only at the back of your mind and not physical. The notion of virtual library is that a person who has access to the Internet, can access the resources of any library without being physically present. "Virtual library is a collection of resources (e.g. indexes, journals, and reference

material) or online reference services available over the Internet. Virtual does not necessarily mean appearance or simulation, but rather refers to activities that instead of demanding a physical presence and a relationship with objects can be executed at a distance by means of a monitor and a keyboard." (Putnik & Cunha, 2008) There are many misconceptions about virtual library some consider Internet and web pages as a virtual library. However, there are some basic differences. The electronic library contains reading material that has been convertedelectronically while digital library stores, manages and disseminate via networks. On the contrary, Virtual Library holds both digital and electronic libraries existing 'Virtually'.

Cloud Library

After the developments in ICT, libraries started procuring huge information technology infrastructure to automate their system. At a later stage, due to increasing in online information, maximum utilization of the Internet, user's inclination shifted more towards online teaching and learning that gave rise to electronic and digital libraries and this compels the institutions to buy expensive servers, hardware, and software. The increase in data storage and retrieval issues became prominent. To solve these issues cloud computing emerged as a solution. Cloud computing also called as on-demand computing, is highly scalable and expandable in nature. This technology is basically a subscription based

service and works through the Internet. Cloud service providers offer services such as information technology infrastructure, hardware, software, application, storage, communication, and if any collaboration is required.

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