

Designing Libraries based on Factors that Determine the Existence of Libraries

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Abstract - Libraries have been considered as knowledge hubs for ages and their sole purpose was and is to preserve and disseminate knowledge resources to its users. But the existence of libraries has evolved throughout the years based on several tangible, non-tangible, physical and conceptual factors. The existence itself is of vital importance due to the fact of knowledge passing being the prioritized purpose of libraries. Hence, in order to assure the continued existence or sustainability of libraries, the designing phase of such buildings, the placement of resources, the accumulation of content and the accommodation of users all need to be determined based on prerequisites. So, this paper tends to breakdown to this level of concepts starting off with why big data is becoming more of a concept encapsulated within libraries and the factors that determine the design of libraries.
Keywords: Big data, Design, Library, Readers, Services

I. INTRODUCTION

The most valuable resource that has been passed down through centuries of discovery and description is knowledge acquired by one generation of scholars to another. The mere accumulation of knowledge will be rendered worthless if not exchanged to future cohorts. As time passes by, the understanding about how the universe and the activities taking place as a natural order function manifest and elucidate themselves. The expansion of resources unfurls the understanding of past scholars and are explained, modified or rendered obsolete by future experimenters. This process of refining knowledge resources will be impossible if the acquired knowledge is not preserved and exchanged to future.

This preservation is empowered through the documentation of books, scrolls, etc. stored in libraries and accessed by readers. Hence, there is a dire need to manage libraries and its services in order to maintain the integrity and validity of knowledge itself. But with the availability of technological access that has provided countless resources to humans, the usage of libraries has been deprecating recently in Sri Lanka. Hence, this paper tends to identify plausible solutions to overcome the lack of usage library services by tailoring the services to suit the diverse type of users or readers accessing library services.

II. THE GLOBAL NETWORK

With the world being condensed and connected through the advancement of science and technology, knowledge or

information, as characterized here onwards, has been illustrated as a single web of atomic data that has at least a remote association with a varying atomic data within the same network. This connection between various data nodes has created an up rise in communication between humans that has generated massive amounts of data besides that being exchanged.

A. The Need for Communication

Entering an era where the entire world has been shrunken into a single non-tangible network connected by physical and virtual channels, 'communication' has become a prime aspect that has experienced a vivid evolution as well as a revolution. Interaction, interactivity, exposure, transparency and many such aspects of an individual's lifestyle has been uncovered with the same level of change that communication has gone through. Hence, relatability of communication that has been tied to personality development needs to be further defined to comprehend the full extent to which it influences the phases within this context.

B. Explicating Communication

Every single individual existing as a member of a society engages in communicating with another on almost a daily basis. Hence, Communication is basically the exchange of information among individuals directly or indirectly [1]. The point or terminal, which in this case is considered as a human being, from which information is sent will be known as the 'Sender' or the 'Source' of that data. The receiving end or being will be referred to as the 'Receiver' or 'Target' of that data being exchanged. Considering this entire scenario as a process, Communication can be seen as a tool more than a process in itself.

C. Information as the Pivot

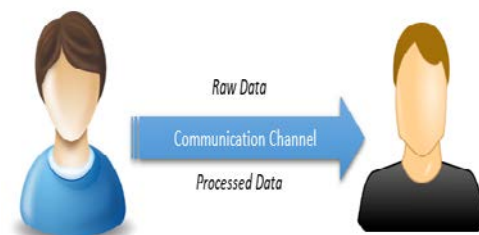


Fig. 1 Communication Channel

The major reason to drill down the definition of communication is to emphasize the importance of what is being transferred through a communication channel as shown in Figure 1– “Information”.

A communication channel can be one of the following.

1. A physical communication path
2. A virtual communication path

If the path is said to be physical, it implies that information is transmitted through a tangible circuit of either wires or materialistic sources that are visible to the naked eye. Such physical communication paths include telephone lines, fibre optics, snail mail, newspapers, etc. But when considering a virtual communication path, many do not comprehend the actual existence of the information being transmitted. For example, the data or messages transmitted as bits among computers over a network take the form of ‘0’s and ‘1’s. Though at this point, human comprehensibility of this message is little-to-none, the encryption of the message at the receiver terminal produces an output that can be utilized in many ways by its users.

No matter how and where information is sent, the source producing the information in the first place and the receiver, utilizing that information at the other terminal will always be humans. The value of information will be lost without being intervened by a person. Also the value of information is not a constant factor. It depreciates with time and renders to be worthless if it is not processed or utilized as intended by the receiving party.

Hence in order to maintain the value of information which is considered to be of high worth in this digital age or the information age, individuals need to act fast and accurately with regard to the information that they produce or receive. But at present, equal access to information and information retrieval has become a challenging factor on so many different levels due to the uniqueness and differentiation of demographics of the user community. Not all individuals can be categorized to view or use data in the same manner that another individual access data. This is due to several features that will be elaborated through the pages to follow.

D. Sources of Information

During the early stages of data as a context of concern, only a few large agencies were involved in generating data whereas all the others including the general public was considered as the consumers. For example, government agencies, newspapers, television broadcasting corporations and radio stations were among the data sources and the massive amount of the general public were considered as the consumers.

But with the shift in time and technological capacities, data has been generated from every nook and corner by various sources. General Public have been granted access to

generate sources both authentic and inauthentic data via the enabling of social media platforms. This has led to all of us generating data as well as all of us consuming data.

This gigantic shift in data processing has brought about the need to consider the various factors or features that data has to manage its maintainability. Data, in its basic form is said to be raw facts that carry mere values and often does not adhere to an organized form of any sorts [2]. These raw facts could be of little-to-no use to users without a certain level of processing. Data can be divided into 2 main categories.

1. Quantitative Data
2. Qualitative Data

Quantitative data carries data pertaining to quantities of numbers that can be delineated based on a quantity or volume [3]. Such quantitative data are examples such as the number of students in each batch that has been enrolled in a university for a given period of years. Quantitative data are specifically useful when analyzed to discover statistical comparisons or arriving at executive decisions based on numeral or percentage-based performance that can be calculated based on these values.

On the other hand, qualitative data helps in visualizing an object or record of data based on its quality, characteristic or behavioral pattern that it illustrates [3]. Qualitative data can be exemplified by data such as color of book covers maintained at a library.

The examples provided here for data are mere rudimental data examples of each type of data. But applied to real world situations, these data can be broadly elaborated and utilized in various spheres. Many different areas or fields all depend on data for various reasons at all times. Such areas or fields are illustrated below in Figure 2 [4].

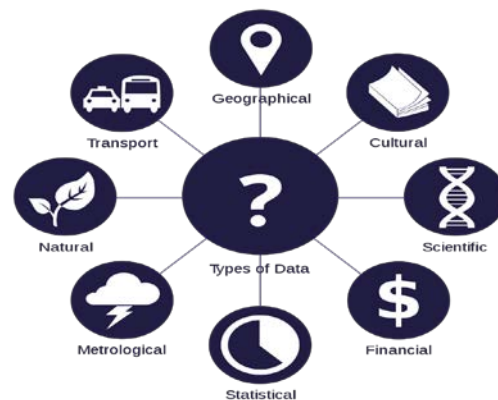


Fig. 2 Global Network

III. THE IMPORTANCE OF BIG DATA IN LIBRARY MANAGEMENT

With the avid engagement of society with mass data, the paradigm of data generation and consumption has shifted

from the conventional one-way template to a dual-path data exchange and usage pattern. This concept can be elaborated through the exaggeration of the buzzword Big Data which is at large ever since the digital revolution.

Big data refers to the massive volume of data that has rendered the traditional data processing methodologies obsolete as they are too complex and difficult to be processed by these legacy methods and system [5].

A. Properties of Big Data

Big data that has now become the pivot of all resources exchanged can be characterized by 4 major properties that it displays. They are listed as follows and illustrated in Figure 3 [6].

1. Volume
2. Velocity
3. Variety
4. Veracity

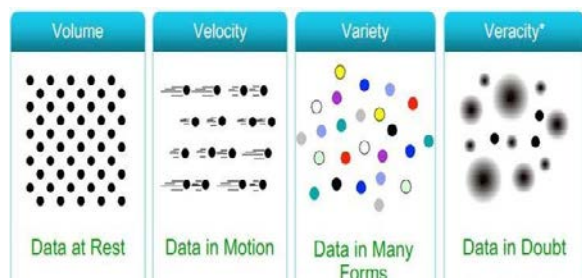


Fig. 3 Properties of Big Data

B. Importance of Big Data

The reason to discuss the importance of big data within this context is to comprehend the type of data that are being dealt with by readers and develop a better understanding about the methodologies that need to be placed in effect to manage and provision such data to the selected target readers.

IV. DEFINING THE TARGET SPECIFICATIONS TO ESTABLISH A BASELINE FOR THE STUDY

In order to restrict the vast scope of the conclusions that could be driven from the study, the platform, location, target users and general requisites need to be specified.

A. The Target Rostrum

Discussing about data and the ways to manage data in the previous sections, the next crucial juncture is to identify the environment or the rostrum within which this data management is being handled. Scrolling back to the olden days, data was plainly and simply considered as books and knowledge resources. But with the advancement of science and technology, it has expanded its borders to indicate several different meanings and types. But as it has always

been, data has been vastly and obviously accumulated within libraries.

The preservation and utilization of data disperses its full purpose within libraries regardless of the type of data, i.e. digital data or manual data such as hard copies. Hence, libraries play a decisive role in the management of data. Centering the research on the identified rostrum, the rest of the sections will be developed within the context of managing data within library environments.

The environment within which data circulates doesn't solely cover the needful for this topic at hand. The volume represents the data to be processed and converted into information that exists at present. The rapidity or speed at which data is exchanged is depicted by the Velocity property of big data. Data has become so massive that there are several different forms or types in which data is present in the 21st century. This omni various existence of data is branded by its variety. Lastly, veracity indicates another decisive factor that requires to be elucidated are the type of readers focused on in this study.

B. The Target Location

With the present anywhere-data-access concept implemented via the advent of the internet and networking, traditional libraries are becoming frail in withholding the walk-in count of readers. Though the idea of a fully digitized library that can be accessed from anywhere sounds conceptually brilliant and is a viable implementation, there are certain services that require a human-in-the-loop. The digitization of each material depends on the condition of the material at the time of acquisition. Some materials such as preserved sanskrit content take time to digitize due to their fragile nature as well as typographical complexities.

Hence, preserving materials within the library and maintaining them requires a physical location. So the source of content will be a physical building whereas making this content available over a network to be accessed from anywhere based on authorization and validation is a non-acclaimed add-on required by the advancement of technology over time.

So as per the location, the existence of tangible resources will be dictated by their accessibility of intangible content of the same. Also, the location of materials is vastly reliant on the type of target readers as modern libraries are layered to accommodate the differently abled reader community as discussed in the proceeding section.

C. The Target Readers

A library will remain a mere building of bricks containing shelves of books if not for the readers who utilize the resources preserved within a library. There are several classes of readers who can be considered as the beneficiaries of library resources. But for our context and

library operations, the following 3 major categories have been chosen with the special consideration towards the Student category.

1. Academic Staff Members
2. Students
3. Differently abled students
4. Researchers

All these users are required to be registered members of the library network in order to track their material usage/borrowal and to render better services tailored for each user via history and surveys.

While servicing all these categories will remain consistent with certain limitations across lending periods, fine deductions, accessible materials permitted for lending, etc. minute considerations need to be redirected towards differently abled students who are now observed to be a huge part of the university community. Differently-abled encapsulates a broader scope of visual impairment, audibility impairment, speech impairment and mobility impairment. Accommodating facilities to make such students comfortable within the library environment is a vital part in provision equality towards data access.

Currently some of the Sri Lankan libraries have taken initiatives towards facilitating data access for visually impaired students using braille and audio books. But, taking these a step further need to be explored on an individual impairment basis for better tailored services.

D. General Requisites in Monitoring Libraries

Libraries are tailored with several preferences that are considered in the form of specifications. A few of these specifications adopt the image of facilities as they are rendered as services. Others take the form of physical layouts and building considerations that aid the provision of these facilities. Some of the major considerations in designing a library are stated below.

1. The main institute with which the library is attached to.
2. The scale of the parent institute in terms of
 - a. Goal
 - b. Mission
 - c. Number of stakeholders
 - d. Government or Private
 - e. Services rendered
 - f. Academic divisions
 - g. Academic disciplines
 - h. Location
3. Proportion of readers as opposed to the total number of stakeholders of the parent institute.
4. Location of the library with relation to the parent institute.
5. Land area allocated for the entire library.
6. Types of disciplines planned to be handled.
7. Number of currently available materials at hand.
8. Financial and material sponsors.

9. Number of expected readers.
10. Furniture facilities.
11. Types of internal and external user categories.
12. Categorization and maintenance models of materials.
13. Acquisition and lending procedures.
14. Modes of automated library service flows that can be implemented.
15. Technical feasibility of automated flow implementation.
16. Unconventional material inclusion.
17. Number of library staff members required to uninterruptedly service users.
18. Stakeholder (library-sponsor-vendor-user) communication channels.
19. Security and authorization methodologies.

These are only a few handpicked summarizations of the wide array of specifications that need to be taken into consideration in designing physical libraries that will be oriented towards attracting the reader community back to the building-based libraries in this modern era of virtually available library platforms.

V. CONCLUSION

The ever-evolving technological platform has brought about acclaimed presence of data access across virtual environments. This has placed conventional libraries that exist on a building-based rostrum at stake. With identifiable reasons that support the necessity of augmenting personal user visits to these conventional libraries, this article focuses on elucidating on the currently trending Big data concept, the factors that keep users away from personal visits, the need for balanced physical and virtual libraries, characteristics that determine the layout of a physical library, specifications that need to be taken into consideration when designing libraries, and so on. This paper serves as a trivial gateway into the facts and features that pivot the necessity of realizing the importance of physical libraries in maintaining knowledge content and materials.

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