Digital Humanities: Concepts, Tools and Applications

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ABSTRACT

Digital humanities is a result of the convergence of digital technology with social sciences and humanities. It is one of the key research areas around the world by the library and information science profession, and in cognate areas such as art and archeology. Focus groups, digital humanities centres are created for intensive researches which are located mainly in libraries as their core programmes. The library techniques and methods such as knowledge organisation, knowledge management, search and retrieval design, education, and emerging areas such as metadata, semantic mapping, ontology, thesaurus construction, digital curation, discovery services, find application in digital humanities. A new area of study, historical informatics complements the digital humanities. India has vast potential application of digital humanities with its diverse culture, customs and languages and so on. India is reckoned as one of the advanced countries in the IT sector, hence recognising the socio-cultural legacy and diverse historical background, it is viewed that digital humanities has many opportunities and applications for LIS professionals in India to contribute substantially. This paper brings together the concepts, tools, and applications of digital humanities and proposes a course of study in LIS curriculum.

Keywords: Digital humanities; Library and information science; Humanities; Social sciences

1. INTRODUCTION

The new millennium has sculptured a new image for library and information science (LIS) profession due to application of information and communication technology (ICT), especially the digital technology. The LIS field has carved-out some unique techniques and tools for information and knowledge organisation and management. It has always been innovative and inventing new areas of study with the tremendous insight gained through the application of ICT that has evolved new products, services and operations and management. Some new areas that have emerged and receiving tremendous acceptance in the last one decade or so are; discovery service, research data management, semantic web, open access to scholarly information including digital curation and digital humanities. The research data management and discovery services find applications in digital humanities, for the content management and search and retrieval design with complex digital data structure respectively. The way digital technology is focused on e-science has now ushered in a lasting interest among the humanists and social scientists to look for the computational applications.

In this paper an attempt is made to present and map the concepts and tools and areas of application of digital humanities and exemplify its potentialities as a subject of study in library and information science and visualise its potentiality as one of the new research areas and opportunity, in collaborating with other cognate subjects. Some of the cognate subjects in which digital humanities finds applications are; Archeology, Epigraphy, Archives, Museums and Art Galleries and Literature and Linguistics, and also Religion and Philosophy and many more. In all the above areas, India has the excellent background collectively renders an agglomerate mode of study known as Indology. No other country has such diversity, for example it has as many as 31 states each with its rich linguistic syntax and semantics.[1] Basham entitled his work 'Wonder that was India' expressing its mythic diversity. This makes Indology as one of areas of potential application of digital

technology. The classical studies and projects over the past 40 years in the subjects listed above.[2]

In further narrowing the areas of application the Babeu states within this historical compass the sources for classicists are equally complex; stone fragments, papyri, pottery shards, the plastic art, coins and some of the most breathtaking physical structure the world has known.[2] Since the LIS professionals deal with the universe of knowledge and its organisational components so they can contribute to digital humanities in the areas of knowledge organisation and management, metadata, data management and analysis, lexicology, concordance development and the analysis of national bibliographies and so on. In fact contextually emphasise that metadata for the cultural objects is one of the very fertile areas as required for precise information retrieval.[3] They further state that a digitised cultural heritage object, like a 3D-model of a vase, is useless without additional information for documentation and retrieval purposes- the metadata. The paper therefore attempts to build a case for the study of digital humanities for library and information science profession, projecting its concepts, tools and areas of applications.

1.1 Meaning And Definition of Digital Humanities

According to the Association of Research Libraries (ARL) "Digital humanities is an emerging field which employs computer based technologies with the aim of exploring new areas of enquiry in humanities".[4] There are number of digital humanities centres in universities doing project in the subject; such as the "George Mason University, Centre for History and New Media". The centres are normally located in the libraries and involve library staff or services as their core programs. The ARL has conducted a survey of digital scholarship centres (alternative to digital humanities centres) or services and support humanities subjects such as; History, Arts, Music, Films, Literature, Philosophy, Religion etc. The Stanford University Libraries are engaged in the analysis of e-mail archives using a software package ePADD developed for this purpose.

2. LITERATURE REVIEW

The Association of Research Libraries SPEC Kit-326 (2011)[4] is probably first publication entitling 'digital humanities.' As early as in 1992 Library Trends brought out a special issue on 'Electronic Information for Humanities which expresses lack of application of computers in humanities and apprehension of social scientists and humanists in using computers.[5] In India much literature on digital humanities is not found available, however two publications[6-7] alien to library and information science are located in the course of study of the subject by one of the authors of this paper. Ohio State University Libraries has offered an appointment of digital humanities librarian in its group of libraries which implies introduction of a specialised course of study (as an open elective) in LIS curriculum.(Ohio State University)[8] and may be in social sciences and humanities subjects.

3. CONCEPTULISATION OF DIGITAL HUMANITIES

3.1 ICT and Humanists

A decade or so ago the humanists and social scientists had avoided using any computing devise, as did not find, it has any beneficial application in their study and research. The special issue of 'Library Trends' (Stover)[5] on Electronic Information for the humanities made this remark and the issue contained several papers in which the authors view humanists' aversion to use computers in research. Stover[5] addresses this resentment by humanists in using computers thus; till 1990s there was a comment that humanists regularly received "bad press" from the conventional wisdom of electronic information. Humanists it is said are resistant to the idea of using computers for research. Another important and critical factor to be considered here is that "the humanists need considerable amounts of older material, a need very different from most other science disciplines".

3.2 Concept of One Culture

The digital humanities has facilitated the integration of two previously separate intellectual communities into a singular culture. Following the industrial revolution, society was divided into two distinct cultures - humanists and scientists - who operated within their own disciplinary boundaries without interacting with one another. Despite their similarities in intellect, background, and social status, these two communities remained isolated for a significant period of time. One of the points emphasised by Snow in his discussion of the divergent world views of the "two cultures" was the industrial revolution, which he claimed was primarily a product of science and engineering that had been largely ignored by writers and humanists.[9] The central premise of this argument was that science embraced technology more readily than the humanities did. However, this assumption is no longer valid, as evidenced by the success of numerous projects that have demonstrated of shared intellectual values, rigorous methodological approaches, and common ground across scientific and humanistic disciplines.

Researchers in these fields depend heavily on one another for insight and discovery, particularly when confronted with complex challenges on a large scale. There is therefore, a pressing need to integrate both e-science and the digital humanities fields to create a unified e-research culture that does not force individuals or organisations to choose between scientific and humanities-based visions of the world, but instead encourages them to fully embrace both. So, in continuation of this argument LIS could be one of the key collaborator for digital humanities research with its time tested tools and techniques of knowledge organisation and management

3.3 Digital Classics

Digital Classics is broadly defined as the use of digital technologies related to the study of classical antiquity. The field classical studies is broad and includes a variety of related disciplines and Babeu[2] reports the studies on the following subjects worldwide.

- Ancient History – areas like, inscriptions, papyri and coins, etc.
- Classical Archaeology –
- Classical Art and Architecture – Ancient theatre and Archives
- Classical Geography
- Epigraphy – Study of inscriptions – Projects – EpiDoc
- Manuscripts Studies
- Numismatics – Study and collection of coins
- Palaeography – Complementary to Philology
- Papyrology – Study of ancient literature and legal archives on paparyi
- Philology – Ancient languages, their grammar, history and the phonetics
- Prosopography – Description of a person, or a collection of such descriptions especially in a historical context.
- The study of personal names "to establish
  - Regional origins of individuals and
  - Family connections

Besides the above subjects, there are also number of multidisciplinary projects that have been completed and available online and they are[2];

- • Electronic Text Corpus of Sumarian literature
- • Cuneiform Digital Palaeography
- • Digital Hammurabi Project
- • Sanskrit Library
- • Cuneiform Digital Library Initiatives
- • Lauven Database of Ancient Books

3.4 Digital Humanities Projects USA

This report results from a study of eight institutional projects that have uncovered previously unimagined correlation between social and historical phenomena through computational analysis of large, complex data sets.Here below given some examples of digital humanities projects underway.

- Rice University digital scholarship archive

- Columbia University: Digital Humanities Centre Brochure

- Cornell University Grants program for digital collection in Arts and sciences

- University of Kansas: Seed Grants Institute of Digital Research for Humanities

- University of Massachusetts Amherst- Digital Humanities Grants

3.5 UNESCO Project IDIL

UNESCO has declared decade 2022-2032 as the International decade of indigenous languages "to draw global attention on the critical situation of many indigenous languages and to mobilize stakeholders and resources for their preservation, revitalisation and promotion". It aims at building a global community for the preservation, revitalisation and support of indigenous languages worldwide.

The preservation implies digital conversion of scripts and vocabulary, dialects and also vocal presentation including digitisation of literary classics and reference books such as dictionaries and encyclopaedias in the Indigenous languages. In this context it is found that number of Indian language publications with the documentation of reference books and language libraries have been brought out covering Kannada and modern Indian Languages. These are the sources to locate the documents for digitisation and preservation.[10-12] This is one of the examples of digital humanities covering Indian languages and linguists. Asundi has also published paper covering Coins and Postage stamps, which would gradually disappear due the impact of ICT with advent of digital currency and digital communication.[13]

https://www.unesco.org.en/decades/indigenous-languages

4. DIGITAL HUMANITIES IN INDIA

Though digital humanities have become a buzz word in developed countries, the field is in its nascent stage in India. The 'archiving movement' in the country is going through, which is characterised by a vast number and variety of projects on the periphery of digital humanities, has set a stage for takeoff". Sneha[7] made an extended survey of digital initiatives in 2014, in arts and humanities practices in India. In the background study on 'mapping digital humanities in India' she has found in her study that "A consultation on digital humanities for Indian Higher Education organised in Bangalore during 2-13 July a proposed short term course in 'Digital Humanities and Cultural Informatics' at Jadhavpur University, Kolkata. This is where some of the early prominent instances of the use of the term digital humanities in India is found. Later it is learnt from one of the people interviewed for this study that digital humanities was already discussed in academic workshops as early as in 2010".[7] The survey contextually brings forth the involvement of National Mission in Education and Information and Communication Technologies (NMEICT) programme which has initiated several projects on higher education. The NMEICT has launched several programmes which included; the Information and Library Network (INFLIBNET), National Knowledge Network (NKN), the National Mission for Manuscripts, the Digital Library of India and the National Library of India. It is also mentioned that digitisation in humanities has been taken up in the interest of preservation and conservation of records, but are also facing some problems with copyright, defining metadata standards. In concluding the survey report Sneha[7] mentions that "Even as I wrap up this study, some of the key questions or problems of definition, ontology, metadata remain with us, as the 'field' (DH) – if there is such a thing- is incipient in India." So there is a scope for its development and as

mentioned in the report and there is need for addressing some issues regarding, copyright, metadata and ontology and others, from the Indian context. So the prospects are clear that there is need for a greater involvement of LIS professionals for research DH and also from the Indian viewpoint. Besides these narratives, there are several other initiatives on DH are going on in India.

5. DIGITAL HUMANITIES TOOLS

A number of digital humanities software tools are available which comprise from word processors, spread sheets, database management systems and also some open source software. Some representative names of the software for digital humanities are;

The software tools require data set to be created for design of maps.

1 ePADD for analysing e-mail archives. This was developed at Stanford University

2 EpiDB – A software used WINISIS for the Epigraphy database

3 Used for the analysis of the Bhajanas of Sri Purandara Dasa by Dr. Srinivas Havnur

4 Database Management Systems

5 Word Processors like MS WORD and OpenOffice

6 Spread Sheet like MS EXCEL for humanities data analysis

7 UCINET[14]

8 MapInfoPro V16

9 CmapTools

6. APPLICATIONS

6.1 Historical Informatics

The phrase historical informatics is coined by one of the authors of this paper on lines of webometrics, medical informatics, Geo-informatics and so on. The term informatics refers to "a broad academic field encompassing computing technologies and development in their diverse relations to the human and social worlds, including applications in science, social problems and the arts (Wikipedia)[6]. The meaning and conceptual basis of the term "Historical Informatics" refers to the study of the historical events, objects, archives and archeological relics and so on and that anything that comprised the study of the history and also the history of subject. Demonstrated some studies on the chronology as one of the eventful and important landmarks in the history which were also some important turning points of the world history in general and Indian history in particular. The examples are:

- 304-232 B.C. The Period of Asoka Maurya
- 1857 Sipoy mutiny
- 1942 Quit India Movement
- 15th August 1947 Independence Day of India

One of the authors of this paper has made several applications in some of the areas that cover the area of digital humanities and also come across work done by others. The following are the list of applications done already by the said author of this paper, prior to the understanding about the digital humanities concept.

- Study of Coins and Stamps[13]
- Paintings
- Geography – Change of names of countries
- Fort and Jeypore Portfolios – Jeypore Palace Architecture
- Indological Knowledge and Its Syllogism
- Medicinal Plants
- Cartoons
- Digital Curation and Historical Informatics

Apart from the above contributions made by the author, he has come across about the projects done by Late Dr. Srinivas Havanur, former Professor of Kannada, Mangalore University and the Librarian, Tata Institute of Fundamental Research, Mumbai, on Dasa Sahitya. The author has had an opportunity to collaborate with Dr. Havanur's work to develop a database using Micro CDS/ISIS. Several Concordances have been created in Kannada covering the Vachan Sahitya and Dasa Sahitya. The Computer technology would be most helpful in building concordances which is a laborious and time consuming task if carried out manually.

Apart from the work mentioned above, it is worth mentioning the work of His Holiness Dr. Shivamurthy Shivacharya Mahaswamiji of Taralabalu Math Sirigere, Chitradurga District, Karnataka State, who has been instrumental in developing two software packages known as ;

- GanakaVachana Samputa – A unique software on Vachana Literature of 12th Century A.D.
- Ganakasthadhyayi – A unique software on Sanskrit Grammar based on sutras of Panini. This software derives its name from the original treatise namely, Ashtadhyayi, the software is therefore named as Ganaka (Computer) Ashthadhyahi.

Both the software packages are available free for use by anybody and can be downloaded from the URL of the Taralabalu Math.

One of the key and important techniques to organise digital content is the need for metadata standard, as a tool for knowledge organisation and discovery service. The projects on medicinal Plants (DST Project) and Paintings as mentioned above have evolved metadata schemas using Ranganathan's concept of PMEST and facet analysis. The study of coins and stamps, envisaging their disappearance in the course of time trending with digital currency and digital communication discuss the preservation of these antiques for the future generations.[13] Even before the concept of metadata had surfaced on LIS domain, an attempt was made to evolve knowledge representation on 'Paintings' comparing the encyclopaedias and Library Classification systems' knowledge of paintings. A paper was published in this context in 1996.

7. DIGITAL HUMANITIES LIBRARIAN – AS A CAREER

The Ohio State University has given a glimpse of how library and information professionals can become digital humanities librarian, as a full time professional as well as a consultant. Leigh Bonds is a digital humanities librarian at Ohio State University Libraries. She is an educationist and a consultant in digital humanities.[8] So it is proposed here that the LIS departments in India can introduce a course on digital humanities as an interdisciplinary course with interdepartmental collaboration in the university.

8. DIGITAL HUMANITIES IN LIS STUDIES

Digital humanities can be incorporated in the LIS Curriculum as an open elective for the studies by LIS departments and by the Social Science and Humanities departments in the universities. This will help for an active collaboration of LIS department that with, the Social Science and Humanities departments, and in particular with History, Archeology and Language and Literature faculties in the universities. They can also undertake joint projects and undertake research involving students from the collaborating departments.

There are several curricular models on digital humanities integrating the components from library and information science, humanities, social sciences, architecture and information technology departments.

9. CONCLUSION

It is often inferred that IT has a key and vast application in science and technology primarily. The library and information science, has found unmatched ICT applications outside science and technology and has demonstrated its total transformation. It is in this context that social sciences and humanities would be other areas perceiving vast application of ICT especially in history and archaeology. In linguistics building vocabularies and dictionaries and concordances find applications where the artificial intelligence and machine translation have found them as key etymological tools of applications.

However the paper has given an over view of the potentiality of digital humanities research going in other countries and also a glimpse of what is happening in India. This country has a unique and diverse cultural heritage and also well developed ICT sector. So it is apt to adopt and adapt to the digital humanities applications in our country and look forward to build a suitable digital content on art, archeology, music, museum and libraries and can be shared with other countries. It is one of key areas of research which fosters intensive collaboration between diverse faculties and scholarship, between library and information profession and other cognate disciplines and nurturing the domain knowledge of LIS professionals.

In the west particularly in USA the library schools have introduced museology courses of study envisaging vast application of digital humanities tools and concepts. Similar aspects in curriculum can be conceived for LIS courses in India.

REFERENCES

1. Basham, Arthur Llewellyn. The wonder that was India: A study of the history and culture of the Indian sub-continent before the coming of the muslims. *Hawthorn Books,* 1963.

2. Babeu, Alison. Rome wasn't digitised in a day: Building a cyber infrastructure for digital classics. Council on Library and Information Resources, Washington, DC, 2011.

3. Schröttner, Martin; Sven Havemann, Maria; Theodoridou, Martin Doerr & Dieter, W. Fellner. A generic approach for generating cultural heritage metadata. *In* EuroMed*.,* 2012, 231-240.

4. Association of Research Libraries. 2021. Digital humanities. SPEC Kit -326. http://www.arl.org/storage/documents/publications/spec-326-web.pdf (Accessed on 24 January 2023).

5. Stover, Marked. Electronic information for humanities. *Library Trends,* 1992, **40(**4), 575-578.

6. Diwan, Radhia. State of digital humanities in India. 2016. https://www.hastac.org/u/radhikadiwan (Accessed on 12 January 2023).

7. Sneha, P.P. 2015. Digital humanities in India: From mapping digital humanities in India. http://cis-india.org/raw/digital-humanities-in-india (Accessed on 12 January 2023).

8. Ohio State University Libraries 2016. Digital humanities librarian, Ohio State University Libraries. https://www.diglib.org/digital-humanities-librarian-ohio-state-university-libraries/(Accessed on 12 January 2023).

9. Snow, C.P. The two cultures [Rede Lecture]. Cambridge University Press, New York,1959.

10. Asundi, A.Y. Reference Books in Kannada- A survey and annotated bibliography (In Kannada). N.A. Prakashana, Bengaluru, 1992.

11. Ramaiah, L.S. & Karisiddappa, C.R. An international bibliography of dravidian languages and linguistics: Kannada language and linguistics.V4. T.R. Publications. Chennai, 2003.

12. Gupta, B.M. (ed.) Handbook of libraries, archives and information centres in India: Indian languages, V15. Segment Books, New Delhi, 2003.

13. Asundi, A.Y. & Ramesha. Knowledge manifestation in creative hobbies: A study of numismatics and philately. *Soference,* Bangalore, 2003.

14. Borgatti, S.P.; Everett, M.G. & Freeman. UCINET for Windows: Software for social network analysis. Analytic Technologies, Harvard, MA, 2002.

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