

Safeguarding Digital Medical Resources: Analysis Of Preservation Methods In Maharashtra's Health Science Academic Libraries

Dr. Trupti Aniruddha Tulsankar

Librarian, Pragati College of Arts and Commerce, Dombivli

trupti.tulsankar@gmail.com

ABSTRACT

Health science libraries preserve their materials so important health information stays accessible over time. Digital preservation means regularly updating files and storage systems so nothing gets lost as technology changes. Libraries use repositories to organize digital resources like e-books and journals. They also use weeding and deaccessioning to remove outdated items, keeping the collection useful and easy to navigate.

Purpose: This study aims to understand how Health Science College libraries (HSCLs) in Maharashtra are handling digital preservation, looking at what practices and policies they currently follow. It will also look at the technology these libraries have in place and explore the difficulties they run into while trying to preserve digital materials effectively.

Methodology: The survey was conducted by using a questionnaire as a data collection tool.

Findings: The findings point to some real opportunities for improving how digital resources are accessed and managed in health science education. Based on this, a few key recommendations stand out: improving basic digital access, setting up clear preservation protocols, investing in training for library staff, and encouraging institutions to work together more closely. Overall, these steps are meant to support long-term preservation efforts and make sure essential medical information stays available for both education and research.

Originality/Value: This study takes a closer look at health science college libraries in Maharashtra, with the goal of understanding the gap between what infrastructure currently exists and what's actually needed to preserve digital medical resources effectively going forward.

KEYWORDS: Digital Archiving; Digital Preservation; Health Science Libraries; Preservation Policies; Sustainable Preservation.

1. INTRODUCTION

Health science libraries today face both big opportunities and real challenges as more academic and medical materials move online. Health Science College Libraries (HSCLs) serve as key sources of medical knowledge,

teaching materials, and research, but they must now figure out how to preserve their digital collections so future doctors, researchers, and students can still access them reliably. In Maharashtra, known for its strong medical education system, these libraries are steadily shifting from physical collections to digital ones. This makes solid preservation practices essential to protect valuable resources from outdated technology, data damage, or loss. Despite this growing need, little research has looked specifically at how health science libraries in Maharashtra are handling digital preservation, a gap this study aims to address.

This study sheds light at how Health Science Academic Libraries across Maharashtra are currently preserving their digital materials, what methods they use, and what challenges they face along the way. It aims to give a clear picture of how well these libraries are protecting their digital medical resources by examining their preservation practices, technology readiness, staff skills, and institutional policies. Understanding these factors is key to building preservation strategies that last, so vital medical information stays accessible for both education and research. The study also looks at how healthcare education has shifted toward digital resources in recent years, partly due to global events like the pandemic. The goal is to improve understanding of digital library management and offer practical guidance for library staff, administrators, and policymakers involved in medical education, particularly in Maharashtra.

2. REVIEW OF LITERATURE

Digital preservation has come a long way since 2011, with several important studies shaping how the field developed. It all started in 2011, when Keiser, Nielsen, and Thirifays introduced the Cost Model for Digital Preservation (CMDP). This gave libraries a structured way to estimate preservation costs, especially around file migration, based on the widely used OAIS framework. A couple of years later, in 2013, Ezra and Zakari Mohammed studied Nigerian National Information Centres and found major gaps in institutional policies and support for digital preservation. Then in 2014, Pandey and Misra looked at academic libraries and pointed out the financial and legal hurdles many of them faced while trying to digitize their collections.

In 2017, Matusiak studied the Jeffco Stories project and found that even smaller institutions could preserve digital content using affordable tools like Omeka and DuraCloud. Around the same time, Corrado and Heather created a broader framework covering content management, technology, and metadata. Adu pointed out how important teamwork between different groups, along with strong government policies, is for successful digital preservation. Then in 2018, Fritz studied how university archives were changing, introducing ideas like digital hubs and teams that work across departments. Between 2019 and 2022, researchers began looking at more specific issues. Adjei studied infrastructure and training needs in academic libraries, Pendergrass and colleagues looked at how preservation practices affect the environment, and Polchow examined the challenges of preserving electronic resources in the Open Access world.

More recently, Moles introduced a tiered access model in 2021 to better serve specific user communities. In 2022, Zahara and Tamra took a close look at issues like data integrity and outdated file formats, while Rhee developed the d-KISTI model to support digital preservation on a global scale. Together, these studies show how the field has grown from simple preservation methods into more advanced, well-rounded approaches. In another 2022 study,

Friday looked at the challenges of preserving electronic theses and dissertations in public university libraries in South-East Nigeria. The biggest problems were a lack of funding, poor ICT resources, untrained staff, unreliable electricity, and the absence of clear preservation procedures. Outsourcing IT services and running awareness campaigns didn't help much, but the study suggested that having a proper digital preservation plan, training staff, and engaging with relevant stakeholders could make a real difference. It also called on government and academic leaders to take stronger action in supporting libraries' digital preservation work.

Ahmad, Rafiq, and Arif (2023) looked at global trends in digital preservation and found that most libraries and cultural institutions prefer handling preservation in-house rather than outsourcing it. In 2024, Ahmad and Rafiq studied how university libraries in Pakistan approach digital preservation, pointing to methods like replication, metadata creation, and media refreshing. They also stressed the need for clear national policies, better funding, and proper staff training. More recently, Panda and colleagues (2025) studied Shodhganga, India's main repository for theses and dissertations. Their research looked at how it has supported open access and academic research, noting improvements to the user interface and a rise in social science thesis submissions in 2023. They also offered suggestions for improving its management and expanding its reach.

Overall, this research shows that digital preservation has moved beyond just basic storage methods. Today, it also has to deal with bigger issues like accessibility, environmental impact, and collaboration between institutions. While frameworks and tools have improved a lot over time, challenges still remain when it comes to using resources wisely, applying policies effectively, and keeping things sustainable. Going forward, more research is needed to build better preservation strategies, ones that make smart use of technology while ensuring resources stay accessible and last well into the future.

3. OBJECTIVES OF THE STUDY

The primary objective of this study is to assess how effectively Health Science Academic Libraries (HSCLs) in Maharashtra are implementing digital preservation methods to safeguard their medical resources. Additionally, this study aims to:

1. To identify the current digital preservation practices and policies implemented in the HSCLs of Maharashtra.
2. To examine the technological infrastructure and resources available for digital preservation in these HSCLs.
- 3 To identify the main challenges these libraries face in carrying out digital preservation effectively.

4. METHODOLOGY

This study focuses on a key area within Electronic Resource Management (ERM) in health science libraries, specifically, how electronic resources are preserved. Other related aspects of ERM are not covered here, as the focus stays specifically on preservation.

4.1 Research Design: This study is a part of big research. The research employed a descriptive survey methodology.

4.2 Population of the study: The entire cohort of 326 Health Science colleges affiliated with MUHS, Nashik, was taken as a population of the study.

4.3 Scope & limitations of the Study: This study investigates the technological infrastructure and resources available for digital preservation. It provides an analysis of the digital preservation practices and policies implemented in Health Science College Libraries (HSCLs) across Maharashtra, specifically those affiliated with the Maharashtra University of Health Sciences (MUHS). The scope of this study is confined to these libraries and excludes other health science institutions outside this jurisdiction.

4.4 Data Collection: The survey method was used for the present study. A well-structured questionnaire was prepared and sent to health science college librarians through registered postal mail and via mail & Google Forms.

4.5 Reliability & Validity of the instrument: The reliability of the questionnaire was evaluated using Cronbach's alpha. The validity of the questionnaire was assessed by gathering feedback from five experts in library and information science, along with the necessary alterations.

4.6 Method of data analysis: The collected data was analysed using SPSS. The percentage and frequency were drawn to analyse the data & MS Excel was used for graphical representation.

5. Data analysis and Interpretation

5.1 Response Rate

Table 5.1 Response Rate

Type of Colleges	Total Number	Questionnaire Sent	Responses Received	Percentage
Medical	38	38	36	94.73%
Dental	29	28	21	75.00%
Ayurveda	63	61	44	72.13%
Homeopathy	46	44	27	61.36%
Unani	06	05	5	100%
B.Sc. Nursing	100	93	60	64.52%
Physiotherapy	32	30	19	63.33%
BASLAP	05	03	1	33.33%
OT	06	06	3	50.00%
Prothes & Ortho	01	01	1	100%
Total	326	309	217	70.33%

Table 5.1 displays the response rates from a survey sent to various Health Science Colleges across Maharashtra. The questionnaire was distributed among 309 HSCLs, out of which 217 (70.33%) responded.

5.2 Distribution of College Status-wise

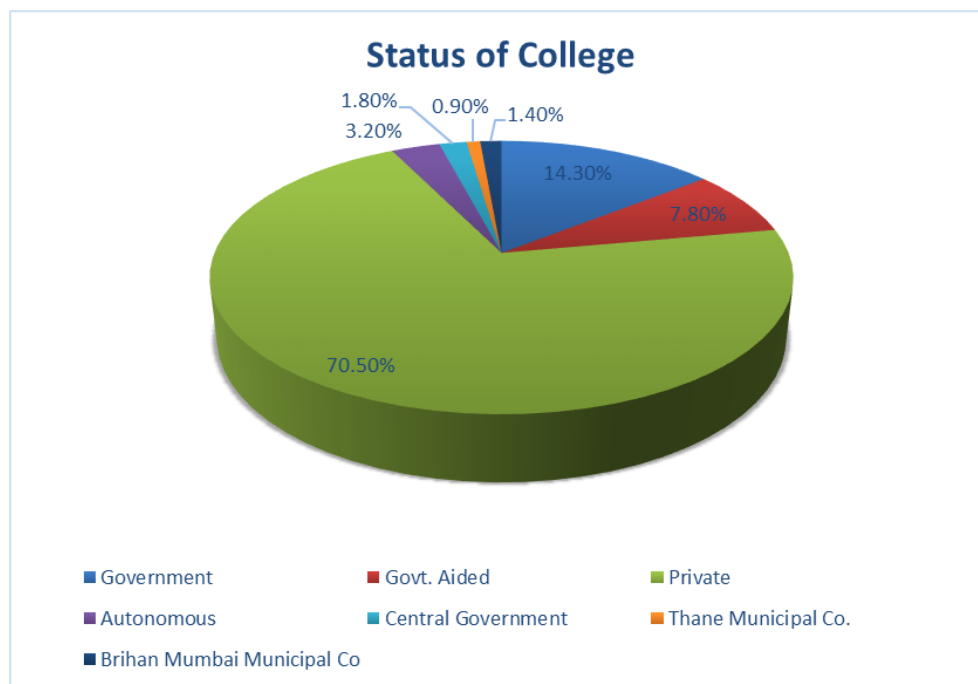


Fig.- 1 Status of the Health Science Colleges

Fig. 1 show that 70.5% of the surveyed colleges are private institutions, while government-run colleges make up 14.3%. Government-aided colleges represent 7.8%, and autonomous colleges account for 3.2%. Colleges run by the central government are limited at 1.8%, with municipal-run colleges at 0.9% under the Thane Municipal Corporation and 1.4% under the Brihanmumbai Municipal Corporation.

5.3 Availability of Digital Preservation Program

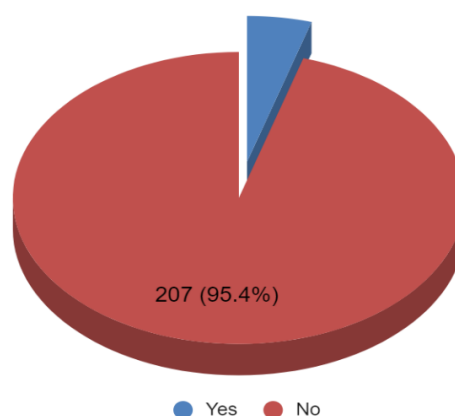


Fig. 2 - Availability of Digital Preservation Program

Fig.-2 indicated that the majority of institutions, 207 (95.4%), reported not having a digital preservation program, while only 10 institutions (4.6%) indicated that they have one in place.

5.4 Need for Digital Preservation Program

Table -2 Need for Digital Preservation Program

Responses	Frequency	Percentage
Strongly disagree	1	0.50%
Disagree	1	0.50%
Undecided	17	7.80%
Agree	67	30.90%
Strongly agree	131	60.40%
Total(n)	217	100%

The table above underscores a significant perceived necessity for digital preservation programs among the participating colleges, with over 90% of respondents affirming their importance. The negligible disagreement rate of 0.9% and the limited proportion of undecided respondents, standing at 7.8%, further highlight the widespread acknowledgement of the critical role that digital preservation programs play.

5.5 Method implemented to increase the life span of digital resources

Method implemented to increase the life span of digital resources

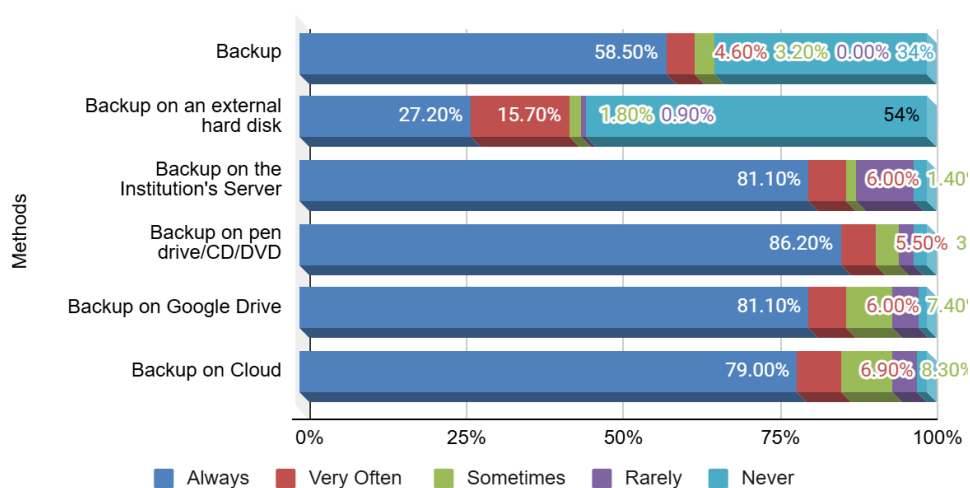


Fig. 3 Method implemented to increase the life span of digital resources

Fig. -3 presents information about the methods used to extend the lifespan of digital resources in the surveyed HSCLs, along with how frequently these methods are implemented. It shows that the most commonly used methods to increase the lifespan of digital resources are: backing up to a pen drive, CD, or DVD (86.2%), backing up to the institution's server and Google Drive (81.1%), and backing up to the Cloud (79%).

5.6 Digitization of library resources for preservation

Digitization of library resources for preservation

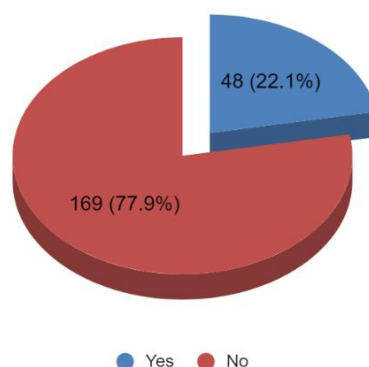


Fig. 4 - Digitization of library resources for preservation

The above table indicates that the majority (77.9%) of health science colleges have not undertaken digitisation efforts for preservation. Only a few (22.1%) of the surveyed HSCLs have digitised their resources for preservation.

5.7 Traditional resources digitized by the library

Table 3 - Traditional resources digitized by the library

Traditional Sources	To a great extent	Somewhat	Very little	Not at all	Total
Books					
Count	16	6	7	188	217
% within	7.40%	2.80%	3.20%	86.60%	100.00%
Journals					
Count	15	7	5	190	217
% within	6.90%	3.20%	2.30%	87.60%	100.00%
Research reports					
Count	17	6	9	185	217
% within	7.80%	2.80%	4.10%	85.30%	100.00%
Annual reports					
Count	14	8	10	185	217
% within	6.50%	3.70%	4.60%	85.30%	100.10%

These & dissertations					
Count	23	9	6	179	217
% within	10.60%	4.10%	2.80%	82.50%	100.00%
Question papers					
Count	23	9	6	179	217
% within	10.60%	4.10%	2.80%	82.50%	100.00%

The data presented in the table indicates that a significant majority of libraries, with percentages ranging from 82.5% to 87.6%, have not digitized any of the traditional resources listed. Among those resources that have seen some degree of digitization, theses, dissertations, and question papers emerge as the most commonly digitized, with 10.6% of libraries having extensively digitized these materials.

5.8 Management of Digitisation

Table 4 - Management of Digitisation

Host of digitisation	Frequency	Percentage
In House	55	25.3
Outsourcing	1	0.5
In-house and Outsourcing	5	2.3
None	156	71.9
Total(n)	217	100

The table presented above illustrates that the overall level of digitization activities among the surveyed Higher Education and Learning Colleges and Universities (HSCLS) is notably low, with over 70% of institutions not actively participating in any digitization initiatives. A limited number of colleges have adopted digitization, with the majority of these efforts being conducted internally (25.3%), as opposed to utilizing outsourcing services (0.5%).

5.9 Types of Storage Devices for archiving purpose

Table 5 - Types of Storage Devices for archiving purpose

Types of Storage Devices used for archiving purposes	Never	Rarely	Occasionally	Frequently	Very frequently	Total

CD-ROM						
Count	176	13	16	9	3	217
% within	81%	6%	7.40%	4.10%	1%	100%
DVD						
Count	172	15	18	8	4	217
% within	79%	7%	8.30%	3.70%	1.80%	100%
Hard Disk						
Count	0	0	43	65	109	217
% within	0%	0%	19.80%	30%	50.20%	100%
Google Drive						
Count	0	0	20	76	121	217
% within	0%	0%	9.20%	35%	55.80%	100%
Cloud technology						
Count	170	22	8	8	9	217
% within	78.30%	10.00%	3.70%	3.70%	4.10%	100.00%

The above table analyzes archiving storage mediums used by surveyed HSCLS institutions. Key findings show that Google Drive is the most widely adopted solution at 90%, followed by hard disks at 83.2%. Many institutions report high usage of these mediums. In contrast, CD-ROMs, DVDs, and cloud technologies are used much less frequently, with a significant number of institutions indicating "Never" or "Rarely" for these options.

5.10 Format preferred for preservation of e-resources

Format preferred for preservation of e-resources

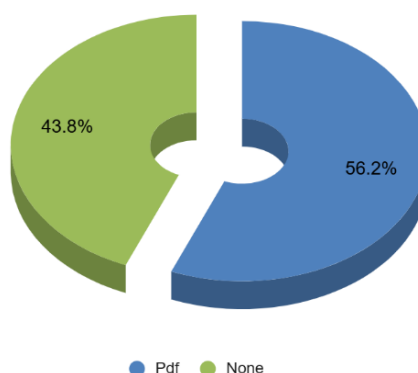


Fig. 5 - Format preferred for preservation of e-resources

The above table shows that more than half (56.2%) of colleges prefer to store their e-resources in PDF format. While a significant (43.8%) of colleges do not have any specific preference when it comes to preserving their electronic resources.

6. OBSERVATIONAL FINDINGS

Health science colleges face a significant digital divide, with nearly 60% lacking any digital resource access points. Where digital access does exist, it primarily occurs through library websites (19.8%) and OPACs (17.1%), while advanced features like federated search remain severely underutilized (3.7%). The findings show an interesting mix of old and new backup methods. Most institutions, around 86.2%, still rely on basic tools like pen drives and DVDs, even while also using institutional servers, Google Drive (81.1%), and cloud storage (79%). Digitization, however, is lagging behind. About 77.9% of health science colleges have no specific plans for preserving materials through digitization, and over 70% don't have any active digitization programs at all. Most traditional resources, between 82.5% and 87.6%, remain undigitized. Only 25.3% of institutions handle digitization in-house, and outsourcing is almost nonexistent at just 0.5%. The materials most likely to be digitized are theses, dissertations, and question papers, but even these stand at only 10.6%. When it comes to storage, Google Drive is the most popular choice, used by 90% of institutions, followed by hard disks at 83.2%. As for file formats, PDF is the clear favorite at 56.2%, though a large portion, 43.8%, don't follow any specific format at all. Overall, these results point to real opportunities, libraries can do a lot more to improve access to digital resources, bring more consistency to their practices, and modernize how they manage information in health science education.

CONCLUSION

Based on these findings, the way forward for health science colleges is clear, though not without challenges. There are real gaps, like the fact that 60% of institutions still lack basic digital access, but there are also positive signs, such as the growing use of cloud storage. Closing this gap will need both quick fixes and long-term planning. By focusing on basic digital access, setting up clear preservation guidelines, training staff, and encouraging collaboration between institutions, health science colleges can significantly improve how they manage information. This isn't just about upgrading technology, it's about rethinking how medical knowledge is preserved and shared for the future. Success won't just be about how much content gets digitized, but how well these digital resources actually support healthcare education going forward. Digitization isn't the destination, it's the foundation for the future of healthcare education.

REFERENCES

- [1] Adjei, E., Mensah, M., & Amoahful, E. A. (2019). The story so far-digital preservation in institutional repositories. *Digital Library Perspectives*, 35(2), 80–96. <https://doi.org/10.1108/dlp-12-2018-0039>
- [2] Adu, K. K. (2018). A multi-methods study exploring the role of stakeholders in the digital preservation environment. *The Electronic Library*, 36(4), 650–664. <https://doi.org/10.1108/el-02-2017-0032>
- [3] Ahmad, R. and Rafiq, M. (2024), "Digital preservation practices for information resources in university libraries of Pakistan", *Online Information Review*, Vol. 48 No. 4, pp. 725-745. <https://doi.org/10.1108/OIR-02-2023-0074>
- [4] Ahmad, R., Rafiq, M., & Arif, M. (2023). Global trends in digital preservation: Outsourcing versus in-house practices. *JOURNAL of LIBRARIANSHIP and INFORMATION SCIENCE*, 56(4), 096100062311734-096100062311734. <https://doi.org/10.1177/09610006231173461>
- [5] Corrado, E. M., & Heather, M. S. (2017). *Digital preservation for libraries, archives, and museums* (2nd ed.). Rowman & Littlefield.

- [6] Friday, Jerry E. and Eze, Monica Eberechukwu MRS, "Strategies for Overcoming Challenges in Digital Preservation of Electronic Theses and Dissertations in Public University Libraries in South-East Nigeria" (2022). *Library Philosophy and Practice* (e-journal). 6756. <https://digitalcommons.unl.edu/libphilprac/6756>
- [7] Fritz, A. (2018). From Collection Silos to Digital Content Hubs: Digital Project Management in Special Collections and University Archives. *Advances in Library Administration and Organization*, 187–198. <https://doi.org/10.1108/s0732-067120180000038014>
- [8] Kejser, U. B., Nielsen, A. B., & Thirifays, A. (2011). Cost Model for Digital Preservation: Cost of Digital Migration. *International Journal of Digital Curation*, 6(1), 255–267. <https://doi.org/10.2218/ijdc.v6i1.186>
- [9] Matusiak, K. K., Tyler, A., Newton, C., & Polepeddi, P. (2017). Finding access and digital preservation solutions for a digitized oral history project. *Digital Library Perspectives*, 33(2), 88–99. <https://doi.org/10.1108/dlp-07-2016-0025>
- [10] Moles, N. (2020). Open government data (OGD): challenging the concept of a “Designated Community.” *Records Management Journal, ahead-of-print*(ahead-of-print). <https://doi.org/10.1108/rmj-10-2019-0065>
- [11] Panda, S.K., Dey, S., Bhatt, A. and Satapathy, A. (2025), "Evaluating the progress and impact of Shodhganga: enhancements, challenges and future directions for India's centralized ETD repository", *Digital Library Perspectives*, Vol. 41 No. 1, pp. 5-20. <https://doi.org/10.1108/DLP-08-2024-0137>
- [12] Pandey, P., & Misra, R. (2014). Digitization of Library Materials in Academic Libraries: Issues and Challenges. *Journal of Industrial and Intelligent Information*, 3(2).
- [13] Pendergrass, K. L., Sampson, W., Walsh, T., & Alagna, L. (2019). Toward Environmentally Sustainable Digital Preservation. *The American Archivist*, 82(1), 165–206. <https://doi.org/10.17723/0360-9081-82.1.165>
- [14] Polchow, M. (2021). Exploring Perpetual Access. *The Serials Librarian*, 80(1-4), 107–113. <https://doi.org/10.1080/0361526x.2021.1883206>
- [15] Zahara, N. R., & Salim, T. A. (2022). Preservation of Digital Archives. *Record and Library Journal*, 8(2), 285–297. <https://doi.org/10.20473/rlj.v8-i2.2022.285-297>
-