

Preservation of Digital Information Resources in Selected University Libraries in Delta State, Nigeria.

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Abstract

This study investigated the preservation of digital information resources in the four libraries of Delta State University. The study utilized a qualitative research technique and applied purposive sampling to select participants. The process of gathering data involved the implementation of structured interviews. The responses from the respondents, who are personnel of the digitization unit, were analyzed. The results suggest that the most often used and remembered sources of knowledge are theses, dissertations, preprints, and post-print periodicals. The libraries surveyed frequently employ external hard drives, CD-ROM/DVDs, and computer hard disks as storage media for the purpose of preservation. Furthermore, it has been discovered that relocation and adoption of standards are the predominant strategies utilized for preservation. The study revealed various significant barriers to the preservation of digital information resources, such as poor infrastructure, technological obsolescence, a deficiency in maintenance practices, insufficient power supply, and inadequate finance. The study reveals that the preservation efforts on digital information resources in the analyzed libraries are lacking effectiveness and efficiency.

Keywords: Preservation, Digital information, Delta State, Libraries, Nigeria

Introduction

The advent of Information and Communication Technology (I.C.T) has fundamentally transformed the methods by which libraries and information centers store and maintain their information resources. It significantly improves the accessibility of information, saves time, and lowers expenses. Institutions possess the capacity to not only retain vast quantities of knowledge but also to swiftly retrieve information from other domains. The field of Information and Communication Technology (ICT) has empowered librarians to effectively fulfill their responsibility of capturing, preserving, and distributing information. The creation and generation of resources are seeing a continuous and rapid increase, posing a challenge for most institutions in terms of their administration.

The preservation of resources in the library aims to ensure ongoing access, use, and effortless retrieval of information resources for both current and future use, while also safeguarding them against potential risks for as long as feasible. In the absence of a proficient digital preservation system for information resources in libraries, the use of digital devices will result in minimal or nonexistent availability of research, teaching, and learning resources within the library.

The library's information resources are available in both print and non-print formats. Printed information Printed materials such as books, maps, theses, conference papers, handbooks, dictionaries, etc., fall under the category of print format. On the other hand, non-print format include information stored in databases, journal articles, websites, and other digital storage devices. Tamaro (2006) defined digital information resources as encompassing online databases and e-journals. Hence, digital resources refer to information that may be readily obtained through a computer network.

The preservation of information resources, whether in print or digital media, in the library is focused on ensuring their long-term survival, utilization, and accessibility. Binding, laminating, scanning, and photocopying are commonly used methods for preserving resources in libraries. The Public Record Office of Northern Ireland (2006) defined preservation as the process of safeguarding libraries and archives for the benefit of current and future generations. They claim that it is a term frequently employed by record offices, libraries, and museums to denote the methods utilized to protect and maintain their holdings in optimal physical condition. This can be achieved by implementing several strategies that attempt to reduce the likelihood of resource loss and mitigate the physical degradation that commonly affects library and archival assets. The potential risks include both anthropogenic disasters, such as manmade disasters, as well as natural disasters, chemical hazards, and insect infestations. Preservation encompasses more than just the protection or restoration of physical objects. It also encompasses the strategic and organizational factors that contribute to the survival of information. The document's context, resource integrity, record preservation, and archival value are maintained.

Digital preservation refers to the systematic actions taken to stabilize and safeguard digital resources and publications, ensuring their long-term retrievability, readability, and usability. Digital preservation refers to the safeguarding of all digital content, including both born-digital resources like emails, websites, videogames, and electronic files, as well as digitized versions of

analog materials. Gbaje (2011) reported that digital preservation involves the preservation of artifacts in a manner that closely resembles their original state, to the greatest extent possible, until they are deemed unnecessary. Unlike the preservation of paper or microfilm, the preservation of digital items requires specialized technology for tasks such as migration, conversion, storage, retrieval, and transmission. Furthermore, this process is constant and ongoing. Consequently, digital preservation can be defined as the collection of procedures and actions that guarantee ongoing availability of information. Rahaman and Muhammed (2012) have provided evidence to support the claim that digital preservation encompasses a set of organized actions aimed at guaranteeing ongoing access to digital resources for as long as possible, while safeguarding them from media failure, physical loss, and obsolescence. There are two methods for digitally preserving information resources: passive preservation and active preservation. According to the International Records Management Trust (2009), passive preservation refers to the method of guaranteeing the ongoing integrity of digital items and their associated information for the purpose of facilitating access. The objective is to preserve the original object without altering the technology employed for its storage or processing. Passive preservation methods like as refreshment, data duplication, and emulation are employed for short-term preservation purposes. Active preservation aims to guarantee the ongoing availability of digital information resources by acting in the storage and management of these resources. Active preservation entails transferring the digital assets to a different storage environment, maybe relying on novel technologies that were not available at the time of the objects' creation and use. Migration is the predominant method used to safeguard information resources within the context of formal digital preservation. This is frequently employed for the purpose of long-term conservation.

The university libraries in Delta State are currently undergoing the transition of digitizing their information resources from physical copies to digital copies. The primary objective of a tertiary library is to obtain, manage, archive, and distribute information resources that are utilized to facilitate education, learning, and research for both current and future generations.

The study noted that many of the local materials, including as theses and dissertations, found at the university libraries in Delta State are mostly in physical form and printed on acidic paper. This type of paper degrades with time, which poses a risk to the long-term accessibility of these information resources. Despite the digitization of information resources, there are significant challenges in maintaining continuous access to these resources. Therefore, it is crucial to have

effective and efficient management to ensure that digital information resources are easily accessible, retrievable, and reusable for both current and future generations.

In his study, Gbaje (2011) noted that the lack of appropriate management and intervention can lead to the loss of accessibility to digital information. The preservation of digital information resources faces risks due to the constant evolution of software and technology. These resources are designed to be compatible with specific hardware, software, operating systems, and storage devices, making it challenging to ensure their long-term preservation. In order for digital information resources to be accessed and utilized seamlessly by both current and future generations, it is essential that the hardware and software are compatible. Ngeope (2008) asserted that technical advancements render them outdated within a few years, as contemporary and forthcoming computers may lack the capability to read older media, hardware connections compatible with earlier media drives, and software incapable of reading older files. Hence, in order to guarantee uninterrupted access, utilization, and re-utilization of digital information resources, it is imperative for tertiary libraries to adopt a preservation strategy. This viewpoint is supported by Reyes (2013), who noted that while several strategies have been employed, not all have successfully achieved preservation objectives. In their study, Satish and Umesh (2005) asserted that digital information resources are susceptible to loss and destruction, degrade rapidly, and can malfunction as a result of virus infection, exposure to high temperatures and humidity, and malfunctioning reading and writing equipment.

Thus, it is the duty of state tertiary institution libraries to guarantee that digitized information resources are readily accessible, retrievable, and reusable for both current and future generations. This is in line with Masakazi's (2009) assertion that digitization involves the creation of a multimedia database enriched with digital information, thereby facilitating convenient access to cultural and scientific advancements for a wide range of users. The need for digital information resources by users of tertiary libraries, which serve as centers of study and research, has expanded over the years. However, the ongoing access and retrieval of these resources has become challenging, posing a severe obstacle for users. The researcher chose to conduct a study on preserving digital information resources in the state tertiary libraries in Delta state, Nigeria. The objective is to guarantee the effective, efficient, and easy retrieval and access to these resources in the libraries. To identify and resolve the obstacles that impede the efficient and convenient access and retrieval of digital information resources.

Research Questions

The aim of this study was to address the following inquiries:

1. What categories of digital information resources are accessible and conserved in the state university libraries in Delta State, Nigeria?
2. Which storage medium are utilized for preserving digital information resources in the state university libraries in Delta State, Nigeria?
3. What preservation measures are employed for digital information resources in the state university libraries in Delta State, Nigeria?
4. What are the problems encountered in preserving digital information resources in the libraries of state universities in Delta State, Nigeria?

Literature Review

Preservation is the means by which records are protected for the use of present and future generations. It is a word commonly used by record offices, libraries and museums to describe the ways in which their collections are safeguarded and kept in good physical condition. This can be done through a variety of measures aimed at both minimizing the risk of loss of resources and slowing down as much as possible the processes of physical deterioration that affect most archives and library collections. According to Kenedy (2005) Preservation of resources in the library refers to anything that contributes to the physical well-being of resources. Preservation of resources are done in many ways such as indirect preservation which includes the building where the resources are being preserved, the storage method, security against threats to the resources and handling. Ogunmodede and Ebijuwa (2013) stated that another way of preserving resources is through substitution, which is done by making copies of original resources and allowing access to only the photocopies. This method reduces the wear and tear of resources.

Preservation is a concept that includes preventive preservation that aims at reducing the risk of deterioration of documents or resources by controlling the environment where the resources are kept, regular maintenance and protection of the collections using appropriate treatment. Active preservation refers to all the steps taken in order to prolong the lifespan of, resources which includes: re-boxing, cleaning information resources, mass de-acidification and disinfecting or fumigation against insects and rodents.(Olatokun 2008)

International Records Management Trust (2009) stated that restoration in preservation has to do

with all actions taken in order to prolong the lifespan of documents in their original form in compliance with the rules of aesthetics ethics while maintaining its integrity. According to Edhebe (2004) conservation is a field of knowledge concerned with the coordination and planning for practical application of the techniques of binding, restoration, paper chemistry and other materials technology as well as other knowledge pertinent to the preservation of resources.

Olatokun (2008) affirmed the various techniques used in preservation and conservation of library collections in selected universities in Nigeria. It examined the causes of deterioration, patterns and strategies used to control the causes of deterioration, and constraint limiting effective preservation and conservation. The findings of the study revealed that preservation and conservation techniques adopted in the libraries were not effectively used. The findings also revealed that cleaning and dusting of library resources were the commonly used technique. Further the results showed that some of the libraries adopted and used some digital preservation techniques but were still not effective. He also observed that most libraries in Africa substituted photocopies of restricted materials. A lot of photocopying is done in libraries to reduce usage of the original resources as a preservation measure. It is also use to prolong the life span of library collection.

Digital preservation is rapidly becoming a principal medium to create, store contents and disseminate information. It is seen as born digital materials that are created originally in digital form and never existed in analogue form (that is born digital) as well as those converted from analogue (printed documents) to digital by the use of cameras, scanners and other imaging technologies for access and preservation purposes. Gbaje (2011) defined digital preservation as „the series of actions and interventions required to ensure continued and reliable access to authenticate digital information resources for as long as they are deemed to be of value. Digital preservation involves a number of activities and strategies for ensuring that digital resources are not only stored appropriately. Digital preservation could also be seen as a set of processes and activities that ensure continued access to information and all kinds of records, resources, scientific and cultural heritage existing in digital formats. This includes the preservation of materials resulting from digital reformatting but particularly information that is born- digital and has no analog counterpart.

Digital preservation is an ongoing process of managing data for continued access and use. Arora (2009) affirms that digital preservation referred to series of managed activities designed to ensure continuing access to all kinds of resources in digital formats for as long as possible and to protect

them from media failure, physical loss and obsolescence. The term digital preservation is a broad term used to describe maintenance and safeguarding of digital records in the foreseeable and distant future. It could be seen as the ability to maintain, display, retrieve and use of digital collections in the face of rapidly changing technology. Digital preservation is the maintenance of digital material for continued accessibility. It can also refer to series of managed activities designed to ensure continuing access to all kinds of resources in digital formats for as long as necessary and to protect them from media failure, physical loss and obsolescence. Digital preservation is the maintenance of digital resources for continued accessibility. It is also referred to series of managed activities designed to ensure continuing access to all kinds of resources in digital formats for as long as necessary and to protect them from media failure, physical loss and obsolescence (Rahman and Muhammed, 2012).

Research Methods

Gbaje (2011) asserted that qualitative research is conducted inside authentic environments. He additionally asserted that in mixed research, the researcher physically visits the site under investigation to gather additional information about the current situation. This methodology is suitable for the research as it employs both structured and open-ended interviews, facilitating a comprehensive comprehension of the social phenomena. Additionally, it offers an opportunity to gain insight into intricate situations and the capacity to analyze genuine issues within their natural contexts. In order to address potential challenges in case studies, researchers have employed a variety of forms of evidence, including guided surveys, interviews, and observations (Yin 2003). This approach facilitated the researcher in capturing and comprehending the conservation of digital information resources.

Population of the study

The study population consisted of four state university libraries in Delta State, Nigeria. From this population, only the university libraries having a digitizing unit were chosen. Mugo (2010) defines population as the collective entirety of individuals, persons, objects, or items from which samples are selected for measurement. The study focused on the staff of the digitization unit.

Table 1 presents the population of the study.

Sample and Sampling Technique

Among the four state university libraries, three were discovered to possess a digitization and preservation unit, while the remaining library and its staff were included in the sample size. The study encompassed a total of 21 staff members who were included as subjects without any manual selection process. Babbie (2007) argued that purposive sampling is a type of non-probability sampling method in which the researcher selects units to be observed based on their assessment of which ones will be the most valuable representatives.

Data Presentation and Discussion

This section presents the data that was collected and analyzed in a descriptive manner. It is followed by discussions that are based on the research questions raised for the study.

Results and Discussion

Types of digital information accessible at tertiary institution libraries in Delta State, Nigeria.

To choose the kind of digital information available, many alternatives were provided for libraries to select the ones they created. Table 4 below enumerates many types of digital information.

Table 2: Forms of Digital information Available

Forms of Digital Information Resources	DELSU (Abraka)	DSUST (Ozoro)	UNIDEL (Agbor)
Digital-text Document	√	√	√
Images	X	X	X
Audio	X	X	X
Graphics	X	X	X
Videos	X	X	X

Key: X = Not Available √ = Available
DELSU=Delta State University
DSUST=Delta State University of Science and Technology
UNIDEL= University of Delta

Analysis of the interview responses in table 2 indicated that the university libraries examined exclusively provided digital text documents, while other types of material such as photos, audio, graphics, and video were not accessible. This research conclusion contradicts the findings of State North Dakota (1998), which discovered that libraries produce several types of information resources, such as E-text, data, graphics, pictures, video, and audio. These resources are created, changed, and sent in digital form using computers. It was found that none of the libraries produced digital images, audio, graphics, and video that were included in the electronic text documents. The finding suggests that if a library only has one type of digital information, it will not be considered a reliable source of information for users with diverse information needs in formats other than electronic text documents.

Categories of digital information resources accessible and conserved by the state universities in Delta State, Nigeria.

To ascertain the sorts of digital information resources accessible and the preservation options, respondents were presented with choices and asked to select the applicable ones in the libraries under study. Thesis, dissertation, seminar papers, conference papers, past question papers, lecture notes, reports, pre-print, and post-print articles were furnished. The findings from the study of the respondent are displayed in table 3.

Table 3: Digital Information Resources Preserved

Types of Information Resources	DELSU (Abraka)	DSUST (Ozoro)	UNIDEL (Agbor)
Theses	√	√	√
Dissertation	√	√	√
Seminar papers	√	X	X
Conference papers	√	X	X
Past question papers	X	X	X
Lecture note	X	X	X
Reports	X	X	X
Pre-print and post print journals	√	√	√

Key: X = Not Available √ = Available
 DELSU=Delta State University
 DSUST=Delta State University of Science and Technology
 UNIDEL= University of Delta

Table 3 revealed that theses, dissertations, and pre-print journals are the predominant information resources that are both accessible and conserved in the university libraries examined. This is because scholarly articles are the sole products of scientific study that are published by the academic community and authorized to be digitized and kept in accordance with their regulations. DELSU includes seminar and conference papers in addition to thesis, dissertation, pre-print, and post-print journals. However, it was observed that none of the university libraries examined stored digital resources such as lecture notes, reports, and past question papers. This suggests that university libraries lacking access to a comprehensive range of digital information resources would be unable to fulfill the users' requirements for additional digital information resources that are not created and stored internally. This finding aligns with the assertion made by Samir (2006) that journal articles, theses, dissertations, conference papers, and proceedings are crucial documents for scientific communication and should be accessible to the University community. The dissertations and seminar papers discovered in DSUST and UNIDEL were sourced from the now defunct polytechnic and college of education, respectively.

Storage media utilized by the State University Libraries in Delta State, Nigeria to safeguard digital information resources.

In order to ascertain the specific storage media used for preserving digital data, the participants were presented with a variety of storage media alternatives and were requested to specify the ones utilized in their libraries. The analytical results are presented in table 4.

Table 4 Storage Media Used to Preserve Digital Information Resources

Storage Media	DELSU (Abraka)	DSUST (Ozoro)	UNIDEL (Agbor)
Flash drive	X	X	X
CDrom/DVD	√	X	X
Computer Hard Disk	√	X	X
External Hard Disk	√	√	√
Memory Card	X	X	X
Microfilm	X	X	X
Memory Sticks	X	X	X
Floppy Disk	X	X	X
Mirror Server		X	X

Key: X = Not Available √ = Available

The analysis of the data from table 4 revealed that the university libraries studied primarily use external hard drives as their main storage media. DELSU also incorporates CD-ROM/DVDs and computer hard disk drives, while DSUST and UNIDEL solely rely on external hard drives. During the interviews, it was discovered that DELSU and UNIDEL libraries have backup systems both within and outside the library. None of the state university libraries studied utilize flash drives, memory cards, floppy disks, or mirror servers. This suggests that while the university libraries are meeting expectations, there are more advanced options available, such as cloud computing, which would provide greater effectiveness and reliability in the event of any failures. These findings align with the conclusions of Mageto (2009), who argued that server-based hard disk storage is the most effective and secure method for preserving digital information resources.

Preservation Techniques Implemented by Delta State University Libraries in Nigeria to Maintain the Integrity of Digital Storage Media.

To ascertain the methods employed to maintain the integrity of digital storage media, respondents were provided with a list of strategies to choose from. Table 5 displays the different techniques available.

Table 5: Measures Taken to Keep Digital Storage Media in Good Condition

Measures	DELSU (Abraka)	DSUST (Ozoro)	UNIDEL (Agbor)
Proper Air Conditioning	√	√	√
Dusting	X	X	√
Blowing	√	X	X
Use of CD racks	X	X	X
Others Please Specify	X	X	X

Key: X = Not Available √ = Available

According to Table 5, the primary method adopted by all libraries surveyed to maintain the quality of their digital storage medium is the use of effective air conditioning. Additionally, DELSU library also employs blowing as an additional measure. Nevertheless, the precautions implemented by the libraries are insufficient, thereby jeopardizing the longevity of their storage media and potentially resulting in the destruction or loss of valuable information resources. This finding corroborated the recommendation of the state of Florida (2010) which advocated for the preservation of digital storage media in a cool environment with moderate humidity. Furthermore,

it is necessary to incorporate other methods that have not been used in the libraries under investigation to extend the lifespan of digital storage media and assure the long-term preservation of resources.

Preservation strategies employed by the State University Libraries in Delta State, Nigeria for safeguarding digital information.

To determine the preservation procedures employed by the libraries under investigation, table 6 presented various alternatives for indicating the strategies utilized by these libraries.

Table: 6 Strategies of Preservation

Techniques	DELSU (Abraka)	DSUST (Ozoro)	UNIDEL (Agbor)
Migration	√	√	√
Encapsulation	√	X	X
Refreshing	√	X	X
Replication	√	X	X
Normalization	√	X	X
Emulation	√	X	X
Technology preservation	√	X	X
Use of Standards	√	√	√

Key: X = Not Available √ = Available

The findings indicated that DELSU employed all preservation strategies listed, including migration, encapsulation, refreshing, replication, normalization, emulation, technology preservation, and the use of standards. On the other hand, DSUST and UNIDEL only utilized migration and the use of standards as preservation strategies. The use of techniques by DSUST and UNIDEL suggests that the ongoing utilization and availability of digital information resources on digital storage media in DSUST and UNIDEL will be hindered due to insufficient preservation measures employed in the two libraries.

File formats utilized for generating digital content by the State University Libraries in Delta State, Nigeria.

To determine the file formats utilized, respondents were provided with many options to select the ones that are suitable to their collections. Table 7 displays the diverse file formats employed by the libraries being examined.

Table 7 File Formats Used to Create Digital Information

File Formats	DELSU (Abraka)	DSUST (Ozoro)	UNIDEL (Agbor)
Adobe pdf	√	√	√
Open Office File Format	X	X	X
Microsoft Office	X	X	X
ASC11	X	X	X
Adobe pdf/A	X	X	X

Key: X = Not Available √ = Available

According to Table 7, Adobe pdf is reported to be the predominant and exclusive file format utilized by all the libraries examined for the preservation of their digital information resources. The interview revealed that the university libraries investigated utilize PDF format due to its security features, lightweight nature, portability, and ability to compress larger materials. None of these libraries utilized open office file format, Microsoft Office, or ASC11 to generate digital content. The reason for using PDF is its global acceptance as the standard format. This implies that the libraries being investigated are conforming to the standard, but alternative formats can also be utilized. According to Gbaje (2011), Adobe pdf is widely utilized as a file format for creating digital information resources and is considered one of the approved formats.

The State University Libraries in Delta State, Nigeria, utilize digital preservation software for the purpose of preservation.

In order to ascertain the software used some options were given so that the respondents can state the ones applicable in their libraries. Table 4.8 presents the types of software as follows:

Table 8: Digital Preservation Software Used For Preservation

Software	DELSU (Abraka)	DSUST (Ozoro)	UNIDEL (Agbor)
Lockss	X	X	X
Green Stone	X	X	X
Dspace	√	√	√
Fedora	X	X	X
E-prints	X	X	X

Key: X = Not Available √ = Available

The results indicate that dspace is the predominant software utilized in the university libraries examined. Notably, none of the university libraries surveyed employed green stone, lockss, fedora, or e-print. The interview revealed that dspace was chosen due to its open source nature, allowing for customization to meet the specific needs of local university communities. This aligns with the findings of Walker (2010) and Pennock (2007), who concluded that dspace is a system designed to capture, store, index, preserve, and facilitate access to digital research materials.

Challenges encountered in the conservation of Digital Information Resources by State University Libraries in Delta State, Nigeria.

To identify the obstacles encountered in preserving digital information resources, participants were given the opportunity to select the options that are relevant to their library.

Table 9: Challenges faced in the preservation of Digital Information Resources

Challenges	DELSU (Abraka)	DSUST (Ozoro)	UNIDEL (Agbor)
Lack of Digital Preservation Policy	X	X	X
Lack of Infrastructure	√	X	X
Inadequate Professionals	X	√	X
Technological obsolescence	√	√	X
Poor Maintenance Culture	√	X	X
Technophobia	X	X	X
Inadequate Power Supply	√	√	√
Inadequate Fund	√	X	√

Key: X = Not Available √ = Available

The study's findings indicate that the libraries under investigation consider insufficient power supply to be the most formidable obstacle. DELSU is confronted with a deficient culture of maintenance, whilst DSUST is confronted with a scarcity of personnel to oversee the existing equipment. DELSU and DSUST both encounter the issue of technical obsolescence, while DELSU and UNIDEL face the obstacle of insufficient funding. The implication is that the libraries encounter several challenges that hinder their ability to do their tasks with effectiveness and efficiency. This finding aligns with the research conducted by Zulu (2008), which concluded

that insufficient power supply hinders the establishment of a favorable and sustainable technological setting.

Summary of the Study

The objective of the study is to examine the preservation of digital information resources at the state university libraries in Delta State, Nigeria. The fundamental premise of this study is that the successful preservation of digital information resources can facilitate ongoing access, reuse, and retrieval of said resources. All state university libraries acknowledge the importance of implementing strategies to preserve various digital information resources for an extended duration. To accomplish the study's goals, four research inquiries were formulated. These inquiries aimed to ascertain the types of digital information resources that are accessible and conserved, identify the storage media employed for preserving digital information resources, examine the strategies employed for preserving digital information resources, and assess the challenges encountered in the preservation of digital information resources.

The review of the relevant literature was examined using the following subheadings. Preservation of information resources, digital storage medium, digitization of resources, strategies for digital preservation, software for digital preservation, and issues in preserving digital information resources.

The study employed a qualitative research approach, encompassing all state universities in Delta State, Nigeria that had a digitization unit. The focus of the study was on the staff members of these digitization units. The three libraries, DELSU, DSUST, and UNIDEL, were selected using the purposive sampling technique.

The study utilized interviews and observations as the research instruments. Triangulation was employed to establish the validity of the study. The acquired data was analyzed, tabulated, and presented in a descriptive manner.

Major Findings

After analyzing and discussing the responses from the structured and open-ended interviews, the study yielded the following findings:

1. The digital information resources that are available and preserved include local content such as theses, dissertations, pre-print and post-print journals, seminar and conference papers.
2. The commonly used storage media are external hard drives, CDROM/DVDs, and computer hard disks.
3. The libraries studied employ strategies such as migration and the use of standards for preservation. Additionally, DELSU utilizes encapsulation, refreshing, replication, normalization, emulation, and technology preservation.
4. The challenges encountered in preserving digital information resources include insufficient infrastructure, a lack of qualified professionals, technological obsolescence, a poor maintenance culture, inadequate power supply, and insufficient funding.

Conclusions

Based on the study's findings, it can be inferred that the preservation of digital information resources in the libraries examined is somewhat conducted, but it lacks effectiveness and efficiency.

Recommendations

The study's findings and conclusion lead to the following suggestions.

1. It is recommended that all the libraries studied should make available and maintain various types of digital information resources, including practical research records, project reports, inaugural lecture recordings, paper evaluation reports, technical reports, papers film strips, and records of inventions. DSUST and UNIDEL should ensure the availability and preservation of seminar and conference papers.
2. It is important to regularly back up digital information resources. Additionally, a mirror server should be utilized as a backup in the event of any breakdown.
3. DSUST and UNIDEL should implement digital preservation solutions, including

encapsulation, refreshing, replication, normalization, emulation, and technology preservation, to provide uninterrupted access to digital information resources.

4. It is necessary to provide high-capacity computers, scanners, and cameras. Additionally, more qualified professionals should be employed and trained in digital preservation. Regular upgrades in hardware and software technology, as well as maintenance of infrastructure facilities, are essential. It is also important to have a standby generator, UPS, and inverters available.

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