The Urgency of Rescuing and Securing University Static Archives Through Digital Preservation

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Abstract. University archives were formed to save important files that's relevant to evidence of intellectual status and also potential development that creates innovation and others intellectual works, that's relevant towards university goals as a research institution, the educational and community service institutions as stated in Article 16 paragraph (3) letter d of Undang-Undang Nomor 43 Tahun 2009 concerning about files management. This writing aimed to described how important it is to reserving and securing university static archives by using digital technology for preserving files. The method is literature study by collecting literature that's relevant with the discussed topic then choose the ones that can describe about the urgency of preserving university static archives through digital preservation. The result shows that the fast-changing technology have an effect towards digital preservation, so when the new technology arrived, the old technology become obsolete and resulting that it became hard to access the old content.

Keywords: Digital preservation; Static Archives; Rescuing University Archives

1 Introduction

The development of science and technology affect the rate of creating and access towards information by users. Digital era as a result of information and communication technology advancement resulting a technology that affects changes in files form and shape. All institution or organization in all sector have created a digital matter. It created as a part of organizational activity records that's made by digitalization of non-digital files or paper (converted to digital format) for increasing access or born digital. The number of activities carried out by an organization increases the volume of archives. So that there is a need for archive management by forming an archive unit or university archive that aims to maintain and process available information.

The awareness of the importance of historical and informational value contained in archives, make the archival institution especially university archives make the most of the archive's usefulness so it can be held continuously and the information that contained in it can be preserved for the next generation. One of the attempts that has been done are by doing digital preservation on static archives. At the moment digital preservation become inseparable in long term static archives preservation. The attention of the global world about how important digital preservation are not only towards archives, libraries, museum and others memoir institution, but it's also become a challenge for everyone that have the interest and the ones that involved in creating, utilizing, gaining and creating an accessible digital material.

The needs of files digital preservation lately has been increasing considering the files service provider, public companies and also service providers in the private sectors are attempting to provide long term access to authentic records like which files user that's want to increase hope and chances for access to resources for files which preferred to be accessed by using electronic, fast, direct and preferably online, and which archives creator that has already invested in a technical infrastructure for creating file electronically and want to preserved the usefulness of the files are preserved for a long time, even majority of the people which static archives are a part of their memory and need to be saved for the future generation as an evidence and marks the past era and generations. Therefore, many institutions make various collection that can be accessed online through digitalization program as a form of rescuing and securing their static archives. Preservation is part of many integrated services that's the files provided for the users, and digital preservation are becoming more important in this whole integration process.

The purpose of this article is to provide an insight for the higher education especially university archival institution about how important it is to rescue and secure static archives through digital preservation. This is because digital preservation are able to save the information value that contained in it, so that if this information were needed the research process can be done quickly and can still be downloaded as a whole, not broken or missing some parts, so it's not cause any harm towards the creator later on and can be a reference for research activity for the next generation.

2 Literature Review

Undang-undang Nomor 43 tahun 2009 about archives explains that all static archives are archives that's produces by the creator because of its historical usefulness, the retention period has expired, and a permanent statement that has been verified either directly or indirectly by the national archives of the Republic of Indonesia and/or archival institutions [1]. Archives as a recorded information are a deposition of information from administration activity/transaction proof the implementation of work units that recorded in various media [2].

Static archives are files that are not available anymore for an organizations or institution that's been kept as a continuous value [3]. Static archives can be used as authentic proof and historically proven evidence from some activities and also function as a collective memory that became a thread of nation unifier along with the weakening of nationalism values and country borders in the reformation and globalization era.

Preservation and perfecting of government, institution and organizations depends on the preservation activities and efficient utilization pf archives. The function of static archives is:

a. as a memory of a company or individual;
b. as an evidence;
c. in accordance with statutory provisions;
d. as a research source;
e. human safety;
f. community interest;
g. educational and entertainment purposes;
h. maintain public relations activities;
i. political and security interest;
j. tracing genealogy;
k. prepare commemorative histories of institutions or individuals;

l. contribute to national personality development and be useful in protecting citizens, personal rights and others [4].

From some of the definition that has been stated it can be concluded that static archives are files that not used directly in national affairs because it have a historical value and must be permanent.

2.1 *University Archives*

College archives are archival institutions mandated by Undang- undang Nomor 43 Tahun 2009 concerning Archives which are obliged to carry out archive management in universities for the availability of information recorded in the archives of the academic community as university assets and the nation's collective memory. Good university archive management is an instrument for saving the nation's collective memory in the academic community.

According to Article 1 number 17 of Undang- Undang nomor 43 Tahun 2009 concerning Archives, College Archives are archival institutions in the form of higher education organizational units, both public and private that carry out the functions and tasks of organizing archives in the university environment. The objectives of establishing university archives are as follows [5]:

a. Assessing, storing, managing, processing, presenting, and maintaining archives that have high use value for universities for the benefit of users;
b. Provide adequate facilities for archive retention and preservation activities;
c. Provide information services that can assist the implementation of higher education activities;
d. Provide research services by providing materials in the form of required archival treasures;
e. Disseminate knowledge and understanding of the program goals and objectives of higher education and the possibility of their development;
f. Facilitating university archiving activities efficiently; and
g. Provide sources of information to spur more creative learning and teaching techniques.

Information from the treasures of university archives must be accessible to university stakeholders and the public, therefore, the controlling and supporting components of the university archives management system, such as policies, institutions, human resources, facilities and infrastructure and other resources that are integrated with each other and integrated needs to be improved and supported by university leaders.

Archive creators in the university environment are in the work units and organizations of the academic community. The existence of the static archives work unit in the university environment can be in the archive unit of the rectorate bureau, faculties, and work units with other names. What is meant by university static archives are:

a. Static archives of work units in the university environment originating from inactive archives that have a retention of at least 10 (ten) years are in the archive creation unit of the rectorate bureau, faculties and work units with other names as archival unit II or university archive processing unit;
b. Static archives of work units in the university environment originating from inactive archives that have retention of more than 10 (ten) years are at the higher education archival institution as archival unit I of higher education; and
c. Static archives in the organizational environment of the academic community are generally stored in the secretariat of the organization.

The types of university archives include [6]:

a. Archives of evidence of the existence of universities, namely evidence regarding the memory and identity of universities, which contain characteristics and special information about universities, including:
   1) Organizational structure and work procedures;
   2) Presidential decree regarding the appointment of the rector/assistant rector;
   3) Decree of the Minister of National Education regarding the appointment of deans/assistant deans;
   4) Management guidelines;
   5) Establishment, change, unification of higher education institutions; and
   6) Symbols, logos, symbols, and identities of universities and institutions.
b. Official archives which are evidence of higher education performance, including:
   1) All policies signed by the head of the tertiary institution that are regulatory in nature;
   2) Higher education strategic plan;
   3) Annual budget planning;
   4) Annual balance sheet and financial reports;
   5) Short-, medium- and long-term work programs;
   6) Memory of Understanding; and
   7) Decisions of the chancellor or the head of the tertiary institution that are regulating and stipulating.
c. Archives of first graduates;
d. Individual archives/university figures. The creators of individual university archives are academics who have a strategic role in the implementation of social, national and state life in the university environment, including:
   1) All files related to career paths as students and/or lecturers, namely:
      - Archives relating to students/lecturers, including: certificates as students/lecturers, letters of appointment for professors, and the like;
      - Records related to participation in student organizations/academic senate, including: letters as members or administrators of student organizations/academic senates, letters of dismissal as members or administrators of student organizations/academic senates, and the like.
   2) All files related to academic achievement, such as:
      - Charter/certificate;
      - Creative works; and
      - Personal paper as evidence of a collection of scientific works produced by the academic community of higher education, such as: dissertations, theses and theses; research result; and scientific speeches.

2.2 Securing and Rescuing University Static Archives

Securing Archives includes physical and information contained in archives so as not to be known by unauthorized persons. Secure in Big Indonesian Dictionary comes from the word safe which means 1) free from danger, 2) free from interference (theft and pests), 3) protected, hidden, cannot be taken by others, 4) certainty (no suspiciousness), peaceful, not afraid, while the word security is the process or method of action taken to secure [7].

Archive security management includes: 1) Targeting, 2) security and protection of archive information is not only the responsibility of management but also the responsibility of archive users, 3) risk assessment must be considered in archive security planning at an agency. 4) security policies and procedures to protect information must be developed and communicated

to those who create or use the information, 5) Procedures for auditing, monitoring and evaluating systems [4].

Meanwhile, archive security is an act of protecting the information contained in the archive so that it is not known by unauthorized people [8]. Securing static archives, which is basically the management of physical aspects, can only be done after the archives have been described in accordance with the applicable technical provisions so that they reflect the continuation of the regulation of their intellectual aspects. The accuracy of the identification of archives made in order to organize archives because it is directly related to the ease of retrieving it [9].

a. Physical security of static archives, carried out with a view to protecting archives from the threat of factors destroying / destroying archives. Some ways to secure archives are as follows:
   1) Use of archive storage space security systems such as access arrangements, storage space arrangements, use of alarm systems to secure archives from theft, sabotage, wiretapping and so on;
   2) Use of watertight buildings or placing archives at elevated levels that are free from flooding;
   3) Use of earthquake-resistant structures and locations that are not prone to earthquakes, typhoons and storms;
   4) Use of fireproof building structures and rooms and equipped with alarm equipment and fire extinguishers.
b. Securing static archive information, is done by:
   1) Provide individual identity cards for archive users to ensure that records are only used by authorized persons;
   2) Regulate access to archivists in detail on the basis of steps/hours;
   3) Develop detailed and detailed fixed procedures;
   4) Giving secret codes to the archives and specifications of certain people who have access rights;
   5) Ensuring that records can only be known by authorized officers and that the use of those rights is well controlled, for this reason, primary (indirect) and secondary (direct) indexes can be used for access control.

Archival rescue is the act or steps of withdrawing or takeover the archives systematically from every agency within the government by an archival institution. This serves to maintain the information contained in the archive, as well as maintain the physical form of the archive. In this case, universities play a role in saving university static archives when there is a change in the organizational structure of universities in the form of establishment, formation, change, appointment or dismissal.

It is very important to ensure the safety of the information contained in the archive. Matters related to saving the information contained in the archive can be done through several stages of saving archives based on the Regulation of the Head of National Archives of Republic Indonesia Number 46 of 2015 concerning Rescue of Archives, Merger or Dissolution of State Institutions and Regional Apparatuses, namely data collection and identification of archives, arrangement and registration of archives, verification or assessment of archives, submission of static archives, and destruction of archives [10]. Static archive rescue is a salvage activity so that the archive is not damaged and that causes the loss of archive use value. Activities in saving archives include archive maintenance and archive maintenance, namely:

a. Archive maintenance is an effort to maintain archives so that their physical condition is not damaged as long as they still have use value.
b. Archival maintenance is an effort to keep records that have been damaged from getting worse.

Based on the description above, saving and securing archives is very important for universities, both by maintaining and maintaining archives to submitting archives to the university archives unit. However, with the development of technology in the current digital era, saving and securing university static archives is not enough only for this, but also must be done through digital preservation or preservation so that the information can be accessed in the long term.

2.3 Digital Preservation

Archive preservation is an activity to ensure that the information in the archive can still be accessed and used according to their needs [11]. A broader definition of preservation was given by IFLA in its 1996 publication, namely that preservation or preservation is all managerial and financial considerations, including storage, provision, human resources, policies, techniques, and methods involved in the preservation of collections in libraries, archives, and information that contained in it.

In Harrod's Librarians Glossary, digital preservation has two definitions, the first is the use of digital as a preservation technique, and the second is a method of keeping digital material alive so that it can be utilized [12]. While in the book Digital Preservation and Metadata: History, Theory, Practice the term digital preservation refers to the preservation of materials or collections created in digital format and never available in print or analogue and using imaging or recording technology to create digital copies of these formatted materials. analogues for ease of access and preservation purposes. In addition, digital materials, both those created digitally and those converted into digital form, are equally threatened with errors and technical destruction [13].

Preservation activities for digital collections can be classified through three activities, namely [14]:
a. Storage media preservation focuses on media preservation activities that store information on tape, disk, CD-ROM and others. This activity needs to be done because this storage media is an access that must be maintained and maintained in such a way that users can find the information contained in this media. This activity can be done by copying or backing up into similar media or media with different types.
b. Preservation of technology because technology is developing very quickly. Even within a period of five years a software can issue several versions that are new, better and continue to grow. this also applies to hardware. Therefore, archivists must be wary of obsolete technology used to store digital documents or to access digital documents.
c. The intellectual preservation of digital collections is still very fragile in terms of legal and copyright protection, because digital information can be easily copied without distinction. Even though there is now electronic signature and watermark technology, this is still something that must be continuously developed so that the originality of the information contained in digital documents can be maintained.

In addition, to save the value of information so that it can be used in a relatively longer time and avoid damage to digital or electronic collections, there are several ways of digital preservation, including [15]:

a. Technology preservation which is the careful care of all hardware and software used to read and run digital material.
b. Preservation by way of refreshing or updating by taking into account the age of the media (moving data from one media to another).
c. Preservation by migrating and reformatting is an activity to change the configuration of digital data without changing its intellectual content.
d. Preservation by means of emulation, which is a "refreshing" process in the system environment, which means that theoretically it can be done periodically to recreate certain computer programs so that they can continue to read digital data recorded in various formats from various versions.
e. Archeology, which is saving the contents of documents stored in storage media or hardware and software that has been damaged, so that the contents of these documents can still be used.
f. Preservation by converting digital data into analog, especially for digital materials that are difficult to save by all the methods above.

However, each of these methods has advantages and disadvantages that can be considered. Every digital preservation activity must contain procedures and mechanisms to test its durability. Basically, this mechanism and selection also takes into account the risk of damage that must be faced by every digital preservation activity. In INFORM (Investigation of Format based on Risk Management) mentions 6 risks that must be considered in digital preservation:
a. The risk is caused by the specification of the format of the digital object itself, including the compression algorithm, and its condition as a proprietary format (closed, only readable by certain programs), the possibility of its contents being scrambled or "hidden" (via encryption), and so on.
b. Risks caused by software characters to read digital objects, including in this case the operating system, special application programs, special software, migration programs and so on.
c. Risks posed by hardware components, including the type of media (CD, DVD, magnetic disk, tape, WORM), CPU devices, I/O cards, and other supporting devices.
d. The risks posed by the relationship between the risks mentioned above and certain institutions, such as owners of digital objects, software and hardware vendors, communities, and so on.
e. The risks that arise from the digital database itself are in terms of architecture, work processes, organizational systems, and so on.
f. Risks that occur in the process of migrating or transforming digital objects, both mechanical and administrative [16].

In digital preservation activities, to ensure an object is "in good condition" for as long as possible, there are 2 things that must be ensured, namely [17]:
a. The storage media must be durable (CD-ROM, tape, disk).
b. The format of the content or information must also be durable, in the sense that it can continue to be read (PDF, TIFF, JPEG)

3 Methods

This writing uses the literature study method or qualitative descriptive research. The data collecting techniques that's used for this writing are participative observation. Writer

collecting literature and then analyzed it and took a conclusion based on the literature, and also do an observation on what technology that's been used and which static archives that can be digitally preserved.

4   Results and Discussions

Saving and securing university static archives is an effort to maintain archive safety so that the physical archives are not lost, and their contents are not known/tapped by other parties who are not entitled. In addition to saving physical archives by lamination, fumigation regulates humidity/dryness and room air temperature, along with technological developments, saving and securing physical archives is of course carried out by digital preservation of printed static archives that have been digitalized and static archives created/born digitally.

The urgency of saving and securing university static archives can be pursued in various ways, including preventive and curative efforts. Preventive efforts are carried out in the form of providing adequate storage space and meeting the requirements/standards of storage buildings. This effort is the physical protection and value of archived information against harm and tampering. This means that preventive efforts are carried out on static archives through the prevention and implementation of effective storage standards. The curative rescue of static archives is carried out if there is an element of destruction to the static archive, for example by restoration, duplication or digitalization. Efforts to digitalize (transfer from analog media to digital media) as a form of digital preservation of the created static archive is one solution that cannot be avoided.

This is caused by:

a.   The obsolescence of analog media devices will make the storage and maintenance of archives more expensive. Preservation of static archives will be lighter if they are transferred to digital form and the originals are kept in their original format.

b.   The availability of supporting devices, both spare parts, reading equipment, and storage media is very difficult to find when the factory is no longer producing old equipment.

Static archives that are born digital are also sought to get digital preservation because in the future digitizing printed copies will be a must because there is no local capacity to manage digital materials that are born. Ensuring access by understanding and mitigating rapid changes in technology and organizations can help ensure the long-term value of digital materials.

All forms of storage in various media, whether magnetic, optical, or static images, adapt to technological developments. However, nothing can guarantee the continuity of the media in the long term. This process requires archiving practitioners to work closely with IT practitioners to analyze technological changes with a blueprint for long-term planning in order to preserve digital static archives.

Moreover, the rescue and security of university static archives can be hampered if there are still the following things, namely:

a.   The lack of archivists who have knowledge in the maintenance and preservation of digital archives;

b.   The lack of adequate facilities and infrastructure for the rescue and security of university static archives;

c.   The lack of funding from universities for digital preservation activities that require substantial costs; and

d.   The lack of attention from the work unit apparatus and the higher education academic community to submit their static archives to the university archiving unit which makes it difficult to access information about related higher education institutions in the future.

e. The lack of policies regarding the regulation of digital preservation activities owned by archival institutions to be applied by university archives in providing limits and references for activities that must be carried out in accordance with the objectives, makes it difficult to carry out digital preservation.

Thus, the efforts that can be made to overcome this problem are as follows:

a. provides training and apprenticeship programs for archival resources to institutions that provide training and education for national archives or those related to the aim of increasing archivists' competence in managing and implementing archive preservation. Higher education archives in developing archivist profession competence should also not only dwell on archiving issues, but basically it is quite important for an archivist to be included in training in the IT field in order to increase experience and skills in the current digital era. related to digital preservation, in practice digital preservation of static archives is closely related to digital technology, so archivists are required in addition to mastering theory and practice in the field of archival management, they must also master a little about the technology used for digital preservation.

b. Completing facilities and infrastructure, especially supporting infrastructure in digital preservation of static archives that support the process of saving and securing university static archives as well as maintaining and using existing infrastructure facilities according to their functions.

c. Provide a special budget for digital archival preservation activities at the university archives unit.

d. Send letters and/or pick up work units and the academic community directly in the university environment to acquire existing static archives.

e. College archives make their own policies and standard operating procedures (SOPs) to carry out digital archival preservation activities.

The urgency of saving through digital preservation based on the guidebook Guidelines for The Creation of An Institutional Policy on Digital Preservation must also pay attention to the following aspects [18]:

a. data integrity, namely ensuring that archived data is protected from unauthorized changes, such as intentional or unintentional manipulation of data by staff or third parties. Evidence of data integrity can usually be ensured through automated procedures. Maintaining data integrity is a matter of protecting against unplanned changes. Except, changes that are intentional as part of an archive migration.

b. Authenticity, i.e. ensuring that the digital object comes from the creator of the document.

c. Completeness, of the data is maintained if it is clear that no part of the digital object is missing.

d. Readability, maintaining the legibility of a data there is a clear prerequisite for the use of digital objects. It should be possible to display and interpret the latest version of the digital information object at any time.

e. Locability, maintaining location ability ensures that objects in long-term digital archives can be found. To ensure long-term location, persistent identifiers (PIDs) and entries in relevant directories and search engines can be used.

f. Confidentiality, the preservation of the confidentiality of a data is very important for information that can only be released for use after the expiration of a certain period of time, to comply with legal rules and other agreements.

The most possible strategies and technologies in digital preservation activities are emulation and migration. The emulation strategy aims to maintain the possibility of running original software to use preserved digital archives or other digital objects as originals. Migration, on the other hand, will change the encoding of digital objects so that they can be used with current software and hardware. In addition to these two strategies, according to the National Archives of Sweden in their book Digital Preservation in Archives: Overview of Current Research and Practices a new approach has been proposed in recent years namely encapsulation. Encapsulation is considered a type of migration technique [19]. Archives stored in wrappers may be able to delay the need for migration for a long time. however, ultimately the information encapsulated in it eventually needs to be migrated. therefore, on digital sources whose format is well known and cannot be actively accessed, encapsulation techniques can be applied.

5   Results and Discussions Conclusion

Based on the discussion above it can be concluded that how important it is to do digital preservation as an attempt to rescue and securing university static archives because static archives that stored in universities are an important asset that must be maintained and preserved. Those archives contain information about identities, collective memory and the asset that owned are evidence and authentic proof of an existence of a university and also as a story of what the university has been through. Static archives can tell the story from the beginning of a university until how to maintain documents of a creation of some workforce and the academic community so as not to be damaged, whose activities are recorded in static archives. Through digital preservation, static archives which were originally in the form of analog media are converted into digital media, not only in the conversion process but more than that, namely digital resource management, long-term preservation following technological developments in maintaining sustainable access to these resources for future generations.

Preservation is a part of integrated services that's provided by the archives for its users, and digital preservation are becoming more important in this whole integration entity. There still no answer or solution that's guarantees 100 percent for long term preservation. However, a range of approaches and methods to reduce the risk of future inaccessibility of archives is available and the list is growing every year, as are the most likely strategies of emulation, migration and encapsulation of digital archives. Research into digital preservation issues has not stopped and many new innovative solutions will emerge, continue, and funding opportunities are growing.

Saving and securing university static archives through digital preservation must be fully supported by the attention and care of all higher education institutions, namely leaders, work units and the academic community. This support can be in the form of providing digital preservation technology, archiving resources who are trained and have technological knowledge, especially digital preservation, policies and procedure manuals on digital preservation, archival infrastructure to support digital preservation activities, good funding and attention to the submission of static archives in the work units and the academic community environments that should be improved.

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