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Assessing ancient manuscript conservation practices: A case study on local content preservation at the North Sumatra State Museum

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Abstract Ancient manuscripts serve as invaluable cultural artifacts, offering unique insights into the historical, social, and cultural aspects of bygone civilizations. This study employs a qualitative methodology with a descriptive approach to investigate the con ancient manuscripts as a means of preserving the local content collections. The North Sumatra State Museum actively contributes to the provision of data, encompassing research on the conservation, collection, and preservation of ancient manuscripts. Purposive sampling was utilized in the study, specifically targeting two managers/officers from the department responsible for the preservation of ancient scripts in the collection. Methods of data collection included interviews, observations, and documentation analysis. This study aims to offer insights for museums and libraries, highlighting the significance of maintaining collections as a means of safeguarding local content. Findings revealed that conservation efforts involve fumigation to eliminate pests and fungi, as well as the application of lemongrass oil and storage in shaded areas to mitigate damage risks. Additionally, gel-based chemicals and paper napkins are utilized for further protection, with staff receiving training from experts. However, challenges include inadequate tools, equipment, paucity of skilled workers, insufficient funding, lack of a specific preservation schedule, and insufficient space.

Keywords: conservation, ancient manuscripts, preserving

1. Introduction

Ancient manuscripts refer to handwritten documents predating the widespread use of printing, encompassing diverse materials ranging from literary works to religious texts and historical records. They are considered a nation's cultural heritage and contain profound insights into the historical, social, and cultural aspects of civilization. The conservation of such artifacts is crucial not only for scholarly inquiry but also for upholding a tangible connection with our shared human legacy. Preserving historical texts requires several efforts, one of which is conservation. Conservation is a deliberate endeavor to preserve the condition of a physical collection, encompassing both traditional and digital formats, ensuring the physical preservation of the collection by safeguarding it against potentially damaging forces. Conservation initiatives designed to preserve the intellectual materials of documents include converting them to alternative formats, regulating temperatures, and implementing fumigation.

Preserving old manuscripts poses distinct and exceptional difficulties. These documents are delicate and are often susceptible to environmental factors such as humidity, temperature variations, exposure to light, and chemical decay over time. Moreover, handling ancient texts for research and exhibition purposes can exacerbate their degradation. Environmental factors such as inadequate climate control and improper storage containers lead to structural damage, while pests and unforeseen disasters pose additional risks. Therefore, thorough preservation efforts are essential to ensure their durability and availability for future generations (Alfida, 2014).

In the Indonesian context, North Sumatra—a former prominent center for commerce and trade—possesses a wealth of historical narratives and cultural expressions, many of which are safeguarded in ancient manuscripts. The deterioration of these manuscripts poses a threat to the preservation of religious, historical, and local knowledge of the region (Fakhriati et al., 2022). Fungal growths on books, documents, maps, and works of art can result in inestimable cultural losses (Pinheiro, 2019). Manuscripts contain invaluable information and wisdom relevant to contemporary circumstances. Manuscripts and writings are generally considered tangible cultural heritage, and the content and knowledge contained within the manuscripts are intangible cultural heritage, as they represent traditions, beliefs, and practices passed down through generations. Based on the concept of intangible cultural heritage, it is important to study traditional methods for conserving and storing ancient calligraphy and paintings on silk. Besides illuminating the past, these manuscripts play a crucial role in comprehending and

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appreciating the region's impact within the broader historical context of Indonesia. Recognizing the importance of these cultural artifacts, the Indonesian government has implemented several measures to safeguard them, particularly by establishing and upkeeping museums. Museums play a pivotal role in preserving ancient texts, utilizing several conservation methods to protect and preserve them. As institutions responsible for conserving historical treasures, museums serve as centers for research and public education, bridging the temporal gap between past and present.

Museums serve as a repository of historical information in both written and digital formats. Collection conservation is essential for every museum to ensure the durability of historical manuscripts and preserve their information. Curators are particularly concerned about indoor air quality in museums and historical buildings, as it can be a source of various alterations in artworks. Hence, it is imperative to organize conservation initiatives to safeguard the contained within the collection. These manuscripts constitute the most precious national and cultural heritage (Khafidlin, 2021). In particular, it is important to be aware of the environmental impact of museum buildings (Lucchi, 2018). Moreover, museums must face the challenges of climate adaptation and the reduction of greenhouse gas emissions.

However, there remains a paucity of comprehensive assessments of the efficacy of these conservation strategies. Gaining insights into the consequences of existing approaches and identifying areas for improvement are essential for enhancing conservation initiatives. This is especially relevant in the context of technological advancements and the evolution of conservation methods. Preventive conservation focuses on indirect physical interventions such as climate control, good housekeeping, and pest management (Sahin, 2017). This study seeks to address this deficiency by thoroughly assessing the conservation measures adopted by the North Sumatra State Museum. This research seeks to identify potential risks that could damage ancient manuscripts in the North Sumatra State Museum, allowing for the implementation of appropriate preventive measures. Thereby, the local cultural heritage can be preserved for future generations. Furthermore, this study aspires to increase public awareness of the importance of preserving cultural heritage sites for the sustainability of Indonesian culture. The findings of this study are expected to significantly aid efforts to preserve local cultural heritage, especially ancient manuscripts from the North Sumatra State Museum.

2. Materials and Methods

2.1. Material

2.1.1. Conservation of ancient manuscripts

The conservation of ancient manuscripts is an essential and complex discipline involving the examination and implementation of diverse methodologies to safeguard, reinstate, and uphold historical records. Frequently dating back centuries, these manuscripts serve as priceless portals for antiquity and have religious, cultural, and historical significance. In addition to technical challenges, the conservation of these manuscripts presents an ethical challenge, as conservators must strike a balance between the preservation of physical artifacts and maintaining their historical integrity. Ancient manuscript conservation has a substantial historical background dating back to the initial preservation techniques implemented in monasteries and libraries. Initially, the simplicity of preservation techniques was prioritized, including the utilization of dry and cold environments, to safeguard manuscripts against deterioration. Nonetheless, as knowledge of materials science and chemistry progressed, so did manuscript conservation techniques. Presently, conservators employ various methodologies, ranging from conventional approaches, such as Japanese tissue restoration, to cutting-edge digital preservation and imaging technologies.

Ancient manuscripts are composed of a diverse array of materials, such as papyrus, parchment, vellum, and early iterations of paper. Cultural heritage items that can be moved include artwork, books, manuscripts, artifacts, and art items. Each material poses unique challenges; for instance, parchments, composed of animal tissue, exhibit extreme sensitivity to variations in temperature and humidity (Rachman, 2020). Neglecting these issues can lead to a crisis point, resulting in irreparable damage to various collections (Chanu, 2019). Empirical evidence shows that custodians must take preservative measures rather than respond after damage has occurred. Effective conservation requires a comprehensive understanding of these materials, as the techniques and materials must be compatible with the original manuscripts.

Determining the sources of deterioration is a fundamental consideration in manuscript conservation. The degradation of old documents on paper is a slow process that occurs over time at varying rates, depending on the environment and conditions in which they are stored. Optimal preservation conditions are required to recover and prolong the quality of old documents. Key environmental factors include light exposure and humidity, biological hazards such as insect and mold damage, and chemical degradation caused by acidic inks or pollutants. To mitigate these concerns, conservation techniques have been customized to employ various methods, from simple washing to eliminate surface dirt, to more intricate processes such as humidification, page flattening, or brittle area repair. Therefore, documents and other old writings on parchment have been the focus of various studies because of their heritage value (Boutiuc, 2020).

In recent years, ethical and philosophical considerations have gained prominence in the domain of ancient manuscript conservation. Controversial topics include the relative importance of preservation versus restoration, the application of

contemporary materials in the conservation process, and the hierarchy of manuscripts that should be preserved. This discourse constitutes an element of a more extensive dialog concerning the function of conservation in safeguarding cultural heritage and the obligations that conservators have toward forthcoming generations. The introduction of digital technology has led to substantial transformation in the field of manuscript conservation. Digital imaging reduces the risk of injury to manuscripts by enabling detailed examination without physical contact. Additionally, digital copies serve as a means of conservation, guaranteeing the security of the manuscript content if the physical copy is misplaced or irreparably degraded.

Policy and standard frameworks for international and regional preservation are critical in guiding manuscript conservators. These guidelines aim to facilitate the ethical and efficient preservation of manuscripts, thereby ensuring their maximum longevity. International Centers for the Study of the Preservation and Restoration of Cultural Property (ICCROM) and the International Council of Musitage (ICOM) are leading organizations in developing these standards and providing training and resources for conservators around the globe.

In summary, the preservation of ancient manuscripts is a complex discipline that demands not only technical expertise and understanding of historical materials but also an awareness of the ethical implications associated with conservation efforts. As our understanding of material science and digital technology advances, new challenges and methodologies continually emerge in the field. Conservators strive to safeguard these invaluable documents, which contain a wealth of shared history, so that they may continue to be appreciated and studied by future generations. This undertaking serves as a crucial act of cultural preservation, protecting physical connections to the past, and is not merely a technical pursuit.

2.1.2. Manuscript conservation technique

Manuscript conservation techniques are categorized into two types: active and passive conservation. Active conservation involves direct interventions aimed at prolonging the lifecycle of the documents. Techniques include placing documents in acid-free boxes, coating them with a buffer and acid-free paper tissue, mass deacidification, and sterilization to remove pests and dirt. Active conservation encompasses both direct and indirect actions to increase the longevity of the objects to be conserved (Rachman, 2017). Rachman detailed five key methods of active conservation: cleaning documents, placing fragile materials in special boxes, humidifying documents, laminating, and using protective coatings. These were made for this purpose but have proved unsatisfactory as they often require frequent handling of all the manuscripts to find the one needed by a reader (Crowley, 2009).

Document cleaning involves removing dirt and dust from the surface, which can cause abrasion and weaken paper fibers. Fragile materials are placed in specially made acid-free cardboard boxes. Humidification is necessary for documents such as rolled paper (e.g., map collections) that can become difficult to open; they sometimes need to be straightened and restored. Lamination involves patching document surfaces with special acid-free tissues, such as washi, sekishu, or hanji. Lamination occurs when the parchment or paper support loses its flatness and usually presents ripples and warpings. Washi tissue, a traditional Japanese handmade paper, is available in various forms and has multiple uses, including decorative arts. Protective layers are essential to protect documents from external damage (Grosso et al., 2021). For instance, encapsulation involves covering a document with two sheets of Mylar plastic that can be replaced if damaged. This method is particularly useful for fragile and frequently used documents. Documents can also be stored in special folders or envelopes made of acid-free materials. Finally, slipcases made from thick cardboard protect items such as encyclopedias, serving as an additional layer of protection. Sometimes, multiple techniques can be used to remove the same stains from a manuscript (Abdul-Maksoud, 2020).

Passive conservation focuses on maintaining optimal environmental conditions, arranging proper illumination, ensuring the cleanliness of storage areas, and conducting physical condition surveys of collections to detect potential damage. Passive conservation in libraries includes these elements to prevent material harm (Rachman, 2017). These endeavors are consistent with preventive nature conservation principles, as they seek to establish optimal environmental circumstances for storing collections to avert any potential harm. Important passive conservation measures in storage areas include monitoring the temperature and relative humidity. Maintaining stable and low humidity and temperature levels is of the utmost importance, as drastic changes can cause severe damage to library materials, particularly those composed of organic materials such as leather or paper, which are hygroscopic. Ensuring the cleanliness of storage chambers is an additional crucial element encompassing safeguards against air, water, and dust contamination. As a solid particulate that absorbs moisture, dust increases relative humidity, attracts insects and mites, and can cause physical harm, such as scratches.

Moreover, light management is crucial. Damage can be caused by artificial illumination, sunlight, and ultraviolet rays. Therefore, it is vital to regulate light exposure in storage areas. Fumigation is implemented to eliminate or prevent the growth of molds, insects, and vermin, which can damage library materials. This procedure, typically performed by trained professionals, may temporarily close collection chambers. It is imperative to perform surveys of the physical state of collections to evaluate the severity of the damage and ascertain suitable methods for restoration. This requires the preparation of assessment documents and the random sampling of collections for evaluation.

2.1.3. External destructive factors to ancient manuscript

Multiple external factors can harm library materials, including environmental conditions, vermin and pollutants, light, temperature, relative humidity, mold, and natural and man-made catastrophes (Rachman, 2017). The tropical climate in Indonesia is characterized by air temperatures generally fluctuating between 20°C and 35°C, with negligible differences between day and night. A critical relationship exists between temperature and relative humidity: elevated temperatures can cause paper to become brittle and dry, whereas decreased temperatures and increased humidity can result in paper rot caused by mold development. Paper-based materials should be stored between 18-20°C and 45-65°C RH, preferably in dry, cold, and dark environments.

Both natural and artificial light significantly contribute to the damage to library materials. Ultraviolet radiation can cause fading and discoloration of paper. Constant light exposure can alter the structure and appearance of organic substances; therefore, light-filtration techniques are recommended. Dust and other pollutants also pose threats. Physical harm can be inflicted on paper and other library materials by contaminants, such as smoke, vehicle exhaust, and grime. Particularly, in environments with high relative humidity, dust particles hasten the cellulose degradation of paper, and pests and insects present substantial danger. For example, cockroaches can impart irremovable stains, whereas bookworms, rodents, and termites can inflict significant physical harm on paper and books. Infestations may be avoided using conventional methods, such as lemongrass oil, and maintaining a clean environment.

In addition, mold is a significant problem, particularly in environments with high humidity. This generates organic acids that can cause the paper to become brittle and acidic. In addition, molds can damage adhesives and impede the legibility of the ink. Riots, floods, earthquakes, and fires, among other natural and human disasters, can cause massive destruction. Water stains and the proliferation of molds can result from flooding, whereas flames can completely demolish materials. Implementing preventive measures entails storing materials in elevated, secure locations and consistently maintaining structures and facilities.

2.2. Methods

The research design used a descriptive qualitative approach (Cresswell, 2014). Qualitative research methods can provide more detailed exploratory explanations; however, the generalizability of the research results is limited. Qualitative social research, whether conducted through ethnography, participant observation, or in-situ interviewing, often fares poorly when examined using the criteria of representativeness, reactivity, reliability, and replicability (Katz, 2015). Qualitative research is utilized to understand the phenomena experienced by research subjects—encompassing behavior, actions, perceptions, and motivation—described holistically in words and language within a natural context and using various natural methods (Nassaji, 2015).

This research was conducted in a naturalistic and appropriate manner under field conditions without any manipulation. Researchers interacted directly with—and remained open to—phenomena that arose in the field during the research. This method was chosen because descriptive data provide detailed and in-depth insights, offering a realistic view of the social world experienced by research subjects, which cannot be quantified. It allowed participants to describe their perspectives on the phenomenon being studied. This study was conducted at the North Sumatra State Museum on Jalan HM Jhoni No. 51 West Medan, Medan City, North Sumatra. The sampling technique used purposive sampling with the characteristics of the informants from the officers of the museum in charge of collecting archaic scripts from two people. The data used in this study were processed as follows:

1. In-depth interviews
   In-depth interviews were conducted to obtain more detailed information and data regarding ancient conservation scripts in the North Sumatra State Museum. Interviews were conducted when the participants were at the museum.
2. Observation
   Researchers conducted field observations to directly observe the conservation processes of ancient manuscripts.
3. Document Review
   As a complementary source of research methods in the social sciences, the documents referred to as data in this study were collected from journals, books, internet data, news, and documents from parties related to this research.

Qualitative data analysis used descriptive and verification formats. The qualitative data analysis model used in this study was the interactive model of Miles, Huberman, and Saldana.

The interactive model is an activity in qualitative data analysis carried out interactively and continues until completion, ensuring data saturation. The data analysis process was as follows (Figure 1).

1. Data condensation: This stage involved simplifying and categorizing all the data.
2. Data display: At this stage, the reduced and categorized data were presented in a matrix based on certain criteria.
3. Drawing conclusions and verification: The results of the data display show that the data obtained were sufficient and in accordance with the information needed, and conclusions were drawn using theory and data results in the field.

Data validity using triangulation techniques. The triangulation method in this research consists of:

1. Triangulation Data
   Data triangulation uses various data sources, such as observation results, interview results, and documentation carried out by researchers at the North Sumatra State Museum.
2. Triangulation Theory
   Theoretical triangulation uses existing theoretical perspectives to ensure the appropriateness and adequacy of the data collected.
3. Triangulation Method
   Triangulation is a method of comparing data in different ways. In this study, researchers compared the observation method with interview and documentation methods.

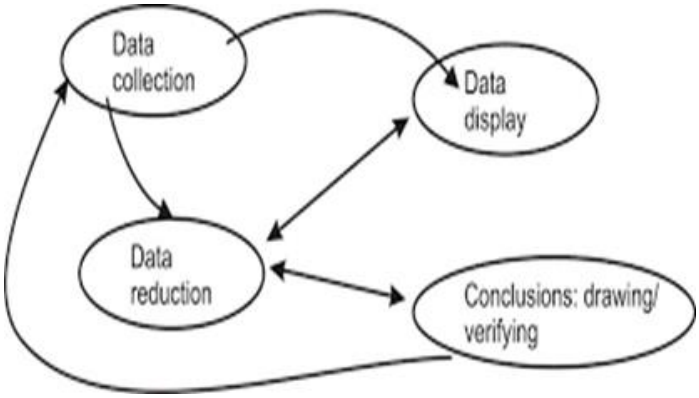

Figure 1 Technique Analysis Data Miles and Huberman.

3. Results and Discussion

3.1. Condition of ancient manuscripts at the medan state museum

Based on statements from informants, it is evident that the ancient scripts at the State Museum of North Sumatra Province originate from various areas, including Dairi, Pakpak, Toba, Sidempuan, and Bali. These collections comprise six types of scripts: skinwood, bamboo, paper, bone, palm leaves, inscriptions, and printed manuscripts. There are a total of 243 collections containing knowledge on Shamanism, the Bible, lamentations, medicine, and letters.

The conservation process of ancient manuscripts is critical for ensuring the sustainability and preservation of this valuable collection. Various tools and methods are employed, including room fumigation room to eliminate pests and using lemongrass oil as a fragrance and insect repellent. Neat organization and optimum storage measures are also necessary to keep the manuscripts in good condition. The organization and storage of ancient scripts at the North Sumatra Provincial State Museum involve placing them inside rack cupboards made of iron and glass, using simple methods such as using chalk to label storage areas (Figure 2).

Figure 2 Ancient manuscripts.

All these steps are carried out meticulously and carefully by trained officers. In addition, regular monitoring is also carried out to ensure the condition of the manuscripts is maintained. With good care, it is hoped that the ancient manuscripts can survive and remain an important part of our history and culture.

3.2. Conservation of ancient manuscripts at the medan state museum

Based on the insights provided by the informants, the primary objective of preserving ancient manuscript materials at the North Sumatra Provincial State Museum is to safeguard their informational and physical value, thereby ensuring their accessibility for public knowledge. Preservation methods entail arranging storage locations, regulating humidity, temperature, and lighting, mechanically removing dust, and conducting fumigation to combat small insects, such as moths and cockroaches, which pose a threat to the integrity of the manuscripts.

A notable challenge the museum faces is the limited human and financial resources allocated to preservation and conservation efforts, with only three employees dedicated to this department out of 40. Preservation and conservation activities are carried out approximately 12 times a year, guided by books and training seminars on manuscript preservation techniques. Fifteen manuscripts have become irreparable because they were already old. Moreover, the failure to maintain manuscripts, the way to preserve manuscripts is by fumigation, animals that most often damage ancient manuscripts, such as moths and cockroaches, smearing citronella oil on damaged manuscripts, and rewriting manuscripts whose writing has begun to fade.

Officers face difficulties due to a scarcity of tools and materials for conservation and a shortage of expertise and financial resources. The limited availability of tools for repairing physical conditions from damaged manuscripts makes at the North Sumatra Provincial State Museum challenging to restore. The North Sumatra Provincial State Museum still lacks funds (budgets from the government) to provide damaged tool restoration manuscripts. Despite these challenges, restoration efforts continue through manual methods, such as stitching loose paper sheets together to restore cohesion (Figure 3 and 4).

Figure 3 Drying of ancient manuscripts.

Figure 4 Dehumidifier as a room humidity regulator.

The arrangement and storage of ancient scripts at the North Sumatra Provincial State Museum involve placing them inside iron and glass rack cupboards. However, due to limited exhibition space, no ancient scripts are displayed, increasing the risk of theft and vandalism in the absence of adequate supervision by museum staff. In contrast, the Jakarta National Museum, located in the capital city, has made notable progress in restoring damaged manuscripts through the use of advanced technological tools, facilitating the repair process.

As per the information provided by research informants, it is essential to ensure that ancient manuscripts are free from diseases, germs, insects, fungi, and other contaminants. To achieve this, fumigation is conducted regularly by the museum's conservation team throughout the exhibition rooms. Specific chemicals are used to fumigate the entire museum space, effectively eliminating pests and safeguarding the entire collection, particularly ancient manuscripts. This routine fumigation activity is conducted every three months in each exhibition room, maintaining environmental conditions conducive to preserving ancient manuscripts, with temperatures maintained at approximately 60 °F-70 °F (22°-25°C) and humidity levels between 45% - 55% RH. These measures are essential for protecting the invaluable ancient manuscript collection from damage caused by pests and environmental factors.

The North Sumatra Provincial State Museum has an initiative to counter minor damage to its paper-based collection. Using finely pounded wood charcoal and placing it close to the manuscripts, they aim to maintain the quality and durability of ancient manuscripts on display. With well-maintained temperature and humidity conditions, ancient manuscripts in the State Museum of North Sumatra Province are well-preserved and less prone to damage. In addition, efforts to maintain the quality and durability of these ancient manuscripts are also a part of the museum's commitment to preserving regional history and culture. In addition, the existence of well-preserved ancient manuscripts is of added value for this museum in attracting public interest to visit and learn more about the history and culture of North Sumatra. Thus, efforts to maintain the quality and durability of ancient manuscripts are not only useful for museum collections but also as a means of increasing appreciation for Indonesia's cultural heritage. Awareness of the importance of preserving ancient manuscripts can also help raise public awareness about the importance of preserving cultural heritage.

3.3. Switch media technique

Digital conservation has transitioned from its early stages, heavily reliant on research and information sharing, to a nascent industry based on practical activities (Toth, 2020). Based on statements from informant research, According to information gathered from research informants, it is evident that preserving the authenticity of script content is paramount, yet to safeguard against unwanted occurrences such as theft, user negligence, natural disasters, and others, the North Sumatra Provincial State Museum has implemented a policy to transition from script-based to electronic/digital forms (Figure 5).

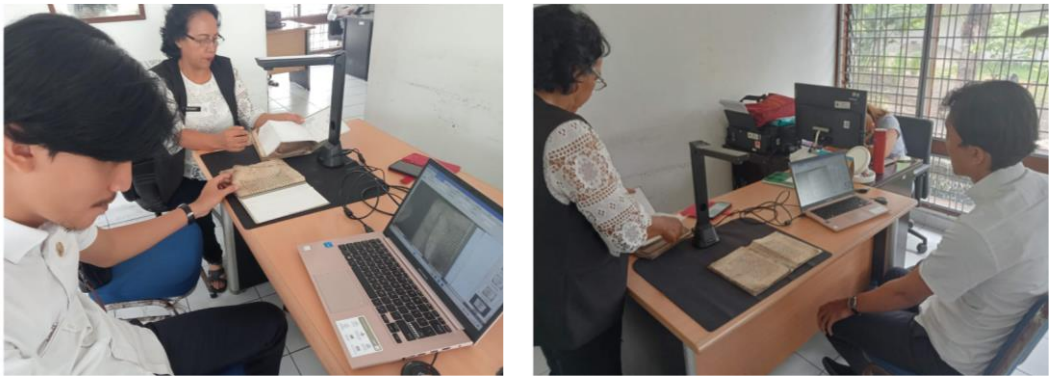

Figure 5 Switch media.

Media redirection involves transferring information from textual to electronic formats without compromising the integrity of the content to ensure greater efficiency and effectiveness. The State Museum of North Sumatra Province has digitized valuable ancient manuscripts to preserve the authenticity of the contents and prevent physical damage that could occur due to natural disasters or human error. Thus, the information contained in the manuscripts remains safe and can be accessed more easily. The media transfer equipment is a special scanner capable of producing high-quality images and special software to organize and store digital data. Digitized information makes it possible to conduct further research and expand the scope of information access for the wider community. Thus, this step not only maintains the sustainability of cultural information but also enriches knowledge and understanding of regional history and culture.

Profits generated from the media transfer activity include faster discovery processes, increased confidentiality of manuscript content, and optimized utilization of human resources, resulting in cost savings and efficient use of space for storing ancient manuscript collections. However, this activity is not conducted regularly by the North Sumatra Provincial State Museum and is short-lived. The museum has recently collaborated with the Medan City Library and Archives Service in 2022-2023 to undertake media transfer using scanning machines, converting media into digital formats. Digital preservation enables easy access to documents via the web from any part of the world (Rajan and Esmail, 2021).

Digital preservation paves the way for people to access documents easily if they are available on the web from any part of the world (Rajan and Esmail, 2021). With digital preservation, important ancient manuscripts can be widely and easily accessed by people from anywhere. This allows the valuable information in these ancient manuscripts to be spread and

accessed by researchers and history enthusiasts without physically visiting the museum. It is hoped that this media transfer activity can be the first step in efforts to preserve and disseminate information about valuable cultural heritage. Thus, not only academics and researchers can utilize valuable information from ancient manuscripts, but also the general public who are interested in history and cultural heritage. Through this easy and broad access, the younger generation can learn and appreciate existing cultural heritage without being limited by distance and place. Thus, digital preservation not only allows for wider dissemination of information but also maintains the continuity and diversity of cultural heritage in an ever-evolving world.

3.4. Conservation constraints

Based on the information from the participants, it is evident that the conservation activities for ancient manuscripts at the North Sumatra Provincial State Museum often do not proceed as planned. Various obstacles hinder the museum officers from achieving the desired outcomes in their preservation efforts; some of them are as follows:

1. Lack of HR (Human Resources)

The preservation of ancient manuscripts requires specialized skills and expertise. However, personnel at the State Museum of North Sumatra Province lack the necessary skills for effectively carrying out preservation activities. This limitation in expertise hampers the preservation process.

2. Lack of budget

Insufficient budgetary allowance from the government poses challenges for the Sumatra Provincial State Museum in acquiring advanced tools and equipment for restoring damaged manuscripts. Adequate funding is essential for ensuring the proper maintenance of manuscript collections and facilities, which, in turn, impacts the quality of services provided to visitors.

Addressing these issues requires attention from the local government, as the preservation of historical artifacts housed in the State Museum of North Sumatra Province is crucial for providing insights into the history of the Indonesian people.

4. Conclusions

The State Museum of Sumatra North in Medan employs various methods to preserve its collection of ancient manuscripts. These methods include fumigation to eradicate animal and fungal infestation. Additionally, to prevent the manuscripts from becoming brittle and fragile, they were smeared with lemongrass oil in one direction and stored in a shaded area. The conservation process also involves the application of a chemical gel to deter pests and using paper napkins for further protection. Experts in ancient script preservation were invited to conduct seminars for the museum's preservation and conservation staff to ensure the ongoing care of these manuscripts. However, museums face several challenges regarding preservation. These include a shortage of specialized tools and materials needed to conserve ancient scripts, a lack of human resources with the necessary expertise, limited financial resources, and the absence of a dedicated schedule for the preservation of these manuscripts. In addition, the space available for conducting conservation activities is inadequate.

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Ethical considerations

Not applicable.

Conflict of Interest

Authors declare no conflicts of interest.

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