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Conservation and preservation of philological collections at the Bengkulu State Museum

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ABSTRACT

Background: The Bengkulu State Museum houses a variety of rare collections that represent the culture of the Bengkulu people. One of the rare collections housed in this museum is the philology collection. The museum conducts conservation and preservation efforts to extend the lifespan of its philological collection materials. **Purpose:** This study examined the conservation and preservation methods used by the Bengkulu State Museum to protect its philological collection. **Methods:** The researcher used a descriptive qualitative method. Data was collected through interviews, direct observation, and document analysis. This research was conducted in March 2025. The data analysis had three main steps: coding the data, presenting or organizing the data, and drawing and checking conclusions. **Results:** The Museum used three main methods to protect the collection: active preservation, passive preservation, and digital preservation through digitization. **Conclusion:**. The Bengkulu State Museum carries out conservation and preservation activities for its philological collections through active and passive conservation measures. Active conservation activities are also optimized by using organic materials, such as spices, to reduce reliance on chemicals in collection care. Passive conservation includes implementing collection care procedures as outlined in the Collection Care SOP. Digital preservation involves converting the philological collection into a digital format. **Implications:** The findings highlight the need to enhance funding, facilities, and the availability of qualified experts to support optimal conservation practices. The use of natural materials and collaboration in digital preservation are crucial strategies to address limited resources and ensure the sustainability of collection preservation.

Keywords: Philological conservation; Philological preservation; Museum; Digital preservation; Museum information management

INTRODUCTION

Philological collections are part of cultural heritage with high historical, academic, and aesthetic value. According to Maryuana et al. (2021), philological collections are collections of ancient manuscripts that serve as the main objects of philology study. Various aspects of past life, with all its limitations, can be explicitly known through philological

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manuscripts. Badrulzaman & Kosasih (2019) define philology as the study of classical literary works written in manuscripts, serving as documentation of information closely related to the past. The existence of these ancient manuscripts is a tangible manifestation of local knowledge passed down from generation to generation. This information can help people cope with future environmental changes by employing adapted strategies rooted in their culture and traditional experiences (Adam et al., 2022). This means preserving local traditions and knowledge is crucial to enable people to adapt more easily to future changes.

Museums are places that collect, protect, and show important artifacts from the past. Museums have a significant responsibility; as a result, they need strong safety systems, effective organization, and regular checks to ensure the document is secure (Siountri et al., 2019). Museums help protect local culture and knowledge, especially by preserving ancient manuscripts. Museums are more than just buildings for keeping artifacts; they also preserve ancient manuscripts that contain local knowledge and historical value. Therefore, the Bengkulu State Museum is a great place to study, especially its care for its philological collections. Based on field observations, 149 philological collections are still undergoing routine conservation and preservation at the Bengkulu State Museum. These collections consist of 122 bamboo collections, 9 rattan collections, 11 bark collections, 5 horn collections, and 2 stone collections. A conservator at the museum explained that preservation and conservation generally use organic materials. However, each material requires a different treatment method based on its characteristics. The philological collections stored in the Bengkulu State Museum's collection room are mostly regional philological collections that use the Ulu script, one of Indonesia's cultural treasures that developed between the 17th and 19th centuries AD.

The Ulu script serves as the traditional writing system of South Sumatran communities and is academically recognized as part of the Ka-Ga-Nga script family. The Ka-Ga-Nga script, which first appeared in the 13th century, is used to write syllables (a mix of one consonant and one vowel). The Ulu script originates from a mixture of Old Malay and Sanskrit. The system includes 16 main letters and 9 additional symbols to represent different sound combinations (Saputra et al., 2023). The Ulu script is a writing system used to transcribe the sounds of local languages. This script is used to write different types of messages. This script is typically used in the southern coastal area of Sumatra, particularly by the Pasemah, Serawai, Rejang, and Lembak ethnic groups. They have used it for a long time to help them communicate and keep vital information secure (Muslihah & Asmara, 2019). Previous studies have examined conservation and preservation strategies for ancient manuscripts in museums. Wahyuningsih et al. (2019) found that the Serawai people in South Bengkulu save and protect their manuscripts using local methods such as smoking them, sprinkling rice water, and applying candlenut oil, kandis, or jackfruit sap to deter insects and mold. Alfadil et al (2022)

explained that it is crucial to present information in a new way based on local knowledge, so that it can still be preserved even if the original manuscript is damaged. Meanwhile, Nur'aini (2025) in her research at the North Sumatra State Museum found that the care of ancient manuscripts is challenging due to insufficient skilled personnel, insufficient funding, and inadequate storage facilities. These three previous studies provide useful insights into protecting manuscripts by examining local culture, the essential messages in the manuscripts, and the problems they face.

However, previous studies have mainly focused on specific aspects of manuscript preservation, such as traditional conservation methods, knowledge preservation, or challenges in preservation practices. The integration of active preservation, passive preservation, and digital preservation within a single preservation framework, particularly in the context of museum philological collections, has received limited attention. Therefore, further research is needed to examine how these conservation and preservation approaches can be implemented collectively at the Bengkulu State Museum. As manuscripts age, it becomes harder to care for them, so they need better conservation and preservation to protect them. According to Rachman (2017), preservation refers to the protection of the intellectual content of information through preservation management activities, including the development of policies, strategies for restoring information records, and the improvement of human resources in maintaining and safeguarding information media from various factors that may cause damage or destruction.

Meanwhile, conservation refers to efforts to maintain and improve the physical condition of library materials, using both traditional and modern methods to protect them from various damaging agents (Rachman, 2017). In practice, conservation can be categorized into active conservation and passive conservation. Active conservation focuses on the repair and restoration of manuscripts that have already suffered damage, whereas passive conservation emphasizes the prevention of deterioration by controlling and maintaining a safe, stable storage environment. Digital preservation also helps to protect these collections for the future. The museum faced challenges such as limited resources, outdated maintenance practices, and a lack of technology. Because of that, this study focused on how the museum used active and passive conservation to protect its old manuscripts from damage and loss.

RESEARCH METHODS

This research used a qualitative descriptive approach. Qualitative research means studying people and their actions by collecting and analyzing information in the form of words, both spoken and written, rather than in the form of numbers. The researcher does not attempt to calculate or quantify the qualitative data obtained and thus does not analyze them numerically (Afrizal, 2016). In this study, the researcher explained the types of libraries owned by the museum, the condition of the philological collection at the Bengkulu State Museum, the preservation techniques applied, the active and passive conservation methods used, the digital preservation efforts undertaken, and the challenges encountered in

conservation and preservation activities. The selected research informants were chosen through purposive sampling, namely, selecting informants according to specific considerations and research objectives. In selecting informants, the informants' positions and roles in managing the museum's collection space were considered. Therefore, someone was needed who played a direct role in philological management activities at the state museum. Informant 1 in this study was the head of conservation in the museum's conservation room and acted as the key informant. Informant 2 was a museum curator who currently holds additional responsibilities as a collection conservator and has been involved in collection conservation activities for the past three years.

Table 1
Informants' data

No.	Name Initial	Gender	Profession	Initial in Article
	HS	M	Conservator	Informant 1
	SU	F	Curator/Conservator	Informant 2

Source: Bengkulu State Museum, 2025

Table 1 presents the research subjects, a conservator and curator in the museum's collection conservation room, who are directly involved in the conservation and preservation of all collections at the Bengkulu State Museum. The object of this study is the philological collection housed at the Bengkulu State Museum, including how conservation and preservation methods are applied and the challenges in preserving the collection. This research was conducted in the Collection Room of the Bengkulu State Museum in March 2025. The research instruments used included an in-depth interview guide, observation sheets, and documentation study guidelines. The interview guide was designed to elicit detailed information from informants; the observation sheets were used to record conditions and conservation activities in the collection room; and the documentation guidelines helped researchers collect archives, notes, and photographs as supporting data. All of these instruments were designed to facilitate data collection in line with the research's needs and objectives. The data analysis technique used was Miles and Huberman's interactive model, which includes data reduction, data presentation, concluding, and verification (Afrizal, 2016). Data reduction involved selecting and coding interview and observation data to make the data more focused and organized. Data presentation was conducted in narrative form and in category tables to facilitate readers' comprehensive understanding of the research findings. The final stage was drawing conclusions and verification, namely formulating provisional conclusions and rechecking the data to ensure their consistency with field conditions.

RESULTS AND DISCUSSION

The Bengkulu State Museum has eight collections consisting of fossils, woven items, sculptures, old photographs,

stamps, manuscripts, and various clay containers. Each collection has its own characteristics and historical value. Therefore, to provide a clearer picture of the types of collections owned by the Bengkulu State Museum, a description of each collection is presented in Table 2 as follows:

Table 2
Types of Collections in the Bengkulu State Museum Library

Collection Type	Definition
Biological	The biology collection consists of 37 collections containing human skeletons, preserved animals, plants, and fossils.
Ethnographical	The ethnography collection consists of 2,764 collections, including cultural objects still in production and no longer in use, such as ceremonial objects, weapons, woven goods, traditional weaving, hunting equipment, agricultural tools, maritime equipment, art objects, and other life necessities.
Archaeological	The 90 archaeological collections comprise cultural objects spanning prehistoric times to colonial influences, including stone axes, drums, burial jars, megalithic burial goods, and statues from the Hindu-Buddhist period.
Historical	The historical collection comprises 8 collections of cultural objects from historical events, including historical documents, important letters, and old photos.
Numismatics and Heraldry	The 1,187-piece numismatic and heraldic collection consists of various types of currency or legal tender, as well as official decorations, emblems and ranks, including seals and stamps used in the past.
Philology	The philological collection comprises 149 collections of ancient manuscripts that describe events related to social life, including manuscripts, old manuscripts, and written materials of linguistic and historical value.
Ceramics	The ceramics collection comprises 1,901 items, including fired-clay containers.
Technology	The 15-piece technological collection consists of objects that depict the evolution from traditional to current technology.

Source: Bengkulu State Museum, 2025

These collections are stored in a specialized storage area called a museum storage. Damage to books, documents, and digital resources is exacerbated by factors such as humidity, pest attacks, and inadequate facilities, significantly shortening the shelf life of library materials (Mesagan et al., 2024). Among managed collections, ancient philological collections are the most vulnerable to damage and require more intensive attention and care. Hanum et al. (2023) reveal that Indonesia's tropical climate, coupled with various insects,

microorganisms, animals, and chemical factors such as heat, humidity, and light, poses a threat to the preservation of library collections, such as manuscripts. Based on informant data, the vulnerability of this manuscript collection stemmed from the philological materials being organic, making them more susceptible to degradation from various environmental factors.

> "This philological collection contains various information, such as advice, family genealogies, traditional medicine, spells, and folk tales that can represent the identity of the Bengkulu community" (Informant 1, interviewed, March 7, 2025).

The condition of the collections at the Bengkulu State Museum varies; some are well preserved, while others are damaged by age, environmental factors, and inadequate care. If ancient manuscripts are not promptly restored, they risk being lost, potentially depriving us of their valuable writings. As a result, the local knowledge contained within these texts may no longer be passed on to future generations (Sajeer et al., 2024). Based on the observation results, the condition of the eight collection types at the Bengkulu State Museum varied, ranging from minor to severe damage. Although the percentage of damage for each collection type could not be precisely determined due to the large number and diversity of collections, observations revealed three main forms of deterioration: physical, chemical, and biological. Physical damage was identified through cracks, fractures a nd missing parts of the collections. Chemical deterioration was indicated by discoloration and the degradation of collection materials, while biological deterioration was characterized by the presence of mold, termites, ants, and other organisms that could damage the collections. The most common reasons are aging, improper storage, and improper handling, with fungi and other organisms accelerating the damage (Rachman, 2017). As explained by Hanum et al. (2023), a lack of public understanding of manuscript preservation has led to many ancient texts being found damaged or poorly maintained. A relevant example is provided by Fakhriati et al. (2025). Researchers studied the Sarakata manuscript from Aceh and found that it retains cultural and artistic value, despite dating to the 19th century. The problem is that when ancient documents are not protected, they risk losing knowledge or information from the past.

At the Bengkulu State Museum, insects and fungi have damaged the texture of collections, such as bamboo and bark. These tiny organisms thrive by decomposing paper, leather, and parchment using the chemical they produce, cellulase (Menicucci et al., 2023). This condition was further exacerbated by high humidity and poor ventilation in the storage room. Meanwhile, chemical damage could weaken old paper, making it more prone to tearing and cracking. Over time, this created holes in manuscripts. This occurred due to the chemical degradation of the cellulose structure, often caused by exposure to certain chemicals and uncontrolled changes in temperature and humidity. Narendra (2021) also notes that air

containing pollutants such as vehicle exhaust and dust particles accelerates the deterioration of manuscripts' organic material, making them more susceptible to decay. Overall, these biological and chemical factors contribute to the deterioration of philological collections, so appropriate conservation measures are needed to prevent further damage. Based on Government Regulation [PP] No. 19 of 1995, which explains that a museum is an institution, a place to store, maintain, secure, and utilize material evidence of human and natural culture and its environment to support efforts to protect and preserve the nation's cultural wealth (Indonesia, 1995). According to this regulation, the museum is obligated to properly maintain, secure, and preserve historical collections, such as ancient manuscripts. In accordance with this regulation, the Bengkulu State Museum applies several conservation techniques, including active conservation, passive conservation, and digital preservation.

Active conservation is an action carried out by conservators, either directly or indirectly, aimed directly at the conservation object to extend the collection's life cycle (Rachman, 2017). Essentially, active conservation focuses on maintenance efforts aimed directly at the object to ensure the collection remains durable and well-preserved.

> "The active conservation efforts undertaken at the Bengkulu Provincial State Museum aim to prevent changes resulting from various sources of damage and to ensure the long-term preservation of the collection" (Informant 1, interviewed, March 7, 2025).

This statement was further emphasized through an explanation of the technical implementation in the field.

> "Active conservation, particularly based on the type of collection material at the Bengkulu State Museum, is not carried out on a schedule, because each collection material has different characteristics and requires different methods and levels of conservation treatment. Therefore, the application of active conservation to each type of basic collection material is carried out based on the level of urgency and preservation priority" (Informant 1, interviewed, March 7, 2025).

The following are the active conservation processes applied to various types of philological collection materials at the Bengkulu State Museum:

First, Collection Selection and Observation. Before determining the appropriate conservation method, conservators first conduct a selection process on the ancient manuscript collection. During this process, conservators evaluate the collection according to a predetermined conservation schedule, ensuring that all conservation work is carried out systematically and in accordance with priorities. This method helps the museum identify which items require additional care. The museum then inspects the collection for condition, such as dust, mold, or insects.

Figure 1. Use of Dry Tissue in Manuscripts
Source: Bengkulu State Museum, 2025

Figure 1 shows the conservator at the Bengkulu State Museum cleaning a collection's surface with a dry tissue. The documentation was taken during weekly conservation activities in the museum's conservation room.

> "Cleaning with dry tissues is only applied to ancient collections that are in good condition and show no signs of damage. Therefore, the cleaning process is limited to the outer surfaces or covers of the manuscripts to remove accumulated dust and dirt" (Informant 2, interviewed, March 7, 2025).

This cleaning activity aims to reduce the risk of damage from dust accumulation, mold growth, and insect infestation, which can threaten the physical condition of the collection and its preservation.

Second, Chemical Care and Preservation. To protect and preserve collections, the museum uses special chemicals on the exterior of these objects. This helps prevent rapid mold and harmful microorganism growth. Rachman (2017) states that traditional preservation practices, such as the use of incense and citronella oil to protect manuscripts from insects, are still used today to help maintain their safety.

Figure 2. Manuscript coated with citronella oil
Source: Bengkulu State Museum, 2025

Figure 2 shows a conservation activity in which a museum conservator applies lemongrass oil to the exterior of the collection. The citronella oil is applied using a cleaning cloth moistened with a predetermined amount of oil according to established procedures, then gently rubbed onto the surface of the collection. This is performed as a preventive measure to maintain the collection's physical condition and reduce the risk of damage from insects and other harmful organisms. At the Bengkulu State Museum, citronella oil is used as a natural way to repel insects and termites from ancient documents. Citronella oil can naturally repel insects, thus helping protect ancient manuscripts from insect damage. This view is supported by Ekarini et al. (2020), who state that citronella oil can slow fungal growth on wood, and a 3% concentration can reduce termite and mold attacks. However, this method should be used with caution, as the natural chemicals in citronella oil might damage the delicate fibers in historical collections.

Third, Wrap the Collection in Acid-Free Paper. The Bengkulu State Museum used acid-free paper to wrap ancient manuscripts, protecting the philological collections from dust, insects, and environmental damage.

Figure 3. Process of Wrapping Philological Bark
Source: Bengkulu State Museum, 2025

Figure 3 shows the process of packaging the bark manuscript collection carried out by the museum's conservator. The packaging process uses acid-free paper, whose size and shape are adapted to the collection. The use of acid-free paper aims to provide extra protection for the collection from various factors that can cause physical and chemical damage. This conservation activity is carried out regularly to preserve the museum's philological artifacts and ensure the collection remains well-preserved and safe in the long term.

Acid-free paper is used because it has a neutral or slightly acidic pH, thus maintaining chemical stability. This pH level slows the hydrolysis of cellulose, the main component of paper, making it weak or brittle (Cirone et al., 2023). As ancient manuscripts are often made from cellulose-organic materials, such as plant fibers or tree bark, the use of acid-free paper is crucial for their preservation.

Fourth, Returning the Collection to the Storage Cabinet. After conservation, the collection is returned to a special storage space.

Figure 4. Condition of the Philology Storage Cabinet
Source: Bengkulu State Museum, 2025

Figure 4 shows the storage conditions of the bamboo manuscript collection, housed in glass-paneled cabinets. These cabinets serve as storage to protect the collection from dust, insect infestation, and other environmental factors that could cause damage.

> "However, storage effectiveness can be improved by using refrigerated cabinets that can maintain a more stable temperature" (Informant 1, interviewed, March 7, 2025).

Philological collections require a controlled storage environment due to their organic materials, making environmental conditions a key factor in determining their durability. Because the base materials for the philological collections at the Bengkulu Provincial State Museum are diverse, specialized conservation methods tailored to each material are required. Table 3 presents the active conservation process for each type of base material for the collection at the Bengkulu State Museum.

Table 3
Conservation Techniques Based on Collection Material Type

Collection Type	Active Conservation Process	Additional information
Bamboo	- Wear latex gloves for observation. - If moldy, use a tissue soaked in citronella oil, apply it, and let it soak in. - If insects are present: Spray with an insecticide such as Baygon, let it dry, and then wrap it in acid-free paper.	- Identify whether the collection is dusty, moldy, or termite-infested. - The storage area is filled with strong-smelling spices such as cinnamon, cumin and cloves.
Tree bark	- The collection is wrapped in acid-free paper. - If insects are present, spray insecticide from a distance on the collection to prevent the manuscripts from getting wet, as this can increase the risk of mold growth.	- The storage area is filled with strong-smelling spices such as wood, cumin and cloves.
Rattan	- Lubricate the rattan collection with citronella oil if mold is present. - In the storage area, spray insecticide to prevent insects and termites.	- The storage area is filled with strong-smelling spices such as cinnamon, cumin and cloves.
Horns and Stones	- If moldy: Wipe the collection with tissue and citronella oil, then clean and spray the storage area with an insecticide such as Baygon. Then, store it in its designated storage area.	- The storage area is filled with strong-smelling spices such as cinnamon, cumin, and cloves.

Source: Bengkulu State Museum, 2025

To optimize conservation in the museum's conservation room, the Bengkulu State Museum also conducts passive conservation of its philological collections. Passive conservation activities are measures taken to extend the life cycle of an object, including maintaining environmental conditions, regulating storage room lighting, and conducting surveys with implications for active conservation (Rachman, 2017). While active conservation is only performed when necessary, passive conservation is carried out daily to

maintain the collection's condition. This supports the findings of Hanum et al. (2023), who stated that regular care, combined with appropriate chemicals and advanced technology, can help ancient manuscripts survive for hundreds of years.

At the Bengkulu State Museum, passive conservation includes several methods, such as:

First, Temperature and Relative Humidity Monitoring in Collection Rooms. High temperatures and humidity can slow the drying process and significantly raise the risk of mold growth and insect damage to the collections (Elnaggar et al., 2024). To protect the physical condition of manuscripts, storage rooms are kept at 20–26^{o}C with 46% humidity.

Figure 5. Thermohygrometer in the Museum Conservation Room
Source: Bengkulu State Museum, 2025

Figure 5 shows a thermohygrometer used to monitor temperature and humidity in the Bengkulu State Museum's collection storage room. Regular measurements are taken to ensure ideal environmental conditions, support collection preservation, and minimize the risk of damage due to changes in temperature or humidity. Based on ANRI Regulation No. 31 of 2015, Article 33 states that temperature and humidity can be measured using a thermohygrometer, a combination of a room thermometer and a hygrometer (ARSIP NASIONAL RI [ANRI], 2015). If humidity levels exceed recommended limits, steps that can be taken include increasing air circulation by opening windows and turning on air conditioning or fans. Conversely, if the indoor temperature is too high, exhaust fans will be activated to control air circulation in the collection storage area.

Second, Maintaining the Cleanliness of the Collection Storage Areas. Wood is an organic material composed primarily of cellulose, hemicellulose, and lignin (Ekarini et al., 2020). Wooden storage cabinets and ancient manuscripts made from organic materials are potentially vulnerable to pest infestation in museum collections. The primary risk for wooden objects is insect infestation. To minimize this damage, the conservation method employed is chemical treatment, with chemicals sprayed directly onto the wood surface.

Figure 6. Insect Prevention Using Baygon Insecticide
Source: Bengkulu State Museum, 2025

Figure 6 shows pest control activities in the collection storage area by spraying insecticides inside the storage cabinets. This activity is carried out as a preventive measure against attacks by harmful organisms, such as termites and ants, which can affect the physical condition of the collections. By controlling the storage environment, the risk of biological damage to collections can be minimized.

Third, Light and Radiation Control. Dry organic materials are quite sensitive to light, especially visible and ultraviolet (UV) light, making them easily damaged (Bromberg, 2020). That is why it is vital to control the amount of light entering the storage area. Too much light can dry out the material and cause damage, especially from UV exposure. In museums, artificial lighting is used at safe brightness levels to protect collections. This aligns with Nurmustafha et al. (2024), who stated that the use of safe lighting during manuscript storage can reduce the risk of light-induced damage.

Fourth, Implementation of Collection Handling Procedures. At the Bengkulu State Museum, the philological collection follows the Standard Operating Procedure (SOP), one of the museum's passive conservation strategies to preserve its collections. The process starts with the appointment of a collection care team through an official letter (SK/SPT). This team checks items in both the exhibition hall and storage area to identify which objects need attention. They collect detailed information about the condition and extent of damage to each item and determine the necessary conservation steps. They then prepare a list of required materials and tools and begin the treatment using appropriate conservation techniques as guided by the SOP. Following treatment, the items are quarantined, reported to the head of the collections division, and returned to their proper place based on their respective collection cards. To ensure the collection remains well-preserved, the museum also follows strict SOPs regarding storage conditions, security, and researcher access to the storage area. After implementing active and passive conservation, the Bengkulu State Museum also conducts digital preservation activities to maintain the value and information contained in its collection. According to Malekani & Wema (2024), preservation means taking steps to protect library materials ot items by ensuring proper security, controlling the environment, storing items correctly, and handling them with care. The primary goal of this practice is to slow

chemical deterioration and prevent physical damage to these materials.

Preservation encompasses actions to prevent damage to library materials, both printed and non-print. Since replacing permanently damaged items can be very expensive, preserving them can help save money. Therefore, preservation is crucial not only for protection but also for its economic value (Adeyeye & Akinlonu, 2024). At the Bengkulu State Museum, one method of preserving collections is to digitize them. This process is called digitization. Digitization involves converting physical items into digital format by taking photographs or making digital copies, as explained by Siti Khadijah et al. (2021). The main goal of this process is to digitize documents and preserve philological collections, making information more accessible while protecting the original materials from damage caused by direct handling.

According to Hanum et al. (2023), long- term protection of ancient manuscripts includes steps such as digitization, publication, and providing open access through online platforms. These methods help reduce physical contact with the originals and prevent damage from theft, vandalism, or incorrect treatment. According to the informants, in 2022, the Bengkulu State Museum used photography to digitize its philological collections. The Bengkulu State Museum worked together with the Regional Library and the National Library to complete the digitization. Acker (2021) explains that to help the public access cultural heritage more easily, teamwork and integrated systems are needed, such as a single software platform across museums and libraries. This collaboration can help the museum address challenges such as insufficient tools, staff, or funding for digital preservation. The museum focuses on preserving philological collections, especially for ancient manuscripts. Before the preservation process starts, the museum team records the collection by classifying and identifying each manuscript.

Several processes are involved in identifying museum collections. The first involves recording each item's name and registration number, which serves as the primary identifier of that item. The museum also collects information on the provenance of items to understand their history and cultural background better. In addition, photographs are taken to demonstrate the current physical condition of each item. Each collection is then described in more detail, including its background story, special features, and other important facts. This helps the museum better identify each item's identity and value. Various hardware and software support this process. The hardware includes digital cameras, memory cards, computers, laptops, and printers. For software, the team uses Microsoft Word for note-taking, Adobe Photoshop for image editing, and iLoveIMG for converting image formats. After the photography process is finished, the most suitable images are selected and edited in Adobe Photoshop to improve their visual quality. Next, the edited photos are added to a digital document, with regular checks to ensure the data obtained is not lost. To prevent data loss, the museum implements a backup strategy across multiple storage media, including external hard drives and flash drives. According to Denanty et al (2023),

this is appropriate because it is relatively easy to implement and back up, with low risk but very significant benefits. Through backup, a copy of the digital collection is available so that if the access file is damaged, it can be retrieved from the backup and does not need to be converted again. Access to this digital collection can be provided to the general public, provided that the objectives are clear and verified. In addition to files and images in JPG and PNG formats, the Bengkulu State Museum also printed several collections of ancient manuscripts that had suffered severe damage. This effort was undertaken to ensure that the information in the collection was not lost when the original manuscript collection was destroyed. This is also in accordance with Fatmawati (2022), who notes that a simple digital reproduction method is to make duplicates or copies of materials without damaging their authenticity. Materials that have been digitized are reproduced back into form, whether written, printed, or recorded. This is done to maintain the authenticity of the collection and to preserve the information content of materials, especially those that are easily damaged, unique, or already classified as rare. This process allows ancient manuscripts vulnerable to physical damage to remain accessible without diminishing their information value. Funding for digital preservation activities comes from the State Budget (APBN) and Regional Budgets (APBD). Collaboration with various institutions is a strategy museums use to overcome budget constraints in preserving philological collections. The digitized results are then stored on the museum's internal server as part of its digital archive management efforts.

In the process, preservation activities at the Bengkulu State Museum face several challenges. One of the main challenges in preserving museum collections stems from the sensitive and fragile nature of the materials (Poliakov & Smirnova, 2019). At the Bengkulu State Museum, another main challenge was budget constraints, which prevented the museum from acquiring the modern equipment necessary for long-term preservation. These limitations reduced the ability to support conservation work, especially when technology might help conservators work more efficiently. Furthermore, the museum lacked certified conservation experts, making it more difficult to care for manuscripts that required extra treatment. Due to a lack of trained professionals and limited training opportunities, skill levels in the proper use of conservation methods remained low. Conservation facilities in the museum remained inadequate to support the preservation, and without the right tools, it was difficult to carry out preservation work effectively and ensure the long-term sustainability of documents. For any institution aiming to improve its preservation program, it is crucial to go beyond written literature. Instead, direct communication and collaboration with experienced professionals from other institutions can provide practical insights and guidance that support more effective conservation efforts (Baker, 2021). This study found that the Bengkulu State Museum faced challenges such as limited budgets, inadequate equipment, and a lack of trained experts, similar to those faced by museums across Indonesia. This contrasts sharply with what is happening in other parts of the world. In many

countries, digitization is now a key means of protecting collections, especially ancient manuscripts stored in museums, libraries, and archives (Savino & Tonazzini, 2022). Digitization not only supports conservation efforts but also significantly improves public access to cultural heritage materials. According to Harisanty et al. (2024), artificial intelligence (AI) has been used in China to identify ancient coins without damaging them and to expedite the recording of historical buildings using 3D visualization tools. These developments demonstrate how fast technology is evolving and how museums in Indonesia need to adapt more quickly to their preservation challenges. By sharing ideas and information on how to preserve collections sustainably, Indonesia can enhance its policies and address challenges such as budget and equipment limitations (Rachman et al., 2023). If these challenges are tackled effectively, museums in Indonesia can make significant contributions to fostering scientific progress, particularly in philology and manuscript preservation.

CONCLUSION

The Bengkulu State Museum carries out conservation and preservation activities for its philological collections through active conservation, passive conservation, and digital preservation. The museum's use of spices is one effort to reduce dependence on chemicals in collection care and protect conservators from potential irritation or long-term health risks. Meanwhile, passive conservation in the museum's collection space includes implementing collection care procedures in accordance with the Collection Care SOP. Digital preservation involves transferring philological collections into a digital format. All transferred collections are included in the philological collection category. Based on the research results, the Bengkulu State Museum has attempted to implement conservation and preservation activities for its philological collections to extend their physical lifespan and preserve the information they contain. This research is descriptive in nature; further studies using evaluative and quantitative approaches are needed to measure conservation effectiveness, assess the risk of collection damage, and develop a sustainable digital management model for philological archives. This research is limited by the conservation facilities and infrastructure available at the research site. The lack of conservation equipment limits data collection, particularly in terms of the diversity of conservation methods available for analysis. This also hampers more in-depth studies of digital preservation processes. Therefore, further research using a quantitative approach and involving institutions with more comprehensive conservation facilities is recommended to obtain more comprehensive results.

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The authors declare that there is no conflict of interest.

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