

Digital Preservation of the Ancient Manuscripts of Legok Kolot Indramayu

Ute Lies Siti Khadijah¹, Ayu Apliliani², Rully Khairul Anwar³, Ipit Zulfan⁴, Edwin Rizal⁵

¹Department of Communication and Information, Universitas Padjadjaran (ute.lies@unpad.ac.id)

²Department of Communication and Information, Universitas Padjadjaran (ayuapriliani28@gmail.com)

³Department of Communication and Information, (Universitas Padjadjaran (rully.khairul@unpad.ac.id))

⁴Department of Mass Communication, (Universitas Padjadjaran (ipit.zulfan@unpad.ac.id))

⁵Department of Communication and Information, (Universitas Padjadjaran (Edwin.rizal@unpad.ac.id))

Abstract. Indramayu Regency has many ancient manuscripts that remain scattered in its society. However, the owners of this ancient manuscript are still reluctant to open or lend them for research material. The reasons are various, starting from the fear that the ancient manuscripts will be damaged to the fear of their ancestors' curse if opened carelessly. One of the manuscripts in the Indramayu Regency is the ancient Legok Kolot manuscript stored in the Darul Ma'arif Legok Lohbener Islamic Boarding School, Indramayu. This study aims to describe the efforts to preserve the Legok Kolot manuscript through the digitization process carried out at the Holy Grave of Prabu Geusan Ulun, Indramayu Regency. This research uses a descriptive-qualitative method where the research data obtained by observation, interview, and documentation study techniques. This research produces a digital manuscript of the Legok Kolot manuscript. The hope is that this digital script can be accessed quickly, adds insight and knowledge to the broader community who reads it and can become one of the identities and cultural riches of the Indramayu people.

Keywords: *Digitalization; Ancient Manuscripts; Legok Kolot; Indramayu*

1. INTRODUCTION

Indramayu Regency is one of the places that keeps many relics of ancient manuscripts. The community and elders keep manuscripts. Unfortunately, many Indramayu people are reluctant to open and even lend to reveal its contents, because they consider the ancient manuscripts to be relics of their ancestors that cannot be opened carelessly (Oet, 2019). Suparto Agustinus, Manager of the Museum and Antiquities of the Indramayu Regency Culture and Tourism Office, said that many ancient manuscripts are in poor condition (Oet, 2019). One of the main reasons is because there are still many people who do not know how to care for ancient manuscripts properly. Improper handling of ancient manuscripts can damage the manuscript itself.

One of the relics in Indramayu Regency is the ancient Legok Kolot manuscript in the Holy Tomb of Prabu Geusan Ulun, which is located in Legok Kolot Village, Loh Bener, Indramayu Regency. The Legok Kolot script has dimensions of about 700cm in length and 30cm in width. The Legok Kolot manuscript is now stored in the grave area of Prabu Geusan Ulun and guarded by the board of the Darul Ma'arif Islamic Boarding School, Legok Lohbener, Indramayu Regency, West Java Province.

Ancient manuscripts are objects of ancestral heritage that must be preserved—ancient manuscripts as human remains in the past contain high-value information.

Ancient manuscripts usually contain various historical events, information, and cultural existence in the past. The content varies, such as religion, history, customs, mythology, philosophy, politics, language, literature, astronomy, moral teachings, building arts or architecture, economic systems, technology, food, traditional medicine, plants, rituals, and prayers. (Ahmad, 2018: 623-624).

However, there are several obstacles to accessing the ancient manuscript. The first is that the ancient manuscript is one of the rare collections. Not everyone has access to ancient texts, only certain people and institutions. According to Hadira Latiar (2018), one of the classic problems that are quite serious is that there are still many ancient manuscripts stored between humans or individuals. According to Pudjiastuti (2018), if the script owner is a closed-minded person, they are reluctant to inform the existence of their old manuscript to be recorded and digitized. They worry that the published manuscripts will be damaged and believe that their knowledge can only be passed from one generation to another orally. As a result, collecting, saving, preserving, and using ancient manuscripts encountered obstacles. The head of the Sri Baduga Museum, Ester Miori Dewayanti in Zuli Istiqomah (2017), said that the Sri Baduga Museum only has 170 religious texts. Law of the Republic of Indonesia, Number 5 of 2017, concerning the Advancement of Culture article 41 letter d, states that everyone has the right to obtain information about culture, one of which is ancient texts.

With advances in technology, personal work has become more comfortable. By utilizing technology, access to ancient manuscripts becomes more accessible, and more importantly, the original manuscripts, including their information content, can be appropriately maintained. The digitalization of ancient manuscripts is one way to explore and preserve historical information contained in ancient manuscripts (Anwar, Husain, & Jaya, 2018; Doumat, Egyed-Zsigmond, & Pinon, 2009; Sukmana, 2005). The digitization of ancient manuscripts is the process of converting the printed text into electronic documents. The purpose of digitizing this ancient manuscript is to avoid direct contact with the original ancient text when looking at the ancient manuscript's contents.

Several previous studies related to the digitization of ancient manuscripts included a 2019 article on "Presentation of the Center for the Study of New Testament Manuscript Study Center Presentation: Bridging the Gap between Ancient Manuscripts and Modern Technology" (Ladewig & Marcello, 2019). This study outlines the first aspect of the CSNTM mission: capturing live digital images of the Greek New Testament manuscripts with high-resolution digital equipment. In collaboration with similar libraries, CSNTM completes the preservation and presentation of cultural heritage artefacts through technological advances. Collaboration details, digitization procedures, and preservation practices and presentations are explored, providing a glimpse into the world of these digitizing artefacts. This article then turns to consider ways to improve digitization and, ultimately, the user experience. Meanwhile, CSNTM involves libraries, archivists, researchers, and students, supporting service partners to facilitate work. Everything is essential, allows CSNTM to preserve and provide access to the endowment.

Research conducted by Muhammad Tajuddin Anwar, Husain Husain, and Nenet Natasudian Jaya (2018), with an article entitled "Preservation of Ancient Sasak Old Manuscript Based on Digital and Website," explains that digitization requires equipment such as computers, scanners, operators, media, sources, and software. Perspective design, such as participatory design and systems design, influences interpretive methods and perspectives. Digitizing Old Sasak Manuscripts is an

interface design using the JQuery Mobile Framework and data storage using the MySQL database, while the programming language uses PHP. The test results show that this application can provide information following user needs, such as manuscript information in the form, Lontar, and Malay Arabic writing. The research conducted and the previous research is that the author focuses more on digitizing the Legok Manuscript, which is unique because it is in the form of a text with a length of ± 6 meters.

Another study on digital preservation of ancient manuscripts. First, a research entitled "Application of Media Transfer in Efforts to Preserve the Ancient Manuscripts of Tawheed in the Prince Sumedang Foundation Library," found that the digital information script contained in the manuscripts could be protected because digital manuscripts had supported the information (Rustandi, 2017). With the existence of digital scripts, those who need the information contained in the script do not need real scripts because digital scripts represent them. With the existence of digital scripts, those who need the information contained in the script do not need real scripts because digital scripts represent them. With digital scripts, it makes it easier to access the information contained in the script. To minimize damage to the original manuscripts, the Prince Sumedang Foundation library provides various digital manuscripts that can be accessed easily.

The issue of ancient manuscripts is regulated in the Law of the Republic of Indonesia Number 43 of 2007 concerning Libraries (Kementrian Hukum dan Hak Asasi Manusia Republik Indonesia, n.d.) (Kementrian Hukum dan Hak Asasi Manusia Republik Indonesia, n.d.). It states that all written documents that are not printed or reproduced by other means, both domestically and abroad, are at least 50 (fifty years old) and have important values for national culture, history, and science. Sudarsono (2009) states that ancient manuscripts are written on paper and on cloth, papyrus, copper plates, bones, horns, wood, bamboo, or other media, which can also be in the form of stone or clay slabs.

Until now, ancient manuscripts have become physical artefacts stored, for example, in library shelf space, or private collections. Although there are still many manuscripts that are stored, not a few are lost and destroyed. The manuscripts written on papyrus, parchment, and paper proved to be relatively durable. Only some people have access to these artefacts. The causes of limited access to these artefacts include economic, communication, or technology factors (Lied, 2019).

According to Muhammad Tajuddin Anwar, Husain Husain, & Nenet Natasudian Jaya (2018), there were several steps involved in digitizing ancient manuscripts, namely Pre-digitalization and Organizing. Pre-digitization is a process of physical activity in collecting, sorting and rearranging ancient manuscripts. While Organizing is a work process in the form of Scanning, Editing and Uploading activities with mechanisms According to Ladewig & Marcello (2019), there are several stages in digitizing ancient manuscripts:

- 1) The first stage is the examination of manuscripts as a prerequisite for digitization. Several types of data collected are content, date, material, physical dimensions, library shelf numbers, columns, and lines per page. Exclusive data not often found in other catalogues, including details such as the number of quires, leaves in each quire, and depth measurements. This stage will make it easier to reaches this script.
- 2) Furthermore, in displaying digital results, a single-lens reflex digital camera (DSLR) will be used. Experienced human resources will produce perfect product images and

quality. This perfection is a combination of working principles to produce precise and focused images, a 3:2 vertical ratio, horizontal alignment, square pages, balanced top, and bottom edges, and hole awareness. To get an excellent presentation, in the production process, always pay attention to each image or manuscript object's details. The camera used has a resolution capacity of up to 50 megapixels. Digital files from DSLRs are transferred directly to the hard drive on an available computer, either using a data cable or Bluetooth technology. Transferring digital data is carried out using specialized software according to the brand of the camera used. Computers exercise direct control in this digitization process, while cameras only take pictures or visuals of photo objects. In this stage, 2-3 photographer assistants assist the photographer.

3) The last stage is the post-production stage. A quality control process is in place to ensure that each image meets "practical perfection." These checks include things like focus review, naming conventions, margin alignment, all four sides of the image without cropping, size, and colour consistency of text from one page to the next, ensuring that all pages are loaded without skipping or duplicating, and file conversion.

2. METHOD

This research uses a qualitative descriptive approach, where the research conducted does not use statistical procedures or other quantification methods. Qualitative research does not use statistics, but through data collection, then the data is analysed. The data analysis results are interpreted with an emphasis on understanding social problems based on natural reality conditions (Anggito & Setiawan, 2018). This research provides an overview of preserving the Legok Kolot manuscript in the Holy Tomb of Prince Geusan Ulun, Indramayu Regency.

Literature study, interviews, and observations are methods in collecting research data. Interviews were conducted with informants from the Darul Ma'arif Islamic Boarding School Legok Lohbener Indramayu and Ki Tarka Sutarahardja - Founder of the Javanese Script Sanggar Kidang Pananjung Indramayu. Observations were made to obtain data and a description of the condition of the ancient manuscripts and to find out where the ancient manuscripts were stored.

3. RESULT AND DISCUSSION

The Tomb of Pangeran Geusan Ulun is located in Legok Kolot Village, Loh Bener District, Indramayu Regency. The holy gravesite of Prince Geusan Ulun has an ancient manuscript which is estimated to be hundreds of years old. This ancient manuscript is known as the manuscript Legok Kolot. This manuscript was passed down from generation to generation. The Legok Kolot manuscript is written in pegon language, on Daluang paper, the length of this manuscript is \pm 6.5 meters. Manuscripts are written on both sides of the daluang paper (Kelana, 2018; Permadi, 2005; Zulfikar, 2018) (recto-verso). His physical condition is still quite good, but the writing, on the other hand, is in an unclear condition because it is faded, and one end of the manuscript is shrunken and has holes in several parts. This Legok Kolot manuscript is stored by being rolled up covered with cloth and placed in bamboo.



Figure 1. Manuscript Legok Kolot ± 6.5 meters in length.
Source: (Khadijah, Zulfan, & Sujana, 2019)



Figure 2. The visual appearance of daluang paper, a typical Indonesian paper which is widely used as a medium for writing ancient manuscripts apart from palm leaves, animal skins, and bamboo.
Source: (Zulfikar, 2018)

So far, the Legok Kolot manuscript has never been presented to the public. The reason is, it is feared that it will accelerate the damage to the characters in the Legok Kolot manuscript. The text contains the history of Indramayu, which should be cultural heritage and identity and wealth for the people of Indramayu Regency.

The process of transformation or digitization of ancient manuscripts is carried out to prevent readers from direct physical contact with the original ancient manuscripts, so that information from the ancient manuscripts can be studied without damaging the physical origin. Rodiah, Khadijah, and Kurniasih (2017) stated that media transfer is needed to:

1. preserve the content and form of the script,
2. so that it can be used longer, and
3. can be used by people in need.

Before this research was carried out, the ancient Legok Kolot manuscript had never been digitized or transferred to digital data. Therefore, this manuscript needs to be digitized as an effort to preserve the nation's cultural heritage.

After everything is needed prepared, the next stage is the digitalization stage. In digitizing the Legok Kolot Manuscript at the Holy Tomb of Geusan Ulun, it will go through several processes, namely:

1. Pre-Digitalization Stage.

At this stage, pre-digitalization is an activity carried out before carrying out digitization activities. The aim is to prepare pre-determined equipment and ensure the manuscript's condition so that it is ready to be scanned. Two things need to be prepared in the pre-digitalization process, namely preparing the Legok Kolot script and preparing the tools used for the scanning process.

Preparing ancient manuscripts aims to produce good quality images, and all parts of the manuscript have been scanned successfully. Some things that must be done to prepare the manuscript are first, before removing the Legok Kolot Manuscript from its storage, determine in advance the best place to carry out digitalization activities.

In this place, the script should be able to stretch a length of $\pm 6,5$ meters. Besides, this location must get excellent and stable light even though we have lighting assistance. The goal is that when scanning, the resulting image is not dark and still has good quality. Because the scanning is done outdoors, it should be done in sunny weather conditions. Secondly, prepare the base with a black cloth so that the Legok Kolot script does not directly come into contact with ceramic tiles. Third, stretch the script straight so that it is easier when scanning. Make sure again the condition of the manuscript so that there are no parts that are folded and carefully open the shrinking part of the Legok Kolot script. Finally, the manuscript is made of a very light and easy-to-blow material, so that at the end of the manuscript is given a barrier. The purpose is given this hold so that the image does not shift and produce a straight image.

After the manuscript was successfully prepared, the next step was to prepare all the equipment so that the digitization process ran smoothly. The steps taken are the first to prepare and install a tripod. Make sure that the tripod is mounted firmly and adequately. Mount the camera and also adjust the height of the tripod to the script. The photos were taken must be the same size as the length of the stick that is the benchmark for shooting.

The next stage put the tripod and camera in the right position to produce excellent images. Make sure the tripod and camera position can produce a straight picture of the script. Next, connect the camera to the laptop with a data cable or Bluetooth technology, so that the visual produced by the camera can be seen through the laptop. Make sure the laptop battery power so that the laptop does not die during digitization.

2. Scanning the manuscripts.

Place the Legok Kolot manuscript in the designated position. Perform a scan with a DSLR camera that has been prepared. Because the ancient Legok Kolot manuscript has a length of ± 6 meters, the scanning process is carried out by starting the scan from the end of the Legok Kolot Manuscript and dividing it into several parts of the image. Use two markers that are differently shaped, making it easier to determine whether the image was scanned or not. So the first thing to do is to place the camera at the end of the Legok Kolot script. Then place markers A and mark B and paste them between markers A and markers B, leaving a fixed distance so that the image size remains the same. Lighting aids or lights will be highlighted in the direction of the script to be scanned. The operator will signal the person setting the lighting so that the image gets the ideal exposure.



Figure 3. Lighting settings on photo objects can get good photo results. The addition of an additional light will maintain a stable light intensity from one photo to another.

Source: (Khadijah et al., 2019)

3. If it is right, then the operator will take a picture and do the scanning process. If the picture taken is right, then the photo will then be saved. So what is done next is to move the stick next to marker B to give the right distance in taking photos. Make sure that the stick stays straight. After that, move marker A next to the stick. So, at this time, the position is the B-stick-A marker.



Figure 4. Position of the marker on the first take photoshoot

Source: (Khadijah et al., 2019)



Figure 5. Position of the marker for taking the second picture

Source: (Khadijah et al., 2019)

If it feels right, then the tripod and the camera will be shifted to the right position for scanning. If it is deemed to be in the right position, and the light is good, the operator will scan again and save the image. If you have a good picture, the stick will be moved next to marker A, and marker B will be moved next to the stick to the marker A-stick-marker B. Then, the camera is shifted, and the scanning process will be carried out. And so on until all the Legok Kolot scripts were successfully scanned. All images will be saved in one folder. Because the Legok Kolot script consists of two sides, recto and verso, the photos will be divided into two folders so that the files remain neatly arranged.

4. Post Digitalization

After the scan results are stored on the computer, the data clothes are processed using photo editor software such as Adobe Photoshop. The editing process aims to adjust the quality of the photo so that the proportion of the text's brightness and color can be optimal. The cropping process is done to remove unwanted parts of the photo so that the resulting image follows the original script. Finally, bring together the pieces of the Legok Kolot ancient manuscript into a large and intact manuscript image like the original manuscript. Apply the researcher watermark or the identity of the manuscript, both digital and print files.

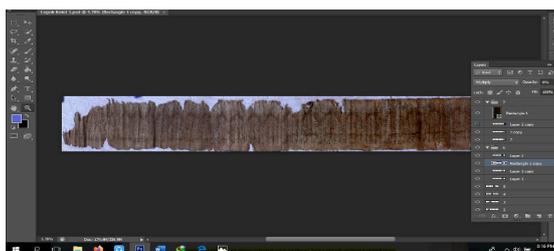


Figure 6. Some raw Legok Kolot Manuscript files after being edited using photo editor software such as Adobe Photoshop. Digital files are saved in PSD, JPG, TIFF, PNG and PDF formats.

Source: (Khadijah et al., 2019)

The file will then become an image and saved as needed, namely in PSD, PDF, JPEG, PNG, and TIFF files. The digital format is then printed in the form of banners with digital printing techniques on fabric materials. The digital printout was handed over to the Manuscript manager Legok Kolot in Loh Bener, Indramayu Regency. To avoid misuse of digital texts that have been made, all digitized files need to be protected by installing a password. With the protection given, the file can only be read (read-only) and printed only, so that the script's authenticity will always be maintained.

4. CONCLUSION

The Legok Kolot Ancient Manuscript is one of the legacy texts of the Indonesian nation's ancestors stored in the Indramayu Regency. The ancient Legok Kolot manuscript includes cultural heritage as well as the identity and wealth of Indramayu residents. The digitization of ancient manuscripts is an attempt to recover historical relics from the damage that can occur due to direct contact with humans or weather conditions. The digitization process of Legok Kolot script consists of several processes: the first is the digitalization planning stage; the second stage of digitization which consists of pre-

digitization and scanning; and finally, post-digitization by editing and saving the output in PDF and JPG that can be printed or saved in digital format.

5. LIMITATION AND STUDY FORWARD

This research is limited to the stages of digitizing ancient manuscripts, starting from the planning that must be prepared, the digitization process, and post-digitization. Further research is needed to explore the values or information contained in the Legok Kolot manuscript.

6. ACKNOWLEDGEMENTS

The researchers would like to express our gratitude to those who have helped the research process, from the preparation stage and implementation until this research is complete. Special thanks go to the manager of the Darul Ma'arif Islamic Boarding School, Loh Bener Indramayu Village, the manager of the tomb site of Prabu Geusan Ulun in Legok Kolot Loh Bener Village, Indramayu, Ki Tarka Sutarahardja - Founder of the Javanese Script Sanggar Kidang Pananjung Indramayu, and Padjadjaran University which facilitates the duration of the research.

REFERENCES

- Ahmad, N. F. (2018). Praktik Jual Beli Naskah Kuno di Masyarakat. *Nusa: Jurnal Ilmu Bahasa Dan Sastra*, 13(4), 623. <https://doi.org/10.14710/nusa.13.4.623-634>
- Anggito, A., & Setiawan, J. (2018). Metodologi Penelitian Kualitatif. In E. D. Lestari (Ed.), *CV Jejak*. Sukabumi: CV Jejak.
- Anwar, M. T., Husain, H., & Jaya, N. N. (2018). Preservasi Naskah Kuno Sasak Lombok Berbasis Digital dan Website. *Jurnal Teknologi Informasi Dan Ilmu Komputer*, 5(4), 445. <https://doi.org/10.25126/jtiik.201854787>
- Doumat, R., Egyed-Zsigmond, E., & Pinon, J.M. (2009). Digitized ancient documents ... What's next? *Document Numerique*. <https://doi.org/10.3166/dn.12.1.31-51>
- Istiqomah, Z. (2017). Museum Sri Baduga Miliki 170 Naskah Kuno Keagamaan Jabar.
- Kelana, N. S. (2018). Mengenal Kembali Daluang, Kertas Asli Indonesia. Kementrian Hukum dan Hak Asasi Manusia Republik Indonesia. *UU No 43 tahun 2007 tentang Perpustakaan*.
- Khadijah, U. L. S., Zulfan, I., & Sujana, L. R. (2019). *Identitas Warisan Budaya Nusantara Melalui Digitalisasi Naskah Kuno di Jawa Barat (Action Research Kasus Pelestarian Naskah Kuno)*. Sumedang.
- Ladewig, S. L., & Marcello, R. D. (2019). Presentation of the Center for the Study of New Testament Manuscripts: Bridging the Gap between Ancient Manuscripts and Modern Technology. *Open Theology*, 5(1), 451–460. <https://doi.org/10.1515/opth-2019-0034>

Latiar, H. (2018). Preservasi Naskah Kuno Sebagai Upaya Pelestarian Budaya Bangsa. *Al-Kuttab : Jurnal Perpustakaan Dan Informasi*, 5(1), 67. <https://doi.org/10.24952/ktb.v5i1.827>

Lied, L. I. (2019). Digitization and Manuscripts as Visual Objects: Reflections from a Media Studies Perspective. In *Ancient Manuscripts in Digital Culture* (pp. 15–29). https://doi.org/10.1163/9789004399297_003

Oet. (2019). Benda Bersejarah di Indramayu Banyak yang Tercecer. Retrieved from radarcirebon.com website: <https://www.radarcirebon.com/2019/06/18/benda-bersejarah-di-indramayu-banyak-yang-tercecer/>

Permadi, T. (2005). *Konservasi Tradisi Pembuatan Daluang Sebagai Salah Satu Upaya Penyelamatan Teknologi Tradisional Nusantara*. Retrieved from http://file.upi.edu/Direktori/FPBS/JUR._PEND._BHS._DAN_SASTRA_INDONESIA/197006242006041-TEDI_PERMADI/Konservasi_Tradisi_Pembuatan_Daluang.pdf

Pudjiastuti, T. (2018). Moloku Kie Raha Community and Their Old Manuscript Heritage. *IOP Conference Series: Earth and Environmental Science*, 175(1), 0–6. <https://doi.org/10.1088/1755-1315/175/1/012059>

Rodiah, S., Khadijah, U. L. S., & Kurniasih, N. (2017). Naskah Kuno sebagai Identitas Budaya di Masyarakat Kabuyutan Ciburuy, Bayongbong, Kabupaten Garut. *Record and Library Journal-UNAIR Surabaya*, 3(1), 97–107. <https://doi.org/doi.org/10.20473/rlj.V3-11.2017.97-107>

Rustandi, S. (2017). *Penerapan Alih Media dalam Upaya Pelestarian Naskah Kuno Ketauhidan di Perpustakaan Yayasan Pangeran Sumedang*. Universitas Padjadjaran.

Sudarsono, B. (2009). *Pustakawan Cinta dan Teknologi*. Jakarta: Ikatan Pustakawan dan Informasi Indonesia.

Sukmana, E. (2005). Digitalisasi Pustaka. *Seminar Peran Pustakawan Pada Era Digital*.

Zulfikar, F. (2018). Tidak Banyak yang Tahu, Ini Lho Kertas Khas Indonesia.