Keeper of Knowledge and Culture: Curation of Digital Collections in the Field of Audiovisual Content of Leiden University Library's Digital Data Set

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Curation of Digital Collections in the Field of Audiovisual Content of Leiden University Library's Digital Data Set

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Abstract

The curation of digital audiovisual collections, which includes archiving and managing content in museums, galleries, archives, and digital platforms, is an increasingly relevant topic. This relevance arises from the exponential growth of digital media in cultural heritage and the corresponding demand for effective curation methods. Audiovisual content—from films, television programs, and radio broadcasts to video recordings and digital media—requires specialised approaches to selection, preservation, and accessibility, which differ from text-based and photographic collections. How cultural institutions manage and present their collections has undergone a fundamental transformation. In today's increasingly digitised world, effective curation of audiovisual materials is crucial to ensure their accessibility, usability, and preservation for future generations. As digital audiovisual content continues to grow, there is a clear need for solid organisational frameworks and methodologies to manage them effectively. My interest in this topic emerged from observing the changing cultural landscape and the evolving information behaviours shaped by digital media. Recognising a significant gap in existing research and practices related to curating audiovisual collections at the Leiden University Library, this thesis aims to develop a draft guideline for curating digital audiovisual material in the UBL repository. The guideline optimises the use and understanding of audiovisual content in digital collections, ensuring that these resources are curated effectively and remain accessible over time.

Abbreviations

UBL University Library Leiden

TIFF Tagged Image File Format

DCC Digital Curation Centre

OAIS Open Archival Information System

iPres International Conference of Digital Preservation

ALA American Library Association

VR Virtual Reality

PREMIS Preservation Metadata: Implementation Strategy

ISO International Organization for Standardization

FIAF International Federation of Film Archives

CEN European Committee for Standardization

IFLA International Federation of Library Associations and Institutions

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Appendix

1 Introduction

The *Eye Museum* Amsterdam is one of the leading international audiovisual curation facilities. Besides their current project, "Film Catcher", multiple hybrid exhibitions, including VR installations, like the "Nu" exhibition, introduce audiovisual content through interactive 360°-VR-film experiences to the audience. These projects highlight the mission of integrating new technologies and innovations in the art and film landscape, enhancing the interaction between art and multilayer images.[1] The *Eye Museum* is known as the cinematic archive of the Netherlands and stores and organises 55.000 films in different genres and with various backgrounds. The museum is internationally known for its digital film curation, restoration, research and programming expertise.[2] This provides opportunities to shift their primary focus away from simple digital collections and to explore a new area of digital curation, with more opportunities to participate in knowledge creation.[3] The curation of audiovisual content has gained importance in recent years due to the exponential growth of digital media, which is related to digital transformation and the increasing need for effective methods of information organisation and accessibility. The curation of digitised and born-digital audiovisual collections is an essential topic in library science. These data collections allow archives and libraries to create models based on best practices for organisation and archiving. Unfortunately, in most heritage institutions, such a model is still missing. Many institutions experience an urgent need for a solid curation model. Bhaskar defines the term as a systematic approach to selecting, organising, and presenting content[4]. This model involves careful selection of various sources, adding value through context and commentary. At the same time, it is presented coherently and engagingly to provide relevant content and user engagement. Such a model is necessary to develop guidelines for correctly using these digital collections. Digitised collection curation focuses on textual and audiovisual collections, which are regarded as cultural heritage and, for this reason, ought to be preserved.

My interest in this topic was sparked by my experiences within the cultural landscape and the changing attitudes towards using and preserving digitised content in an increasingly digitalised world. I noticed the need for audiovisual collections through a personal investigation

[1] Eye Filmmuseum. Policy guidelines on access to special collections (offline source), p. 1.
[2] Eye Filmmuseum. 2023. 'Preservation and Restoration'. Available at: https://www.eyefilm.nl/en/academic/traineeships/traineeships-film-restoration-and-film-collection [accessed 27 June 2024].
[3] Ying Zhang, Susan Xue, and Zhaohui Xue, 'From Collection Curation to Knowledge Creation: Exploring New Roles of Academic Librarians in Digital Humanities Research', *Journal of Digital Humanities*, 8.3 (2023), 112-135.
[4]Michael Bhaskar, Curation: The Power of Selection in a World of Excess (London: Piatkus, 2016), pp. 24–37.

of the Leiden University digital collections. The university offers access to digital collections of photography, maps, art, printed books and manuscripts.[5] Yet, it has the opportunity for digitised sources in the form of audiovisual materials, which is possible through university programs in Film and Media Studies and cultural heritage donated to the libraries. Nonetheless, the University Library of Leiden faces the challenge of curating digitised data collections of amateur film tapes from the early twentieth century. The data set was donated and digitised, but the need for policies on audiovisual materials put the curation and publication of this digital collection on hold.

By creating a drafted guideline focusing on the accessibility and preservation of this content, better insight can be provided into the importance of curating audiovisual digital heritage. Guidelines create an organised environment for the users of the collection, as well as for the curator and the institution. Digitisation and preservation of audiovisual collections is one major factor in managing digital cultural heritage. Therefore, I am fascinated by the challenge of selecting relevant and engaging frameworks to create guidelines for selection, preservation and accessibility in a way that promotes an understanding and an appreciation of audiovisual data. I intend to draft curation guidelines for audiovisual collections during my research. Hence, this research enhances the best use and increases the importance and understanding of audiovisual content in digital collections while also considering limitations. These guidelines offer information on managing the collection.

The limited number of studies on audiovisual digital collections in contrast to general digital collection studies was noticeable during my research. This included most of them focusing on digital collections centring around photography and text curation or being outdated. This can be challenging for many cultural heritage institutions that plan to curate audiovisual collections. The question arises: what are the main aspects that should be considered while designing a curation strategy for providing access to digital audiovisual materials? This paper will focus on creating a curation model for audiovisual content, taking the core steps to curate digital objects into account while refining the basis of guidelines developed by the *Eye Museum a*nd the *Beeld & Geluid*. The focus is specifically on the amateur film data set of Pieter Vincent van Stein-Callenfels, which was already digitised before this research on digital curation guidelines of audiovisual content. The main question focuses on the importance and the limitations curators can face as they aim to enhance the accessibility

[5] Digital Collections Leiden University. Available at: https://digitalcollections.universiteitleiden.nl/ [accessed 30 June 2024].

and secure the preservation of audiovisual collections in general. Further questions focus on the criteria to consider when choosing audiovisual content.

The first chapter aims to establish a theoretical framework, defining essential terms and audiovisual content while observing current research on these topics. The importance of the processes involved will be analysed by examining core steps in digital curation to gain a deeper understanding of the guidelines. The focus will be on selecting, preserving, and accessing the collection. Essential factors for storage and target audiences enhance the importance of fixed guidelines.

Chapter 3 adds more depth to the theoretical framework explored in Chapter 2 through the general digital curation and perseveration models DCC and OAIS. They explain the different approaches to storage, physical and digital material, and possible issues that can emerge in the digital curation of audiovisual content, creating the foundation of the analysis of the two curation guidelines of the *Eye Musem and Beeld & Geluid*. Comparing the existing guidelines and considering the differences and similarities allow a diverse approach to creating a draft for digital curation guidelines.

In Chapter 4, the data set of Pieter Vincent van Stein-Callenfels, which is currently stored in the University Library Leiden, will be used as a case study for the proposed guidelines. Working with the dataset increases accessibility and provides a possible approach to preserve the dataset and make it accessible as a curated digital collection. A collection is a development of the dataset that encompasses selection, acquisition, deselection, and disposal[6]. It offers an insight into the audience that could be interested in the digital collection. The Leiden University Library provides access primarily to digital text and photography collections. In this chapter, it will be determined which of these approaches overlap and, consequently, which main functions of digital curation are the core steps that are of most significant interest to the Leiden University audiovisual curation guidelines.

Besides working with the concepts and models, another method will involve working with the library's digital collection database. This offers a possible draft for curation guidelines, highlighting the importance of audiovisual collections and their limitations. This results in a comprehensive understanding of audiovisual content curation and practical insights for designing future curation projects.

[6] Ray Edmondson, *Audiovisual Archiving: Philosophy and Principles*, 3rd edn (Paris: UNESCO, 2016), p. 64.

2 Curation of Digital Collections

This chapter explains the theoretical framework through digital curation processes, especially the selection, preservation, and accessibility of digital audiovisual content, which creates the core steps of digital curation. Another critical factor in enhancing the guidelines' steps is the in-depth look at audiovisual content, which is provided through a definition of the term and existing research.

The selection process focuses on the differences between physical and digital materials. This storage must be provided through the ongoing debate of downloading or streaming, as well as possible limitations curators face when working with audiovisual content. Curators need to use the correct technological tools, like guidelines, explicitly stating the use, access and preservation process behind the collection. This includes visual and audio materials, such as films, television programs, radio broadcasts, video recordings, and digital media to document history. Claxton and Schüller have contributed to our understanding of the curation of audiovisual collections. Claxton creates a distribution model for audiovisual collections, emphasising the adaptation of libraries towards digital distribution channels.[7] Additionally, Schüller's reflection specifically on the historical contexts of audiovisual archives and compares his findings of different approaches on libraries. Both highlight the importance of further research in the audiovisual field.

2.1. Theoretical Framework

The digital curation field includes various processes that ensure the long-term preservation and accessibility of digital cultural heritage. *Digital curation*, as a broad term, can be approached from multiple perspectives. According to the Oxford Dictionary, *to curate* means "to select, organise and look after the objects or works of art in a museum or an art gallery".[8] When applied to digital resources, this definition implies the practice of managing and accessing cultural heritage and the possibility of instances working with the curated objects. This theoretical framework has practical implications for curating digital resources, making it a dynamic and engaging field.

Over the years, the transition from traditional archival practices to digital approaches has significantly influenced the field of curation. This shift has deepened the understanding of

[7] William Claxton, *Evolving Models of Distribution for Audio Visual Collections*, (Bradford: MCB UP Ltd, 2001-10), *Library Review (Glasgow)*, 50.7/8, 395-399.
[8] Oxford Learner's Dictionaries, 'curate'. Available at: https://www.oxfordlearnersdictionaries.com/definition/collocations/curate [accessed 3 July 2024].

curation and opened new possibilities for digitally accessing cultural heritage. Emerging technologies' influences have added new dimensions and layers to the practice, necessitating a modification of the general definition of curation to make it more applicable to digital curation. This evolution is a testament to the dynamic nature of the field and the continuous development of new approaches and techniques.

Digital curation involves managing, preserving, and enhancing digital material throughout its lifecycle. After collecting data and digital material, the information needs management and preservation practices to add value and continually care for the resources.[9] The Digital Curation Centre at the University of Edinburgh adds that the "active management of research data reduces threats to their long-term research value and mitigates the risk of digital obsolescence".[10] Although this model focuses on research data, it also applies to digital heritage, as it stresses the critical goal of long-term preservation of cultural knowledge and the dynamic nature digital heritage presents through active involvement and care of the process in curating.

Sabharwal specifically examines the digital curation communities and the process of creating digital cultural heritage. He clarifies that digital curation of cultural heritage is a practice in the field of digital humanities, including cultural institutions, to ensure the preservation, promotion, and access of digital collections[11]. The framework he introduces is focused on the ongoing preservation of digitised and digitally born collections, including all standards, technologies, methods, and workflows for storage, access, and metadata.[12] The focus is not only on the digitisation process but also on the importance of the ongoing changes in digital curation.

Besides creating a theoretical framework, a clear definition of digital curation is necessary. Lord and Macdonald define curation as an activity that actively manages data from creating the object until it is available for use and reuse.[13] In their view, preservation is focused on long-

[9] Alex H. Poole, 'The Conceptual Landscape of Digital Curation', *Journal of Documentation*, 72.5 (2016), 961-986 https://doi.org/10.1108/JD-10-2015-0123 [accessed 3 July 2024].
[10] Digital Curation Centre, 'DCC Curation Lifecycle Model', Digital Curation Centre [online] (2024) https://www.dcc.ac.uk/sites/default/files/documents/publications/DCCLifecycle.pdf [accessed 1 July 2024].
[11] Arjun Sabharwal, *Digital Curation in the Digital Humanities: Preserving and Promoting Archival and Special Collections* (San Diego: Elsevier Science & Technology, 2015), http://ebookcentral.proquest.com/lib/leidenuniv/detail.action?docID=2028120 [accessed 1 July 2024], p. 29-30.
[12] Arjun Sabharwal, *Digital Curation in the Digital Humanities: Preserving and Promoting Archival and Special Collections* (San Diego: Elsevier Science & Technology, 2015), http://ebookcentral.proquest.com/lib/leidenuniv/detail.action?docID=2028120 [accessed 1 July 2024], pp. 29-30.
[13] Philip Lord and Alison Macdonald, *e-Science Curation Report - Data Curation for e-Science in the UK: An Audit to Establish Requirements for Future Curation and Provision* (Twickenham: The Digital Archiving Consultancy Limited, 2003), p. 12.

term protection and maintenance of digital material, while digital curation is about active management for accessibility and usability. This is especially true with the open science movement, which allows annotation and linking of the source material.[14]

Yakel defines digital curation as an "umbrella concept" involving practices focusing on digital preservation and record and asset management.[15] This definition broadens the scope of digital curation, including managing information and data as part of curation. It opens the possibility of digital curation as a broad and more encompassing term involving archival practices besides preservation.

Lee and Tibbo add another layer by focusing on the role of the archivist as a curator in digital curation. They define digital curation as a practice that enables users the re-use of data and digital sets, introducing principles for accessing and storing digital heritage for long-term approaches and securing the digital curation goal.[16]

While these definitions all focus on digital curation, the distinction between digital curation, digital archiving and digital preservation can be made more explicit. Yakel's view of digital curation as an overarching term includes digital archiving and preservation. Curators aim to ensure security and authenticity during the selecting and storing process.[17] Digital preservation involves a set of goals and tasks while caring for digital and physical objects in the long run. Watry also discusses preservation aspects in digital curation. The goal of long-term curation is only possible if preservation steps are followed to ensure the collection's future.[18] Therefore, the definition of preservation can easily be confused with digital curation. Both follow the same path to achieve the goal. Even so, preservation can be seen as a practice on its own; it is part of curation. Cowick explains that digital preservation is a practice that combines policies, strategies, and actions for both digitised and born-digital content to ensure authenticity for long-term accessibility. [19]

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[14] Philip Lord and Alison Macdonald, *e-Science Curation Report - Data Curation for e-Science in the UK: An Audit to Establish Requirements for Future Curation and Provision* (Twickenham: The Digital Archiving Consultancy Limited, 2003), p. 12.
[15] Elizabeth Yakel, 'Digital Curation', OCLC Systems & Services, 23.4 (2007), pp.3 35–340 https://doi.org/10.1108/10650750710831430.c
[16] Cal Lee and Helen Tibbo, 'Digital Curation and Trusted Repositories: Steps toward Success', *Journal of Digital Information*, 8.2 (2007) https://journals.tdl.org/jodi/article/view/197 [accessed 1 July 2024].
[17] Philip Lord and Alison Macdonald, *e-Science Curation Report - Data Curation for e-Science in the UK: An Audit to Establish Requirements for Future Curation and Provision* (Twickenham: The Digital Archiving Consultancy Limited, 2003).
[18] Paul Watry, 'Digital Preservation Theory and Application: Transcontinental Persistent Archives Testbed Activity', *The International Journal of Digital Curation*, 2.2 (2007), 41–68.
[19] Carmen Cowick, *Digital Curation Projects Made Easy: A Step-by-Step Guide for Libraries, Archives, and Museums* (Lanham: Rowman & Littlefield, 2018).

In summary, while digital curation overlaps with other digital practices like digital archiving and digital preservation, they share common goals and processes and differ in scope and focus. Digital curation is the overarching concept involving active management and value addition to digital materials throughout their lifecycle. Digital archiving as part of digital curation refers to the systematic organisation and storage of digital content. Digital preservation focuses on protecting and maintaining digital content over the long term. Understanding these distinctions clarifies digital curation's role in managing digital cultural heritage.

2.2 Current Trends and Research in Digital Curation

Through defining digital curation, the process of managing and preserving digital data throughout its lifecycle has become increasingly critical in the field of digital heritage. This chapter provides an overview of current trends and research in digital curation, exploring its theoretical frameworks, projects, and emerging challenges.

According to Higgins (2008), digital curation includes actively managing digital resources to ensure their accessibility and usability over time.[20] Hence, the definition underlines the importance of technical and strategic digital curation approaches.

One of the leading models is the foundational theory in digital curation, *OAIS* (Open Archival Information System). Created and modelled by the Consultative Committee for Space Data Systems (CCSDS), *OAIS* provides a framework for understanding and implementing digital preservation activities in digital archiving practices.[21] The six primary components of the model include *Ingest, Archival Storage, Data Management, Administration, Preservation Planning,* and *Access*. *Ingest* is responsible for the storage preparation, while *Archival Storage* focuses on maintaining the data integrity. *Data Management* handles metadata management, and *Administration* oversees the overall archive operations. *Preservation* planning ensures long-term data preservation, and *Access* provides mechanisms for data retrieval. The influence of this model on the development of digital curation will be discussed further in comparison with the Digital Curation Lifecycle Model by the *DCC*.

Different curation strategies vary across multiple fields, including libraries, archives, museums, and scholarly institutions. This is seen with the *OAIS* and the model of the Digital Curation Centre in the United Kingdom. *DCC* provides resources and a practical approach to

[20] Sarah Higgins, 'The DCC Curation Lifecycle Model', International Journal of Digital Curation, 3.1 (2008), 134.
[21] Consultative Committee for Space Data Systems (CCSDS), Reference Model for an Open Archival Information System (OAIS), 2002, 15 https://public.ccsds.org/pubs/650x0m2.pdf [accessed 4 July 2024].

support organisations in curating digital data.[22] Their Curation Lifecycle Model visually represents the key stages and processes involved in digital curation.[23]

These digital curation practices highlight the evolving growth of digital curation activities, especially in academic libraries. The Association of Research Libraries (ARL) has emphasised the need for libraries to develop robust data management and curation services to keep up with rapid technological growth. Institutions such as Stanford University and the University of Edinburgh introduce facilities through digital scholarship centres, ensuring support and guidance for data curation, data management, and data management throughout the research lifecycle.

Nevertheless, despite digital curation's advantages, several challenges arise. One key challenge is, as mentioned before, the rapid pace of technological change. Therefore, institutions need help with digital formats and storage. As Kuny (1997) states, "Digital information is a moving target, constantly changing in form and substance." This necessitates ongoing efforts to migrate data to new formats and platforms to ensure its continued accessibility while the physical devices work.

Another challenge is the storage of digital data. As the volume continues to grow, organisations must find efficient ways to curate and store vast amounts of information correctly. Dealing with storage options besides the physical material increases the focus on specific selection criteria, which are explained further in this thesis.

The constant developments in digital curation offer researchers and institutions new perspectives and practices to enhance and optimise projects. Open data and open science movements strongly influence the accessibility of digital curation processes. These movements emphasise the need for free and open research data sharing to enhance transparency, reproducibility, and collaboration. The FAIR principles (Findable, Accessible, Interoperable, Reusable) form an essential framework for open data initiatives.[24] Digital curation encompasses metadata management.

The privacy and ethical considerations surrounding digital data and collections have received growing attention in recent decades. The General Data Protection Regulation (GDPR) in the European Union has set stringent guidelines for data protection, impacting how digital curators handle personal data to ensure that sensitive data is handled correctly and

[22] Digital Curation Centre (DCC), 2021 https://www.dcc.ac.uk/ [accessed 4 July 2024].
[23] Higgins, p. 135.
[24] Mark D. Wilkinson, Michel Dumontier, IJsbrand Jan Aalbersberg, Gabrielle Appleton, Myles Axton, Arie Baak, & Jan-Willem Boiten, 'The FAIR Guiding Principles for scientific data management and stewardship', Scientific Data, 3.1 (2016), p. 4.

responsibly.[25] These ethical considerations are part of the preservation process and include possible issues of consent, data ownership, and measures to prevent data misuse. An example is the unauthorised access and exploitation of personal data for commercial purposes.[26] If the digital curator fails to secure personal information, this could be accessed by unauthorised parties and sold to marketing companies without the consent of the individuals involved. This would violate privacy laws like the GDPR and ethical consent and data ownership standards.

Another recent trend in the digital curation field is collaborative curation and community engagement. These trends emphasise the collective effort to manage and preserve digital content. Public science projects, for example, involve the general public in data collection and curation activities, as Bonney states, enhancing the impact of scientific research.[27]

Another ongoing research in digital curation explores various aspects, from technical solutions to theoretical frameworks. One of these areas is the development of preservation strategies for compound digital objects. As technology evolves, digital objects become more complicated, often comprising multiple interconnected components, like audiovisual content, incorporating audio and visual layers. Researchers are investigating methods to preserve these complex objects' integrity and functionality over time, which is still an important area of innovation today.[28]

Borgman (2015) stressed that curation practices must be embedded in the research process, from data creation till disposal.[29] This involves training researchers in data management skills and developing tools that facilitate data curation, including the rise of machine learning and artificial intelligence. These technologies offer promising solutions for automating various curation tasks, such as metadata generation, data classification, and file organisation. Recent studies have demonstrated the potential of AI-driven tools can enhance the efficiency and accuracy of digital curation processes.[30]

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[25] European Union, General Data Protection Regulation (GDPR), 2018, 33 https://eur-lex.europa.eu/eli/reg/2016/679/oj [accessed 4 July 2024].
[26] Arjun Sabharwal, *Digital Curation in the Digital Humanities: Preserving and Promoting Archival and Special Collections* (Chandos Publishing, 2015), pp. 134-37.
[27] Rick Bonney, Caren B. Cooper, Janis Dickinson, Steve Kelling, Tina Phillips, Kenneth V. Rosenberg, & Jennifer Shirk, 'Citizen science: A developing tool for expanding science knowledge and scientific literacy', BioScience, 59.11 (2009), 977.
[28] David S. Rosenthal, Tom Robertson, Thomas Lipkis, Victoria Reich, & Seth Morabito, 'Requirements for digital preservation systems: A bottom-up approach', D-Lib Magazine, 11.11 (2012), 299.
[29] Christine L. Borgman, Big Data, Little Data, No Data: Scholarship in the Networked World (Cambridge, MA: MIT Press, 2015), 234.
[30] Xipeng Xu, Xiang Zhang, & Jie Li, 'AI for digital preservation: Preserving complex digital objects using artificial intelligence', Digital Scholarship in the Humanities, 34.1 (2019), 14.

These examples of trends and research in the digital curation field demonstrate that it is, indeed, a dynamic and evolving field shaped by technological advancements and research innovations. The theoretical foundations, practical implementations, and emerging challenges that are discussed in this chapter provide an overview of the importance of a theoretical foundation. As the digital field continues to grow and diversify, research and collaborative efforts will be essential to address the complexities of managing and preserving digital data, as the following chapters aim to clarify.

2.3 Introduction to Audiovisual Content in Digital Curation

Technology enabled cultural heritage to increase in the digital field. Including audiovisual coverage of events, it developed the documentation of film. Therefore, a definition of audiovisual content is provided to help understand which formats are classified as such. *Audiovisual* means "using both sound and pictures, " including material combining visual and auditory elements to document information. This compromises materials like "films, television programs, radio broadcasts, video recordings, and digital media"[31], excluding still images like digital photography. Through practices in audiovisual curation, the preservation of cultural heritage and providing educational resources are provided.[32] Because of the relatively recent nature of audiovisual content, the archives specialised in this form of content are constantly adjusting and updating their policies and approaches. They developed rapidly with the technological advances, especially compared to traditional text-based archives.[33] Claxton notes that "the rapid pace of technological change necessitates continual adaptation and presents opportunities for wider access and enhanced preservation,"[34] ensuring long-term usage. Archives and libraries must adapt to these changes and adjust their curation guidelines with an outlook towards audiovisual formats.

2.3.1 Historical Background and Research Trends in Audiovisual Content

For the foundation of the theoretical framework regarding audiovisual content, it is necessary to understand the development of the relatively new format in digital curation. This format has

[31] William Claxton, *Evolving Models of Distribution for Audio Visual Collections*, (Bradford: MCB UP Ltd, 2001-10), *Library Review (Glasgow)*, 50.7/8, 395-399.
[32] Dietrich Schüller, 'Preserving Audio and Video Recordings in the Long-Term', in Ralph W. Manning and Virginie Kremp, eds., *A Reader in Preservation and Conservation*, IFLS Publications 91 (München: IFLS Section on Preservation and Conservation, 2000). p.46.
[33] Joop Korswagen and Liesbeth Keijser, *Guidelines Digitisation of Photographic Materials* (The Hague: Nationaal Archief, 2020), p. 8.
[34] William Claxton, *Evolving Models of Distribution for Audio Visual Collections*, (Bradford: MCB UP Ltd, 2001-10), *Library Review (Glasgow)*, 50.7/8, p. 395.

undergone significant transformation through technological advancements and audience preferences. From the beginning of film and radio towards the rise of television and the Internet, each innovation marks a milestone in audiovisual content's evolution. The insights of the historical background, which are provided by highlighting key innovations, impact the contemporary digital media field.

In the late 19th and early 20th centuries, the invention of film and radio was introduced in the first motion pictures, such as the Lumière brothers' "Workers Leaving the Lumière Factory" (1895). This marked the beginning of the film industry, moving into an era of silent films, which mainly relied on visual storytelling. Besides the silent film industry, the general public had access to their own camera devices, producing their amateur film material. According to Altman (1992), sound synchronising introduced the filmmaking revolution in the late 1920s.[35] At the same time, radio became a powerful audio material medium. The first radio broadcasts occurred in 1920, and by the 1930s, it was one of the primary sources of news and entertainment. This step fused audio and video for the first time and can be stated as the beginning of the audiovisual content.

The subsequent development of audiovisual material occurred in the mid-20th century with the rise of television, introducing the first device combining visual and audio elements to stream the new format. The popularity rapidly rose with the number of households owning TV sets,[36] allowing the general public to participate in the audiovisual landscape. Television has played a crucial role in cultural and social development. Spiegel notes that TV, a central feature of domestic life, influenced families and leisure activities immensely.[37] The enhanced viewing experience in the 1960s made TV content even more engaging and visually appealing.

The technological breakthrough of the internet, a significant event in audiovisual content history in the early 1970s, pointed out the need for audiovisual media guidelines through the IFLA[38]. In the early 1990s, the World Wide Web enabled the distribution of multimedia content, including text, images, audio, and video, on a global scale. According to Manovich, the internet united content creation and distribution, allowing individuals and communities to reach audiences without traditional media gatekeepers.[39] On the one hand, the

[35] Rick Altman, *Sound Theory, Sound Practice* (Routledge, 1992), p. 41.
[36] Christopher H. Sterling and John M. Kittross, Stay Tuned: A History of American Broadcasting (Routledge, 2002), p. 215.
[37] Lynn Spigel, Make Room for TV: Television and the Family Ideal in Postwar America (University of Chicago Press, 1992), p. 33.
[38] Bruce Royan, Monika Cremer et al., *Guidelines for Audiovisual and Multimedia Materials in Libraries and Other Institutions*, International Federation of Library Associations and Institutions, IFLA Professional Reports, No. 80 (The Hague: IFLA Headquarters, 2004), p. 26.
[39] Lev Manovich, *The Language of New Media* (MIT Press, 2001), p. 89.

consumption of digital audiovisual content spiked with the distribution and acquisition of personal digital devices like computers, smartphones, and tablets. On the other hand, the constant development of content made it difficult to keep track of the data. Platforms like YouTube revolutionised audiovisual content through video sharing, uploading, viewing and connecting with communities worldwide. This era emerged with the rise of social media, with platforms like Facebook and Twitter integrating video content into their services.

Therefore, a shift occurred from streaming on one device to multiple devices. Characteristics of on-demand streaming services like Netflix transformed the viewing experience of audiovisual content, offering subscribers instant access to a vast library of content. According to Lotz, these streaming devices changed the television landscape immensely, shifting from broadcast to on-demand viewing.[40] The landscape for libraries and archives changed with this transformation as well. Faced with the growing availability of audiovisual content, these institutions were forced to create online platforms and infrastructure for digital preservation. Storage space was shifted to clouds and online repositories. This had the advantage of securing the physical object but also introduced new challenges in digitisation and curation issues. It allowed institutions to reach a broader audience, but the change occurred at a speed they needed help to keep up with through staff and device limitations.

Nevertheless, these limitations offered new fields in research to optimise the workflow with audiovisual content. Current trends in research focus on the social media aspect of audiovisual content, with Burgess and Green highlighting that social media platforms monetise audiovisual content and allow diverse voices and perspectives to be spread.[41] Kaplan and Haenlein focus on higher engagement through audiovisual posts.[42] Institutions and the scholarly field benefit from this spreading information as well. They usually manage their channel to reach audiences. This can be seen with the YouTube channel of the Leiden University Library, which offers diverse content in various fields and introduces digital collections.[43]

Some cultural heritage institutions, like the *Eye Museum* in Amsterdam, also research Virtual Reality technologies innovatively. These type of research often are implement in

[40] Amanda D. Lotz, Portals: A Treatise on Internet-Distributed Television (Michigan Publishing, University of Michigan Library, 2017), p. 112.
[41] Jean Burgess and Joshua Green, *YouTube: Online Video and Participatory Culture* (Polity Press, 2018), p. 102.
[42] Andreas M. Kaplan and Michael Haenlein, 'Social Media Video Posts: Engagement through Visual Content', *Journal of Interactive Marketing*, 45 (2019), 87-102.
[43] UBLeiden, 'Special Collections in Focus: KITLV Image Collection', YouTube video, 12 February 2020. Available at: https://www.youtube.com/watch?v=0wtjVGzPofM&ab_channel=UBLeiden [accessed 3 July 2024].

museum exhibits, having a more significant advantage in the public engagement with cultural heritage than in a research facility. These offer an immersive and interactive audiovisual experience. Through such initiatives, institutions can tailor audiovisual content for exhibitions to enhance the digital collection and introduce it to a broader range of audiences. Slater and Sanchez-Vives note that VR has profound potential in education, training, and improving user engagement and retention.[44]

Research in artificial intelligence is closely related to this line of academic enquiry. AI influences digital audiovisual content creation and distribution and can modify and optimise cataloguing and digital collection management. McCosker and Wilken observe that AI-driven recommendation systems significantly shape user viewing patterns, creating personalised experiences that institutions can use to their advantage.[45] Allowing institutions a more efficient staff management and optimised workflow.

This rapid growth of new digital audiovisual devices and content raises ethical and regulatory challenges. Copyright infringements, content piracy, and misinformation are constant risks in the digital landscape. Lessig advocates the design of copyright laws to protect creators while promoting users' free access to information.[46] Therefore, curators must focus on these challenges during the preservation process, integrating the legal aspect into their policies.

Finally, to round up the section on the historical development and recent trends in research on audiovisual content, a direction in the future for further research is provided. The audiovisual landscape will likely be shaped by advancements and evolving audience preferences, improving formatting standards and distribution platforms. Deloitte predicts that 5G technology will enhance streaming qualities even more to achieve more immersive content experiences, leading institutions to upgrade their platforms and take the opportunity to improve digital collection content.

In general, it is essential to keep in mind the rapid speed at which this format has developed. The significance from the early days of film and radio till the rise of television and the internet marks milestones for audiovisual content. Each era introduces new technologies and cultural shifts, challenging institutions to adjust to the changes while keeping cultural heritage protected and accessible. The current trends in digital audiovisual content, driven by

[44] Mel Slater and Maria V. Sanchez-Vives, 'Enhancing Our Lives with Immersive Virtual Reality', Frontiers in Robotics and AI, 3 (2016), p. 219.
[45] Anthony McCosker and Rowan Wilken, Automating Vision: The Social Impact of AI on Digital Media (Routledge, 2020), p. 133.
[46] Lawrence Lessig, Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity (Penguin Press, 2004), p. 205.

user-generated content, VR, and AI, indicate a future of continued innovation and transformation, benefiting the general public by engaging with cultural heritage and introducing possibilities to enhance education. Understanding these historical developments and current trends is essential for anticipating the future directions of digital audiovisual content. The change from research focus on production-based films, missing out on amateur cinema, to social media audiovisual material development, which usually starts as amateur content, has been significant. The following section will explain how such audiovisual materials can be curated.

2.4 Concepts of Selection, Preservation and Accessibility

The focus will be on three core processes: selection, preservation, and accessibility. These three steps are all part of the different digital curation practices already mentioned in the framework. Therefore, it can be said that selection, preservation, and accessibility are the core practices of digital curation. The goal is to provide communities with long-term access to digital cultural heritage. With these three activities, curators can create collections in the digital field with minimal information loss.

2.4.1 Selection

Selection deals with the criteria curators work with when forming and building a collection. Besides focusing on the audience, curators must focus on relevance, significance and usability. Curating is a complex topic which impacts the selection of information and knowledge. The curators must consider the criteria that make data fit into a collection. Higgins emphasises that the selection process is crucial, as those criteria are the critical factors for long-term curation with value.[47]

Selecting the content for a collection implies a high responsibility for the curators. Their task is to ensure that the information and knowledge are relevant to the cultural heritage institution and that they are useable for the audiences. They also protect ethical guidelines and biases.[48] Curating cultural heritage collections involves significant responsibility. Curators must ensure that the information and knowledge they select are relevant and usable for their institutions and audiences. Moreover, they must protect ethical guidelines and avoid biases.

[47] Sarah Higgins, 'The DCC Curation Lifecycle Model', *International Journal of Digital Curation*, 3.1 (2008), 134-140 https://doi.org/10.2218/ijdc.v3i1.48.

[48] Arjun Sabharwal, *Digital Curation in the Digital Humanities: Preserving and Promoting Archival and Special Collections* (San Diego: Elsevier Science & Technology, 2015) http://ebookcentral.proquest.com/lib/leidenuniv/detail.action?docID=2028120 [accessed 1 July 2024].

Understanding how collections can be biased and the causes underlying these influences is crucial in contemporary cultural heritage management. Different types of biases can be differentiated. Personal preferences, cultural norms, and institutional priorities can influence curators' decisions.[49] The influences can be put into five categories: interpretive bias, collection practices, documentation bias, funding and resource allegation, and cultural and political influences. Interpretive bias presents or interprets the curator's views or cultural narratives, creating only a partial understanding of the collection material.[50] The personal and professional background of the curator can be part of the choices. Personal perspectives like education and cultural environment shape the value of the selection.[51] The following bias category is the collection practices. Historical practices in collecting items of the institution can involve, for example, colonialism. Objects were taken from their origin without proper consent and context, representing a Western-biased view of other cultures.[52] This is also reflected in the documentation bias. Cultural and political influences can affect the way of categorising and describing the item.[53] Governments and institutions may push certain narratives on the collection that align more with their interests and goals, instead of a correct cultural representation of cultural minorities.[54] The last bias is funding and resource allocation. Through an unequal distribution of financial support, areas or themes that attract more interest can be favoured, leading to an imbalance in representing cultural heritage.[55]

This is central to understanding these causes and the importance for curators to create more inclusive and representative collections that reflect the diversity of human experience outside these factors. The curator is in charge of a diverse, objective representation. The values of digital curation ensure effective curation lifecycle management and protect important digital research data for the future.[56]

Besides an inclusive and diverse selection of collection items, the reuse of knowledge and information is one of the main goals, which impacts research in general. Hence, to achieve this goal, the evaluation of the digital object is based on the "value, demand, condition, legal

[49] Richard Sandell and Eithne Nightingale, Museums, Equality and Social Justice (London: Routledge, 2012), p. 34.
[50] Eilean Hooper-Greenhill, Museums and the Interpretation of Visual Culture (London: Routledge, 2000), p. 47.
[51] James Cuno, Who Owns Antiquity? Museums and the Battle Over Our Ancient Heritage (Princeton, NJ: Princeton University Press, 2008), p. 76.
[52] Tony Bennett, Pasts Beyond Memory: Evolution, Museums, Colonialism (London: Routledge, 2004), p. 89.
[53]Sharon Macdonald, A Companion to Museum Studies (Oxford: Blackwell Publishing, 2006), p. 115.
[54] Sheila Watson, Museums and Their Communities (London: Routledge, 2007), p. 134.
[55] Robert R. Janes and Richard Sandell, Museum Management and Marketing (London: Routledge, 2007), p. 202.
[56] Digital Curation Centre, 'DCC Curation Lifecycle Model', *Digital Curation Centre* [online] (2024) https://www.dcc.ac.uk/sites/default/files/documents/publications/DCCLifecycle.pdf [accessed 1 July 2024].

and ethical issues, and availability"[57]. Those criteria should be observed while defining collection profiles, as this allows the curator to optimise and tailor the purpose of the collection data specifically for the audience. This certifies that digital collection data is reused and fits research standards aligning with the FAIR standards. The curator must follow the significant selection criteria to create a foundation for the collection. Therefore, these criteria can be stated in the collection guidelines and highlight the importance of selection as one of the core steps in curation.

2.4.2 Preservation

While the aspect selection is focused on the content, preservation is the practice of ensuring the constant updating and care of the collection. This is through correct storage in a secure digital archive with comprehensive metadata for easy retrieval and use. The benefits include long-term preservation, protection of digital material, and avoiding data loss, corruption, or technological obsolescence.[58] This includes archiving as a preservation practice through the process of storing digital information involving the use of standardised formats, metadata, and robust storage solutions.

The goal of retrieval and use of the collection is managed through techniques and technologies, including emulation, migration and archiving.[59] Kennedy states that such technologies to protect collections ultimately open the access process. Examples of technologies such as screen readers and voice recognition software are crucial in making cultural heritage material accessible and inclusive.[60] Screen Readers convert text displayed on a screen into speech or Braille, enabling users to access digital content with visual or mobility impairments. They can listen to audiovisual content or digital text.

The second example is voice recognition software, which allows users to interact with digital systems through voice commands. It includes mobility-impaired users in a collection.[61] They can navigate through a digital archive using just their voices. This makes cultural heritage accessible and broadens the community's access without excluding community members.

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[57] Carmen Cowick, *Digital Curation Projects Made Easy: A Step-by-Step Guide for Libraries, Archives, and Museums* (Lanham: Rowman & Littlefield, 2018).
[58] Emily Brown, *Modern Archiving Methods* (Chicago: University of Chicago Press, 2020), pp. 78-85.
[59] Paul N. Edwards, 'Knowledge Infrastructures: Intellectual Frameworks and Research Challenges', *Digital Curation*, 8.1 (2019), 15-33 https://doi.org/10.2218/ijdc.v8i1.235.
[60] Robert Johnson, 'Digital Preservation Strategies', *Digital Archives Online*, 10 March 2021, http://www.digitalarchivesonline.org/preservation-strategies [accessed 7 August 2024], p. 12.
[61] Sarah White, 'Voice Recognition in Digital Archives', paper presented at the *International Conference on Digital Preservation*, Paris, 15-17 June 2022, pp. 102-110.

Aside from general preservation tasks, digital preservation also involves ensuring authenticity and managing metadata in digital collections. Cowick's step-to-step guide explains and differentiates digitisation and digital preservation. Digital preservation aims to maintain the object authentically and ensure its accessibility for long-term storage and usage. Authenticity is indeed one of the critical elements of digital preservation. As a common element to ensure authenticity, digital preservation policies are a mandatory part of digital curation. They provide a framework for institutional digital preservation practices.[62]

Digital preservation policies require a comprehensive and detailed plan to ensure that the institution's needs are met and the development of practical digital preservation is fulfilled. Key elements are the purpose, which states the objective itself, finalising the goal of the preservation activities. Taking prior existing preservation models, like the OAIS, as a guide can ensure a more standardised and general workflow. Defining the scope and responsibilities is crucial for materiality and the roles of the staff members. They must establish guidelines and principles for access, authenticity, standards, and possible training and regularly update and evaluate the policy.

The last element is the preservation strategy for actions necessary to provide content usability over time.[63] Brown delivers a digital preservation policy example. The policy can state that objects will be in an acceptable format, accompanied by metadata that meets repository standards and is checked for viruses.[64] By managing possible decays and errors, the curator can ensure an authentic preservation practice and fulfil the goal of long-term access while keeping the institution's goals in mind.

Another important task of preservation includes the management of metadata. Metadata is "information that describes other information to help you understand or use it"[65]. Digital preservation chooses the metadata standard, which considers the purpose of the digital collection, goals, audience, access, object version, prior existing metadata, standards and descriptions.[66] Hence, authenticity is achieved through proper metadata management.[67]

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[62] Adrian Brown, 'Preserving Digital Objects', in *Practical Digital Preservation: A How-to Guide for Organizations of Any Size*, (London: Facet, 2013), p. 194.
[63] Carmen Cowick, *Digital Curation Projects Made Easy: A Step-by-Step Guide for Libraries, Archives, and Museums* (Lanham: Rowman & Littlefield, 2018).
[64] Adrian Brown, 'Preserving Digital Objects', in *Practical Digital Preservation: A How-to Guide for Organizations of Any Size*, (London: Facet, 2013), pp. 193–242.
[65] Oxford Learner's Dictionaries, 'metadata'. Available at: https://www.oxfordlearnersdictionaries.com/definition/english/metadata?q=metadata [accessed 3 July 2024].
[66] Carmen Cowick, *Digital Curation Projects Made Easy: A Step-by-Step Guide for Libraries, Archives, and Museums* (Lanham: Rowman & Littlefield, 2018).
[67] Arif Shaon and Andrew Woolf, 'An OAIS Based Approach to Effective Long-term Digital Metadata Curation', *Computer and Information Science*, 1.2 (2008), 2-16 https://doi.org/10.5539/CIS.V1N2P2.

Possible formats are spreadsheets, web forms, databases and XML encoding.[68] Another importance is the correct file naming. Therefore, not only can the data be optimised, but the findability in the storage is also more efficient. Institutions can access standardised guidelines for metadata provided through the state, like the digital photography guidelines from the *Nationaal Archief*.[69]

Besides the care of the collection, digital preservation of collections can include challenges like media obsolescence, data degradation, and resource constraints.[70] As mentioned, protocols can help to prevent those errors. Standardised protocols provided by the institution or via ISO standards improve the chances that the digital content is preserved effectively and correctly.[71] To summarise the key points of digital preservation, authenticity is crucial; managed metadata ensures authenticity, while policies can be used to monitor the process. It is also essential to state that digital objects differ from physical ones and encounter different errors. Hence, unique preservation challenges can be created by working with various physical items.[72]

2.4.3 Accessibility

One of the main goals of digital curation is the usage by the audience. Accessibility is a way to ensure that collections stay usable. Access is necessary for audiences and communities to work with or use the collection, annulling the aims of the selection process, which is tailored to showcase the collection with a specific audience in mind. This highlights that access is one of the fundamental goals of digital curation.[73] The possible access factors are stated in the preservation policy and include functionality, familiarity, community, support and costs. Through functionality, the platform or repository is chosen. The institution must select an access model with which the target audience is familiar. For example, Leiden University uses its digital collection website to ensure that students can access the digital collection. Institutions

[68] Adrian Brown, 'Preserving Digital Objects', in *Practical Digital Preservation: A How-to Guide for Organizations of Any Size* (London: Facet, 2013), pp. 193-242.
[69] Joop Korswagen and Liesbeth Keijser, *Guidelines Digitisation of Photographic Materials* (The Hague: Nationaal Archief, 2020), p. 1.
[70] Helen Grant, 'Challenges in Long-term Preservation', *Digital Libraries Forum*, 19 (2017).
[71] Howard Besser, 'Digital Longevity', in *Handbook for Digital Projects: A Management Tool for Preservation and Access*, ed. by Maxine K. Sitts (Andover, MA: Northeast Document Conservation Center, 2000), pp. 155-166.
[72] Adrian Brown, 'Preserving Digital Objects', in *Practical Digital Preservation: A How-to Guide for Organizations of Any Size*, (London: Facet, 2013), pp. 193–242.
[73] Keith Jenkins, 'Digital Curation and Preservation', *Digital Libraries Forum*, 19 (2018).

can work together to build platforms.[74] The annual conferences like the iPres[75] or ALA[76] connect and inform the community about new research and findings. Institutions also provide their curators with support from the IT department to prevent unnecessary errors in digital data management.

The last factor is costs. Buying digital storage and preserving the collection in a repository can be expensive in the long term. Usually, the institution has its infrastructure or collaborates with national or international consortia. Also, providing technologies, as stated in the preservation chapter, has a financial impact in providing access to collections. To conclude, these three core steps in digital curation must be planned through guidelines to ensure inclusiveness, representation, correct storage and accessibility.

2.5 Storage Audiovisual Collection: Download vs Streaming

Accessibility is a necessary part of digital curation that ensures the interaction with the digital collection. The target audience is required to reuse and work with the collection. Recent studies and authoritative recommendations address whether to use downloads or streaming for the storage and presentation of audiovisual collections.

The IFLA recommendations, the expertise from the Institute for Sound and Vision, and the UNESCO report on audiovisual collections provide valuable insights and updates relevant to this discussion. Both interactions with the collection have their advantages and disadvantages. The IFLA guidelines emphasise the importance of long-term accessibility and usability of digital content. To ensure this, they recommend high-quality formats and metadata standards so that digital files remain accessible despite technological development. The IFLA states, "[t]he quality of digitisation should always be high enough to enable reproduction of the original in the foreseeable future"[77]. This aligns well with the download-based method through high-quality file storage and independent access to the digital collection. However, this also takes much storage of the file materials into account, which is impaired with the necessary high internet connection to upload or download and storage on the download device. The IFLA guidelines also acknowledge the role of streaming in providing access to the collection,

[74] Adrian Brown, 'Preserving Digital Objects', in *Practical Digital Preservation: A How-to Guide for Organizations of Any Size*, (London: Facet, 2013), pp. 193–242.
[75] *iPres*, OSF. Available at: https://osf.io/u5w3q/ [accessed 3 July 2024].

[76] *Ala.org* <https://www.ala.org/search/site?keys=Principles%20of%20Digital%20Curation> [accessed 3 July 2024]
[77] Bruce Royan, Monika Cremer et al., Guidelines for Audiovisual and Multimedia Materials in Libraries and Other Institutions, IFLA Professional Reports, No. 80 (The Hague: International Federation of Library Associations and Institutions, 2004), p. 15.

especially for educational and public engagement purposes. It is more flexible and less time-consuming than downloading.[78]

While the IFLA offers a more general view of accessing digital collections, the UNESCO Report emphasises managing digital heritage with sustainable file formats, maintaining. The report states, "Preservation strategies should prioritise sustainable formats and comprehensive metadata to ensure long-term accessibility"[79]. Streaming benefits access should be complemented with download options to maintain high-quality, preservable copies. This combination limits the risks of data loss or format obsolesces. Therefore, a balanced approach is favourable for UNESCO.

Both opinions for downloading or streaming focus on the general accessibility of digital collections. The Institute for Sound and Vision in the Netherlands is a leading centre of expertise in audiovisual archives and provides a more specific approach regarding download or streaming. The institute focuses on digitisation and digital preservation, emphasising the importance of maintaining high-quality master files. According to their policy guidelines for digital curation, "[b]oth high-resolution master files and access copies need to be managed to ensure long-term preservation and access"[80]. Therefore, they use download and streaming methods to balance preservation needs with accessibility goals. Their approach created a hybrid model where high-quality, downloadable files are preserved for archival purposes while streaming is used to reach a broader audience efficiently.[81] The analysis of the three approaches for accessing digital collection via downloading or streaming suggests, in all cases, a hybrid approach as the most effective strategy. Downloading allows the preservation of high-quality master files, which is necessary for long-term archival purposes. These downloads can be reused and repurposed as technology evolves. The backside of this is the high storage space, good internet connection, and good time. Streaming provides an efficient way to reach a broad audience and facilitate easier access. Still, it is prone to data loss and formatting issues that can affect the content of the digital collection.

In general, metadata practices should support both methods for long-term usability and accessibility of digital collection. Therefore, the choice between downloads and streaming should also consider the target audience's specific needs. Education would profit from quick, on-demand access, while cultural heritage institutions and research would favour offline access

[78] Royan, Cremer et al., *Guidelines*, p. 22.
[79] Ray Edmondson, *Audiovisual Archiving: Philosophy and Principles*, 3rd edn (Paris: UNESCO, 2016), p. 28.
[80] Nederlands Instituut voor Beeld en Geluid, *Collectiebeleid Beeld en Geluid*, ed. by Mieke Lauwers, trans. by Beth Delaney (Hilversum: Nederlands Instituut voor Beeld en Geluid, 2013), p. 10.
[81] Nederlands Instituut, *Collectiebeleid*, p. 14.

and detailed analysis. By combining both methods, the strengths of each approach ensure preservation and access to the digital collection.

2.6 Focus on Accessibility for Target Audience

The framework for digital curation and the concepts of selection, preservation, and accessibility are based on one main goal: providing cultural heritage for target audiences and the general public. The general accessibility approach has already been explained, especially regarding digital preservation policies.

Nevertheless, the specific focus on the access for target audiences provides a deeper explanation. The target audience is part of the designated community, "an identified group of potential Consumers who should be able to understand a particular set of information," according to the OASIS[82]. The digital collection should be accessible worldwide through the institution or a platform. This leads not only to the reuse of data but also increases the institutional presence and possible collaborations in research[83]. Digital collection should be as open as possible and closed as necessary to avoid privacy and copyright issues. This is an essential section of the open science movement because digital collection can work as data for future research.

Besides the worldwide accessibility, physical handling is reduced, which protects fragile objects. Following the correct policies and guidelines for authenticity and integrity checks provides the target audience with high-quality information and knowledge.[84]

3 Curation of Digital Audiovisual Collections Model

In this chapter, we will examine curation models and the significance of guidelines, particularly in managing digital audiovisual content. We will explore Higgins's (2008) Digital Curation Life Cycle Model in-depth to explain all the processes involved in digital curation and how they can be applied to audiovisual content. When working with audiovisual content, it is essential to consider the differences between digitised and born-digital information. When digitising a physical object, it is required to preserve the physical object and eventually represent it as digital bits. On the other hand, the emphasis is typically on the format for born-

[82] Consultative Committee for Space Data Systems, Reference Model for an Open Archival Information System (OAIS): Recommended Practice, CCSDS 650.0-M-2, Magenta Book (Washington DC: CCSDS, 2012), p. 10 https://public.ccsds.org/pubs/650x0m2.pdf [accessed 1 July 2024].
[83] Adrian Brown, 'Preserving Digital Objects', in *Practical Digital Preservation: A How-to Guide for Organizations of Any Size*, (London: Facet, 2013), pp. 193–242.
[84] Carmen Cowick, *Digital Curation Projects Made Easy: A Step-by-Step Guide for Libraries, Archives, and Museums* (Lanham: Rowman & Littlefield, 2018).

digital content. In the context of this thesis, the focus is on physical objects that have been converted into digital form. Therefore, this chapter addresses explicitly digitised audiovisual content and the importance of adhering to guidelines. When considering institutions, especially libraries, the curation policies of the primary institution in the audiovisual field in the Netherlands serve as a guide for the applied framework of curation models.

3.1 Introduction to the Digital Curation Lifecycle Model by Higgins

In 2008, the *Digital Curation Centre,* "a world-leading centre of expertise in digital information curation with a focus on building capacity, capability and skills for research data management,"[85] created the Digital Curation Life Cycle model (fig. 1) to build a generic framework for understanding and managing digital curation and all its tasks.

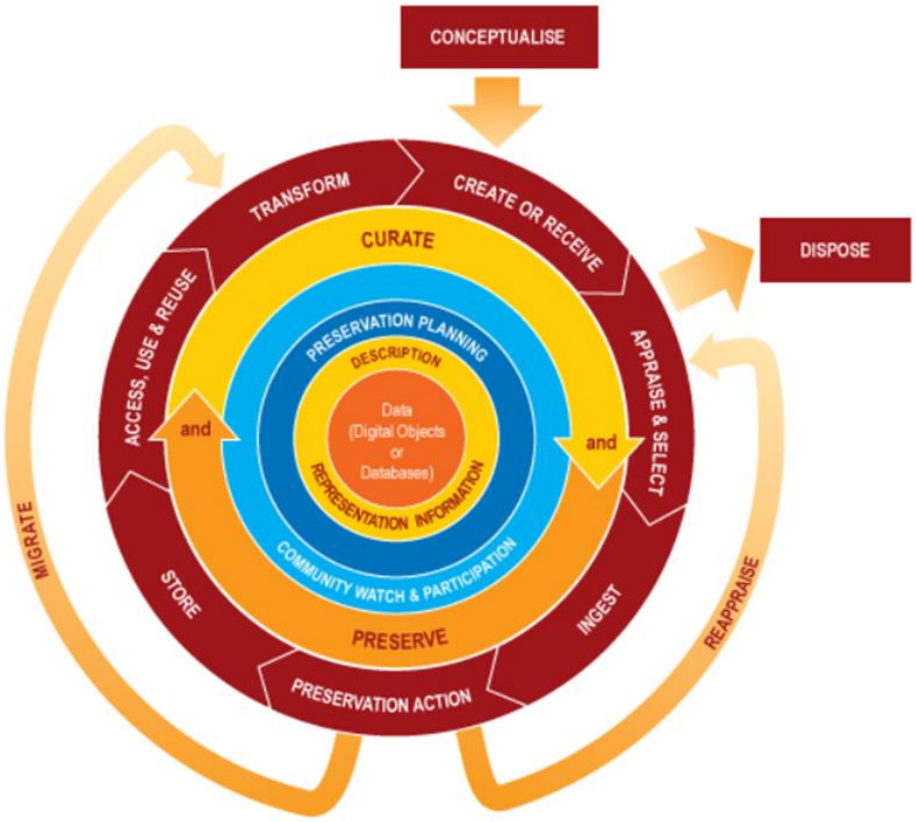

Figure 1: Digital Curation Life Cycle Model by Higgins (Edinburgh, 2008)[86].

[85]Higgins, Sarah, 'The DCC Curation Lifecycle Model', International Journal of Digital Curation, 3.1 (2008), 134-140 https://doi.org/10.2218/ijdc.v3i1.48. p. 134.
[86] Digital Curation Centre, 'DCC Curation Lifecycle Model', Digital Curation Centre [online] (2024) https://www.dcc.ac.uk/sites/default/files/documents/publications/DCCLifecycle.pdf [accessed 1 July 2024].

Higgins conceptualises the theoretical approach of digital curation into a practical framework to aid institutions in implementing digital curation initiatives.[87] The model consists of concentric circles describing the activities: conceptualise, create, access and use, appraise and select, dispose of, ingest, preservation action, reappraise, store, access and reuse and transform. Through conceptualising and creating, institutions are invited to plan and produce the digital object and the associated metadata. Additionally, they need to formulate access policies to ensure later usage. Institutions should take the appraisal and select stage of assessing curation and preservation needs into account while documenting the disposal process for the future.

The digital object is maintained and retained by ingesting the digital object into a trusted repository. The next step is to reappraise the object in case of validation failure. To prevent failure, a secure storage of the digital objects is part of the curation cycle. The last step is the digital object's access, reuse and transformation, which is the managed access and usage for reusing or creating new digital objects from existing ones. Integrating those components of structured knowledge management with a disciplinary focus simplifies the process and allows stakeholders and communities to participate in the curation. With the circle starting in the middle with the data, the process of curation and preservation highlights the circular motion and influence on the different tasks. ´

3.1.1 Audiovisual DCC life cycle model

In this section, the DCC life cycle model will describe the curation process for digital audiovisual collections and highlight the specific selection and preservation approaches.

As mentioned, the lifecycle model is a flexible framework for the practical approach to managing digital content. Therefore, creating digital collection processes for audiovisual content is also applicable.[88] This is provided by following the ten steps of the DCC model. Effective planning requires a strategic approach to audiovisual material in the conceptualisation step[89]. Before starting with preservation and digitisation, curators need to map out the process to build concepts for digital collection curation.

The next step is digitising the physical object; this step is optional for born-digital material. Generating and understanding the different approaches are vital. Therefore, the focus is specifically on the digitised physical material. The curator can decide whether the institution

[87] Higgins, *Curation Lifecycle Model.*
[88] Mitchell p. 16, Mitchell, Laura (2020) "DCC Lifecycle Model and Its Application," Digital Curation Annual Meeting, 16-17
[89] Mitchell p. 16, Mitchell, Laura (2020) "DCC Lifecycle Model and Its Application," Digital Curation Annual Meeting, 16-17

or an external company provides the digitisation. Involving an external company requires extra care in the legal field and policies.

As a next step, the content needs to be evaluated and selected. As mentioned before, curators must follow selection criteria in the curation process to secure proper selection. This can differ in institutions, either before digitisation or afterwards. Digitisation is costly; hence, an institutional decision beforehand is necessary to ensure the investment is only on the relevant material. These include the importance of content, historical significance and the needs of the prospective audience. As a result of the selection criteria mentioned, many of the magnetic tapes produced at the beginning of the 20th century have been preserved.[90] An understanding of the material care is, of course, crucial for adequate preservation[91]. As long as it is possible to display the tape in a working device, digitalisation should be prioritised. The possibility of not accessing the physical device through technical evolvement is a high timely risk that institutions are facing.

Conway adds to Evan's methodology by highlighting limitations and ethical dilemmas that may complicate authenticity, contextual understanding, and ethical considerations, especially in audiovisual content curation. These dilemmas can be avoided through metadata management and creating guidelines for digital collections. The institution can use the FIAF (International Federation of Film Archives)[92] and CEN (European Committee for Standardization)[93] guidelines to provide standards for preserving and disposing of audiovisual content and can work as general suggestions based on the OAIS and DCC models.

3.1.1.1 FIAF and CEN Guidelines

The FIAF guidelines focus on preserving film and audiovisual archives to ensure the importance of maintaining the integrity and accessibility of audiovisual materials for future generations. The key aspects included are preservation, restoration, cataloguing, access and disposal. Thes are similar to the DCC model and core steps discussed in Chapter 2. The FIAF ensures long-term storage conditions that prevent deterioration and involve correct storage of the physical object. The temperature, storage containers

[90] Mark Evans, 'Appraisal and Selection in Digital Curation', *Archival Techniques Conference*, 35 (2019), 20-30.
[91] William Claxton, *Evolving Models of Distribution for Audio Visual Collections*, (Bradford: MCB UP Ltd, 2001-10), *Library Review (Glasgow)*, 50.7/8, 395-399.
[92] *FIAF 'International Federation of Film Archives'. [n.d.]. Fiafnet.org <https://www.fiafnet.org/> [accessed 3 July 2024]*
[93] *CEN* 'About CEN'. [n.d.]. CEN-CENELEC <https://www.cencenelec.eu/about-cen/> [accessed 3 July 2024]

and regular inspections are noted in the guidelines.[94] Restoration is part of regular material maintenance without altering the original content.[95] The institution ensures correct storage and usability later on through detailed cataloguing and documentation. This includes metadata standards and recordings of the history and condition of each item. Balancing the need to preserve and provide access simultaneously involves creating digital copies to prevent damage to the original.[96] The final aspect is disposal. Not every material is part of the digital collection, so establishing clear criteria for when and how to dispose of materials no longer needed by researchers or the public is essential in guidelines.

The second guideline that can be used as a reference for digital collection is the CEN (European Committee for Standardization) Guidelines. These are more standardised and ensure best practices across Europe for preserving and managing audiovisual content. The key aspects of the CEN guidelines are more detailed, including standardised processes, training and education, the importance of handling audiovisual material, storage and legal considerations.[97]

Through a standardised process, an institution can create general procedures for preserving, digitising and disposing of audiovisual content to ensure consistency and quality. This leads to a constant need for quality control to meet established standards in preservation across different institutions. An example of established standards is technical specifications. Providing detailed specifications for equipment and materials used for conservation and digitisation ensures high quality and compatibility. Another crucial key aspect is the training and education of the personnel involved in preserving and managing audiovisual archives to ensure that they can meet the established standards and best practices. For example, annual conferences and workshops like the International Digital Curation Conference (IDCC25) in the Netherlands ensure information and knowledge sharing.

The following essential aspect is the importance of care in handling audiovisual materials.

In contrast to other materials, audiovisual items require more care due to their the complexity of their materiality and formatting involved in the preservation process.

[94] *FIAF 'International Federation of Film Archives'. [n.d.]. Fiafnet.org <https://www.fiafnet.org/> [accessed 3 July 2024].*
[95] FIAF.
[96] FIAF.
[97] *CEN* 'About CEN'. [n.d.]. CEN-CENELEC <https://www.cencenelec.eu/about-cen/> [accessed 3 July 2024].

To ensure no physical deterioration, technological obsolescence or content loss, guidelines provide strategies to minimise the risk. In providing suitable storage space for physical items, the decline of film, magnetic tapes, and other audiovisual materials is avoided by keeping environmental factors such as humidity, temperature, and light exposure in the guidelines.[98] Content loss can be avoided through the correct equipment for audiovisual formats to ensure the item is not damaged or can't be accessed anymore. Therefore, an appropriate digital format for preservation and access is necessary. Another process is metadata creation, which creates easily found and accessed information about the original video and the digital file.

As mentioned, storage and backup protect the physical item and the digitised file from data loss. Besides the correct storage space, regular repository backups ensure the integrity of the digital files. Other verification methods help to detect and correct any possible corruption or data loss over time. By accessing a digital collection instead of a physical one with audiovisual content, institutions protect the physical items and offer an opportunity to reach a broader audience by creating copies and digital access through online platforms.[99] The last aspect of the CEN guidelines involves legal and ethical considerations. These protect the creator and the content through copyright laws and moral standards, especially when dealing with culturally sensitive or private materials.

In conclusion, both FIAF and CEN guidelines provide a comprehensive framework for preserving and handling the physical material of audiovisual content. This ensures that digital copies remain accessible for future generations and enables a similar qualitative standard between institutions that use those guidelines as a guide. Both guidelines also include the standard process of the DCC model and adapt it to audiovisual content.

While audiovisual content requires special care in digitisation and selection, the next step involves uploading it into a digital repository to ensure integrity and accessibility.[100] The digitisation process of analogue video requires more attention to technical and preservation

[98] *CEN* 'About CEN'. [n.d.]. CEN-CENELEC <https://www.cencenelec.eu/about-cen/> [accessed 3 July 2024].
[99] *CEN* 'About CEN'. [n.d.]. CEN-CENELEC <https://www.cencenelec.eu/about-cen/> [accessed 3 July 2024].
[100] National Archives, 'Digitisation and Preservation Guidelines', *National Archives Website* [online] (2023) https://www.nationalarchives.gov.uk/documents/archives/digitisation-and-preservation-guidelines.pdf [accessed 1 July 2024].

details to ensure digital content retains its integrity and is accessible in the digital format without data loss. The combination of visual and auditory elements creates a complex format for digitisation. The equipment must maintain the original frame rate, including selecting resolution, aspect ratio, colours, and high-quality audio.[101] Proper handling and storage of the physical tape include stable environmental conditions to prevent crucial damage. Metadata standards are also included in digitisation, as well as widely supported file formats and creating multiple copies stored in different locations. Another important aspect is the assurance that the digital repository is user-friendly and includes accessibility. Besides metadata management, the actions to preserve the digitised content involve the correct file format standards. Curators create detailed metadata for efficient compression, finalise storage solutions, and ensure regular backups are made[102]. The importance of proper storage and special care of the physical item of audiovisual content is explained on magnetic tapes, and the preservation and storage of those tapes protect the physical object and the digitised file.

Through the storage process, measures are taken to keep the digital content safe in the repository.[103] One of the typical audiovisual formats is magnetic tape. These are fragile objects that face significant stability issues. Maintaining these tapes requires proper care and storage conditions to ensure longevity and usability. Magnetic tapes have historically been used for recording and storing audiovisual content. However, they face various forms of degradation, such as magnetic decay, physical wear and chemical breakdown. Over time, magnetic tapes lose their charge, which leads to data loss. Repeated playback and environmental factors can cause damage to the physical object. The binder of the magnetic tape holds particles that can degrade, causing the tape to become sticky and brittle.[104]

To avoid these issues, it is crucial to implement preservation strategies. The Audiovisual Archiving Report from UNESCO recommends five aspects for storing and caring for magnetic tapes. Climate control in the storage space ensures a stable temperature and humidity. Ideal conditions are typically around 18-22°C and 30-50% humidity.[105] Besides

[101] Ray Edmondson, *Audiovisual Archiving: Philosophy and Principles*, 3rd edn (Paris: UNESCO, 2016), pp. 35-37.
[102] Dietrich Schüller, 'Preserving Audio and Video Recordings in the Long-Term', in Ralph W. Manning and Virginie Kremp, eds., *A Reader in Preservation and Conservation*, IFLS Publications 91 (München: IFLS Section on Preservation and Conservation, 2000).
[103] Dietrich Schüller, 'Preserving Audio and Video Recordings in the Long-Term', in Ralph W. Manning and Virginie Kremp, eds., *A Reader in Preservation and Conservation*, IFLS Publications 91 (München: IFLS Section on Preservation and Conservation, 2000).
[104] Ray Edmondson, *Audiovisual Archiving: Philosophy and Principles*, 3rd edn (Paris: UNESCO, 2016), pp. 35-37.
[105] Edmondson, *Audiovisual Archiving*, p. 38.

climate control in storage space, the environment should be clean and dust-free because pollutants and contaminants can damage the tape's surface.[106] The institution can ensure the safety of the magnetic tape through archival-quality storage containers that avoid exposure to light. Still, the most successful way to prevent damage is to minimise the handling and playback of the original.[107]

By applying these preservation strategies, digital content and physical material protection is ensured. Proper storage of magnetic tapes safeguards the original audiovisual data and facilitates ongoing access and usage. While the focus is usually on the correct digitisation process, the correct storage for analogue sources is equally essential for comprehensive preservation efforts. Through proper storage, preservation activities provide access and usage to digital content, ensuring authenticity and protection of data and physical material.[108]

Making the digital collection accessible allows target audiences to re-use the material. The requirement of constant backups and updates of the audiovisual programs ensures the content remains accessible, even though the technological device changes. The digitisation of audiovisual content allows users to access magnetic tapes, but after centuries, the physical device has not been accessible to the general public. Hence, this opens up reuse in research.

Another necessary process is disposing of unneeded content due to ethical and practical considerations. Removing content from digital collection is sensitive and requires careful handling to avoid losing valuable content.[109] For example, a university's media collection department of the library needs to remove old lecture recordings to free up storage space. To ensure no valuable or historically significant material is lost, consultation with the stakeholders and the faculty confirm which recordings are no longer necessary. The historical significance of files like old lecture recordings can be anticipated by forming review committees and transparent selection criteria. The importance of the material can be determined by maintaining detailed metadata, scheduling periodic reviews, conducting pilot projects, collaborating with other institutions, and analysing through AI tools.[110] The disposal process also includes preventing unauthorised recovery; hence, documenting the decision-making process for future reference is crucial.

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[106] Edmondson, *Audiovisual Archiving*, p. 39.
[107] Edmondson, *Audiovisual Archiving*, p. 40-41.
[108] Eye Filmmuseum. Policy guidelines on access to special collections (offline source), p. 18.

[109] Helen Grant, 'Challenges in Long-term Preservation', *Digital Libraries Forum*, 19 (2017).
[110] Society of American Archivists, 'Guidelines for College and University Archives', https://www2.archivists.org/groups/college-and-university-archives-section/guidelines-for-college-and-university-archives [accessed 7 August 2024].

The last step of the DCC model entitles reassessing the content for ongoing relevance for periodic reviews and decision-making processes. Constant reviewing and updating ensure the content remain valuable and relevant for authenticity and usage[111]. The rapid speed at which technology evolves and introduces constantly growing audiovisual content will only increase the selection and reassessing of audiovisual content.

3.2 Introduction to the OAIS Reference Model

Besides the DCC, another digital curation model that creates the fundamental understanding is the OAIS, Open Archival Information System (fig. 2).[112]

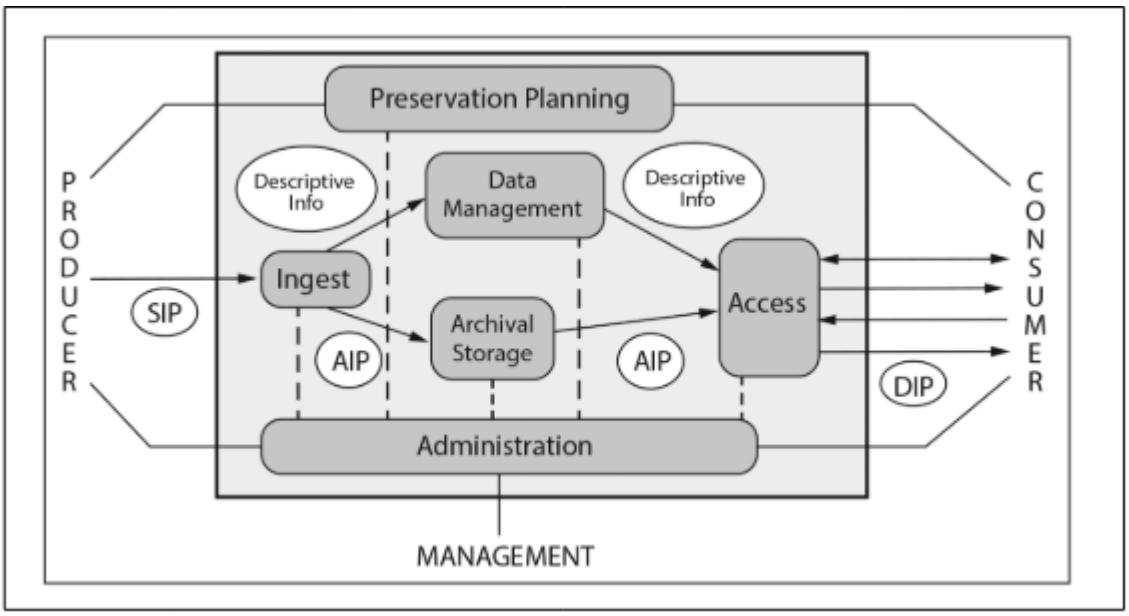

Figure 2: Open Archival Information System (Washington, 2012)[113]

The OAIS is focused on an archival system that preserves information and makes it accessible to communities.[114] While the DCC is detailed in the multiple processes of curational practices, the OASIS is explicitly tailored for the digital preservation field. It goes into more depth

[111] Alex H. Poole, 'The Conceptual Landscape of Digital Curation', *Journal of Documentation*, 72.5 (2016), 961-986 https://doi.org/10.1108/JD-10-2015-0123 [accessed 3 July 2024].
[112] Consultative Committee for Space Data Systems, *Reference Model for an Open Archival Information System (OAIS): Recommended Practice*, CCSDS 650.0-M-2, Magenta Book (Washington DC: CCSDS, 2012), p. 10 https://public.ccsds.org/pubs/650x0m2.pdf [accessed 1 July 2024].
[113] CCSDS, *OAIS*, p. 4-1.
[114] Heather Ryan and Sampson Walker, 'Digital Preservation Storage and Strategies', in *The No-Nonsense Guide to Born-Digital Content*, (London: Facet, 2018), pp. 111–28.

regarding digital preservation activities, which is necessary to understand the core steps for creating digital curation guidelines. The model can be organised into three key components: functional entities, information packages and preservation strategies. The Open Archival Information System (OAIS) model provides a comprehensive framework for the preservation and long-term accessibility of digital information, essential for maintaining its authenticity and usability over time. The OAIS model comprises three primary components: functional entities, information packages, and preservation strategies.

The functional entities in the OAIS model manage the information lifecycle. These entities include ingest, archival storage, data management, preservation planning, access and administration. The OAIS model involves receiving information from producers and preparing it for storage. It includes verifying the information and generating necessary metadata to transform the data into a suitable format for archiving. The entity's archival storage, data management, preservation planning and access align with the critical aspects of the DCC model and the general analysis of Chapter 3.1. A new entity is the administration, installing an overall management and coordination of the archival system. It includes policy development, resource management, and compliance with standards and regulations.[115]

The OAIS model is organised into three types of information packages: submission information package, archival information package and dissemination information package. These packages are part of the process, as seen in Fig. 2. They include information on metadata and responses to user requests, adding new information on storage and data management along the process.[116]

To ensure long-term accessibility, the OAIS model focuses on actions and policies designed to maintain the integrity and usability of the information over time. This includes format migration, converting data into current formats to prevent obsolescence, metadata enhancement, updating and enriching metadata to improve information and context, and integrity checks, conducting regular check-ups to ensure data has not been corrupted or damaged.[117]

3.2.1 Audiovisual OAIS Model

[115] Consultative Committee for Space Data Systems, *Reference Model for an Open Archival Information System (OAIS): Recommended Practice*, CCSDS 650.0-M-2, Magenta Book (Washington DC: CCSDS, 2012), p. 10 https://public.ccsds.org/pubs/650x0m2.pdf [accessed 1 July 2024].
[116] CCSDS, *OAIS*.
[117] CCSDS, *OAIS*.

The Open Archival Information System (OAIS) model can be applied effectively to the preservation and long-term accessibility of digital audiovisual content and the DCC model. Through ingesting the audiovisual content, the curator must verify the files, check for any errors, and ensure they are in acceptable formats. The metadata generated includes descriptive, technical, and preservation metadata. This will later help identify, manage, and retrieve the content. For future usability, it is necessary to convert the content into formats suitable for long-term storage and preservation. For example, they convert video files to widely accepted archival formats like MOV.

The second entity is archival storage, protecting the audiovisual content in a secure digital archive with multiple copies[118]. Like the DCC, regular check-ups or verification methods ensure data integrity. Through backup management, copies are stored in different locations to prevent loss due to hardware failures or other disasters. File management includes metadata administration, ensuring that the audiovisual content remains accurate and facilitates the search and retrieval user-friendly.

The preservation planning entity monitors technological changes in archives standards and practices to keep the audiovisual content accessible and compatible. When necessary, audiovisual files are migrated to new formats to prevent obsolescence. For example, older video formats are converted into newer ones so devices with newer software can still access them. This identifies and mitigates potential risks that can arise in the preservation process.

The OAIS develops access policies to control who can access the content and under what conditions, ensuring that sensitive or restricted content is protected. While the DCC takes a more hybrid approach to downloading and streaming content, the OAIS prefers to provide streaming access to ensure the safety of the original material.

The last entity is the administration, including policies governing audiovisual content preservation, access, and use. Besides the content, these policies manage resources, including personnel, budget, and infrastructure, ensuring compliance with relevant standards, regulations and institutional practices.

According to the OAIS model, audiovisual content can be divided into three information packages. The Submission Information Package contains content files and metadata, including information about the content's origin, creation date, technical specification, and any associated rights or restrictions. The archival information package stores

[118] Consultative Committee for Space Data Systems, *Reference Model for an Open Archival Information System (OAIS): Recommended Practice*, CCSDS 650.0-M-2, Magenta Book (Washington DC: CCSDS, 2012), https://public.ccsds.org/pubs/650x0m2.pdf [accessed 1 July 2024].

metadata to facilitate management and preservation activities. This leads to the last dissemination information package, created through user access requests. The file includes metadata and format suitable for the user's needs.

Applying the OAIS model to digital audiovisual content provided a more standardised approach in contrast to the DCC. However, both have the same goals of long-term preservation and accessibility. While the OAIS model prioritises the preservation process, making it suited for audiovisual collections to ensure integrity and usability is crucial, the DCC model focuses on the immediate data curation needs. They provide practical tools and guidelines for managing audiovisual content through the creation lifecycle until disposal. The standardisation of the OAIS model helps institutions maintain consistency and reliability in preservation practices; on the other hand, the DCC model provides practical tools that can be directly applied in the curation of audiovisual content, managing content effectively, addressing issues such as metadata, storage, and access[119]. This focuses on practical aspects, including curation like selecting and transforming data, while the OAIS offers a comprehensive framework for maintaining usability.

In contrast to the DCC model, the OAIS model serves as a standardised approach to digital preservation, ensuring that information remains accessible and understandable to the designated community over the long term. While the DCC focuses on immediate curation needs, providing practical tools for data curation, the OAIS delves deeper into preservation activities, creating an essential foundation for developing digital curation guidelines. This makes the OAIS model more suited for institutions that focus on the long-term preservation of audiovisual content, such as archives, libraries, and museums, ensuring the content remains authentic and accessible over time. Nevertheless, the DCC model is ideal for organisations such as research institutions and universities to manage the content effectively. Hence, the DCC model aligns with the curation for the digital collection of the audiovisual data set of the Leiden University library, focusing on the main concepts of selection, preservation, and access in the creation of guidelines.

3.3 Introduction Curation Guidelines from the *Eye Museum Amsterdam* and the *Beel&Geluid Collection Policy*

This chapter introduces two of the Netherlands' leading institutions in digital audiovisual curation. Both curation policies provide insights into an approach to creating specific curation

[119] Higgins, Sarah, 'The DCC Curation Lifecycle Model', International Journal of Digital Curation, 3.1 (2008), 134-140 https://doi.org/10.2218/ijdc.v3i1.48.

guidelines for the Leiden University Library. Based on the prior analysis of the two digital curation models, the policy presents a practical example to support the theoretical framework and enhance the core aspects of creating digital curation guidelines for audiovisual content. Even so, both institutions focus on the cultural heritage factor and are not only educational institutions like the Leiden University Library; they create and curate digital audiovisual collections and collaborate in research projects.

3.3.1 *Eye Museum Amsterdam Digital Collection Policy*

As a leading institution in the digital audiovisual collection, the *Eye Museum* in Amsterdam provides a policy explicitly tailored to audiovisual content. The website of the *Eye Museum* states that the institution "is a guardian, guide, and pioneer in the world of film and the art of the moving image".[120] It welcomes audiences from all over the world to its vast collections. They aim to collect, restore, and preserve film heritage and culture[121]. By contextualising, presenting, promoting and researching this content, the museum creates an accessible platform for the general public and research.

With this goal, the *Eye Museum* aims to be a leading institution in preserving and presenting film within a museum context. The goal of digital curation can be fulfilled through collecting and sharing strategies. The collection composition includes collection management of over 55,000 film titles, photographs, posters, sheet music and more audiovisual content. The *Eye Museum* arguably achieves the ideal preservation efforts both for the analogue and the digital to ensure the longevity of cultural heritage in the audiovisual field. Films and related items that reflect Dutch film culture and a diverse and inclusive film history are prioritised[122].

Curation and accessibility to historically significant, forgotten, or urgent films allow audiences to connect and reuse the content. The museum offers audiences access to the collection through their Eye Film Players or other digital presentations, like projectors. Besides accessibility, one of the institutional goals is to create influence even in international cultural heritage communities. Therefore, the Eye develops educational programs and promotes Dutch film culture.

One of the opportunities the *Eye* offers is a traineeship program for programming, film curation, and restoration[123]. Creating a platform for collaborations and research projects led to important discoveries and innovations in the audiovisual field, which is still underrepresented

[120] Eye Filmmuseum. Policy guidelines on access to special collections (offline source), p. 3.
[121] Eye Filmmuseum. Policy guidelines on access to special collections (offline source), p. 3.
[122] Eye Filmmuseum. Policy guidelines on access to special collections (offline source), p. 4.
[123] Eye Filmmuseum. (2023). Preservation and Restoration. Available at: Eye Filmmuseum Website.

in library science. Significantly, with digital innovation, new ways to make the collections accessible, online and on-site, benefit all digital collections.

Institutions can broaden their collections through hybrid exhibitions and artistic VR works, creating a new experience for the audience and a general contribution to curating cultural heritage in a more interactive way. Additionally, the policy states the future aspirations for digitisation, diversity and sustainability. They state, "[a]s guardian of film heritage in the Netherlands, *Eye Film Museum* has a museum function and an archive function. To fulfil its museum function, *Eye* makes choices based on substantive, artistic, historical, cultural, and social criteria"[124], clarifying the selection criteria for preservation efforts to create a digital collection and including inclusiveness and sustainability, allowing new projects and contributions for research and the audiovisual field. The current goal is a new nitrate storage facility to store film tapes correctly and secure the original material[125].

Nevertheless, the *Eye Museum's* digital collection policy approach to preserving and promoting audiovisual heritage for curation still has challenges and opportunities.[126] For example, Brown highlights the critical role museums and archives take in preserving film heritage, providing a detailed analysis of the *Eye Museum's* impact on cultural heritage; Williams also emphasises the importance of digitisation in the audiovisual field, providing insights into *Eye Museum's* initiatives to broaden access to its collection and engage with a broader audience[127]. These scholarly perspectives complement and critically face the museum's commitment to sustainability and innovation in audiovisual preservation. The *Eye Museum's* curation policy complements the theoretical framework to preserve and promote audiovisual heritage through several critical strategies besides preservation and accessibility; they also include the influence of audiovisual heritage. The *Eye Museum* protects cultural heritage across multiple formats by prioritising analogue and digital preservation, ensuring longevity and integrity.

The museum's accessibility efforts are enhanced through digital platforms like the Eye Film Players and other technological presentations, making the collection inclusive and available to a broader audience[128]. Educational programs further extend the museum's influence, promoting

[124] Eye Filmmuseum. Policy guidelines on access to special collections (offline source), p. 13.
[125] Eye Filmmuseum. Policy guidelines on access to special collections (offline source), p. 13 – 26.
[126] John Smith, 'Developing Digital Collections: Challenges and Opportunities', *Journal of Digital Curation*, 15.2 (2023), 45-60.
[127] Sarah Williams, 'Digitisation and Accessibility in the Audiovisual Sector', *Digital Humanities Quarterly*, 17.3 (2023), 101-115.
[128] Eye Filmmuseum. Policy guidelines on access to special collections (offline source), p. 13 – 26.

Dutch film culture and engaging with international cultural heritage communities. Research and collaboration are critical aspects of the policy, with traineeships and projects in programming, film curation, and restoration fostering innovation and addressing underrepresentation in library science.[129]

The *Eye Museum* also focuses on future aspirations such as continued digitisation, diversity, and sustainability, including constructing a new nitrate storage facility to secure original materials. The selection criteria for preservation emphasise inclusiveness and sustainability, ensuring that the museum's practices align with artistic, historical, cultural, and social values.

Scholarly perspectives, such as Williams's insights on the significance of digitisation, support the museum's efforts. These perspectives affirm the *Eye Museum's* commitment to sustainability and innovation, highlighting the alignment of its curation policy with its broader mission of preserving and promoting audiovisual heritage for future generations.

The storage space strategy is specifically tailored to the physical format. The policy example suggests that magnet tapes should be stored in climate-controlled conditions, with a temperature of +5°C and a relative humidity of 35%.[130] At the same time, another depot for extra sensitive material is kept at -5°C. In classifying the material correctly, the ideal storage space can be decided upon, ensuring the safety of the original. It should be discussed if all the film tapes should be stored at the library.

In general, the *Eye Museum* Amsterdam is a hybrid institution from an archive, storing the physical material and a museum, displaying multiple digital and in-person collections of audiovisual content.[131] Therefore, they optimised the accessibility and engagement of the material. Besides the collection display, they engage in collaborative projects and research, contributing to the development of audiovisual curation.

3.3.2 Curation Guidelines of Beeld& Geluid Collections

The *Beeld & Geluid* Digital Curation Guidelines provide a comprehensive framework for digitising and preserving audiovisual, audio and visual archival documents in the Netherlands. This policy aims to enhance the integrity, accessibility, and long-term preservation of digital

[129] 'Eye International Conference', Eye Film Museum, https://www.eyefilm.nl/en/academic [accessed 1 August 2024].
[130] ye Filmmuseum. Policy guidelines on access to special collections (offline source), p. 18 – 26.
[131] Eye Filmmuseum, *Collection*, *Eye Filmmuseum* [online] https://www.eyefilm.nl/en/collection [accessed 6 August 2024].

audiovisual collections. The guidelines support preservation and archival activities, ensuring long-term storage and broader access to collections of national significance in photography and negatives. This coherent approach to digitisation and access to digital collections is a crucial aspect of their strategy.

The Netherlands Institute for Sound and Vision, or *Beeld & Geluid*, is a prominent cultural organisation, including a museum and research facility, dedicated to the collection, preservation, description, and accessibility of audiovisual materials with national, historical, and cultural significance. According to the policy, the institute's collection policy is designed to manage an extensive and diverse collection of audiovisual content, ensuring long-term preservation while making these materials accessible to a broad audience, including professionals, researchers, and the general public.[132]

The institute's core collection consists of over 800,000 hours of audiovisual material, including film, television, radio, music, and other sound recordings[133]. This collection is further supported by various supplementary materials, such as photographs, objects, costumes, and documents, which provide historical and cultural context to the audiovisual media.[134] The vast number of diverse formats and materials includes a multilayered policy outline to ensure curation and preservation according to the format is correctly implemented.

The policy underscores the importance of digitisation and digital preservation, emphasising the necessity of preserving these materials to guarantee long-term accessibility. The institute employs advanced technological processes to ensure these materials remain available to future generations.[135]

As the national audiovisual archive, *Beeld & Geluid* plays a central role in collaborating with other institutions in the Netherlands and internationally. This collaboration enhances the intensity and reach of its collection. The policy emphasises the importance of preserving cultural heritage in the digital age, applying selection criteria as mentioned in Chapter 2.4.1 to ensure the collection remains relevant and valuable.[136]

Furthermore, the Institute's commitment to digital preservation is reflected in its adherence to the Open Archival Information System (OAIS) model, which guides its practices in maintaining the authenticity and integrity of digital collections.[137] In contrast to the DCC

[132] *Collection Policy*, Nederlands Instituut voor Beeld en Geluid, Hilversum, 2015, pp. 4-5.
[133] 'Organisatie', Beeld & Geluid, https://www.beeldengeluid.nl/organisatie [accessed 6 August 2024].
[134] *Collection Policy*, pp. 8-9.
[135] *Collection Policy*, pp. 32-33.
[136] *Collection Policy*, pp. 12-13.
[137] *Collection Policy*, p. 37.

practical approach, the institute is focused on archiving rather than displaying. The policy also highlights the dynamic nature of the media landscape, noting the need for continuous adaptation to technological advancements and evolving user demands.

Active participation in research and development projects, including those that enhance the accessibility and usability of its collections, such as initiatives in automatic speech and image recognition. The collection policy is reviewed and updated regularly to ensure it remains aligned with these ongoing developments and addresses emerging challenges in audiovisual preservation.[138]

Overall, the Netherlands Institute for Sound and Vision's collection policy illustrates its role as a leader in preserving and promoting audiovisual heritage. It balances the demands of cultural preservation with the opportunities presented by digital innovation, a testament to the Institute's commitment to maintaining and expanding its influence in this field.[139]

The *Beeld & Geluid* offer a structured and detailed approach to digitisation and preservation, supporting national and research-focused institutions like Leiden University Library. Despite the robust framework, ongoing evaluation and adaptation are necessary to address practical challenges and incorporate new technological advancements in digital curation.

3.3.3 Comparison of Eye Museum Policy and Beeld & Geluid Collection Guidelines

Introducing the *Eye Museum* and *Beeld & Geluid,* collection guidelines demonstrate critical methodologies that help define a fundamental approach to audiovisual curation, reflecting digital collections and institutional goals. They include their preservation strategies, accessibility and innovation for future applications. Generally, audiovisuals in the *Eye Museum* and at the *Beeld & Geluid* are the same. The *Eye Museum* specialises in curating films and moving images. At the same time, *Beeld & Geluid* curates a diverse spectrum of audiovisual materials with a broader focus, including broadcasts and radio programs. Audiovisual materials demand preservation techniques, including analogue formats, traditional restoration, and digitisation. This dual nature requires a unique approach to maintain the integrity of the content, while singular nature formats, like sound, tend to have a less complex process and risk of data loss.[140]

[138] *Collection Policy*, pp. 13-14.
[139] *Collection Policy*, Nederlands Instituut voor Beeld en Geluid, Hilversum, 2015, pp. 6-7.
[140] Eye Filmmuseum. Policy guidelines on access to special collections (offline source), p. 18 – 21.

The prioritising digitisation processes for preserved images in detail requires an emphasis on usability and standardised metadata to maintain usability in research and educational contexts. Another critical difference is the focus on preservation strategies. The *Eye Museum* involves a mixture of photochemical restoration to preserve the quality of older analogue films and digital restoration techniques that address the complexity of digitalisation and preservation[141]. One major issue audiovisual content curation faces is the vinegar syndrome, an error in the acetate film base. These can be prevented or damage controlled through chemical treatments and storage solutions[142].

The *Eye Museum* provides the audience with innovation in its collection presentation. There are different access methodologies for audiovisual content. Films are available through the *Eye Museum* streaming services, whereas collections are accessible digitally. These methods reflect the various needs and uses of each type of content.[143]

They invest in hybrid exhibitions and virtual reality projects to create an immersive experience. They take a dynamic and interactive approach that opens up the audience's experiences with film heritage. Even though they both aspire to achieve the same goal of successful digital curation, they differ in their approaches. In terms of digitisation and accessibility, both institutions place a strong emphasis on making their collections available to the public and academic communities, but they use different approaches to manage. The *Eye Museum* uses its digital platforms, including streaming services, to make films accessible to a broader audience. This strategy is complemented by hybrid exhibitions and virtual reality projects that create immersive experiences, engaging users in dynamic and interactive ways.

In opposition, *Beeld & Geluid's* approach is more structured around the detailed guidelines in their curation policy and information sections on their website. These guidelines emphasise the technical aspects of digitisation, such as proper file formatting, resolution standards, and storage protocols[144]. These guidelines ensure that digitised materials are preserved with high integrity and made accessible primarily through academic and research channels. Both institutions work with their specially tailored preservation activities reflecting the specific requirements of their materials. The *Eye Museum's* focus

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[142] Eye Filmmuseum. Policy guidelines on access to special collections (offline source), p. 18 – 21.
[143] Michelle V. Cloonan and Shelby Sanett, 'Preservation Strategies for Complex Objects', *Library Trends*, 54.1 (2005), 179-197.
[144] *Collection Policy*, Nederlands Instituut voor Beeld en Geluid, Hilversum, 2015, pp. 32-37.

on films requires specialised techniques to prevent and manage issues like vinegar syndrome in acetate film bases, using chemical treatments and controlled storage environments[145]. In contrast, *Beeld & Geluid*, while also concerned with preservation, provide a more generalised framework that includes handling recommendations for various types of photographic materials, such as photographic prints, film-based negatives, and glass plate negatives. Instead of creating their preservation practices, they use the OAIS model[146]. Their approach includes standardised digitisation processes to maintain consistency across different institutions, supporting a nationwide standard for audiovisual preservation.

The next difference in their approaches is accessibility and innovation. At the same time, the *Eye Museum* stands out for its efforts to make Dutch film culture accessible nationally and internationally by creating an interactive platform that includes both digital and in-person experiences; the museum ensures that its audience can engage with film heritage more profoundly[147]. On the other hand, the focus of *Beeld & Geluid* is more aligned with enhancing accessibility through well-structured digitisation processes, which is aimed primarily at the academic and research community.[148] Their emphasis on high-quality digitisation and detailed metadata supports the scholarly use of their collections, making them a vital resource for institutions like Leiden University Libraries.

The last aspect is the critical perspective both institutions' guidelines represent. They highlight different challenges they encounter during their curation process.

The challenge for the *Eye Museum* lies in balancing the need for innovative, interactive presentations with the technical demands of preserving film heritage[149]. In contrast to this issue, *Beeld & Geluid* deals with maintaining image integrity and adapting to new technological advancements, such as 3D digitisation, which present ongoing problems that require continuous evaluation and refinement of their guidelines[150].

In conclusion, while both the *Eye Museum* and *Beeld & Geluid* are committed to the preservation and accessibility of audiovisual content, their approaches are shaped by the nature of their collections and institutional goals. The *Eye Museum* emphasises innovation, inclusivity, and a dynamic engagement with film heritage, appealing to a broad audience.

[145] Eye Filmmuseum. Policy guidelines on access to special collections (offline source), p. 18 – 21.
[146] *Collection Policy*, Nederlands Instituut voor Beeld en Geluid, Hilversum, 2015, pp. 18.
[147] Eye Filmmuseum. Policy guidelines on access to special collections (offline source), p. 41-48.
[148] *Collection Policy*, pp. 39-42.
[149] Eye Filmmuseum. Policy guidelines on access to special collections (offline source), p. 41-48.
[150] *Collection Policy*, pp10-15.

Meanwhile, *Beeld & Geluid's* guidelines focus on creating a standardised, high-quality digitisation process that supports academic research and long-term preservation, significantly influencing digital curation practices at institutions like Leiden University Libraries.

Leiden University can develop a digital audiovisual collection policy by integrating the strengths of the *Eye Museum Amsterdam Digital Collection Policy* and the *Beeld & Geluid Digital Guidelines.* This policy should prioritise selection and preservation, enhance accessibility, foster research and collaboration, and ensure sustainability and inclusiveness. The combined approach will provide a comprehensive framework for curating and maintaining digital audiovisual collections, ultimately supporting the long-term goals of authenticity and accessibility.

3.4 Limitations: Challenges in the Audiovisual Collection

While the DCC model provides a valuable framework for the description of the curation process, it is also clear that it needs to consider several essential characteristics of audiovisual content, such as historical, a relatively new type of material. Therefore, the digital curation process needs help with preservation and materiality itself. Edmondson explains that the limited resources and recognition for audiovisual archiving are disadvantageous.[151] Technological development makes audiovisual formats obsolete quickly, creating significant challenges.[152] Resources and specific technical skills can help to prevent data loss and inefficiency. Through policies and workshops, new strategies for digital content management transform the distribution model[153].

Another essential task is metadata and process documentation for maintaining reliability.[154] Strategies like the FIAF and CEN ensure the goal of digital preservation and authenticated content over time, and challenges like technological obsolescence and data degradation can be limited.[155] In contrast to digital collection with other formats, audiovisual documents require a

[151] Ray Edmondson, *Audiovisual Archiving: Philosophy and Principles*, 3rd edn (Paris: UNESCO, 2016), p. 75.
[152] Adrian Brown, 'Preserving Digital Objects', in *Practical Digital Preservation: A How-to Guide for Organizations of Any Size*, (London: Facet, 2013), p 202.
[153] William Claxton, *Evolving Models of Distribution for Audio Visual Collections*, (Bradford: MCB UP Ltd, 2001-10), *Library Review (Glasgow)*, 50.7/8, 395-399.
[154] Adrian Brown, 'Preserving Digital Objects', in *Practical Digital Preservation: A How-to Guide for Organizations of Any Size*, (London: Facet, 2013), p. 203.
[155] Joop Korswagen and Liesbeth Keijser, *Guidelines Digitisation of Photographic Materials* (The Hague: Nationaal Archief, 2020), p. 15 – 24.

higher degree of protection and security[156]. The physical format of magnetic tapes is standard for audio and video data. Unfortunately, they face stability issues and require careful preservation strategies.[157]

Possible threats for the physical and digital formats include accidental and malicious alterations, wrong storage, media decay, bit rot, hardware failures, network and service disruptions, and software bugs.[158] This can lead to compromised usability and the loss of metadata. Therefore, policies should ensure the proper handling and maintenance of the original m. The curation of digital audiovisual collections requires a nuanced approach that acknowledges the distinct challenges posed by their format diversity, technological dependence, and legal complexities. As digital objects, audiovisual materials are susceptible to various threats, such as accidental or malicious alterations, storage issues, software bugs, and network disruptions, which necessitate robust preservation strategies, including regular backups and secure storage solutions. Moreover, the complexity of managing multimedia content—encompassing audio, video, and metadata—demands specialised curation techniques to maintain usability and accessibility.

Furthermore, the legal challenges of copyright and access rights complicate the curation process, highlighting the need for clear policies and guidelines to ensure long-term access. The *Eye Museum's* efforts to refine curation strategies for digital audiovisual content, particularly in handling the amateur film dataset of Pieter Vincent van Stein-Callenfels, exemplify the ongoing need for research in this field to develop practical models for the curation of such complex.[159] Audiovisual curation additionally faces legal challenges from working with other companies for digitalisation to copyright laws and access rights.[160] Even so, the main goal of digital collections is accessibility, and this can be restricted through access rights of institutions and platforms, complicating the curation process.

While digital curation in the audiovisual field is rapidly growing, it needs a research focus. Policies and guidelines are necessary to prevent challenges and create successful digital

[156] Dietrich Schüller, 'Preserving Audio and Video Recordings in the Long-Term', in Ralph W. Manning and Virginie Kremp, eds., *A Reader in Preservation and Conservation*, IFLS Publications 91 (München: IFLS Section on Preservation and Conservation, 2000).p. 46.
[157] Dietrich Schüller, 'Preserving Audio and Video Recordings in the Long-Term', in Ralph W. Manning and Virginie Kremp, eds., *A Reader in Preservation and Conservation*, IFLS Publications 91 (München: IFLS Section on Preservation and Conservation, 2000). P. 48
[158] Adrian Brown, 'Preserving Digital Objects', in *Practical Digital Preservation: A How-to Guide for Organizations of Any Size*, (London: Facet, 2013)
[159] Joop Korswagen and Liesbeth Keijser, *Guidelines Digitisation of Photographic Materials* (The Hague: Nationaal Archief, 2020), p. 5-13.
[160] Adrian Brown, 'Preserving Digital Objects', in *Practical Digital Preservation: A How-to Guide for Organizations of Any Size*, (London: Facet, 2013), p. 207.

collections. The thesis focuses on curation strategies for providing access to digital audiovisual materials. It aims to create a model for curating audiovisual content, considering the core steps to curate digital objects and refining the guidelines developed by the *Eye Museum.* The emphasis is on the amateur film data set of Pieter Vincent van Stein-Callenfels, which has already been digitised.

Digital audiovisual collections are unique due to their dependency on technology for preservation and access, their vulnerability to digital threats, and the complexity of managing multimedia content. Effective curation strategies encourage addressing these challenges through comprehensive policies, regular backups, proper storage solutions, and clear guidelines for handling access rights and legal issues. These strategies are essential to maintain the integrity and accessibility of digital audiovisual collections over time.

4 The collection of Pieter Vincent from Stein-Callenfels at Leiden University

Given the vast amount of materials available in the digital collection of Leiden University Library, the absence of an audiovisual collection is noticeable. As a result of a donation in 2022, Leiden University received a private collection of Pieter Vincent van Stein Callenfels. The collection contains amateur video recordings. Over the past two years, digitalisation has created digital data for these recordings, while the physical film tapes are stored in the library. Audiovisual content has no curation guidelines to curate the data set correctly. Therefore, this chapter applies the theoretical framework, taking the policy guidelines of the *Eye Museum* and the *Beeld & Geluid* collection policies into account**.** Following the introduction of the dataset provided by Pieter Vincent from Stein-Callenfels and the discussion of the possible target audiences for the digital collection, the draft proposal guidelines are presented.

4.1 Introduction Data Set

Standardised policies are required to achieve authenticity and accessibility for the long-term curation of a digital collection. Therefore, in the prior chapter, the *Eye Museum Amsterdam Digital Collection Policy* and the *Beeld&Geluid collection guidelines* were compared to find the optimal foundation for creating a policy draft for Leiden University, focusing on selection, preservation, and accessibility.

The Leiden University acquired a private collection of amateur movies by Pieter Vincent van Stein-Callenfels, who was a renamed Dutch archaeologist. His research about Indonesia and Asia more broadly enriches the cultural heritage immensely. The University Library

already stores two digital collections of his letters and photographs[161]. While UBL manages a vast digital collection, it focuses mainly on textual materials or photography. The curators only have experience with digital photography guidelines, while audiovisual content requires specific care. The following will introduce the dataset and the current state of audiovisual content at Leiden University. Subsequently, the possible target audience is highlighted to offer a deeper insight into the necessity of a draft for audiovisual digital curation guidelines.

4.1.1 Pieter Vincent van Stein-Callenfels Donation

On June 8 2022, Mr. and Mrs. Weijland donated ten 16mm film tapes to Leiden University Libraries.[162] The donated films were found in the estate of Mrs Gitta Weijland's grandmother, who was married to a brother of Pieter Vincent van Stein-Callenfels, combining private heritage with cultural heritage. This material represents a significant part of his private collection and is expected to provide valuable insights into his work and the regions he studied. These films are associated with Pieter Vincent van Stein-Callenfels, a successful Indologist, archaeologist, and prehistorian focusing on Javanese culture[163]. The Weijlands discovered the collection, including recordings of Indonesia from the early 20th century, with possible references to archaeology, plantations, industry and day-to-day life[164]. Given Van Stein-Callenfels' frequent travels, the footage might also include Siam. These films consist of amateur travel material, challenging the curator to enable them with metadata.

The donation was possible through a bequest, including a transfer process. A transfer form signed by all parties secured the donation with the request of the donors to receive a digital copy of the films after the digitisation process. They are aware that the process will take time[165].

The films were initially placed in the quarantine room because of suspicions of nitrate tapes. After confirming this was not the case, the tapes were moved to Film Vault LK96034.

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[161] 'Digital Collections'. [n.d.]. Universiteitleiden.Nl <https://digitalcollections.universiteitleiden.nl/> [accessed 3 July 2024]

[162] Pieter Vinecent van Stein Callenfels, 'Coll Films', intranet document, 8 June 2022.

[163] 'Stein Callenfels, P. v. van (Pieter Vincent), 1883-1938'. [n.d.]. Universiteitleiden.Nl <https://collectionguides.universiteitleiden.nl/agents/people/741> [accessed 3 July 2024]

[164] Van Stein Callenfels, Pieter Vincent.*Amateur Film.*

[165] Pieter Vinecent van Stein Callenfels, 'Coll Films', intranet document, 8 June 2022.

They are stored correctly in archive boxes in a clean and dry environment, without direct sunlight and low temperatures. The storage was visited in person in the company of Saskia van Bergen in April 2024. Before storage was provided, the digitisation process was handled by an external company specialising in preserving and digitising nitrate and delicate films. Nevertheless, they informed the library of the tapes' non-flammable nature, allowing the correct storage. To provide metadata, the digital copies were screened and linked to the existing East Asia collection about Pieter Vincent van Stein-Callenfels, enriching UBL's digital collections. As a result of the donation, the urgent need for UBL to establish a clear workflow for preserving, storing, and handling film tapes emerged. This includes identifying the personnel responsible within the organisation and determining the further roles of the digital curation project.

Marco de Niet stated in the introduction protocol that Marieke van Meer, who will start as the new head of BC on July 1, 2022, will oversee these films' management and preservation processes and finalise the donation agreement.

The document still needs to be updated; therefore, current information was provided through constant exchange with the head of the unique collection department, Saskia van Bergen. The importance of correct digital curation is necessary, with Pieter Vincent van Stein-Callenfels as a prominent figure, influencing the Antiquities Service through his archaeologist work and his expertise in Javanese culture, including a 1951 publication titled "Ivan the Terrible, life and Works of Pieter Vincent van Stein-Callenfels"[166]. These films represent a significant part of his private life and experiences, and, as a result, the digital collection provides valuable insights into his work and the regions he studied. The importance of organised and proper collection care through selection, preservation and accessibility is highlighted.

4.1.2 Target audience

The first application of the digital curation process, according to the DCC, is the planning stage of the digital collection. Purpose and audience must be specified to clarify the selection criteria for the digitised data set. In the case of Pieter Vincent van Stein-Callenfels' amateur film collection, three possible target audiences can be identified:

[166] 'Southeast Asian & Caribbean Images (KITLV)'. [n.d.]. Universiteitleiden.Nl <https://digitalcollections.universiteitleiden.nl/imagecollection-kitlv> [accessed 3 July 2024]

students, researchers and the general public. Leiden University offers students in Media Studies a program for Film and Photographic Studies. [167]The collection can serve as a resource for researchers and scholars in Asian Studies studying the area. The last group is the general public interested in historical photography and film.[168]

Leiden University is renowned for its Media Studies and Film and Photographic Studies programs, and it is uniquely positioned to host an audiovisual digital collection on Pieter van Stein-Callenfels. By adding this collection to the special collections of Pieter Vincent van Stein-Callenfels, an invaluable resource for students, researchers, and the general public would emerge, deepening their understanding of early twentieth-century photography and film through the lens of one of the practitioners.[169]

He was a significant figure in photography and film during the early twentieth century, creating historical documentation enriching cultural heritage. His work involves various genres and techniques, providing a unique perspective on visual culture from this time. These contributions are artistic and document historical and social contexts, making his collection a critical resource for scholarly and public engagement, which would fulfil the purpose of the digital curation of this data set.

Leiden University's Media Studies Program is the first group to benefit from digital collection. This collection can provide academic enrichment through implementing interdisciplinary studies and primary source material.

The collection offers a collaboration between history, art and media studies. The digital collection allows students to explore historical context, artistic techniques, and media evolution. This would also provide an interesting primary source for the digitised movie and the physical material currently stored at Leiden University. These can be source material for dissertations, research and critical analysis. Further, the collection can be integrated into the curriculum. Workshops and seminars can use the collection to teach students about archival research, digital curation, and digitisation practices.

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[167] Leiden University, 'About the programme - Media Studies: Film and Photographic Studies (MA)', *Leiden University* [online] (2024) https://www.universiteitleiden.nl/en/education/study-programmes/master/media-studies/film-and-photographic-studies/about-the-programme [accessed 1 July 2024].

[168] Leiden University, 'About the programme - Media Studies: Film and Photographic Studies (MA)', *Leiden University* [online] (2024) https://www.universiteitleiden.nl/en/education/study-programmes/master/media-studies/film-and-photographic-studies/about-the-programme [accessed 1 July 2024].

[169] Australian Centre for the Moving Image (ACMI), 'The Koorie Oral History Program and the Bill Onus Family Archive', *ACMI* [online] (2021) https://www.acmi.net.au/works/118182%2D%2Dthe-koorie-oral-history-program-and-the-bill-onus-family-archive [accessed 1 July 2024].

Professors can integrate the material into their coursework as well. Amateur films from the early twentieth century can offer a firsthand experience with historical material and the devices from that time.

The second group that could benefit from the collection are researchers. This unique collection provides historical insights into the socio-political climate of the early twentieth century. These can support diverse research topics in history and media studies, primarily if they are focused on Asia and Media Studies. Another example is this paper itself. The collection can provide a deeper understanding of the content, the evolution of photographic and film techniques, and digital curation and preservation practices.[170] This can lead to collaborative research between the UBL, *Eye Museum* and *Beeld & Geluid*, increasing the presence of Leiden University's academic network[171]. Therefore, the accessibility of the Leiden repository ensures that the digital collection is authentic and allows scholars worldwide to engage with the material without geographic restrictions. Integrating film material into Leiden University's institutional repository, enhanced research and learning opportunities arise, and valuable resources for various academic fields are provided, increasing the university's global educational network. It is technically feasible but requires specific planning for storage, file formats, metadata, and copyright compliance. Creating proper infrastructure updates, metadata standards, legal reviews, and user access control are also essential. A possible way to test user accessibility and system performance is to gather performance issues and feedback. Collaborating with the Leiden University IT department can ensure successful implementation, enriching the repository and accessibility.

The third target audience interested in the digital collection is the general public. A general knowledge about cultural heritage is increased through cultural and historical education. The library can curate the digital collection as a public exhibition, educating a broader audience about the cultural and historical significance of Van Stein-Callenfels' work. This can be complemented through an open-access online platform, in this case, the official Special Collection website of the UBL[172], allowing individuals outside the

[170] Angela Fritz, 'From Collection Silos to Digital Content Hubs: Digital Project Management in Special Collections and University Archives', in *Project Management in the Library Workplace*, ed. by Emerald Publishing Limited (Leeds: Emerald Publishing Limited, 2018), pp. 187-198. https://doi.org/10.1108/S0732-067120180000038014.

[171] 'Collaboration'. [n.d.]. Leiden University <https://www.universiteitleiden.nl/en/collaboration> [accessed 3 July 2024]

[172] 'Digital Collections'. [n.d.]. Universiteitleiden.Nl <https://digitalcollections.universiteitleiden.nl/> [accessed 3 July 2024]

university to explore and appreciate early twentieth-century photography and film. Furthermore, a public community project, like an interactive exhibition as part of a study program, can foster a greater appreciation for historical media, educational purposes and engaging contact between the different target audiences.

Therefore, establishing an audiovisual digital collection of Pieter van Stein-Callenfels amateur films at Leiden University would enrich the academic landscape, support scholarly research, and engage the public with historical and cultural heritage. It aligns perfectly with the objectives of Leiden's Media Studies and Film and Photographic Studies programs, offering a resource that benefits a broad audience and possible collaborations in the future[173]. Leiden University should invest in media studies and its academic infrastructure to develop and promote this digital collection, ensuring it becomes a cornerstone of historical media research and public education.

Additionally, research on the digital collection can unlock new dimensions of scholarly inquiry. By employing AI techniques, scholars can identify the videos' people, locations, and events, facilitating a deeper understanding of the historical context and creating detailed metadata. Quantitative analyses can measure screen time devoted to specific individuals or locations, revealing patterns and trends. Digital Humanities (DH) approaches, as outlined by Jockers (2013) and Berry (2012), can further enrich the study by integrating computational methods with traditional humanities research. This combination of innovative and traditional methodologies will enhance the value of the digital collection, making it an indispensable resource for researchers and the public.

4.2 DCC Model Framework on Pieter Vincent van Stein-Callenfels Donation as Workflow

The framework provided for audiovisual content is based on the Digital Curation Centre (DCC) Curation Lifecycle Model. It provides the outline for managing and preserving digital assets and optimises the planning stage of the possible digital curation guidelines. The processes are conceptualised, created or received, appraised and selected, ingest, preservation action, store, accessibility, transform, roles, curate and preserve, and disposal. Selection, preservation, and access will be part of the draft proposal. Therefore, they are excluded in the following analysis. The selection is justified through unique content and value in the beginning stage of a digital curation project. The library acquired the physical

[173] Hafid Ballafkih and Daniel van Middelkoop, 'Efficiëntie of Kwaliteit? : studiesucces volgens hbo-docenten', *Journal of Educational Studies*, 15 (2018), 123-135 https://typeset.io/papers/efficientie-of-kwaliteit-studiesucces-volgens-hbo-docenten-l2hg45dgle [accessed 3 July 2024].

film collection through a donation from Mr. and Mrs. Weijland, which led to the outcome of an initial assessment being conducted.

The next step involves ingesting the digitised films according to the repository guidelines of the Leiden University Library to ensure the correct storage. This is also important for the physical tapes to protect their cultural value. Constant reviewing and metadata management enhance usability and improve cataloguing for better access and research.

Roles and Responsibilities are defined in an official document, clearing the delineation of responsibilities if collaboration between institutions, like the *Eye Museum*, is organised or departments are in the library. Keeping the curation and preservation constantly updated improves the management, conservation, and accessibility of the collection. The last step is disposal or deselection. The library must provide measurements for disposing of materials not meeting the selection criteria. Therefore, a relevant and manageable collection will be created.

The final draft proposal ensures a systematic and comprehensive approach to managing the Pieter Vincent van Stein-Callenfels film collection, achieving its preservation and accessibility for future generations, and cultivating digital cultural heritage for future generations by applying the DCC Curation Lifecycle Model and considering the *Eye Museum* and *Beeld & Geluid* policies.

4.3 Proposal for Selection, Preservation, and Accessibility of the Pieter Vincent van Stein Callenfels Film Collection

The guidelines focus on the selection, preservation and accessibility process, combining the DCC model framework with the input from comparing the *Eye Museum Policies* and the *Beeld & Geluid collection policy*. The first step for the proposal is introducing the collection and data set. In this case, the specific audiovisual data set at Leiden University Library. The Pieter Vincent van Stein-Callenfels film collection was donated by Mr. and Mrs. Weijland, including ten films (16mm) which are believed to contain valuable historical amateur recordings from early 20th-century Asia.

1. Selection Criteria

A selection for a digital collection of specific films from the digitised data set of the Pieter Vincent van Stein-Callenfels can be based on their historical significance and potential research value. Given van Stein-Callenfels' notable contributions to archaeology and Javanese culture, these films offer insights into early 20th-century Indonesian history and archaeology. Scanning

through the film material allows the user to see and experience his view of society during these times. Besides the valuable contributions of his research, he also offers insights from family and friends. The amateur nature of the film material individualises the content and the perspective, creating a unique source material that can be studied for its content and the material itself.

As stated in Chapter 4.1.2, the benefits for target audiences are fulfilled, ensuring the reusable quality of this collection. Besides the value and reusability, legal issues concerning copyright are regulated through the heirs' donation and the copyright law's ceasing, exceeding the 70-year mark after Pieter Vincent van Stein-Callenfels died in 1938[174]. Another aspect of the legal issue is the protection of the individuals in the video. Therefore, the collection should be open only partially.

2. Preservation

Preserving these film tapes requires immediate and careful handling due to their fragile nature. While the digitisation was provided by the external company *Bruinfilm,*[175] the digitised files are preserved at Leiden University Libraries. After receiving the material, they were classified as nitrite tapes, which are highly flammable and, therefore, stored in quarantine storage to protect the general materials of the UBL. To protect the physical material, the storage space must fulfil specific criteria provided by the *Eye Museum* policy[176]. The storage space should be stored in climate-controlled conditions, with a temperature of +5°C and a relative humidity of 35%, while another depot for extra sensitive material is kept at -5°C. In classifying the material correctly, the ideal storage space can be decided upon, ensuring the safety of the original. It should be discussed if all the film tapes should be stored at the library. Depending on the digital collection, photography of the physical tape can be included to ensure the safekeeping of the physical original. A possible approach could be collaborating with the *Eye Museum* to secure the proper storage for the film tapes.

The next step is metadata management. The films are digitised and uploaded to the Leiden Library intranet repository, ensuring long-term preservation and easier accessibility. Proper metadata management is achieved through XML encoding and a spreadsheet. Working

[174] 'Stein Callenfels, P. v. van (Pieter Vincent), 1883-1938'. [n.d.]. Universiteitleiden.Nl <https://collectionguides.universiteitleiden.nl/agents/people/741> [accessed 3 July 2024]
[175] Bruinfilm, Available at: https://www.bruinfilm.com/ [accessed 3 July 2024].
[176] Eye Filmmuseum. Policy guidelines on access to special collections (offline source), p. 18.

with staff members to identify metadata markers in the movies could provide more efficient collection management, increase information in the catalogue, and reach a larger audience.

Regarding descriptive standards, it is essential to consider how the videos can be catalogued using established frameworks. The MARC (Machine-Readable Cataloguing) standard can be used to describe videos, providing a robust format for encoding the metadata necessary for library catalogues. AACR2 (Anglo-American Cataloguing Rules, Second Edition) also offers detailed instructions on cataloguing various media types, including videos. These standards ensure consistency and interoperability across different cataloguing systems, facilitating better access and discoverability of the videos within the library's collection.

By adhering to these standards and integrating detailed metadata management practices, the Leiden Library can enhance the value and accessibility of its digitised film collection, supporting both preservation and broader dissemination of the materials.

Proper metadata management is part of the policy; the library must create and regularly update. The policy's collection goals, metadata, legal information, role management, and accessibility should be stated, as well as the Leiden University policy standards and goals. Therefore, the best method to achieve authenticity and usability for the collection is an optimised and regulated digital preservation strategy.

3. Accessibility

Finally, one of the primary purposes of digital collection is to make accessibility to researchers, students, and the public a priority. As mentioned before, accessibility is part of the preservation strategy. The purpose of digital collection is achieved through digitisation, metadata management, and online access. The Leiden University Library offers its digital collection website access to various digital collections.[177] Besides the university's members, the public can access these collections without an account, making them usable to a broad audience.

It offers students, teachers, and curious minds the digital version of cultural heritage. They can engage with the material and reuse it for their own needs. The teacher can incorporate the material in their curriculum to engage with the historical and cultural significance of the films.

A crucial factor that has to be addressed is the option of streaming or downloading the collection. Downloading the .mov files requires time, device storage space, and good internet

[177] 'Digital Collections'. [n.d.]. Universiteitleiden.Nl <https://digitalcollections.universiteitleiden.nl/> [accessed 3 July 2024].

access. For students and researchers, watching a streamed version resembling YouTube videos can be helpful. Therefore, a hybrid model similar to the *Bleed & Geluid* collection policy, including downloading and streaming, is suggested.

4. Further Responsibilities

The curation and organisation of the project must be handled through one institution to avoid mistakes in the collection management process. Therefore, the overall management and preservation of the film collection are provided through Leiden University Libraries. They already oversaw the digitisation process and ensured the proper storage of the digital files. Besides, they own the physical collection, as rightfully obtained.

The *Eye Museum's* expertise and storage facilities are still available. Since the UBL is new to audiovisual curation, it is advantageous to work with policies and best practices in film preservation with the help of an experienced guide like the *Eye Museum*.

This collaboration and training will provide the UBL staff with the expertise to increase their knowledge in digital collection, especially with a possible audience in the media field studying at Leiden University.

One of the most important factors is the budget and funding the library is required to provide for the digital collection. The guidelines also include the costs for digitisation, maintaining storage space, and preservation. By developing digital collections, funding can be acquired to develop and implement educational programs.

The selection, preservation and accessibility of the Pieter Vincent van Stein-Callenfels film collection are essential to preserve the historical and cultural heritage it represents and ensure the authenticity and usability of the data set. By creating a curation strategy with this possible draft, the Leiden University Library can ensure that this valuable collection is preserved for future generations and made accessible to researchers, students and the public.

5. Conclusion

This thesis explores the importance of digitising and curating the Pieter Vincent van Stein-Callenfels film collection with emphasis on the need for possible guidelines to ensure the preservation, accessibility, and engagement of historical audiovisual materials. The proposed strategies aim to address the challenges inherent in handling films, digitising them, and making the final collection accessible to a broader audience through online platforms and university programs.

The core steps for designing a curation strategy for digital audiovisual material include the critical aspects of selection criteria, preservation techniques and accessibility measures. Selection criteria are the initial step involving carefully selecting materials based on their historical significance, potential research value, and relevance to the institution's mission.

Therefore, the goal of reuse and accessibility through researchers and the public is achieved. The next step is effective preservation strategies to maintain the integrity of audiovisual materials. This includes proper storage conditions, like climate control for physical tapes, regular backups, and appropriate digital formats to prevent data loss and degradation. The last significant step is accessibility measures, which primarily focus on the easy access of digital material for a broad audience. This also includes legal and ethical standards. Institutions must offer user-friendly digital platforms and provide metadata to facilitate search and retrieval.

In addition to the critical aspects of creating curation guidelines, audiovisual materials have distinctive features, offering an exciting research topic. Besides the format diversity, through various formats such as tapes, films, and digital files, audiovisual collections contain content complexity through complex multimedia elements, including audio, video, and metadata, that demand specialised curation approaches. Consequently, audiovisual collections demand special techniques for curation. As a result, they are heavenly dependent on technological infrastructure to keep up with technological advancements and legal issues. Institutions must constantly update their technology and face legal challenges that can arise through copyright and access rights. About these features, libraries can only secure proper curation of audiovisual materials by effectively investing in technological infrastructure, training and staffing, preservation facilities, and research collaborations.

A key element in investment is the technological infrastructure. Libraries should use up-to-date hardware and software to ensure correct digitisation, storage, and access to audiovisual content. This incorporates high-quality playback and digitisation equipment, secure storage solutions, and robust digital platforms. To preserve the proper handling of technology, staff must participate in training for digitisation techniques, metadata management, and legal compliance—the library profits from specialised and selected staff.

Further, the physical storage of original material is a serious element. The library demanded that they either provide correct storage of the material themselves or work with either the *Eye Museum* or *Beeld & Geluid* to acquire the proper storage of the physical material. This leads to sustainable practices for long-term preservation and collaboration between other institutions. This can enrich and start research initiatives and lead to innovations in the

audiovisual field. Additionally, digitisation projects and shared platforms enable broader access.

In conclusion, curating digital audiovisual materials demands a strategic approach that balances selection, preservation, and accessibility while addressing the unique challenges correlating with audiovisual material. Libraries should invest in more technological infrastructure, staff training, and sustainable preservation facilities to ensure the long-term integrity and accessibility of their audiovisual collections. By adopting comprehensive curation policies and fostering collaborative efforts, libraries can enhance their capacity to manage and preserve valuable audiovisual heritage for future generations.

Limitations and Further Research Topics

Despite planning, several limitations must be acknowledged. Besides the limitations in the curation guidelines, the limitations of this paper are also notable. First, the preservation poses significant challenges due to the unknown direction the digital collection faces. The questions about further storage and implementing it in the unique collection repository involve space and costs that need further discussion. The collaboration with the *Eye Museum* is only a suggestion and needs, as well as policies, legal measurements, and contracts to ensure the proper handling of the collection and the data.

Second, the digitisation process itself introduces risks. Technical issues such as data loss, file corruption, and technological obsolescence can endanger long-term preservation efforts. Additionally, the quality of the digitised versions may not fully capture the original films' nuances, potentially leading to a loss of historical integrity. Unfortunately, the UBL does not own a device to watch movies.

Third, metadata management and the creation of accessible digital archives require substantial human, time and financial resources. Ensuring metadata interoperability across different platforms and standards is complex and time-consuming, often requiring specialised expertise from the IT department. The films require a deep analysis to create metadata about people, places and time. This can be a project to develop the metadata about the collection.

Lastly, this paper only introduces digital audiovisual curation for the film data set. The research is a theoretical view of the process without actual practical processes. The time and paper format restriction only left the possibility of offering suggestions and not working on it as an actual project. Therefore, besides recommendations from university members, there was yet to be a real collaboration.

Still, this introduction and draft offer a possible digitalisation project and enhance an outcome for several areas for further research. This can be an opportunity for advanced preservation techniques. With the constant developments in digital curation, investigations and developments for more cost-effective and efficient storage methods can be explored, including new materials or technologies that offer stability and safety for fragile physical storage. Another research project is the latest advancements in digital preservation, including new digitalisation techniques. The option of 3D scanning is one of the more recent topics in libraries and digital media. Also, improving techniques for data redundancy, error-checking, and minimising technological errors could be beneficial in long-term digital preservation. The last suggestion for further research is user engagement and accessibility. A study on user behaviour and engagement with digital archives can lead to optimising the accessibility and usability of digitised collections at the Leiden University Library. This could include website navigation and collection management to reach a wider audience.

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Appendix

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2. Coll Films Pieter Vincent from Stein Callenfels, Translated version of the official document provided by Saskia van Bergen.

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Coll Films Pieter Vincent from Stein Callenfels

On June 8, 2022, I received a can with 10 nitrate films (16mm) from
Mr. and Mrs. (Johan and Gitta) Weijland
Burgemeester Prinslaan 66
6711 KG Ede06 53403417
j.weijland@provicis.nl

The donation transfer still needs to be made!! A transfer form was signed (only), a copy is in the collection. The donation becomes final as soon as it is clear who will be responsible for the preservation and disclosure of film material (not to mention the fact that this concerns nitrate).
The donors (I call them that now, but a donation agreement has not yet been completed) want a digital copy after digitization. (include this in the deed of donation) . They are aware that the procedure will take time.

Current status : The collection was placed in the quarantine room on collection June 8 (in an archive box). The material looks clean and dry. Since June 21, 2022, this collection has been (temporarily) placed: Film vault LK96034 pending an appointment/ procedure with, for example, Eye of Beeld & Geluid.

At the UBL, a digital file can eventually be linked to the existing EAD about Pieter Vincent van Stein-Callenfels (see http://hdl.handle.net/1887.1/item:2365275 and https://digitalcollections.universiteitleiden.nl/search/Stein-Callenfels?type=edismax).
Van Stein Callenfels is an important name. He worked for a while as an archaeologist for the Antiquities Service, a UBL collection that has recently been re-digitized.
At first glance, these videos could also be about the period when he worked at a few different companies in Java. It could be a special addition to what is already present in the UBL collection.
UBL/KITLV has more film material, Doris Jedamski is the one who knows more about it. So far there is *no* workflow to preserve, store and make films available.

The most pressing question now is: Who at the UBL is responsible for the workflow/ procedure surrounding (nitrate) films??? I received this material at the insistence of the MT (Kurt), but I am not knowledgeable about it.

Given the flammability of the material, it is important that the UBL soon introduces a procedure for handling nitrate in general and films in particular.
Ideally, this is digitized and posted outside the door.

Marco de Niet has indicated that the new head of BC (Marieke van Meer, starts July 1, 2022) will be responsible for the process surrounding management & preservation of films. She will also be able to make the donation final. In November 2022, Marieke will refer to Saskia van Bergen who will investigate this.

Donor's information:
Films from the private collection of Van Stein-Callenfels: found in the estate of Mrs. Gitta Weijland's grandmother. Gitta's grandmother was married to a brother of Pieter Vincent van Stein-Callenfels. Pieter Vincent van Stein-Callenfels (1883-1983) was a well-known Indologist, archaeologist and prehistorian and a particularly great expert on Javanese culture. A book about him was also published in 1951 with the title: Ivan the Terrible, life and works of Dr. PV van Stein Callenfels.

(from email:) “Today, while cleaning out a cupboard, we found a can with various videos. We do not dare to open it because we think this would be better done by an expert in the field . The titles suggest that they contain recordings of Indonesia from the early 20th century, but we have no idea what the content exactly is. Probably something to do with archeology or recordings on plantations. But he was also regularly in Siam , so that is also possible.”