

The Current Landscape of Film Archiving and How Study Programs Can Contribute

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Introduction

Film archives are not a monolithic block, but are very different institutions which encounter hugely diverse challenges. There are smaller institutions struggling with the most basic archival tasks, like storing their film prints in cold storage or making headway with cataloging their holdings. Others have already managed to implement functioning data management systems, which allow for easier access to their digitized or born-digital material by scholars or other stakeholders. However, film archives on the whole are arguably not as advanced compared to their neighbouring cultural heritage institutions and particularly libraries, when it comes to sharing metadata and developing comprehensive workflows for making their holdings accessible. The reasons for this are manifold. One reason might simply be that libraries as institutions have a longer tradition and therefore more experience. Another reason lies in the native heterogeneity of the collected and archived material types, from film material in various stages in the life cycle of the film work to photos and posters and textual documents in any shape and form.

In my article, I will try to outline the challenges film archives face, influenced by the digital revolution, which was comparatively slow to arrive in most film archives. My viewpoint is mainly a European one with a special focus on Germany, despite the fact that the field, obviously, is an international one. The attempt to take international developments into account would simply be far too ambitious. Furthermore, safeguarding and making national film heritage available has traditionally been considered a task for the respective national institutions or, at most, a European one. Film archives on the other hand have been collecting far more than their own countries' film productions. Some have adapted a wider definition than others, for example by regarding every film shown in national cinemas - whether produced in their country or not - as national film heritage. As Anna Bohn, head of the audiovisual collection at the Zentral- and Landesbibliothek Berlin, points out, there is a long standing tradition for this practice in Germany, going back to 1934, when the Reichsfilmarchiv and later the Staatliches Filmarchiv of the GDR collected international film heritage (Bolewski 2015, 1). These preliminary thoughts are meant to help understand that film archives and their staff are faced with a situation where national and international collaboration would be a key to carry out their duties. Even though digital material has been arriving in film archives for a while now and holdings are digitized by archives themselves,

I think we are reaching a point where certain technical operations can be performed faster, and alternative information environments are being developed and adapted like Wikidata or the Semantic Web.¹ There are big and exciting challenges for film archives ahead, where we need most of all people with a more comprehensive vision. In the 1990s, a for its time ambitious—if not, in retrospect, over-ambitious—project was set up with the intention of creating a database containing detailed filmographic information on European films, which could be used by film archives as authority records: the Joint European Filmography (Nowell-Smith 1996). Times are different now and not only the information infrastructure is more advanced but also people are more open to share information.

Furthermore, I think we can safely say that the established structures of how knowledge is created, distributed, accessed, transformed and judged are crumbling. It could be argued that the role of curatorship as a qualified, carefully performed and responsible duty is challenged in similar ways.

Finally, I will outline possible intersections for scholarly collaboration, where for example computer science (or digital humanities) can support film archives.

Taking all these preliminary remarks into account, my thesis is that the last years have been particularly exciting for everyone who is dealing with information science as well as knowledge production, transfer and distribution. Therefore, this paper will be mainly written from the perspective of metadata management in film archives, how the cultural heritage sector can benefit from recent developments and interdisciplinary collaborations, and lastly how academic study programs² as well as inter-archival training courses³ can help to tackle the challenges and opportunities. The challenges nowadays do not differ so much from those of pre-digital times, but I would argue that the current infrastructures provide us with possibilities to go a step further and think bigger.

Current Film Archivists

Jobs in cultural heritage institutions have become multifaceted and complex. Change is visible in changing job titles, like a recent restructuring in the British Film Institute (BFI), where previously titled catalogers were renamed information specialists and a head of data is responsible for multifaceted (data) projects, like *bfi player*⁴, *bfi filmography*⁵, *britain on film*⁶. One reason for this is that an increasing number of archives face having to maintain a parallel structure for working with their objects. Not only must the older generation of film archivists adapt to the new digital landscape, but the younger generation of “digital natives” must also retain a working knowledge of analogue film and the practices surrounding its production, reproduction and distribution. While archivists (as a profession) should last forever, archivists (as people) by virtue of the laws of physics cannot. And while knowledge can in theory be passed down, experience cannot. The archives must take measures to counteract this; otherwise, the gap between the digital present and the analogue past will only be widened with each passing generation. To complicate matters further, there are not only films on film stock and digital files in archival holdings, but also analogue video formats of all kinds. There are huge photo and document collections, 3D objects (like costumes and old projectors), gray literature, personal estates, press kits etc. A film production encompasses everything from its conception to the final release version (or several versions), many material types and many authors. This may seem like a banal statement, but one notices quickly that archivists, film scholars, policymakers still tend to think in material categories rather than information. In other words, we rather continue a tradition of pointing to the differences rather than common ground.

Few could anticipate the rapid pace and depth of the changes to film production, exhibition and preservation that were brought on by the onset of digital technology. Archives in particular have struggled to deal with the change in their primary mission of collecting, preserving and making available audiovisual cultural heritage. As analogue film increasingly comes under threat of becoming a thing of the past, the expanding efforts of archives and museums to convey the importance of the materiality of the film medium - by explaining to the public through its preservation, presentation and education activities how film works, how it is/was produced, restored and shown - could be considered a current form of media archaeology. According to Lev Manovich, professor of computer sciences and media theorist, this change in paradigm fundamentally alters our understanding of media (2013, 65). As Manovich writes in this regard:

From Gotthold Ephraim Lessing's *Laocoon; or, On the Limits of Painting and Poetry* (1766) to Nelson Goodman's *Languages of Art* (1968), the modern discourse about media depends on the assumption that different mediums have distinct properties and in fact should be understood in opposition to each other. Putting all mediums within a single computer environment does not necessarily erase all differences in what various mediums can represent and how they are perceived—but it does bring them closer to each other in a number of ways.

The tacit conviction that analogue reproduction (copying film on film) is somehow more authentic than digitization, and thus that an analogue copy which is still noticeably inferior to the source material (e.g. an original negative or first generation print) is somehow better than a digital reproduction made from the same source, is still very much alive. However, it is important to note that these beliefs originate from reasoned and comprehensible considerations, and that they bear an additional cultural-political significance. Film cultural heritage is, as it has always been, threatened to disappear because there are not enough resources to preserve it. What makes things worse for film archives is the fact that now the scarce resources have to be used to keep two systems running—facilities for cold storage or even an analogue lab alongside a likewise costly digital infrastructure. This may lead to difficult decisions, as the recent case of the German Bundesarchiv has shown, where the wet lab is in danger of being closed in order to afford scanners to digitize films (Koppe 2016). The discussion is influenced by the widespread conviction that digital technology may leave the public and the decision makers with the impression that once a film print is digitized it is saved. This stance, on the other hand, has consequences for researchers or general consumers of filmed entertainment: sometimes they are able to watch a film on 35mm in a movie theater, at other times there may be only a DVD or even just a YouTube video of questionable quality available. And still at other times, and not infrequently at that, the requested film is not available in any format. The question of which audiovisual documents are and were available for scholarly research, and in what form(s) and to what ends they can be viewed, analyzed and maybe even reused, directly shapes film history and film historiography (Heftberger 2016, Olesen 2017, Noordegraf 2010, Verhoeven 2012). The fundamental issue of access to sources leads to the formation of a canon on the one hand and blank spots on the other, where potentially important and interesting aspects of film history go unnoticed simply because we are unaware that they exist.

When faced with the contradicting task of preserving documents for posterity and at the same time ensuring they remain accessible to the public, film archives inevitably have to make decisions, and for many preservation will take precedence over access. However, the stereotypical view of the archivist as a kind of unfriendly gatekeeper can also be the result of accident rather than design. Indeed, with few exceptions, most archives are chronically underfunded and understaffed, hindering their ability to process user requests in an expedient manner. Many lack in addition the necessary technical infrastructure to provide access to the documents they hold in digital form. The lack of available primary sources would also seem to explain why more comprehensive studies in the digital humanities, such as the work carried out by the psychologist James Cutting and his team (2011, 2013), tend to focus on Hollywood productions, as these are more readily available to researchers than say the Hungarian cinema of the 1960s.

Since most film archives already lack the necessary resources and infrastructures to preserve their collections adequately, then the added task of trying to meet the increasing demands of the public for access to these collections becomes nigh-on impossible. By 2012, only 1.5% of the collections held by European film archives had been digitized, according to an estimate given by the Association des Cinémathèques Européennes (L'Association des Cinémathèques Européennes, ACE), 17). Each unlucky encounter or troubled relationship between an archive and its users has far reaching, global implications for how we access, link, quantify, visualize and study our collective cultural (film) heritage.

Where metadata and the building of information infrastructures are concerned, it remains questionable whether the traditional segregation of objects within film archives into the respective institutional or material types (audiovisual, photographic, etc.) is still constructive other than from a conservatorial point of view. Furthermore, we can ask ourselves if nowadays clear labels and distinctions as “scholar,” “librarian,” “archivist” or even “professional” versus “amateur” are not more of a hindrance than a help. As Eric Hoyt (2016, 358) writes insightfully in support of such an argument:

For those of us trained primarily as researchers, writers, and teachers, we should listen especially carefully to our librarian and archivist friends when they bring up questions of usability, findability, and preservation. No one wants to pour her energy into a project that researchers and the public never discover or want to use — or into one in which the data corrupts or disappears from the web.

Some films archives, for example the BFI or EYE Filmmuseum Netherlands, have recently decided to take a bold step and make their catalog entries openly available online⁷. Now everyone with internet access can look up which prints of a certain film are held in the archive. Their boldness consists mainly in the fact that they lay their data open, while knowing that it might be incorrect or incomplete. A similar yet even more advanced example can be found in other fields like the German National Library providing all their data via APIs for download and Europeana strengthening its efforts to become a data hub for researchers and the public. Finally, open knowledge bases like Wikidata are increasingly recognized as potential collaborative partners not only for libraries⁸ but also for film archives.⁹

Not only do archives preserve and provide access to their collections, they also actively engage with the individual objects housed within these collections on a content-based level. Therefore, many archives have historians, art historians or humanities scholars on staff. Although archivists still tend to be placed in a separate camp to scholars, there are nowadays in many cases very little that separates them, especially in light of recent generations of archivists who have gone through third-level education in one or other of an ever-increasing number of academic institutions that offer relevant graduate or postgraduate programs. Schnapp and Presner (2009) in their “Digital Humanities Manifesto 2.0” rightly point out that a great deal of research is indeed carried out within libraries and archives, yet the traditional hierarchies still seem deeply rooted in public consciousness. Still, the once firm boundaries between librarians, archivists and museum curators on the one hand and academics on the other are not as clear anymore, as has already been pointed out elsewhere (Hanley, Heftberger 2012; 2014). To me, the description of the Media Ecology Project, a digital resource at Dartmouth College, sounds like the vision we need (Williams 2016, 336):

The scope of MEP’s work toward this goal includes exploring new methods of critical human and computational analysis of media, developing networks between institutions that expose existing archival collections to new audiences, and building tools that facilitate automated sharing of rich cultural data and metadata among software platforms.

As Williams explains, working collaboratively in the project was based on collegiality and connectedness, guided by “openness and mutual respect as well as a balanced critical eye,” while the people involved would be “at some level working outside their comfort zones: across disciplines, across expertise, across vocabularies” (ibid., 343). This means that our traditional perceptions of collecting and curation will change. Inviting the public to participate in this process would be a step into the right direction and not just because it shows active democracy and respect for the populace who in large part finance these institutions. Strategically, it also makes culture more relevant in the eyes of political leaders.

The goal of having to make one’s own institution known and continuously visible for funding bodies and the public, presents a challenge for film archives in terms of marketing and public relations. They are thus faced with a dilemma: While they are supposed to become a recognizable brand which works to a certain extent in the real world, the issue becomes more difficult when it comes to their online presence. Following a 2008 workshop, the Cultural Heritage Information Professionals (CHIPs) published a report including a somewhat polemic statement which in my eyes still bears a certain degree of truth: (1) On the Internet, nobody knows you’re a library, archive, or museum. (2) Engage your audiences, or lose them. (3) Information wants to be free. (4) Embrace our commonalities, and our diversities. It is true that users are not ready to familiarize themselves with the mission statement or history of the providing archive when it comes to finding relevant information quickly. Also, we should be careful to make demands on an audience which has very diverse and changing needs. Film archives could interpret the above statement in all its boldness as something positive and encouraging, highlighting the obvious assets and virtues of cultural heritage institutions, which is quality on every level, e.g. cataloging, digitization and curation. On the other hand, it can be read as a call

to action to unite forces and platforms when it comes to providing material, e.g. film journals, which are scattered among many different institutions and websites. Clever branding as an archive could therefore also be to develop ways for making it easier for researchers and the public to access their holdings, even if it means that they don't always have to go to their own website first. Aggregating platforms on the other hand could leave more space for (maybe smaller) archives to be represented more visibly.

Both creating meaningful online collections and allowing for crowd and collective curation belong to the same broader concept. It is interesting to find somewhat similar ideas from software programmers, as Hoyt claims based on his experiences with data mining digitized collections of fan magazines (2016, 361): "After spending five years working in this space, I have come to believe that the best reason to develop software is not to advance our own arguments. Instead, we build software to serve others, allowing them to arrive at their own insights, surprises, and arguments."

Film archives might also be interested in learning from libraries how better interact with their audience, for example through user studies, or building networks for data exchange and interoperability. Setting up projects which facilitate collaboration between and across domains is as challenging as necessary if cultural heritage institutions are truly dedicated to making culture more widely available, improving our knowledge about our cultural heritage and ultimately contributing to better research and scholarship.

One of the obstacles to more intensive collaboration lies in the differently structured individual training programs (Novia 2012, 5). While librarians usually have a MA in Library and Information Sciences, archives and museums on the other hand still hire people from diverse backgrounds. Some come from the humanities (like history or literature), while others do not have a university degree. Film archives have traditionally found room for "unusual careers." For example, it was not uncommon for a film critic or festival director to become head of a film archive or museum, which usually brought a strong emotional attachment to film as well as profound knowledge of film history and culture (Magliozzi 2003).

The separate educational pathways are still firmly in place, with only a few exceptions, like the "Cultural Heritage Information Management" program at the Catholic University of America (CHIM), which is explicitly aimed at teaching the convergence of different practices of libraries, archives and museums.¹⁰ Jennifer Trant (2009, 383) argues along the same line, and claims that the students should be more deeply familiarized with related disciplines, rather than taking courses with a more general approach, as seems to be the common standard.

Cooperation across institution types becomes easier when program alumnae can be found in all types of cultural heritage institutions. Creative thinking, problem-solving, teamwork and continuing education can be emphasized in all aspects of curriculum, and drawn out, consciously, in less formal parts of the curriculum such as a practicum or internship.

This vision seems to me as convincing as challenging: Not only do cultural heritage institutions need to communicate their needs in terms of education and training clearer, but we also need to find people who can teach cross-disciplinary to a new generation of audiovisual archivists and information professionals in general. Alternatively, new jobs could be created which operate on the intersections of academia and cultural heritage institutions, e.g. a film historian or information specialist who works with archival holdings on a scholarly and curatorial level. Introducing new types of professors (e.g. something like "transfer professor") might work out beneficial for academia and the film archives, or even the industry like film production or film laboratories.¹¹

Educating Future Film Archivists

Many young people still want to work in archives and new archival training programs continue to flourish. Their graduates, many with a background in film and media studies or another degree in the humanities, might think that inspecting, cleaning, shelving, identifying and restoring analogue film material will be their main duties. These expectations are fuelled by the iconography and language of film archives: dark rooms with flickering lamps; rows and rows of shelves stacked with film cans; piles of dusty boxes

neatly stacked or lying in a heap in corners; the lonely archivist serenely watching a film on a viewing table in the middle of a low-lit room. In short: the film archive as a place for contemplative investigation. Of course, preserving analogue film material is an important task that has rightly been highlighted in the latest discussions concerning our audiovisual cultural heritage. It is only a logical consequence that special study programs were set up in order to educate those interested in film archiving and film presentation for future jobs. However, the aforementioned tasks now constitute a mere fraction of the daily operations of a film archive.

Noticeable efforts in Germany manifest themselves in a number of study programs for film archiving and curating.¹² Recently there seems to be growing awareness in cultural politics that preserving, archiving and presenting audiovisual material requires specialized education. These education programs therefore aim at filling this gap and creating a new generation of specialists. But how do digital production and preservation influence the curricula, and what kinds of management duties should future film archivists expect?

The digital revolution has made a whole new range of skill sets increasingly important, which the modern film archivist must be equipped with in order to carry out his or her job satisfactorily. So far archival training courses within the archive community but also many study programs in the US have focused on preservation (Lukow 2000), while academic programs seem to lay an emphasis on curation. However, when it comes to providing information or access, the needed skill sets have more in common with other disciplines (e.g. Information Technology) than they do with “traditional” film archiving such as the ability to differentiate between different types of film stock or the ability to date an unidentified film print by deciphering the codes printed by the film stock manufacturer in the perforated area. Moreover, these two specialist knowledge types (analogue on the one hand, digital on the other) are not interchangeable. On the contrary, as Martin Koerber (2013, 44), curator of the film archive at the Deutsche Kinemathek in Berlin, explains:

Even when all access to and handling of audiovisual heritage material is digital, there will still be a need for specialists who know how to properly treat the analogue originals. [...] There will be a need for people who can, for example, tell the difference between a Technicolor print and an Agfacolor print just by looking at them, or who can easily distinguish an Eastmancolor print from a Kodachrome reversal original.

Although Koerber’s statement is certainly true, it also confirms common assumptions about how film archivists spend their time: identifying films by looking at edge markings, collecting information about rare film formats, restoring rare colour material in the best way possible, and generally taking time to research all these issues thoroughly and discuss them with their fellow archivists. Also, the term “archive” itself is loaded with meaning, influenced by famous texts like *Archive Fever: A Freudian Impression* by Jacques Derrida. The archivist, filmmaker and pioneer of the Internet Archive¹³ Rick Prelinger (2015), describes the academic view on to the archive as one which is not very helpful in this discourse:

Theorists who do not work in archives project all sorts of ideas onto what they call “the archive.” For them archives can be blank screens, even playthings. And scholars and producers regard us as repositories for what they *wish* we collected made available in the ways they *want* to use it. We spend a lot of time resisting the identities projected onto us. But only a few scholars speak with archivists directly. Few have spent even a day rewinding film, or shifting cans from one vault to another, or digitizing videotape.

Consequently, this image of the film archivist as the expert of unique and “old” film material bears the unproductive notion of pure artisanship, closer to the art restorer or art historian who is able to identify art works by merely looking at which colour schemes were used. Prelinger’s statement strikes a point because it unveils how the academic view on film archivists is sometimes influenced by their own research interests, foregrounding identification and analyses of film material. These activities are certainly very important tasks which can be very time consuming and request a vast film historical knowledge and years of experience. However, the staff of an average film archive is probably a lot more diverse than film scholars and the public expect. Just to give one example: a profound understanding of conservation science is arguably

as essential for film archivists as knowing national (and international) film history. While restoration projects have gained public awareness, they risk misleading people into believing that film archivists dedicate all their time to comparing numerous film elements from different archives around the globe. However, it would be equally misleading to assume that the staff in an average film archive just rewind LTO tapes, put hard drives on shelves or identify obsolete codecs rather than film cans, just to give a somewhat polemic example. Rather, I would like to move away from the notion that we have to define the tasks either as analogue (past) or digital (future), which limits the discussion to technological issues. Koerber (2013, 49) quotes an alumni from the study program at University of California, Los Angeles (UCLA), who states quite clearly the additional skill sets needed for real job security: “a) IT/IA knowledge, some level of prowess in database management, b) experience with fundraising, project management and knowledge of non-profits, c) extreme tenacity and entrepreneurial vision.” To sum up: We need to look at film archivists as information specialists, data managers, cultural heritage managers or, on a more general level, interlocutors in a much bigger debate involving the different GLAM institutions and knowledge producers.

Collaborations between archivists and scholars

As the points I have outlined thus far suggest, film archivists still work in something of an isolated manner when it comes to collaborations with their peers in neighbouring cultural heritage institutions. Similarly, the comparatively young discipline of film and media studies still seems to struggle to be taken seriously within the humanities. This presents a twofold problem: while collaboration within their own communities is already difficult for film scholars, their potential partners also only rarely look across disciplinary borders. However, as I highlighted in my introduction, there would appear to be ample ground for archivists and digital humanists, or academia in general, to enter into a potentially meaningful form of cooperation.

In the following, I will map out the potential of collaborative projects for metadata enrichment on one hand and the presentation of collection items on the other with reference to specific examples. Let us regard film archives as big data collections, which are filled with not only audiovisual but also textual data to be mined, explored and visualized. Not only have films been published and presented via a range of means since the emergence of the medium, but they have more often than not been accompanied by a variety of different film-related materials. These usually consist of a heterogeneous collection of media types and documents including (but by no means limited to) handwritten charts, scripts, photos, posters or, more recently, electronic press kits (EPK). Other examples of filmic paratexts would include the sometimes visually fascinating cinema listings in historical newspapers or the equally fascinating advertisements for cinematographic equipment in trade journals, to name just two. These documents contextualize cinema not only for professionals and scholars but also for the general film-going audience. The latest developments in the field of Social Media (with posts, blogs, likes, tweets, etc.) have increased exponentially the amount of potential data and the number of sources which may offer researchers points of departure in future. The aforementioned diversity of data still presents a challenge to film scholars when it comes to diligent and comprehensive online research. The available digitized documents are scattered across a countless number of websites and portals with a similarly wide range of different navigation and search features. But there are also positive examples to be found. The website accompanying the book *The Promise of Cinema* (Kaes 2016) provides among other resources a list of historical film journals¹⁴. Also of note is the Austrian National Library’s online newspaper portal ANNO, which offers an integrated OCR search.¹⁵

However, there is not one single entry point for scholars nowadays to conduct their research, directing them to useful online sources. It seems a daunting task to have to sift manually through the plethora of relevant websites, made all the more daunting by the language barrier, in order to uncover any kind of information on a film title, director or topic. This point is equally pertinent to both the film historian examining vintage newspaper articles as well as for the scholar of contemporary cinema trying to follow the discussion surrounding a current film release. In both cases it would be helpful to have the possibility to search across different platforms, media formats, data types and time periods. Even though Europeana, for example, provides users with a SPARQL entry point and an API, access to this data is not immediately available and searchable for the

average user. In addition, the available documents come in a range of different formats of variable quality. More often than not, the scans are not OCR searchable or the websites themselves lack useful search options. In short, both film scholars and film archivists can benefit significantly from digital tools which are able to aid the enrichment of filmographic data on the one hand and organize this data in a useful and standardized way on the other. There are no limits as to what we can regard as useful forms of metadata enrichment: transcriptions, subtitles, reviews, descriptions of a film's content as well as its formal characteristics (e.g. shot composition and editing structure) etc. My suggestion would be to adopt a two-fold approach: (a) use existing tools to harvest metadata from online databases and develop a unified metadata standard, and (b) develop tools for automatic film analysis to generate new metadata. Such an approach could prove useful in a number of different ways. For example, digital tools and digital humanities can aid the exchange of filmographic and technical metadata between film archives and libraries, perform automatic indexing and abstracting, support the import of data from relevant web sources (DBPedia, IMDb etc.) or explore the potential of Linked Open Data for film archives and cultural heritage institutions.

These tools would aid film archives to enrich their catalogs but also to create better metadata in general and consequently to help archives curate innovative online presentations, thus also facilitating education and (further) research. This leads us to the general hypothesis that the combination of text-based and content-based retrieval methods with effective visualization and presentation techniques is ideally suited to dealing with research questions in film studies, similar to what has been achieved in projects like the aforementioned Media History Digital Library¹⁶, Cinematics¹⁷, Timeline of Historical Film Colors¹⁸, Kinomatics¹⁹, VIKUS²⁰ or the recent Weimar Talkies Project²¹.

Joint projects between film archives and libraries or international projects which strive to improve interoperability and establish infrastructures for the exchange and enrichment of metadata are still rare, in no small part due to their complexity. One example worth mentioning here is the collaboration between the German National Library and the Deutsches Filminstitut (DIF) on the project IN2N.²² Major potential for a sustainable and successful collaboration lies in EU-funded projects, which would be able to provide the necessary financial resources to build interfaces for metadata exchange and mapping. Such interfaces could then be used by the individual participating institutions even after the project is finished, and perhaps even later on, in other collaborative projects. *EFG1914* - a follow-up to the earlier European Film Gateway project (September 2008 to August 2011), and likewise coordinated by the DIF - was set up to facilitate the high-quality digital transfer of analogue film material related to the events surrounding the First World War (1914-1918), and to make it freely available via a web-based platform (in this case the European Film Gateway and Europeana portals). One big advantage of these projects was that it was possible to build the necessary technical infrastructure (e.g. common standards and interfaces for data exchange) which then later could be used for projects afterwards.

From a computer science perspective, the technical processes involved are not very complicated, but the manifold metadata standards and cataloging traditions nonetheless pose a major challenge for such an endeavour. There is still a widespread belief that one's own metadata is better curated than the other person's, specifically when compared to the available web sources such as Wikipedia or IMDb. One has to bear in mind that cataloging in GLAM institutions is essentially about following strict rules and hierarchies. Opening up databases to imports from external sources raises questions about the hegemony over authority files.²³ Who will decide whether a title is right or wrong or if it has to be written in a different way? For cultural heritage institutions, questions such as these are important because otherwise they would end up producing just meaningless database entries. German and Austrian libraries, for example, solve this problem by appointing only one person in the respective national library to have the last word on authority files. On the positive side, this workflow guarantees trustworthy entries. On the negative side, it is extremely time consuming and therefore also slow. Why not let algorithms do the job? Would not software be particularly useful here, both for comparing large amounts of records quickly and cleaning data in the same process? Even if the intellectual input still prevails, many processes could certainly be automated. I would even go one step further to ask: Why not also include other media than text? Suddenly the possibilities for the annotation - as in extended and/or time based content description - of archival documents grows exponentially. I believe that eventually what were once called catalogs in film archives will develop into fully-fledged media

asset management tools that integrate digital representations of cinematographic works or audiovisual documentation of 3-dimensional objects.

An increasing number of intriguing crowd sourcing projects can be found online, which actively invite the users to contribute their knowledge in various ways. Some cultural heritage institutions seem to recognize the benefit in adopting such an innovative approach to aid, for example, in the identification of their archival holdings. Portals such as *zooniverse*²⁴ have meanwhile made it fairly easy to set up your own crowd sourcing project. While some institutions prefer to keep their documents on their own website as a branding strategy, to me this seems a shortsighted and potentially dangerous course of action. Dangerous, because many documents will never make it to the online platform due simply to the lack of manpower and the necessary technical infrastructures, among other issues. If automatic analysis could facilitate the transcription and identification processes, this would prove extremely beneficial for the institutions and their users alike.²⁵

The search would have to follow the same logic. To initiate such projects, which are essentially digital humanities projects, information specialists from GLAM institutions will have to start working more closely with academics. Unfortunately, the cultural heritage sector has proven slow to adapt to new expectations and demands, but it is clear that manual cataloguing alone can no longer be the solution in the future, despite the intellectual challenge the alternative poses.²⁶

Conclusions

I have tried to outline areas where future film archivists may find themselves when they start working in film archives in what can be seen as a transitional phase influenced by the shift from analogue to digital. It is not easy for universities to put together curricula which reflect these changes in every single detail and can foresee further shifts in job profiles even in this comparatively traditional profession. In my view it would be safe to educate students particularly in more technically-oriented subjects like data mining, data wrangling or data exchange, especially because the traditional hierarchies of knowledge are becoming less influential, while concepts like Open Science, Open Access or Open Data are the keywords in a recent debate in Germany which influences universities and cultural heritage institutions alike. The growing interest in these topics shows for example in the context of events like the *WikidataCon*²⁷ (held for the first time in 2017 in Berlin) and the yearly conference “Zugang gestalten”²⁸ which is dedicated to opening up cultural heritage to the public, or the symposia “No Time to Wait!”²⁹ about open source solutions for audiovisual archives.

Future film archivists might additionally benefit from a focus on management and leadership skills as well as a profound knowledge of rights issues. In the future, universities will hopefully conduct surveys among the alumni of the existing study programs in order to see where they are working (or have worked in the past) and which courses have proven most valuable to them in retrospect.

Since governments seem disinclined to provide more substantial funding for film archives, it becomes all the more important to find innovative ways to raise money. Therefore, working at the crossroads of archiving, academia and cultural politics requires multifaceted skills, including project management, the ability to work with small budgets and find creative solutions to problems, or being able to work in interdisciplinary settings collaboratively. These jobs entail experience in fund raising and public relations and a profound knowledge of cultural politics or rights issues. Depending on the projects, knowledge of metadata, data exchange formats and maybe even programming skills may be required, while familiarity with innovative concepts like Knowledge Design or Open Science will certainly help in developing overarching strategies with other institutions.

The question of where the alumni of specialized programs will ultimately find jobs has already been raised, but it is doubtful whether archives will have the resources necessary to hire them. Future film archivists will probably also have to accept that in many cases they will have to create their own jobs, as managers of projects financed by external grant funding, for example. It may also be realistic and sensible to create more positions at the intersections of film culture, for example positions shared between film archives and universities. If students manage to build a broad network, ranging from technicians to lawyers and open science activists, they will have better chances than if they just meet with their own peers.

Therefore, I see the graduates of these programs as managers in the best sense: people with a love of film and an understanding of film material in every shape and form, but with the ability to lobby for the safeguarding and promotion of audiovisual heritage, and to develop collaborative strategies in order to better achieve this goal.

References

L'Association des Cinémathèques Européennes (ACE). "Interim Report on ACE activities July 2015-February 2016." Unpublished document.

Bolewski, Norbert. "Sicherung und Bewahrung des Nationalen Filmerbes. Gespräch mit Dr. Anna Bohn." *FKTG-Multiblog*. Accessed November 1, 2017. <https://www.fktg.org/node/6081/sicherungund-bewahrungdes-nationalenfilmerbes>

Cultural Heritage Information Professionals (CHIPs). "Workshop Report. April 3-4. 2008." Accessed November 1, 2017. https://www.imls.gov/sites/default/files/publications/documents/chipworkshopreport_0.pdf

Edmondson, Ray. "Is Film Archiving a Profession?" *Film History* 7, no. 3 (1995): 245-255.

Hanley, Oliver and Adelheid Heftberger. "Scholarly Archivists/Archival Scholars: Rethinking the Traditional models." *The Velvet Light Trap* 70 (2012): 64-65.

Heftberger, Adelheid. "Film archives and digital humanities – an impossible match? New job descriptions and the challenges of the digital era." *MedieKultur – Journal of media and communication research* 30, no. 57 (2014): 135-153.

Heftberger, Adelheid. *Dziga Vertovs Filme, die Visualisierung ihrer Strukturen und die Digital Humanities*. Munich: edition text+kritik, 2016.

Hoyt, Eric. "Curating, Coding, Writing: Expanded Forms of Scholarly Production." In *The Arclight Guidebook to Media History and the Digital Humanities*, edited by Eric Hoyt and Charles Acland, 347-373. Sussex: Reframe Books in association with Project Arclight, 2016.

Koerber, Martin. "Who are these new archivists?" In *Work | s in Progress: Digital Film Restoration Within Archives*, edited by Kerstin Parth, Oliver Hanley and Thomas Ballhausen, 43-50. Vienna: Synema Publikationen, 2013.

Koppe, Egbert. "Der Medienwechsel analog zu digital in der Filmproduktion und seine Auswirkungen auf die Archivierungsstrategie des Bundesarchivs." *Forum. Das Fachmagazin des Bundesarchivs*, 2016. 44-53. Accessed November 1, 2017. https://www.bundesarchiv.de/imperia/md/content/bundesarchiv_de/oeffentlichkeitsarbeit/fach-publikationen/forum_2016_akt.pdf

Lukow, Gregory. "Education, Training and Careers in Moving Image Preservation." 2000. Accessed November 1, 2017. http://www.amianet.org/sites/all/files/ed_training_careers.pdf

Magliozzi, Ronald S. "Film Archiving as a Profession: An Interview with Eileen Bowser." in: *The Moving Image* 3, no. 1 (2003): 132-146.

Noordegraf, Julia. "Who knows television? Online access and the gatekeepers of knowledge." *Critical Studies in Television* 5, no. 2 (2010): 1-19.

Nowell-Smith, Geoffrey. "The Joint European Filmography (JEF)." In *The Lumiere Project. The European Film Archives at the Crossroads*, edited by Catherine A. Surowiec, 169-173. Lisbon: The LUMIERE Project, 1996.

Novia, Jennifer. "Library, Archival and Museum (LAM) Collaboration: Driving Forces and Recent Trends." *Endnotes: The Journal of the New Members Round Table* 3, no. 1 (2012): 1-10..

Olesen, Christian G. *Film History in the Making: Film Historiography, Digitised Archives and Digital Research Dispositifs*. Ph.D diss., University of Amsterdam, 2017

Prelinger, Rick. "The Future of Memory: Disrupting the Archives To Save it" (paper presented at the annual meeting for the International Association of Film Archives, Sydney, April 19, 2015). Accessed November 1, 2017. <http://www.fiafnet.org/images/tinyUpload/E-Resources/Reports-Glossaries-And-Papers/Sydney-Symposium/Sydney-Symposium-slideshows/Rick%20Prelinger-slideshow.pdf>.

Schaffner, Jennifer. "The Metadata is the Interface: Better Description for Better Discovery of Archives and Special Collections, Synthesized from User Studies," Report produced by OCLC Research. 2009. Accessed November 1, 2017. <http://www.oclc.org/programs/publications/reports/2009-06.pdf>

Schnapp, Jeffrey T., and Presner, Todd. "Digital Humanities Manifesto 2.0." 2009. Accessed November 1, 2017. http://humanitiesblast.com/manifesto/Manifesto_V2.pdf

Trant, Jennifer. "Emerging convergence? Thoughts on museums, archives, libraries, and professional training." *Museum Management and Curatorship*, 24, no. 4 (2009): 369-386.

Williams, Mark. "Networking Moving Image History: Archives, Scholars, and the Media Ecology Project." In *The Arclight Guidebook to Media History and the Digital Humanities*, edited by Eric Hoyt and Charles Acland, 335-346. Sussex: Reframe Books in association with Project Arclight, 2016.

Verhoeven, Deb. 2012. "New Cinema History and the Computational Turn." In *Beyond Art, Beyond Humanities, Beyond Technology: A New Creativity*. Proceedings of the World Congress of Communication and the Arts Conference. University of Minho.

Endnotes

1 For example the Cataloging Commission of the International Federation of Film Archives (FIAF) has put Linked Open Data on their agenda in order to look into potentially useful applications for film archives. Furthermore a workshop including a panel on Linked Open Data, organized by the Association des Cinémathèques Européennes (ACE) and FIAF at the Brandenburg Center for Media Studies (ZeM) in Potsdam in March 2017, has shown overwhelming interest from audiovisual archives and libraries alike.

2 The FIAF's website for example provides an overview over international academic study programs, which unfortunately is not quite up to date but still a useful resource: <http://www.fiafnet.org/pages/Training/Other-Film-Preservation-Courses.html>. The Library of Congress as well makes collected information (with a focus on courses in the US) available: <https://www.loc.gov/programs/national-film-preservation-board/resources/film-schools-and-careers/>

3 The FIAF has also collected their own activities on their website (<http://www.fiafnet.org/>) under the section "Training."

4 See <https://player.bfi.org.uk/>

5 See <http://www.bfi.org.uk/archive-collections/bfi-filmography>

6 See <http://www.bfi.org.uk/britain-on-film>

7 See for the bfi: <http://collections-search.bfi.org.uk/web>, and the EYE Film Institute Netherlands: <https://www.eyefilm.nl/en>.

- 8 See for example a project by Georg Schelbert from the library of the Humboldt University in Berlin: https://wikis.hu-berlin.de/mediathek/...Warum_nicht_gleich_Wikidata%3F.
- 9 These observations stem mainly from personal conversations and observing the ongoing discussion among colleagues of international archives. In my view it won't be long before projects will be set up for data import from film archives as well.
- 10 For more information see: <http://lis.cua.edu/MSinLS/coursesStudy/CHIM.cfm>
- 11 One example would be the position of Film Museum Potsdam' Head Ursula von Keitz, which includes a professorship at the Film University KONRAD WOLF Babelsberg as well.
- 12 See contribution in this issue.
- 13 For more information see: <https://archive.org>
- 14 See <http://www.thepromiseofcinema.com/index.php/digitized-historical-journals/>
- 15 See <http://anno.onb.ac.at/>
- 16 See <http://mediahistoryproject.org/>
- 17 See <http://www.cinematics.lv/>
- 18 See <http://zauberklang.ch/filmcolors/>
- 19 See <https://www.debverhoeven.com/projects/kinomatics/>
- 20 See <https://uclab.fh-potsdam.de/projects/vikus/>
- 21 See <http://weimartalkies.com/>
- 22 See <http://in2n.de/>
- 23 For example the German National Library for GND (Integrated Authority File). For more information see here: http://www.dnb.de/EN/Standardisierung/GND/gnd_node.html.
- 24 The platform zooniverse (<https://www.zooniverse.org/>) might serve as an inspiration of how to set up crowd-sourcing projects. Specifically for annotation, see <https://anno.tate.org.uk/#/>.
- 25 I am aware of ambitious and innovative projects like Transcribus (<https://transkribus.eu/Transkribus/>), but what I have in mind is more a kind of online tool which can be integrated within existing websites.
- 26 Jennifer Schaffner (2009) has conducted user studies that call for new ways of thinking about search by users.
- 27 See here https://www.wikidata.org/wiki/Wikidata:WikidataCon_2017. For my own work on using Wikidata to foster scholarly research see here: <http://www.apparatusjournal.net/index.php/apparatus/announcement/view/24>.
- 28 See for the latest edition in Frankfurt here: <http://www.zugang-gestalten.de/programm-2017/>
- 29 See for the latest edition in Vienna here: <https://mediaarea.net/MediaConch/notimetowait2.html>