**Digital Archiving Practices in Audiovisual Archives: an
exploration of the use of media asset management
systems in television broadcasting organizations**

by

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Abstract

Research Problem: Over the last decade television audiovisual archives have undergone major changes in response to the introduction of digital media and digital production systems, particularly in relation to television news. While there is significant research into how the use of digital technology affects other user groups within the television broadcasting sector, such as journalists, there is very little that focuses on the work of audiovisual archivists.

Methodology: Semi-structured interviews were used to explore the experiences of television audiovisual archivists who have been involved with the implementation and use of digital media management systems. Questions focused on three main areas: selection and appraisal, cataloguing, and search and retrieval.

Results: Interview data provided detailed descriptions of the processes and actions that audiovisual archivists employ in the course of their daily work. Qualitative analysis of the data is used to identify the problems that audiovisual archivists experience and the methods they use to address these problems. It also provides insight into the ways archivists incorporate media management tasks into their routines.

Implications: Television archives are very much still in a transition phase which is characterized by the use of multiple systems that enable access to both analogue and digital content. One area that remains problematic for some archivists is the lack of ability to incorporate quality and authority control into descriptive metadata that is created using digital media management systems. Archivists are taking on more media management responsibilities and working closer with production staff in a number of ways

Keywords: Media Asset Management, Audio-visual Archives, Television News, Broadcasting

Contents

1	Introduction.....	7
1.1	Research Problem	7
1.2	Rationale for Research.....	8
2	Definition of Terms.....	9
3	Literature Review.....	11
3.1	Literature Review: Introduction.....	11
3.2	Literature Review: Television Archives.....	12
3.3	Literature Review: Selection and Appraisal.....	13
3.3.1	Selection and Appraisal: Background	13
3.3.2	Selection and Appraisal: Digital Factors	16
3.3.3	Selection and Appraisal: Conclusion.....	17
3.4	Literature Review: Cataloguing	17
3.4.1	Cataloguing: Authority Control	19
3.4.2	Cataloguing: Metadata	22
3.4.3	Cataloguing: Conclusion	24
3.5	Literature Review: Search and Retrieval.....	24
3.5.1	Search and Retrieval: Users.....	25
3.5.2	Search and Retrieval: News and Current Affairs	28
3.5.3	Search and Retrieval: Conclusion.....	29
3.6	Literature Review Conclusion.....	29
4	Research Objectives.....	30
5	Research Question	31
5.1	Sub Questions.....	31
6	Research Method	32
7	Research Methodology.....	33
7.1	Data Collection.....	33
7.2	Research Sample.....	35
7.3	Research Setting.....	36
8	Analysis	38
8.1	Coding Themes	38
9	Results: Selection and Appraisal	39
9.1	Selection and Appraisal: News Programmes and Items	39

9.2	Selection and Appraisal: Stock Footage.....	40
9.3	Selection and Appraisal: Media Management	42
9.4	Selection and Appraisal: Research Questions	45
10	Results: Cataloguing	46
10.1	Cataloguing: Organization of Cataloguing	46
10.2	Cataloguing: Cataloguing Tools and Authority Control	46
10.3	Cataloguing: Keyframes.....	49
10.4	Cataloguing: Authority Control	51
10.5	Cataloguing: Research Questions	52
11	Results: Search and Retrieval.....	53
11.1	Search and Retrieval: Legacy Catalogue versus Digital Database.....	53
11.2	Search and Retrieval: User Searching.....	54
11.3	Search and Retrieval: User Training.....	57
11.4	Search and Retrieval: Access to Legacy Collections.....	57
11.5	Search and Retrieval: Research Questions	59
12	Discussion.....	60
13	Conclusion.....	63
14	References.....	65
	Appendix I: Academic Request for Broadcast News	75
	Appendix II: Job advertisement for a Supervisor Metadata Services at CNN.....	76
	Appendix III: Interview Schedule	78
	Appendix IV: Participant Information Sheet (Manager)	79
	Appendix V: Participant Information Sheet (Archivist).....	81
	Appendix VI: Participant Consent Form	83

List of Figures

Figure 1: Thematic Descriptors	20
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List of Tables

Table 1: Description of audio-visual content types in news libraries.....	37
Table 2: Coding themes	39

1 Introduction

Over the last decade audio-visual archives have been greatly affected by the introduction of digital technology (Lauwers, 2004; Ng, Rubin, & Van Malssen, 2010). This has been especially significant within television broadcasting organisations where analogue equipment and production systems have been completely or partially replaced with digital infrastructure (Caldera-Serrano, 2008a) enabling audio-visual content to be copied, saved and transferred via computer networks. Digital media is very versatile; multiple users can access content simultaneously and repurpose it for a variety of uses. In contrast, analogue audio-visual content is linear in nature; it is stored on film or video tape, must be viewed sequentially, and copying is labour and time intensive. In order to ensure that digital audio-visual content is preserved and accessible, television archives responsible for maintaining audio-visual collections have had to adapt workflows and processes in response to the introduction of digital formats, storage systems, and retrieval tools while at the same time continuing to preserve and provide access to existing analogue collections. How television archives manage this transition and link analogue and digital systems is the subject of this project.

1.1 Research Problem

Television archives, especially dedicated television news archives, are often closely linked to the production process and are frequently viewed as a production resource by the broadcasting organisation as highlighted in a Library of Congress report into the preservation of television and video (Murphy, 1997). This relationship is intensified when digital content management systems are incorporated directly into production systems enabling not only archive staff, but all users, to search and view archival material from their desktops. Content

management systems are also capable of performing automated work flow tasks and can be linked to long term storage systems. Although the use of content management systems is increasing, there is limited research into their use (Marmor, Malssen, & Goldman, 2011; Rubin, 2009; Vázquez, 2006). This lack of research is particularly significant when looking at the use of media asset management systems from the perspective of audio-visual archivists who's requirements differ from other user groups such as content producers (Wright, 2006).

1.2 Rationale for Research

The increasing complexity of audio-visual archiving in conjunction with a growing demand for access to audio-visual content across digital platforms has contributed to a skills gap which is highlighted in a report by UK Creative body Skillset ('Skills Strategy for the Audio Visual Archive Industry', 2008). Working with the audio-visual archiving sector, Skillset identified a shortage of people with experience in technical operations, digitisation, digital rights management and metadata systems. Initiatives, including training schemes, have been established to encourage people into the field in order meet the demand generated not only by the production of new digital content but also by the conversion of analogue collections to digital formats. While many of these digitization projects are one-off events, the huge volume of analogue material (Ubois, 2005; Wright, 2004) in combination with the on-going requirement to migrate digital content to new formats will contribute to continued demand for audio-visual archivists who have a deep understanding of both the technical and archival implications of preserving and organising digital audio-visual content. Moreover without archival expertise included in the development process of these multipurpose systems, it is possible the archival requirements could be obscured by the needs of other, more prominent user groups.

Existing research into media asset management systems covers a range of topics from broadcast engineering and information technology to the development of metadata standards and user needs. While the term “archive” features in most of the literature, there is little emphasis on the role of the archivist and the processes that are utilised to translate traditional archival skills and knowledge into digital workflows and requirements. The absence of literature is more pronounced when looking at the role of audio-visual archivists who work in the specialised area of news and current affairs which is more closely linked to the production process and thus greatly affected by use of digital systems. But this gap in television archive research is not new. In 1995 a researcher looking at the use of library material in a regional BBC news programme observed: “whilst the more accessible areas of public or academic libraries have been subjected to countless investigations, the broadcasting world has remained a relatively research-free zone” (Pearson, 1995, p67). The purpose of this research is therefore to investigate how the role of the television archivist has changed and identify the benefits and challenges associated with digital audio-visual archiving. As a working audio-visual archivist who has been involved with various digital projects I also have a personal interest in the area.

2 Definition of Terms

Audio-visual Archive – “An audio-visual archive is an organisation or department of an organisation which has a statutory or other mandate for providing access to a collection of audio-visual documents and the audio-visual heritage by collecting, managing, preserving or promoting.” (Edmondson, 2004). This paper focuses on audiovisual archives within broadcasting organisations, specifically in relation to the handling of news and current affairs material.

Audio-visual Archivist/Librarian – The term “librarian” is frequently used in reference to audio-visual archivists, often in relation to those working in a news environment. Throughout this paper both terms are used interchangeably to refer to qualified or experienced professionals working in an audio-visual archive.

Legacy – The term legacy is used to describe the collections, holdings and catalogues that pre-date the introduction of digital technology and/or are not included within the digital infrastructure. This includes audio-visual material held on analogue tape formats and text only catalogues that do not include any visual representation of the media.

Media Asset Management System – The extent to which broadcasters implement digital content management systems differs between organisations as do the terms used to describe these systems. Some of the organisations approached in the course of this research claimed they did not yet have a media asset management system yet they use digital infrastructure to produce, annotate, access and store digital audio-visual content and therefore meet the criteria of using a media management system according to the following definition:

Media management provides the framework for both the information and the technical architecture of a network. Media management, also called media asset management controls

- Storage of all digital content (individual or clustered media objects, also called media assets)
- Applications for processing and cataloguing the content
- Applications for searching and retrieving the content (de Jong, 2003)

The terms “content management systems”, “digital asset management systems”, “media asset management asset systems” and “digital systems” are used interchangeably throughout.

Metadata - As the building blocks of digital content management systems, metadata provide technical, administrative and description information about digital documents. “Metadata are

data that describe the attributes of a resource; characterize its relationships; support its discovery, management and effective use; and exist in an electronic environment” (Vellucci, 2000, p.34).

News Library – The news library is a specialised area of a wider audio-visual archive. It is generally responsible for collecting, organising and providing access to content generated by the news department. News libraries provide services primarily, but not exclusively, for the news department and due to their unique nature have demands that differ from other audio-visual archives.

User – To distinguish between expert and non-expert users the term “user” is used only in relation to non-expert users of audio-visual archival systems such as journalists, members of the public and academics.

3 Literature Review

3.1 Literature Review: Introduction

Given the limited nature of a body of academic literature devoted to audio-visual archiving in broadcasting organizations, (Caldera-Serrano, 2008b; Pearson, 1995) this literature review draws on the different disciplines that in combination illustrate the diverse aspects of the audio-visual archivist’s role as well as the multifaceted nature of the research problem. By including research from Information Studies, Information Science, Communications, the broadcasting industry and audio-visual archiving sector, this literature review takes a narrative approach (Bryman, 2008, p.93). Restricting the literature review to one particular area would limit the understanding of the research problem and hinder a full exploration of the issues. As such, the objective of this literature review is to illustrate the fundamental

archival functions related to selection and appraisal, cataloguing, and search and retrieval, in order to identify how these practices change when digital content and processes are introduced.

3.2 Literature Review: Television Archives

The emergence of audio-visual archiving as a specialised field that is separate from general archiving is a relatively recent development due in part to the newness of moving image technology. However, the value or lack of value attributed to audio-visual documents (Turner, 2009) also plays a part in the development of an audio-visual archiving culture as illustrated by the contrast between the British experience which is characterised by a public broadcasting ethos and a strong commitment to the preservation of both film and television since the earliest days of both mediums (Dupin, 2007; Malden, 1991; Oppenheim & Walker, 1996) and the American, generally commercial, approach which is strongly influenced by financial factors and lacks a public mandate to preserve audio-visual content (Fain, 2007; Marmor et al., 2011; Martin, 2005; Schreibman, 1991). This was evident as recently as 1996 when the Library of Congress conducted a comprehensive study into the state of television and video preservation and noted: “A strategic plan for the future of television film and videotape seems lacking. This failure is rooted in a certain reluctance to establish a formal archival programme that requires some tough decisions about appraisal criteria, disposition, and preservation” (Murphy, 1997). A lack of adherence to information management standards in television archives could also be attributed to the close association between the archive and the broadcasting organisation which may weaken ties with the broader archiving profession. Low pay rates, an absence of dedicated training programmes and a lack of professional recognition also distinguish audio-visual from the wider archiving sector (Schopflin, 2008; Stoker, 1991).

3.3 Literature Review: Selection and Appraisal

Selection is a core task of any archive. It involves the appraisal of documents according to a set of values which are often defined in a selection policy. The role of the archivist in defining value varies according to different theorists. Tschan (2002) contrasts the two main perspectives as represented by Jenkinson and Schellenberg. The former sees the archivist as having a non-active role in determining value while the latter likens the archivist to a historian who not only acknowledges the primary value of a document as determined by its creator but also recognises the importance of the document in other contexts such as academic or historical research. Other factors, such as how archival objects are used (Eastwood, 1993), awareness of influences from the wider archival community (Samuels, 1986), and the emergence of digital objects which have redefined the concept of permanence (Cook, 2001) also contribute to and complicate how value is established during the selection and appraisal process.

3.3.1 Selection and Appraisal: Background

All of these factors are relevant within television archives where selection is determined according to the dual demands of production needs and preserving historically and culturally important audio-visual documents (Bergeron, 2007). Genre, format, legal deposit obligations as well as production requirements all play a role in determining selection policies, although criteria is not always explicit as described by one South African audio-visual archivist: “staff...must also have almost a sixth sense for potential future interest in something which may have been a minor incident yesterday, but may blow up into a cause celebre” (Muller, 1994). The International Federation of Television Archives (FIAT) selection standards give archival priority to actuality material that depicts historical events, places, objects and natural phenomenon. This is followed by interviews, fictional and entertainment material, and finally

material that illustrates developments in television practices and techniques (Kula, 2002).

Public service broadcasters that have an explicit obligation to provide educational, cultural and current affairs programming, generally have well established selection guidelines. Such broadcasters may be required to provide content to a national archive for preservation yet they will likely also have their own archival systems for the collection and management of content for production purposes, which although not explicitly indicated, also act as records of cultural and historic significance.

While preservation objectives, either for production purposes or as a historical record, are more widely acknowledged now, that has not always been the case, especially in America where the origins of television as a live medium with an “ephemeral” nature did not encourage preservation. A survey of 166 American television stations of various sizes showed that only 26 per cent have retained any of their news film holdings (Fain, 2007). The introduction of videotape in the late 1950s made it much easier to record programmes yet broadcasters saw videotape stock as a reusable resource that could be recorded over multiple times: “the very quality of videotape that can make today’s archivists despair – its reusability – was perhaps its chief virtue to early users” (Martin, 2005).

Since the 1970s commercial broadcasters have recognised that selecting and preserving content can reduce production costs. A former head of the Canadian Television Network CTV claimed the company saved \$35,000 in 1976-1977 through the use of library stock shots (Bergeron, 1986). Although a relatively small amount in comparison to today’s figures, measuring the total cost of purchasing library footage externally is one of the ways that television archivists argue against budget cuts (Pearson, 1995). Furthermore the contribution of library material to television programmes is significant, especially in news. A study of the

use of library footage in a regional BBC programme, “Newsroom South East” found that 14% of the total programme came from library footage. This increased to 21% when looking only at news stories of which one third consisted entirely of library footage (Pearson, 1995). A larger survey of six Spanish television channels in the early 1990s found that 42% of all news items used library footage. This increased to 50% in the first three stories of a news bulletin. From these results the author concluded “audiovisual documentation [library content] enriches and completes the news, facilitating the audiences understanding” (Agirreazaldeg, 2008). The increasing pressure on broadcasters to provide programming for various digital platforms also highlights the economic benefits of capturing and preserving footage for reuse and has shifted the perception of audio-visual holdings from being a liability to an asset (Murphy, 1997).

As well as being important for depicting current events, news material is very versatile and is often used in a range of other genres: “News and current affairs programming have the highest potential significance of any type of television production. Television news broadcasts contain reports on ‘hard’ news such as...politics and economic conditions. They also feature stories on prominent personalities, cultural events, and lifestyles” (Bergeron, 1986). More than any other genre, news content meets the dual needs of documenting historic and cultural phenomena as well as providing a valuable resource to be used in other productions, thus the selection values and processes adopted by audio-visual archivist working in news libraries must reflect the needs of the organisation as well as the wider community as described by one news librarian:

our prime task, the one that earns us our budget, is to serve production needs, keep a record of news and current affairs transmissions and provide for possible future production needs....Yet many of us are always aware of a responsibility to maintain an historical record of the broadcaster as well as maintaining a wider historical public record of national life as reflected by television. (Muller, 1994)

3.3.2 Selection and Appraisal: Digital Factors

The FIAT standards recommend that all news programming, both transmitted and untransmitted, be kept for five years before appraisal. However, as well as being acknowledged that this is often unrealistic in practical terms (Kula, 2002) it can be counterproductive when managing digital content that is generated in much larger volumes than analogue content and often consists of multiple components. Moreover the speed at which digital content is generated necessitates selection much earlier in the lifecycle of the content if not in conjunction with the production process:

Leaving archiving to the end of the lifecycle opens the door to a host of threats including dissociation, interoperability, and migration problems and obsolescence, not to mention managing a volume of used materials that far exceeds that of the analogue world (Rubin, 2009, p.395).

Selection processes in the digital newsroom are changing in recognition of this factor.

Immediate and simultaneous access to incoming footage means that archivists no longer have to wait until reporters are finished with their tapes to start evaluating and selecting footage. In addition archivists are extending their role by taking responsibility for managing content before it is archived. At Spanish channel Telemadrid archive staff select footage within 24 hours of it being ingested onto the server. They also add some descriptive metadata as part of the selection process which then reduces subsequent cataloguing time (Vazquez, 2001).

Archivists are also responsible for managing all content on the server and although all users can access footage and make selection suggestions, it is essential that the archive has an authoritative role in selection:

If the selection is left up to the journalists, editors or producers, each one applies their particular criterion and much valuable material is lost from the archive. For example, the producers tend to conserve material exclusively for the visual value, not for the content; a journalist may consider important a certain political statement and not others, etc. On the other hand, an experienced documentalist [archivist] takes into consideration these aspects and makes the selections for the archive in accordance to multiple criteria. (Vazquez, 2001, p11).

In the wider community there has been a growing recognition that television is an important cultural mirror and resource. The UNESCO document “Recommendation for the Safeguarding and Preserving Moving Images” published in 1980 states “moving images are an expression of the cultural identity of peoples, and because of their educational, cultural, artistic, scientific and historical value, form an integral part of a nation’s cultural heritage”. One tangible consequence of this recognition is the increased demand by academics wanting access to television programmes for research purposes (Bergeron, 1986; Michael, Todorovic, & Beer, 2009; Smeaton et al., 2004). For an example of a request for archival news footage for academic research see Appendix I. There is also a growing expectation from the public that television content be easily accessible (Knapskog, 2010; Wylie, 2007).

3.3.3 Selection and Appraisal: Conclusion

Research indicates that the increase in production and demand are contributing to changes in selection values and processes within the digital environment where selection decisions are made much earlier in the production cycle. Moreover archivists are extending selection criteria to short-term or non-archival content and taking on more of a media management role. Archivists also need to consider a greater variety of user requirements as members of the public and academics expect ready access to audio-visual content. An extension of the selection process is appraising analogue content for digitisation, however that is beyond the scope of this project.

3.4 Literature Review: Cataloguing

As with selection, the cataloguing of audio-visual material is greatly affected by form, genre, and use. Likewise, there is a large variation in terms of quality (Sandom & Enser, 2003).

Large organisations such as the BBC have well developed cataloguing procedures which have evolved in response to changing needs and technology (Simpson, 2008). In contrast, audio-visual archives in many developing countries, such as Lebanon and Egypt have few qualified or trained staff, and cataloguing may be characterised by a lack of consistency and little regard for standards (Azmi, 2008; Saade, 2004).

Cataloguing conventions for moving images can range from basic indexes of programme titles (Bird & Clark, 1979) to detailed shot by shot descriptions (Caldera-Serrano, 2010).

While the former provides limited information about the content of a programme, the latter is very time-consuming and thus expensive. A high level of granular detail distinguishes the cataloguing of news and current affairs content from other genres such as drama and entertainment which are often catalogued in brief bibliographic styles. A catalogue record for a 30 minute entertainment programme may include such fields as programme title, transmission date, creator(s), duration, and material, whereas a catalogue record for an individual two minute news story that is only a small part of a 30 minute bulletin could include all of this information as well as a synopsis of the story and a detailed description of the pictures. This high level of detail captures information contained in the audio voice track and describes the pictures to provide multiple access points. Caldera-Serrano (2010) refers to this as the visual and sonorous aspects of audio-visual cataloguing but it is more commonly expressed with the terms “of-ness” and “about-ness” which Shatford (1986) uses to distinguish between the factual or objective, and expressional or subjective aspects of images. For example, a news story about a proposal for a public transportation rail line may feature images of urban streets clogged with traffic (of-ness) while the voice-over contains information about the specific rail proposal (about-ness). The cataloguer needs to ensure that all of this information is captured in order for the item to be useful in the future, either as an

example of traffic jams or in reference to the rail line proposal. The textual description of the pictures as well as the context provides important access points when searching audio-visual material.

3.4.1 Cataloguing: Authority Control

The use of subject headings is another way to identify what an item is about (Yee, 2007).

These are used in the form of controlled vocabularies or thesauri which increase search precision by enabling searchers to differentiate between words or concepts that have the same spelling but different meanings. Likewise subject headings increase search recall by grouping together various words or concepts that have similar meanings. Controlled vocabularies can also link related concepts in a hierarchical structure enabling the searcher to increase or limit the scope of the search.

As described above, news content is catalogued to include a description of the action in the pictures as well as relevant contextual and conceptual information that may not be visually present. Controlled vocabularies and thesauri are used to support both types of information: description (off-ness) and context and/or concept (about-ness). Caldera-Serrano and Zapico-Alonso (2006) distinguish between these two different types of access points with the terms “viewed thematic descriptors” and “referred to thematic descriptors”. Controlled vocabularies when used in relation to the former may overlap with the shot descriptions, while the latter relates to the context and concepts that are not necessarily replicated in the free text description of the pictures. The example in figure 1 illustrates the “viewed” thematic descriptors used in a news sequence about traffic disruptions resulting from a winter storm at the start of the Christmas holiday period. There is frequent overlap between the shot descriptions and the controlled vocabulary terms with terms such as “Roads-motorways” and

“fire-brigade”, but not always. The use of a controlled term like “accident” which does not appear in the shot description supports the search function by enabling the item to be located without relying on a query that uses the descriptive term “wrecked”. The “Referred to” or contextual and conceptual elements for this sequence include: traffic, winter, storms, and exodus i.e. traffic jams on major holidays as people leave the city. Using the controlled terms would enable a searcher to locate all stories about accidents in stormy conditions on mountains road during heavy traffic at the beginning of a holiday period without having to search a variety of descriptive terms such as “crash”, “aftermath” etc. The use of controlled terms in the search query would also eliminate stories about traffic jams on mountain roads in other contexts such as during construction work.

Figure 1: Thematic Descriptors (Caldera-Serrano and Zapico-Alonso, 2006, p.311)

The use of authority control is based on principles and standardised practices that maintain catalogue integrity and improve searchers' ability to find and identify material. Its effectiveness is reliant on an understanding of “cause and effect in the information retrieval process” (Vellucci, 2000, p.36). Yet, because media asset management systems are designed from the perspective of the broadcaster, the requirements of the archive may be overlooked or not fully understood. Research conducted at the Netherlands Institute for Sound and Vision

into a thesaurus browser that can aid the cataloguing process is one of the few examples of technology designed to improve the cataloguing process from the perspective of the cataloguers (Malaisé et al., 2006). Although the benefits of ensuring the integrity of database are experienced by all users.

In addition to understanding the conventions associated with cataloguing audio-visual content, cataloguers must view the footage in its entirety and include all relevant contextual information, which may not always be included in the news item itself. This is what makes the cataloguing process labour intensive and expensive. The Vanderbilt Television News Archive allocates approximately five hours to catalogue one hour of content (Ubois, 2005) and cataloguers at the Netherlands Institute for Sound and Vision calculate that it can take three hours to catalogue one hour of television content depending on genre (Gazendam et al., 2009). This has prompted research into Content Based Image Retrieval (CBIR) technology which is designed to reduce the reliance on human cataloguers and therefore the cost. CBIR technology uses algorithms to recognise audio and visual content through such things as shape, colour, pixels, etc. and automatically capture descriptive metadata. (Enser, 2008; Gazendam et al., 2009; Hare, Lewis, Enser, & Sandom, 2006; Jörgensen, 2004; Sandom & Enser, 2003; Smeaton et al., 2004; Viana & Alves, 2009). A study of attitudes among archivists showed there is a high degree of scepticism about the usefulness of automated speech recognition in cataloguing (Zuurbier, 2009, as cited in Huurnink, Hollink, van den Heuvel, & de Rijke, 2010). The use of crowdsourcing in conjunction with CBIR (Geisler, Willard, & Whitworth, 2010) has also been explored as an inexpensive way for users to index publicly available audio-visual collections thus increasing access with little cost. Reliance on non-archive staff to add metadata during the production process is another way which is proposed to reduce the cost of using professional cataloguers.

According to de Jong (2007) these changes to cataloguing processes will result in a loss of quality: “use of professional cataloguing standards will decrease. There will be more Recall and less Precision and the inevitable loss of accuracy”. However while she views this as a necessary sacrifice others (Arsenault, Ménard, & Leide, 2008) view it as a significant challenge to be overcome. And according to Yee (2007) the move away from established cataloguing standards is misguided: “In recent years there has been a proliferation of metadata standards designed for use by people with little training, based on the unexamined assumption that surrogate records....are much less important once a system is providing direct access to the works themselves in digital form” (p. 11).

3.4.2 Cataloguing: Metadata

The term “cataloguing” is increasingly being replaced with the term “metadata”. An example of this is a recent job advertisement for a Metadata Supervisor at CNN. The key focus of the position is to be “responsible for coordinating cataloging of content archived in the library’s permanent collection” yet an understanding of metadata is also essential. See Appendix II for the full ad. The role of metadata in the management of digital objects is divided into three categories: technical metadata enables interoperability, access, and preservation; administrative metadata contains information about the lifecycle of an object and enables content management; descriptive metadata, the most familiar to archivists, provides descriptive information about the object and is similar but not identical to what would be contained in a catalogue record. As Vellucci (2000) points out, the concept of metadata marks the convergence of information management, information science and information technology within the digital domain. One of the challenges of developing metadata standards is how to incorporate the standards and requirements of these multiple sectors into

a unified structure. To date, the primary requirements of broadcasting organisations i.e. producing and transmitting programmes, has taken precedence in the adoption of metadata schemes with very little regard for television archival requirements. This is because the type of institution, rather than the type of documents, has the strongest influence on an organisation when selecting metadata schemes (Viana & Alves, 2009). Because broadcasters are more familiar with broadcast engineering, they focus their attention on broadcast engineering standards such as SMPTE and may overlook library metadata schemes that are more relevant to the long term preservation of audio-visual content (Addis et al., 2010; Wright, 2008).

Two important projects that are concerned with preservation of digital audio-visual content have a strong focus on the development and use of metadata. The PrestoPRIME project in Europe provides research and development tools to support audio-visual archives of all types. In the United States the Library of Congress National Digital Information Infrastructure and Preservation Program (NDIIPP) Preserving Digital Public Television Project has developed a preservation repository model using PBCore, a metadata standard for audio-visual material based on the library standard Dublin Core. Early in the NDIIPP project developers recognised the importance of descriptive metadata in relation to providing long term preservation and access to digital audio-visual content and developed workflows and tools that encourage users to make selection decisions and add metadata early in the lifecycle of audio-visual material:

“the key....is to implement an infrastructure and workflow on the production side that gives the content creators the tools and training to input descriptions that can flow through to other users and systems including broadcast distribution systems, web content management systems, and preservation environments” (Marmor et al., 2011)

It is often assumed that because images, either moving or still, are included within databases of digital content, the textual description of pictures (off-ness) is less important and there is more reliance on textual information relating to the concepts and contexts (about-ness). Yet, according to the Skillset report this is not expected to decrease the need for experienced and trained cataloguers: “The skills shortages identified in the metadata area are with experienced cataloguers needing to embrace using new key word methods or more contextual information to describe the material content” (‘Skills Strategy for the Audio Visual Archive Industry’, 2008).

3.4.3 Cataloguing: Conclusion

The potential benefits of digital production and archiving systems on cataloguing processes include a reduction in the cost associated with cataloguing and faster access to content. Challenges relate to the use of authority files and methods to ensure cataloguing standards are maintained as the concept of cataloguing takes on new meaning in the form of metadata. To date there is limited use of these systems and little evaluation of the impact of digital media management systems on cataloguing processes.

3.5 Literature Review: Search and Retrieval

Search and Retrieval is the other side of cataloguing; the nature and quality of cataloguing directly impacts the ability to successfully find and identify material. This close relationship is even more important in a digital environment which lacks the physical markers of collection management such as tape labels and arrangement that can sometimes supplement the searching process. Moreover the proliferation of digital content necessitates a high standard of search precision in order to isolate the desired material (M. Addis, Lowe, & Middleton, 2009; Viana & Alves, 2009). In addition, there is an increasing expectation that

access is greatly improved when audio-visual content is digital (Bergeron, 2007; Rubin, 2011; Sandom & Enser, 2003) especially among members of the public (Wylie, 2007), academics (Auffret & Prié, 1999; Gray & Sheppard, 2004; Kirkegaard Lunn, 2009; Michael et al., 2009) and professional users of images (Jørgensen & Jørgensen, 2005; McCay-Peet & Toms, 2009). While these three user groups feature prominently in the research there is much less research that focuses on how archivists search their collections. One study comparing the searching strategies of broadcasting professionals included one archivist. It found that search strategies are influenced more by a searcher's background and experience than by the required task (van den Heuvel, 2010). Another study which examined the work stages at which archival video is used in the programme making process included two information specialists (Markkula & Sormunen, 2006). It concluded archival content is used primarily in the planning stages as an information source and at the editing stage when visual gaps may be identified. An example of a footage request received by one of the information specialists during the editing stage indicates the need for both an objective and subjective interpretation of the appropriateness of moving images for a particular request: "we need a few seconds of sunset above the sea. The sun is filtering through the leave in the beach. A feeling of paradise isle" (Markkula & Sormunen, 2006, p.116). This study was concerned with the potential improvements in a digital environment where journalists have direct access to content: "In the integrated video archive system, the journalist has much better tools to test program ideas since the audio-visual contents can be browsed while searching" (p. 116).

3.5.1 Search and Retrieval: Users

Much of the research into user requirements is done from a technological perspective in conjunction with the development of Content Based Information Retrieval (CBIR). The objective of CBIR is to reduce the reliance on human cataloguers while at the same time

ensure that material remains searchable and accessible. Thus it is essential for the developers of CBIR to have a deep understanding of user requirements and searching processes. Sandom & Enser (2003) identified three different types of requests for audio-visual material: simple single term requests, multi-faceted requests, and highly specific and complex requests. Using the mode facet matrix developed by Shatford (1986) they analysed 1270 footage requests according to their nature and complexity. They found the majority of requests were for specific subjects such as people places and events while requests for abstract concepts were rare. Requests that combined specific subjects with concepts e.g. a request for “quirky – light hearted view of transport – cars – 20s to 70s” were very complex and required subjective intervention on the part of the cataloguer or researcher in order to be identified. The degree of success in locating suitable pictures could also be affected by the researcher’s familiarity with the cataloguing conventions, subject thesauri and the collection.

Hertzum (2003) uses the term “fluidity” to describe this multi-layered nature of audio-visual requests. His analysis of need attributes of 275 email requests to a German film archive highlights the importance of the dialogue between the user and the archivist who interprets the user’s requirement. He also emphasizes the limitations of email as a request method where the reference interview is severely compromised and often lacks information about how the material will be used. He found 43 per cent of the requests had no information about the context in which the material would be used and without this, it can be “very difficult for the archivists to form an interpretation of these requests and assess the relevance of the archived material” (Hertzum, 2003,p.175). The reliance on contextual information increases if the request is vague. Moreover, reducing these complex requests, which are often clarified through a dialogue between the user and the archivist, into queries that are compatible with CBIR is reliant on the level of detail included in cataloguing and indexing. He concludes:

The most viable way to improve retrieval from the archive is probably to acknowledge the archivists' capabilities as expert intermediaries and direct retrieval systems at supporting the archivists in their work with the collection and with requests from the users of the archive. (Hertzum, 2003)

Analysis of transaction logs at the Netherlands Institute for Sound and Vision (Huurnink, Hollink, et al., 2010) found that most users search for known subjects, people and locations using free text keywords while only nine per cent make use of the advanced search option. A high proportion of the search terms were from item titles indicating that many of the searches were for known items. Most of the searches resulted in orders of either individual stories as indicated in the catalogue record or for fragments that had been identified by the users through viewing a low resolution copy or keyframes which are still thumbnail images of key images contained in a sequence. The level of cataloguing also has a large impact on the ability of users to identify segments and fragments; finding a specific segment in a programme that is catalogued with only a brief description took much longer than finding material that is catalogued at the story or fragment level.

A similar analysis of searches conducted by non-archive professionals using a commercial website to locate still images Jörgensen & Jörgensen, (2005) found that users lacked understanding of how to manipulate advanced search query options to increase search effectiveness as demonstrated by the use or misuse of Boolean operators “overall these queries continue to demonstrate that Boolean is poorly understood by end users and that a little Boolean can be a dangerous thing” (Jörgensen & Jörgensen, 2005, p.1354).

Further research into the use of CBIR tools at the Netherlands Institute for Sound and Vision (Huurnink, Snoek, de Rijke, & Smeulders, 2010) compared the results of searches that were conducted using three different tools: original catalogues, CBIR tools, and a combination of

the two. The results showed that of the three options the best result were obtained when CBIR was used in conjunction with the existing catalogues.

3.5.2 Search and Retrieval: News and Current Affairs

Another major user group that relies heavily on television archives are news journalists and producers. The requirement to locate specific pictures in a short time-frame means news users rely heavily on detailed catalogue descriptions (van den Heuvel, 2010). In addition the introduction of digital technology in news production has altered the role of the journalist who may now be expected to take on editing tasks (Cottle & Ashton, 1999), locate library material (García Avilés, León, Sanders, & Harrison, 2004) and produce material for an increasing variety of outlets or platforms (Molster, 2010). While this non-linear approach is seen to have production benefits (Shao, 2010), it is also often portrayed as a way to reduce costs and increase efficiency, and therefore may contribute to redundancies, multiskilling and a loss of specialisation (Cottle & Ashton, 1999).

As with external users of television archives, there is an expectation and assumption that access to library content improves in the digital environment enabling journalists to potentially by-pass the archivist. Thus the technological and operational changes brought about by digital production and archiving may have an impact on the role of the television archivist. This includes possible changes to the number and type of requests the library receives, less reliance on physical resources such as tapes and therefore the potential to be relocated to be closer to the user group (Vázquez, 2006) and changes to workflow which enable librarians to provide research as well as capture and catalogue content earlier in the life cycle of the content. (Lewis & Plester, 2004).

3.5.3 Search and Retrieval: Conclusion

It is expected that users will do more of their own searching which is believed to be enhanced by the inclusion of images in catalogue records. Yet there remains limited understanding among users of advanced search strategies. Moreover a lack of knowledge about a particular collection or cataloguing conventions may negatively impact search success among users.

3.6 Literature Review Conclusion

From the literature review a number of themes associated with the broad topics of selection and appraisal, cataloguing, search and retrieval, and the role of the audio-visual archives in the digital setting have been identified. The research question(s) have been developed in response to these themes:

- The selection process takes place much earlier in the production cycle
- Digital production has contributed to an increase in the amount of material that is available for selection
- Different user groups have distinct requirements which may affect selection decisions
- The inclusion of images in the catalogue records affects the cataloguing process
- The use of automatically generated metadata in conjunction with human cataloguers is expected to improve cataloguing efficiency
- Authority files may be used differently or not at all in digital systems
- There is an increased expectation that users conduct their own searches when using digital media asset management systems
- Changes to cataloguing practices and standards may impact search precision and recall

- In a digital environment the role of the audio-visual archivist may change to include media management tasks.

4 Research Objectives

The technological changes arising from the transition from analogue to digital processes marks a significant development in audio-visual archiving and provides a good opportunity to examine an area of information management that has not had a great deal of attention. Understanding how audio-visual archives and archivists adapt to this change is essential in order to make informed decisions about how audio-visual content is selected, organized and accessed in the future. The objectives of this research are therefore to:

1. Explore the experiences of audiovisual archivists who have worked with the transformation from an analogue to a digital operation in television archives.
2. Investigate how traditional audiovisual archiving practices and standards are adapted or changed in a digital setting.
3. Increase understanding of the weaknesses and strengths of digital media management systems from an audio-visual archiving perspective.
4. Identify how the use of digital media management systems affects the ability of archivists to manage audiovisual material.
5. Compare and contrast the different ways in which media management systems are used.
6. Identify changes in the ways users and archivists interact when media management systems are used.

5 Research Question

How does the introduction of digital format media and the use of digital media management systems affect archive processes and standards in audio-visual archives within television broadcasting organizations?

5.1 Sub Questions

1. Selection
 - a. Do digital media management systems affect when the selection process takes place?
 - b. Does selection criteria change when media management systems are used?
2. Cataloguing
 - a. How does the cataloguing process change when media management systems are used for cataloguing?
 - b. What impact do digital media management systems have on the quality of catalogue records?
3. Search & Retrieval
 - a. Do users conduct more of their own searching when they have access to digital media management systems?
 - b. Is there a change in how archivists perceive search recall and precision when digital media management systems are used for searching?
4. Audio-Visual Archivist Role
 - a. How does the role of the archivist change in a digital setting?
 - b. Do archivists take on media management tasks when working with media asset management systems?

6 Research Method

As indicated by the range of disciplines featured in the literature review, the evolution of information access and management in a digital world is reliant on concepts and knowledge from multiple domains including Information Technology, Librarianship and in this case the related field of Archival Studies. These disciplines may be viewed either as separate domains or conflated into the one subject area of Library and Information Science. While Librarianship is more closely associated with the social sciences and is aligned with information use in terms of communication (Wilson, 2000), philosophy (Spink & Cole, 2004) or social justice (Rioux, 2010), Information Technology is often situated within the scientific paradigm where information is frequently interpreted as data and understood according to information theory with an emphasis on transmission, systems and metrics. Although there is often agreement that the contrasting nature of the two arms of Information Science is one of its defining features (Arms, 2005; Bates, 2010; Neill, 1987; Saracevic, 2009; Thornley, 2009), this dichotomy can be portrayed as either a positive development that extends the role of the librarian and provides opportunity, or as a negative influence with information technology, and its close alliance to commercial expansion, seen as a diluting the professionalism and standards of librarianship. On a more practical level, the complexities of each area and the ways they interact, described by Bates (2002) as a “cascade of interactions” means digital information systems that are designed without a full appreciation of all relevant areas can have major problems. As a backdrop to the research problem, this junction between the two domains can be used to contextualise the disjoint between the archivist’s concern with organisation, access and preservation of information, and the commercial and technological incentives of the overarching broadcasting organisation.

As a theoretical frame for this research, Dervin's Sense-making theory which starts with the assumption that experience is characterised by discontinuity provides a good starting point. The concept of discontinuity can also be seen as a metaphor for the current state of the audio-visual archive where multiple systems are being used and the archivist is required to adopt new processes to ensure access to all of them. Further, the focus of Sense-making theory on the problem solving process rather than the system, provides a useful way to interpret the experiences of audio-visual archivists and better understand the steps that they undertake to bridge the gaps they encounter in their information processing, seeking, creating and using activities. Sense-making theory is appropriate because it highlights the importance of the perspective, knowledge and actions of the information seeker in defining and potentially solving the problem: "the ways in which people see their gaps will be related to the ways in which they try to bridge them and not to characteristics of persons independent of the gaps" (Dervin, 1992) thus the ways that audio-visual archivists interpret and bridge knowledge gaps is likely to be different from the way other user groups use the same system. The core concepts of Sense-Making theory are:

- reality is neither complete nor constant but rather filled with fundamental and pervasive discontinuities or gaps
- information is not a thing that exists independent of and external to human beings but rather is a product of human observing
- all information is subjective (Dervin, 1983)

7 Research Methodology

7.1 Data Collection

Interviewing, specifically time-line interviewing is a key data collection method used in relation to Sense-making theory. Interviewees are asked to describe a situation and the steps they took in the processes of solving or bridging an information gap or problem. The steps

are then explored to identify how the subject identified what knowledge was lacking or required in order to move to the next step (Dervin, 1983). Time-line interviewing is useful because it provides a format for the interviewee to describe the situation or the context of the problem and it can also aid recall (Schamber, 2000). In this research, semi-structured interviews that included elements of time-line interviewing were used to collect data. Archivists were encouraged to talk about their role and tasks they perform in relation to topics identified in the literature review: selection and appraisal, cataloguing, and search and retrieval. A pilot interview was conducted and some changes were made to the interview approach as a result. An interview schedule which was used a guideline during the interviews (see Appendix III) was submitted for Human Ethics Approval School of Information Management Human Ethics Committee at Victoria University of Wellington.

There is a large variety in the way audio-visual archives organise their work and implement standards. Semi-structured interviews that focus on processes allowed subjects to describe the specifics of their workflows and also captured the tasks from the perspective of the archivist. Initial questions were very open and focused on the role of the subject e.g. “can you me about your role and your key responsibilities”. There was a large range of responsibilities among the subjects and this general opening provided an opportunity for the interviewees to describe the specific nature of their role. Some archivists only work within one aspect of the role such as cataloguing or appraisal while others are involved with multiple aspects of audio-visual archiving. After a general overview questions became more specific and focussed on the relevant topics according to each archivist. The objective of these questions was to:

1. Understand processes and tasks e.g. “you said you archive the next day. What does that entail?”

2. Identify workflow changes that have resulted from using a digital system e.g. “do reporters and producers add metadata?”
3. Explore the transition from analogue to digital work flows e.g. “how does your catalogue talk to the digital system?”
4. Identify benefits and problems of using a digital system e.g. “what is the best/worst thing about the digital system?”

Interviews were conducted by telephone using Skype and recorded using Skype MP3 Recorder. The interviews were on average one hour in duration with the shortest being 31 minutes and the longest one hour and ten minutes. Interviews were fully transcribed and a summary sent to the subject for checking.

7.2 Research Sample

In terms of information management professionals, audio-visual archivists are a relatively small part of the information management population. Given the highly specialised nature of broadcasting archives, specifically those that handle news material, a purposive sample was required (Bryman, 2008). As such, electronic mailing lists devoted to audio-visual archiving, conference reports and existing professional contacts were used to identify an appropriate sample. Organisations that have a mandate to reflect and/or preserve national culture and heritage were targeted because these broadcasters are more likely to: have existing analogue collections; have already commenced the transition to digital production and archiving systems; and have a dedicated news department and news library. Eleven organisations were contacted by email and sent an overview of the research project which outlined the objectives of the project and what involvement in the project would entail (see Appendix IV). Five archives from five different countries agreed to participate, two declined because they did not

have the time, two were not yet using a digital system and therefore did not meet the criteria, and two did not respond.

In order to capture a fuller picture of the processes two archivists, one in a management role and one with hands on experience with the day to day tasks, were approached at each archive. Once a manager agreed to participate he or she was asked to recommend a suitable archivist who was familiar with day to day tasks. This archivist was also sent an information sheet (see Appendix V). All participants signed and returned a consent form indicating they understood the objectives of the project, understood that the information they provide was confidential, and knew they had the right to view their interview transcripts (see Appendix VI). They were also given the option to indicate if they would like to receive a report of the results when the project is completed. Ten subjects from five archives in five different countries agreed to participate. Three of the archives each provided two subjects. Three subjects came from one archive where the tasks are divided between different teams. At another archive only one subject was interviewed because of language barriers. Some of the managers engaged in the daily tasks and others did not. There was also a large range of experience among the participants with some having up to 30 years of experience and others less than five years.

7.3 Research Setting

There is a lot of variation among television archives in the way they organise their work, the terminology they use, and the processes and practices that are implemented. However there is also a large degree of similarity regarding the standard types of television content as illustrated in Table 1. While all of these content types are relevant to news production, they have different qualities which affect how they are used. Programmes are valuable as a representation of a moment in history and provide an example of broadcasting styles and

standards. They are often archived outside the news library and catalogued as an entity with very little, if any content detail. Programmes are usually accessed by searching the catalogued records of the component parts of a news programme which are fully catalogued. Component parts are archived “clean” meaning the different audio tracks can be used separately or together as required. They are also archived without graphic labels such as running news headlines or tickers at the bottom of the screen. This clean version is much more reusable because the natural sound of the pictures can be used without the reporter’s voice. However, because news items are often under two minutes in duration and specific sequences or shots may only be 20 seconds long so it can take a number of news items to fulfil a request for a variety of shots on a certain topic.

Table 1: Description of audio-visual content types in news libraries

	Programmes	News Items	Stock Footage	Raw footage
Description	Entire news bulletin recorded as it goes to air	Single news story or pre-edited component of news bulletin	Footage that is selected from raw footage and edited into re-usable sequences	Field footage that is filmed for a particular news story, may be filmed on tape or in a digital format
Cataloguing Style	Very briefly or not at all	Detailed, includes description of pictures and context	Detailed description of pictures and context if relevant	Usually not catalogued. May be kept in its entirety if related to major historic event.
Uses	Provides a historical record and example of production styles and techniques Not suitable for generic re-use	Can be re-used in relation to original story or in other contexts but because of short duration can be limited	Very versatile, can be used in a range of genres. Provides longer duration shots and more variety than in news stories.	Long form documentary programmes,

The most versatile and reusable content is stock footage which consists of sequences edited directly from the raw footage. Because longer shots are selected, stock footage provides more choice and can be used in a variety of contexts. Stock footage is generally fully catalogued

and held within the news library for quick access by news users. News programmes and news stories may be selected according to explicit collection policies which are determined by representatives from various user groups and in conjunction with national requirements however, the acquisition of stock footage is a much more fluid process and requires a good understanding of user requirements, collection gaps, ethical implications and provenance factors.

All the five archives that participated in this research handle news material and provide a research service for news users but only three have a dedicated news library. All archivists at only one archive engage in all of the main three topic areas. At another archive the news library is responsible for selecting and cataloguing stock footage and providing research but the cataloguing of the news items is handled by the wider archive outside of the news library. The third organisation with a dedicated news library divides the work between different teams: selection, cataloguing and research. Archivists from various archives expressed concern about the impact of splitting tasks among different departments or teams because of a loss of complementary knowledge. For example familiarity with cataloguing conventions and news content informs search strategies and vice-versa.

8 Analysis

8.1 Coding Themes

The transcribed interviews were initially coded to identify the four main topics: selection and appraisal, cataloguing, search and retrieval, and role transformation. Further coding was used to identify general themes across the topics, see Table 2.

Table 2: Coding themes

Themes	Topics: Selection & Appraisal, Cataloguing, Search & Retrieval, Role Change
Processes	Captures day to day processes, tasks and responsibilities Differentiates between manual and automated tasks
Media Management	New tasks, responsibilities and processes that were not present in an analogue setting
Archiving	Related to big picture issues including access, storage and preservation
Problems	Incidents and issues that disrupt the archival processes
Benefits	Improvements that have resulted from the digital system
Staff •Expertise •Roles •Training	Enables comparison between archives, identifies changes in role parameters responsibilities
Users •User Education •User Searching	Highlights user involvement with archival processes
Future	Expected growth and developments
Reflection on Past	Comparison between digital and analogue processes, description of transition process
Resources	References to resources and funding

9 Results: Selection and Appraisal

9.1 Selection and Appraisal: News Programmes and Items

At all of the organisations that participated in the research, off-air or broadcast news programmes are archived in their entirety. In two of the three archives that have a dedicated news library this is handled by a wider archive department. Little appraisal is required because in most organisations it is policy to archive these programmes as a matter of course. For one manager, knowing that these are kept means his team can focus on the production

needs of news: “the archivist in me is sort of relaxed by the fact that that every day we have at least four or five hours of news output kept for posterity on a proper managed broadcast quality format”.

The component parts or news stories are also generally archived in full which means little appraisal is required. The introduction of 24 hour news, which has been facilitated through digital production, has increased the work-load but not significantly. Because these programmes are very repetitive with little unique material they are generally not kept and only unique news stories are selected. For one archive this amounts to four to six news stories per day. One manager commented on the lack of funding associated with the extra demands of having a dedicated news channel:

With the 24 hour news channel, by its very size, we don't archive much of that because the channel was created out of savings so there was never any budget for archiving which is a slightly contentious issue, so we just sort cherry pick material for the news library.

Despite the selection of transmitted content being relatively straight forward, it remains a manual process requiring archivists to look through a list of items and indicate which items need to be archived: “At this point we're just going through everything basically line by line”.

9.2 Selection and Appraisal: Stock Footage

The news librarians all consider that the principle purpose of their role is to meet production needs, primarily for the news department, while the historical or cultural considerations come second as indicated by the following statements:

In the news library our brief is to collect material that is firstly generated by news but also what news can reuse in its subsequent bulletins but we're also considering what has value for all the other programming...outside of the news area.

The most important thing is what reuse value it has. We also consider things like copyright, if we have the right to keep it and reuse it, is it of national or international significance? Is it significant to the company as an organization? So we definitely have those historical considerations but the major consideration is how useful will it be for reuse in the future.

We establish ownership right away. And then there is a descending list of things that make it more or less worthy to be part of the permanent collection. Does it have reuse value? Is it part of the patrimony? What is the historical significance?

These criteria are particularly important to the selection of stock footage which is a much more labour intensive and specialised task. It involves viewing everything from the previous day or, at one archive which is staffed 24 hours a day, the previous 12 hours. For all three news libraries the introduction of a digital system has significantly improved this process. At one archive selection decisions were previously made only by the manager, now all library staff undertake this aspect of the role. One archivist believes they now keep a much higher standard of footage because of the non-linear nature of centralised access which increases flexibility:

It's a far easier process to chop something out of a digital file.... you might take a couple of minutes on the end of something and just keep that part, whereas before we might have thought that's a bit difficult and not bother.

Another expresses a similar view: "It means you can get the absolute cream of what has been shot by a huge number of cameramen".

Digital production has also had an impact on the amount of material available for stock footage. However, while there were no major problems related to the increase in volume the lack of descriptive information and misuse of naming conventions is an issue which four archivists referred to with one describing the task of identifying footage on the server as "nightmarish". For most this was an on-going irritation rather than a significant problem and the advantages of viewing and editing digital content as described above outweigh this

annoyance. Also, archivists no longer have to wait for tapes to be submitted to the library before they can begin to assess the footage.

9.3 Selection and Appraisal: Media Management

At two of the news libraries, once stock footage has been edited and catalogued it is added to the permanent collection. A third archive is unique in that it does not add stock footage to the permanent collection. Instead, all stock footage is stored on an on-line server and is regularly reviewed and updated or deleted every six to twelve months: “the online stock shots are constantly under review and the idea is that we want to keep the best and most current and best use and fresh material available on-line”. In this situation the archivist has become a media manager who is primarily concerned with the production needs of the news department. The long-term historical and cultural value of the footage is in this case not a significant factor of the selection criteria. Moreover the selection process which takes place within 12 hours of footage being ingested onto the server is almost parallel to the production process.

The archivists or media managers also ensure that raw material that has not gone to air is retained on the server and follow up library recommendations from reporters although that does not necessarily mean the footage will be kept: “occasionally you'll get producers recommending some pictures be kept because they think they're of archival value....but ultimately it is our call to make that decision”. All staff perform these media management tasks as part of their regular rostered duties. In this archive the audiovisual archivist's role has been redefined in terms of media management which is incorporated into all aspects of the role: selection, cataloguing and research.

A second archive has taken on a media management dimension by adding a dedicated media manager position which is situated in the newsroom. These media managers manage content on the server by overseeing the retention and deletion process. They also organize footage on the server so it is easily accessible: “we'll basically take all the content that's associated with [a particular story] that's coming into the server... we make it a one stop shop for the newsroom”. Unlike the example above, these media managers do not catalogue or make selection decisions. Their focus is on maintaining the on-line server content and providing support for users. This entails helping users locate material on the server, processing requests for material to be held past the deletion date, restoring material that users have located in the deep archive through their own search, and basic non-technical trouble shooting. They have minimal involvement in the selection process and generally do not undertake cataloguing or research outside of the digital system. These core tasks are handled by teams who are located outside of the newsroom. However this archive did trial having research staff in the newsroom but concluded there was no benefit because only ten per cent of the requests were face to face.

The above two archives demonstrate clear and unambiguous changes to the archivist's role to accommodate new responsibilities but for staff at a third archive the media management role is formally associated with the editing department and not the archive however, the library has ended up taking on some of the media management tasks:

a lot of what we do now was meant to be done by the media managers and we just found they were not doing it properly... they're senior editors and they're now basically performing information management roles...a lot of things were disappearing [from the server] that shouldn't have and naming conventions weren't being adhered to so we do do a lot of correcting of titles.

All users in the news area have the ability to put a “hold” on material that needs to be

retained on the server past a default deletion date. This involves ticking a box and adding some notes but according to one archivist there is a lack of clarity around this process with some journalists doing it themselves and others expecting library staff to do it which has led to problems associated with removing material from hold:

the journalists either don't think to remove the hold when they're finished with it or depend on library staff to do it for them...it's an issue of a lack of understanding more broadly how the system works, the journalists are only interested in what they have to do for their immediate needs and what they need to do to get their story to air, they're just not aware of the bigger picture and the system and how it operates.

The two archives that do not have a dedicated news library have a much less pronounced role in the selection and appraisal process. At one archive most of the content is generated by external production companies. It is therefore the producer's responsibility to supply the archive with a set of specified deliverables which includes all original footage, programme masters, animations, graphics, music, third party material. The objective of the selection policy, which has been developed by archivists in conjunction with programme producers over many years, is to capture material for both re-use and preservation purposes. This well-defined set of deliverables functions as a check list for producers who do not have an archival perspective. For this archive, the most pressing problem is getting production companies to provide material in a compatible file format with the manager describing the current state of flux regarding file formats as the "wild west". They are now working to incorporate incentives and penalties into the list of deliverables to compel production companies to meet the format requirements.

The fifth archive does not receive the raw footage as a matter of course and thus does not generate stock footage. Only broadcast programmes and the component stories are archived, making selection and appraisal a very straightforward process. The archive will only take raw footage if a user requests it be held and supplies the required metadata as stipulated by the

archive however this rarely happens because as indicated above journalists' workflows revolve around their story deadlines: "once they have finished one story they have already moved onto the next one".

9.4 Selection and Appraisal: Research Questions

RQ1a: Do digital media management systems affect when the selection process takes place?

The availability of content in the digital work flow has improved the selection process because the archivist is able to assess footage earlier in the life cycle and is not reliant on users submitting tapes to the library.

RQ1b: Does selection criteria change when media management systems are used

The selection criteria at these five archives have not changed significantly since the introduction of digital production and archival processes. The increase in content which has accompanied digital production has been balanced by improved access and editing tools.

RQ4b: Do archivists take on media management tasks when working with media asset management systems?

The major change in the selection and appraisal process is in relation to media management.

The three archives that have a dedicated news library have all taken on some media management tasks but in different ways and to varying degrees. According to Lewis & Plester (2004) "media management requires the skills of classification and indexing, in addition to a bigger picture awareness of wider [organization] and industry standards" (p.36).

This view is shared by one of the media managers who has a degree in Information Studies.

Even though his university course work was not directly related to what he is doing now, he believes it provided him with an understanding of the relevant concepts: "I don't think I'd

have fit into the job very well if I had not done that”. Moreover the experiences of the news library that initially had minimal involvement with media management and have since taken ownership of some of these tasks indicates a natural fit between media management and the library.

10 Results: Cataloguing

10.1 Cataloguing: Organization of Cataloguing

As with selection, the three archives that have a strong news focus provided the most data about cataloguing. There was a large degree of variation among the five archives in terms of how the cataloguing of news material is organised. At one news library all staff are rostered across all shifts; they select and catalogue both news items and stock footage and do research requests. Another archive has a dedicated cataloguing team who only catalogue. They are responsible for all cataloguing including programmes, news stories and stock footage, but most of their time is devoted to news because of its high re-use value and the detailed nature of the catalogue records. One news library only catalogues stock footage while all other content including the news stories is catalogued by a wider archival department which was not included in this research. One archive provides production teams with catalogue templates which they are responsible for completing. Archive staff then check these, make any necessary corrections, and enter it into the digital system. And one archive does not acquire any stock footage so only catalogue the news stories.

10.2 Cataloguing: Cataloguing Tools and Authority Control

There was also significant variation in relation to the cataloguing tools used. One archive continues to catalogue new material using its legacy or original catalogue. This is primarily

because of a lack of authority and quality control tools in the digital system which has a limited number of fields and no thesauri or spell check tools. Archivists attributed this weakness to the fact that the digital system “is really a production system not a library database, we did adapt it so we could search it and enter certain critical pieces of metadata but it’s not a full library catalogue...it’s very limited”. As a result, the library has had to have a high degree of tolerance regarding spelling mistakes, keyboarding errors and invalidated subject headings. All librarians who were interviewed from this archive regard the legacy catalogue as being superior to the database that is included in the digital system: “it’s the database of record because it’s the one we trust most”. However, because most users rely primarily on the digital system when searching content from the previous five years, catalogue records which are created in the original catalogue are copied and pasted into the digital system every day. This extra step has been problematic adding approximately two hours per day to the cataloguing workload. The library is on the verge of implementing a tool which will copy records to both databases in the required format simplifying the process.

The security of the metadata is also a problem with users being able to add, change or delete it. This flexibility may be useful during the production process but once assets are considered archival this lack of security can reduce the integrity of the record:

There’s nothing that stops a user from putting in whatever information they wanted on any submitted metadata, we sort of rely on the fact that very few people do use most of the fields, there are a lot of special fields that were created specifically for the library and they’re not locked down”

Ironically user generated metadata, such as shot-logs that are added during the production process are not retained in the library clip and not utilised in the cataloguing process.

Although this information may not be in a form that complies with library standards it could still be advantageous in the cataloguing process and may address some of the problems

associated with trying to identify footage such as misuse of naming conventions as described in relation to the selection and appraisal process.

The frustrations of a second archive mirror the above example. News librarians at this archive catalogue stock footage directly into the digital system despite the loss of authority control files. As with the above example these archivists attribute these problems to the fact that they are using a system that has not been designed for an archival capacity:

We've developed standards, I wrote the metadata manual myself but there are no authority files that it refers to... so someone could make up their own subject headings, or they could put the wrong date or spell something wrong, there is nothing to tell them. I go through and correct it myself to make sure it complies with our standards but I'm human like everyone else, there are so many limitations to this news production system, it isn't ideal

As with the above example, all users have access to the descriptive metadata and can alter or delete it: "all the metadata can be deleted at any moment, because the production system is not an archive and that is a great problem for us". At this archive news items continue to be catalogued onto the legacy catalogue by an external department. Only the stock footage is catalogued using the digital system.

A third archive has avoided these problems by continuing to catalogue using their original system which has been incorporated into the digital system; they use all their existing cataloguing conventions but with the added benefits of access to a low resolution viewing or browse copy of the clip and keyframes which are still thumbnail images taken from different points within the clip. Because the cataloguing system and database is shared between a number of production centres, some of whom do not have access to the digital system, many users rely heavily on detailed textual descriptions to locate images. Yet it is acknowledged that even when images are included within catalogue records, text remains the key access

point. Another advantage of having a fully integrated system is the ability to search the whole collection, analogue and digital, through one interface. In this case the traditional method of cataloguing is combined with the features of the digital system, such as the inclusion of keyframes, to enhance usability: “this allows us to be much more accurate in telling the users what are the relevant sections”. However, they are currently having problems because the system is generating too many keyframes which is slowing down the system.

10.3 Cataloguing: Keyframes

While keyframes are seen as being beneficial to both the cataloguing and searching process, the advantages are limited if the archivist does not have the ability to manipulate them. At the one archive that has moved completely to the digital system and now uses it to catalogue all new content, both news stories and stock footage, keyframes are automatically generated by the system but the cataloguer can override these and add their own keyframes which reduces some of the common problems associated with automatically generated keyframes:

For example if you've got a sequence from a press conference and there are lots of people there taking flash photography [the system] will look at the flash photography and think it's a change of sequence every time there's a burst of light so you get 100s of keyframes within one sequence

The first step of the cataloguing process at this archive is to go through, delete the automatically generated keyframes and position new keyframes at notable action changes, interviews, and reporter appearances. This creates a storyboard of the clip. Brief textual descriptions are then added to the keyframes. The inclusion of keyframes has reduced the length of the textual descriptions yet the use of text remains essential in order for the content to be searchable.

If you specifically want a walking shot and you haven't used the term ‘walking’ somewhere, it won't be returned in a search so I think we discovered that you can't go

completely minimal but certainly you can reduce it and with keyframe annotation you can be a lot more precise if you like, and you don't need to keep repeating the shot-list.

The keyframes and corresponding text refer to and describe the “of-ness” aspect or what the pictures depict. A separate description field contains information that provides context and background information related the particular news story or “about-ness”. The keyframes enable searchers to isolate and access distinct sequences without having to scroll through an entire item because “most of the time people aren't looking for something necessarily in the context of the story”. This demonstrates the non-linear qualities of digital media management. In an analogue format someone would have to play the tape until they reached the suitable shots, in the digital environment very specific shots can be accessed directly.

At another archive the keyframes are also system generated but the archivists do not have the ability to override them. In addition the archivists cannot add any textual metadata to the keyframes further limiting their usefulness. One archivist commented that the keyframes can also be misleading:

Often you'll look down at the keyframes and think oh that shot that I was looking for isn't there, and then when you open it up and scroll through it, the shot is there, it just didn't have a keyframe, even if it was at the beginning of a shot.

Cataloguers at this archive enter much less detail than they did when using the legacy catalogue and one librarian thought this had increased cataloguing efficiency: “it was harder to get used to because we used to catalogue in so much detail but it is easier and more efficient, we get through it a lot faster”.

10.4 Cataloguing: Authority Control

This same librarian expressed concern with the loss of authority control tools and its impact on the wider organization which has multiple centres. Because each centre can potentially adopt its own conventions, consistency over the entire network is compromised. She predicts that once all the centres are networked the subject headings are going to be “all over the place”. This is not a problem when using the legacy catalogue because it includes a subject thesaurus and is networked throughout all centres. One archive has imported a person index and keyword index into the digital system but in general fields in which data entry is regulated are related to: content type, the programme, the centre where it was produced, and the date. The lack of subject headings was not perceived to be a major a problem by one archivist but he did wonder how it would impact searching in the future when the database becomes much larger. For the other two news libraries the lack of authority control is one of their main concerns with the digital system.

The archive that has incorporated their existing catalogue into the digital system has never used controlled vocabularies: “we decided that the amount of input of an index would be too much and we have had no problems so far. The fact that we haven't got a thesaurus or lists hasn't had any negative effects”. Whether or not this has been a factor in their ability to integrate their existing cataloguing practices into the digital system has not been investigated here. They do use cataloguing conventions that have been developed across all the centres where the database is used and feel there is high level of consistency in the cataloguing throughout all centres.

At the archive where catalogue records are supplied by programme producers subject headings are not included but when legacy material is digitised subject headings are added. As a result the quality of the catalogue records for digitised legacy content is sometimes

better than the catalogue records for new digital content.

Only one archivist made any reference to automatic annotation tools designed to reduce the reliance on human cataloguers:

New technology can help us but new technology also costs money and a lot of it. I'm talking about video mining or automatic cataloguing...we are open to it, but at this moment this new technology will probably not be available as quickly as we would like to have it

While there is a lot of research into this area, the practical application of it is not immanent. Moreover given the limitations of the current tools such as problems with keyframes, and the challenges of incorporating authority control into existing digital systems it may be difficult for archivists to envisage how these tools could fulfil all of their requirements, especially within a news environment.

10.5 Cataloguing: Research Questions

RQ2a: How does the cataloguing process change when media management systems are used for cataloguing?

The use of new cataloguing tools such as keyframing and a reduction of textual description has changed the cataloguing process at four of the five archives. For one archive the cataloguing process has become more laborious because of the need to catalogue new records into the legacy catalogue in order to ensure the records for digital content comply with the same standard as analogue holdings. They are then copied into the digital system to provide easy access. Some archivists report an improvement in efficiency and keyframes are useful to varying degrees.

RQ2b: What impact do digital media management systems have on the quality of catalogue records?

There were major concerns with authority control at two archives while a third archive

expressed minor concern with the long term implication of not using controlled subject headings. Given the range of experiences with authority control it is difficult to draw a conclusion regarding its usefulness from this small sample. The archives that use it are passionate about it while others do not view it as an important concern. Clearly more research into the archive requirements regarding authority control is required.

11 Results: Search and Retrieval

11.1 Search and Retrieval: Legacy Catalogue versus Digital Database

Despite using terms such as “dinosaur”, “clunky” and “old” to describe the legacy catalogues, most of the participants consider their legacy catalogues to have better search functionality than the digital systems, especially for complex searches. Legacy catalogues were perceived to be more flexible and provide better search precision compared with the digital system, even though the ability to use legacy catalogues effectively is reliant on a good knowledge of the specific search commands and terminology:

the [legacy catalogue] can be more fiddly but more accurate...you can be very precise, you can say I want to look for this word within so many words of this word and that sort of thing, and once you get the hang of it then you tend to find stuff very quickly and you find it straight away, [the digital system] is a lot more intuitive to the Google generation.

One archivist favours the legacy catalogue for large complex searches because it does not limit the search result as the digital catalogue does. This can be an important factor when doing comprehensive searches on subjects that have been extensively covered. She provided the example of locating images of a prominent personality for an obituary news item. In order to get an overview of his whole life it was necessary to be able to do a comprehensive search that included all references in the search result. Because the digital system limits the search

this was only possible by conducting multiple searches. Another archivist prefers using the legacy catalogue for in-depth searches because of the ability to page through textual shot-lists providing a quick overview of the material. He finds the same process can be much more time-consuming using the digital system because each clip has to be loaded individually in order to see the full record. As an experienced archivist of many years he added that this could be dependent on the level of expertise in using the legacy catalogue. In contrast an archivist with five years of experience finds the opposite: “sometimes the detail [in the legacy catalogue] can be a problem because it can certainly slow you down, you get so many false hits...actually physically tabbing through all those shot-lists can be really time-consuming and laborious”.

11.2 Search and Retrieval: User Searching

At all five of the archives, it was acknowledged that users are expected to search for some material themselves rather than always relying on archive staff to find material for them: “in theory the whole point of [the digital system] was that [reporters] start doing their own research and that’s ultimately the long term goal”. Archivists are generally supportive of users doing their own searches and see this as a key aspect of their role:

We're always trying to encourage people to use it themselves and we help people if they are unsure how to search properly...we will help them if they phone up and we are trying to encourage people to do their own research.

The degree to which this actually happens is variable and certainly much less than predicted by one Spanish archivist who estimated that the proportion of requests handled by archive staff in a digital environment would reduce to 10 per cent of all requests (Vázquez, 2006).

One archivist said that initially there was a concern that the ready availability of media would reduce the need for librarians but so far that has not been the case. She attributes this to the

fact that only a small portion of the total holdings are available on the digital system.

In addition to finding their own library material many reporters are now expected to take on some of the editing tasks which in combination with redundancies has significantly increased the reporters' workload: "[reporters] were also expected to do some searching but that hasn't really materialised...they can do some very basic researching but they still rely on us for in-depth stuff". The fact that reporters can do their own searching does not necessarily mean they will do it well. One archivist remarked that the portrayal of reporters as being very self-sufficient is a "nirvana picture" and in fact one of the disadvantages of users finding their own material is that they tend to rely on pictures that they are either familiar with or are easy to find:

We're sometimes a bit frustrated and think hang on, there are better shots there, it's just that you're just going back to the same shots because either they'll come up first or because of the way you're conducting your search strategy.

As a way to combat this, these archivists are going to be relocated to the newsroom directly with their users. The objective is that the interaction between the archivists and users will be much more fluid and archivists will be able to intervene when inferior shots are being used. They will also be able to respond quickly to late breaking stories. This is already happening to a certain extent at another archive in the form of a separate media management role, however there, media managers do not do any selection, cataloguing and only search the digital system. The media management role is a separate and distinct role. In contrast, these archivists undertake all aspects of the role and have already incorporated media management tasks into the core functions which are performed by all staff. Moving these staff to the newsroom in teams of two or three further increases the link with the production process and contributes to the redefinition of the archivist as a media manager. Currently these archivists attend planning meetings and regularly check news diaries to pre-empt library requests: "in

some ways it's a fantastic day for us if we've had no requests at all because that means that we've got everything on the system before people even knew they wanted it". For another archive, staffing is too tight to even contemplate the ability to provide pro-active research.

Equally, archivists indicated a degree of irritation with users' lack of initiative with locating material that is readily available:

It's quite frustrating sometimes when people phone you up and ask you to search for something...that is really generic that you know there is bags of material on [the digital system] and you know in the time it's taken them to phone me they could have done the search themselves.

Non-expert searchers rely heavily on the names or titles of items when searching. These titles are usually determined by production staff and do not always provide an indication of what pictures an item contains. Moreover a news item can include a wide range of pictures. For one archivist one of the weaknesses of the digital system is that it enables users to access material without referring to the metadata which can lead to mistakes. She provided the example of an editor who assumed she had found pictures of Afghanistan because that was the name of the item: "she just typed in Afghanistan and said this will do, and I went back and looked at the shot-list and it was actually footage of Iraq not Afghanistan". These issues could be related to user training and users not being able to distinguish between searches that are straight forward and more complex searches that require assistance from the archivists.

While all of the archives are supportive of users doing their own searches there remains some apprehension around the impact on archive staff with one archive manager describing it as a "slightly political issue". Two other archivists indicated a slight apprehension about the impact that user searching may have on archive staff numbers but no statistics or anecdotal evidence were provided to indicate there had actually been a drop in the number of requests

since the introduction of the digital system. Moreover in at least three of the archives even when users do their own searching they must go through the archive to have material restored from off-line storage. Also, because only a small proportion of the total holdings are generally available on the digital system, users can only access a very small portion of the collection. One archive added that because of financial cutbacks staff numbers will reduce over the next ten years.

11.3 Search and Retrieval: User Training

Despite the expectation at all of the archives for users to search the digital system themselves only three of the five archives provide training for the digital database. For the most part user training is done in conjunction with the general newsroom training with one archivist commenting “I don’t know what level of training they get in the newsroom to be honest... but from our perspective it’s sporadic to say the least”. One archive which previously provided formal training for users to search a simplified user interface to the legacy catalogue said training is now done on an ad-hoc basis. Another archive provides training for both the analogue and digital databases but training is not mandatory. And one archive provides training for users who work hours when the library is not staffed but this archivist expressed some hesitation about training “I don’t want to train people and then I won’t have a job anymore, obviously we’ve got to make sure that everyone is self-sufficient but also we've got to make sure that people’s skills and real abilities are recognised and utilised”

11.4 Search and Retrieval: Access to Legacy Collections

Another common feature among all of the participating archives is the diversity of legacy collections which may be held on a range of tape formats, stored in different locations, and

catalogued on various databases, card catalogues, or not catalogued at all. Knowing how to navigate through these multiple systems is a key aspect of the archivist's role and one of the most challenging aspects of training new staff according to many of the interviewees. Yet, this is not exclusive to analogue formats. At one organisation a significant proportion of material from a particular tape format was digitised a number of years ago for preservation reasons. However this digital archive is not linked to the digital production system so "when we need to access that material from the digital archive we actually have to download it back onto tape, we then ingest the tape into our digital news production system which you can imagine how ridiculous that is". The current affairs department use a third system and have to copy digital content from the news system to tape before they can use it: "So interoperability is an issue and not something that we have here, there's a lot of double handling, so this myth that we were going to go tapeless is rubbish". Access is further complicated by the fact that most of the digitised legacy content is either not catalogued or catalogued with very limited detail. The archivist used the example of the sudden death of a prominent sports person to illustrate how this impacts use. Although the digital archive holds many of the actual games in which he was featured, these games are not catalogued and so in order for the librarians to meet the tight deadline of 24 hour news coverage, they had to rely on using fully catalogued news stories that included only brief segments of archival footage. With a longer deadline the library was able to do more extensive research, locate the relevant games and find longer sequences. While the importance of digitising content to ensure its long term preservation cannot not be overlooked, digitisation on its own without adequate cataloguing or metadata is not enough to improve access, and in fact may reduce access.

In many cases analogue material is held off site and access may rely on pre-arranged delivery times yet it is not until the librarian views it that they can judge if it is appropriate for the required use. This highlights not only the importance of expert searching ability but also the

need to have a good institutional knowledge especially in cases where catalogue detail is limited. However even relatively recent material can pose access problems as illustrated with the following example:

I searched [the digital system] for it, there was nothing, I went to [the legacy catalogue] and there was a cut story from 2001 but because it was 2001, the cut story was at [another location] which is going to take at least a couple of hours to get to me depending on what time of day it is....but we do have in the building all the [off-air programmes]...the problem is the [off-air recordings] aren't always clean, so yesterday it was an emergency, they needed this footage to go air within the next hour so...I got the [off-air recording] up from the basement and said you can have this now or you can wait a couple of hours for the clean recording. They were happy with the mixed sound as it happened.

The use of multiple databases also has an impact on users in other centres. At one archive stock footage records are only created on the digital system. But because the digital system is not yet networked these records are not searchable by users at other centres. In contrast the legacy catalogue which is still used to catalogue news stories can be searched by all users in all centres. As a stopgap measure details about related stock footage are sometimes added to a miscellaneous field in the catalogue records for news stories. But not all stock footage is related to a particular story and could remain invisible to users outside the centre where it was created. Moreover, the stopgap measure involves extra steps at both the cataloguing and the research stages.

11.5 Search and Retrieval: Research Questions

RQ3a: Do users conduct more of their own searching when they have access to digital media management systems?

While the availability of digital content has enabled users to access material directly it is not clear what impact this has on archive requests. The quality of user searching is a concern and in some organisations archivists are working or planning to work closer to users in order to address this. Users also rely on archive staff to restore digital material from a deep archive

even when they locate the material themselves. A large proportion of archival content is not available within the digital systems and users are generally reliant on archive staff to access this material. Accessing these holdings is also complicated by storage location and cataloguing detail.

RQ3b: Is there a change in how archivists perceive search recall and precision when digital media management systems are used for searching?

Many archivists feel their legacy catalogues are more robust and reliable than the databases within the digital systems but there were no significant problems related to searching and one archivist preferred searching the digital system. A number of archivists commented on the fact that the digital databases were still very small in comparison to the legacy catalogues so it was difficult to compare them.

RQ4a: How does the role of the archivist change in a digital setting?

Some archivists are working more closely with users, especially in archives where there has been a clear decision to take on more media management tasks but the essential role and tasks associated with appraisal, cataloguing and searching have not changed even though some of the tools have changed.

12 Discussion

The experiences of these archivists are greatly affected by the way in which the transition from analogue to digital processes has taken place. Archivists who have experienced significant problems, such as inability to catalogue using the digital system or a lack of security for metadata, blame these problems on the fact that the system is primarily a production system and not an archival system. Many of these problems are related to the need

for archivists to use work processes that enable access to both the analogue and digital content with one archivist describing the required workflows as “contortions”. At another archive the development of the digital system was initially based around the Information Technology department and it is only within the last few years that the archive criteria and perspective have become central. In contrast, the archive where the digital system was designed with archiving practices and requirements inherent in all aspects of the system, reported fewer problems as did the archive that has been able to continue adding digital content to its legacy catalogue. However all archives reported technical problems. Common problems are:

- Difficulty restoring material from the deep archive
- Network problems that slow down the system
- The system timing out or freezing
- Limited storage space (this is exacerbated when High Definition formats are introduced)
- Format problems which can make it difficult to access content from other centres
- Too many keyframes or still images being generated
- General technical instability

There is a high degree of tolerance regarding technical problems and in general archivists seem to take them for granted:

The problems that I was dealing with when I first started here are different from the problems that I deal with now so as we add new features and new tools it seems like the problems change but there's always a new set of problems as we bolt on the next piece of software that fixed the last problem or that allows us to do something new.

One archivist noted that it is becoming more difficult to determine the cause of problems. This is aggravated when IT staff who have a good understanding of the system leave the company. It then takes a long time for their replacements to acquire a comprehensive

understanding of all aspects of the system and its idiosyncrasies. In addition these people do not have time to deal with all the requests that are being made of them.

All participants highlighted improved and immediate access to content as the best aspect of using the digital system with one archivist saying “I don’t know how we used to do our jobs to be honest”. All archivists with experience in selecting and appraising content for stock footage indicated a significant improvement because of this with inconsistent use of naming conventions and incomplete metadata one of the disadvantages. However this is not something that is necessarily related to the digital system and can just as easily be a problem when handling tape content that is not labelled properly. An increase in the amount of content being generated was not indicated as being a problem. Cataloguing processes have changed and are now either done using the digital system or if done using the legacy catalogue and records are incorporated into the digital system in either automatically or through manual tasks. The standard and integrity of metadata in the digital system is one of the most problematic areas with archivists working in a variety ways to ensure high quality catalogue records are maintained. While the use of keyframes can be advantageous, most archivists agree that access relies on the ability to search textual keywords or descriptions. All archives continue to use their legacy catalogue for searching legacy content. The use of multiple systems has led to some fragmentation which can restrict access within and between centres. In general, interoperability is weak, with only one archive having successfully ensured streamlined access to both digital and analogue content by all users.

The redefinition of the role of audio-visual archivist to include media management tasks is most obvious in the selection process where in some cases archivists are organising content for immediate use as well as longer term archival perspective. Some archivists are also

working in different ways to support users with one archivist saying this is the best aspect of going to a digital system: “you feel like you’re part of the newsroom... like you’re actually part of the production process”. While archivists support user searching, it is rare for them to provide formal training. This could be an aspect of the role that could be further developed.

In the literature there is much emphasis on the user being more self-sufficient and making a greater contribution to the cataloguing process. While the former is happening to a limited extent there is no indication that users make a meaningful contribution to metadata and indeed even getting users to adhere to naming conventions and submit limited mandatory metadata is problematic. None of the archives had any experience with the use of tools that automatically generate descriptive metadata.

13 Conclusion

Three of the five archives that participated in this research are actively involved in planning for the introduction of larger media asset management systems which are hoped will link the disparate collections, databases and catalogues and resolve some of the interoperability problems. These systems which will be deployed throughout the entire organisation are expected to:

- Solve problems related to transferring content
- Enable digitisation of legacy collections
- Provide improved metadata standards
- Incorporate authority files within the metadata structure
- Provide one search interface for all content
- Be more user friendly and intuitive to use

This research has provided an overview of some of the issues that affect how audiovisual archivists use digital media management systems. Despite this research focussing on a small number of archives, a range of archiving practices and approaches have been identified indicating that audio-visual archivists respond to digital challenges in a variety of ways. The fundamental objectives of capturing, organising and preserving audio-visual content continue to be relevant however a closer association with production processes is contributing to changes in the role which now frequently includes media management aspects. While most of the archivists acknowledge that an important aspect of their job is to preserve historically and culturally important content, the increasing focus on production needs may lead to this aspect become less prominent. Further research is required into the needs of archivists and the development of tools that aid the cataloguing and searching process. The problems around authority and quality control are a major issue and if these are not addressed the accessibility of digital audio-visual content may be compromised.

Word Count: 17,292

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Appendix I: Academic Request for Broadcast News

Example of email request seeking archival news broadcasts for the purpose of academic research retrieved from the Association of Moving Image Archivists mailing list.

From: Association of Moving Image Archivists [mailto:AMIA-L@LSV.UKY.EDU] **On Behalf Of** Justin Gallagher

Sent: Tuesday, 6 March 2012 2:22 p.m.

To: AMIA-L@LSV.UKY.EDU

Subject: [AMIA-L] local tv news broadcast subject matter

Hello-

I am a researcher at Case Western Reserve University. I am interested in finding an archived source for local TV news broadcast stories, so that I can compare how the number of stories reported on various topics differed between different TV media markets. I spoke with someone at the Vanderbilt Television News Archive (which has archived TV news stories/topics for national news broadcasts only) who suggested that I try posting on this list serve.

Does anyone have a suggestion as to a source for archived local TV news stories (ideally a text searchable database)? The source would need to cover multiple years or multiple TV media markets (ideally both). But do so daily, so that I will have a consistent record on the topics of news segments on local TV news broadcasts.

I have explored 2 other specific sources:

(1) the UCLA News and Public Affairs (NAPA) collection, but this doesn't have the frequency of news stories in the database (i.e. doesn't contain each day's local news)

(2) local news film housed at the Miami-Dade public library, but there is no searchable database

Many thanks!

-Justin

Appendix II: Job advertisement for a Supervisor Metadata Services at CNN

Wed, 25 Jan 2012 10:47:45 -0500

Reply-To: Association of Moving Image Archivists <[log in to unmask]>
Sender: Association of Moving Image Archivists <[log in to unmask]>
From: "Kordt, Krista" <[log in to unmask]>
Subject: Position Available - CNN Archives
In-Reply-To: <[log in to unmask]>
Content-Type: multipart/alternative;

The CNN Archives has an immediate opening in Atlanta for a Metadata Supervisor.

Krista Kordt Hester

Director, Archive Asset Management

CNN Library

Qualifications: Bachelor's Degree required. Master's Degree in Library or Information Science preferred. 3-5 years video archive experience performing at a senior level. Supervisor or management experience preferred, demonstrable leadership skills a must. Experience in a moving image archive in a news or major broadcast environment and knowledge of media asset management systems. Knowledge of news and current events. Must have excellent communication skills and thrive in collaborative settings. The schedule will include weekend work and, on occasion, evening or overnight shifts, so flexibility is a must.

Duties: **The Supervisor, Metadata Services** is responsible for coordinating cataloging of content archived in the library's permanent collection. Content includes video fed into feeds/edit systems and raw

CNN field content. Working with the Asset Management team, the supervisor ensures video receives essential information to enable quick and accurate retrieval of images for CNN production, affiliates and other business purposes. Prioritizes assignments based on knowledge of news production needs and business-driven projects. Contributes to the development of best practices for cataloging and metadata documentation. Supervises a team of archivists, managing schedules and assignments and ensuring quality standards are being met on a daily basis. May provide some video research and participate on cross-departmental special projects involving additional cataloging efforts during special events. Other duties as necessary to support Archive services in times of breaking news or staff shortages.

Appendix III: Interview Schedule

Question	RQ	RO
What criteria do you use to decide what to hold in the archive?	1b	1
Describe the processes that you use to identify material that is to be archived.	1a	1,2,3
Do you catalogue all content that is selected for archiving?	1a,2a,	1,2,
How do you manage raw footage? Do you receive any digitally born raw footage e.g. footage filmed on memory cards rather than on tape or disk?	1a,1b	1,2,3
How has the use of the digital system affected your selection processes?	1a	1,3,4
Is cataloguing done using the digital system? If not what system is used to catalogue material?	2a	1,2,3,5
Do people outside of the archive contribute to the cataloguing process in any way? If so describe how.	2a,2b	2,4,6
How do you ensure accuracy, consistency and authority control in your catalogue records e.g. indexes, thesauri, drop down options, spell check etc.?	2a,2b	2,3,4,5
How has the introduction of the digital system affected your cataloguing processes?	2a	1,3,4,5
How has the introduction of the digital system affected the quality of your catalogue records?	2b	1,2,3
Are catalogue records from legacy collections incorporated into the digital system?	2a,2b	2,4
Before the introduction of the digital system could clients search and retrieve content themselves? Do clients search and retrieve material using the digital system?	3a,3b	1,2,6
Has the introduction of the digital system changed the type of requests that archivists receive?	3a	1,3,6
How has the digital system affected your ability to search effectively? Are archivists (and users) able to locate the required footage in the required time-frame?	3a,3b	1,2,3,6
How has the digital system affected retrieval times?	3b	1,3
How do you access legacy material?	3b	1,2,4
Have you encountered problems associated with the preservation of digital audiovisual content such as hardware or software malfunctions, format and encoding issues, the accidental deletion of archive content, storage space limitations? How do these problems compare with preservation problems associated with analogue content?	All	1,2,3
Do you have a thorough understanding of the technical aspects of preservation and storage of digital audio-visual content?	4a	2,1
Overall, what has been the best thing about the digital system?	All	3
Overall, what has been the most challenge aspect of the digital system?	All	3

Appendix IV: Participant Information Sheet (Manager)

PARTICIPANT INFORMATION SHEET (MANAGER)

Digital Archiving Practices in Audiovisual Archives: an exploration of the use of media asset management systems in broadcasting organisations.

Researcher: Kathleen Eagle

I am a student in the Masters of Information Studies programme at Victoria University of Wellington. As part of my degree I am undertaking a research project looking at how the change from analogue to digital technology is affecting the work processes of audiovisual archives in broadcasting organisations. This project complies with the University's Human Ethics Guidelines. I work at Television New Zealand as an audiovisual archivist.

The objective of the research is to explore the experiences of audiovisual archive managers and archivists who have worked with the transformation from an analogue to a digital operation in television archives and investigate how traditional archiving practices are adapted or changed in a digital setting. The research will focus on the use of media asset management (MAM) systems and aims to increase understanding of the weaknesses and strengths of these systems from an archiving perspective.

As an archive manager with experience in the transition from analogue to digital systems your contribution to this research can improve the understanding of the benefits and challenges associated with the use of MAM systems in television archives.

Your participation will involve:

- An interview by telephone of approximately one hour in duration
- The supply of sample documents that help to illustrate work flows and processes
- Permission to interview an audiovisual archivist in your organisation who has hands on experience with the day to day tasks and can provide information from a practical perspective.

Interview questions will focus on four main areas: Selection Processes; Cataloguing; Search & Retrieval; Preservation & Storage. All questions will seek to identify how the introduction of digital processes has affected the ability of the archive to organise, search, retrieve and store audiovisual material. The interviews will be recorded as electronic files and then transcribed for analysis. Should any participants feel the need to withdraw from the project prior to the final analysis of data they may do so without question at any time before 24 January 2012.

All data collected from this research will be stored securely and kept confidential. During the project, access will be restricted to me and my supervisor Alastair Smith. All data collected will be destroyed after two years. The resulting report will be submitted to the School of Information Management for marking and deposited in the Victoria University Library and may be made available in an electronic format via the VUW institutional repository to interested professionals and academics. Findings from this research may be used as a basis for conference papers or publication in scholarly journals.

If you have any questions or would like to receive further information about the project please contact me eaglekath@myvuw.ac.nz or my supervisor Alastair Smith Alastair.Smith@vuw.ac.nz.

Thank you for your participation in this research project.

Appendix V: Participant Information Sheet (Archivist)

PARTICIPANT INFORMATION SHEET (ARCHIVIST)

Digital Archiving Practices in Audiovisual Archives: an exploration of the use of media asset management systems in broadcasting organisations.

Researcher: Kathleen Eagle

I am a student in the Masters of Information Studies programme at Victoria University of Wellington. As part of my degree I am undertaking a research project looking at how the change from analogue to digital technology is affecting the work processes of audiovisual archives in broadcasting organisations. This project complies with the University's Human Ethics Guidelines. I work at Television New Zealand as an audiovisual archivist.

The objective of the research is to explore the experiences of audiovisual archive managers and archivists who have worked with the transformation from an analogue to a digital operation in television archives and investigate how traditional archiving practices are adapted or changed in a digital setting. The research will focus on the use of media asset management (MAM) systems and aims to increase understanding of the weaknesses and strengths of these systems from an archiving perspective.

Your manager has identified you as someone who has day to day experience working with a MAM system and who may be willing to share your experiences with me. As an archivist who has been involved in the transition from analogue to digital systems, your contribution to this research can improve the understanding of the benefits and challenges associated with the use of MAM systems in television archives. Your participation will involve an interview by telephone of approximately one hour in duration and the supply of sample documents that help to illustrate work flows and processes. Having been identified by your manager in no way compels you to participate in this research. Your participation is voluntary. Should you feel the need to withdraw from the project prior to the final analysis of data, you may do so without question at any time before 24 January 2012.

Interview Questions will focus on four main areas: Selection Processes; Cataloguing; Search & Retrieval; Preservation & Storage. All questions will seek to identify how the introduction of digital processes has affected the ability of the archive to organise, search, retrieve and store audiovisual material. The interview will be recorded as an electronic file and then transcribed for analysis.

All data collected from this research will be stored securely and kept confidential. During the project, access will be restricted to me and my supervisor Alastair Smith. All data collected will be destroyed after two years. The resulting report will be submitted to the School of Information Management for marking and deposited in the Victoria University Library and may be made available in an electronic format via the VUW institutional repository to interested professionals and academics. Findings from this research may be used as a basis for conference papers or publication in scholarly journals.

If you have any questions or would like to receive further information about the project please contact me eaglekath@myvuw.ac.nz or my supervisor Alastair Smith Alastair.Smith@vuw.ac.nz.

Thank you for your participation in this research project.

Appendix VI: Participant Consent Form

CONSENT TO PARTICIPATE IN RESEARCH PROJECT

Digital Archiving Practices in Audiovisual Archives: an exploration of the use of media asset management systems in broadcasting organisations.

I have been given and understood an explanation of this research project. I have had an opportunity to ask questions and have them answered to my satisfaction.

I understand that I may withdraw myself or any information that I have provided from this project at any time before 24 January 2012 without having to give reasons or without penalty of any sort.

I understand that any information I provide will be kept confidential to the researcher and the supervisor, the published results will not use my name or the name of my organisation and will not contain any information that could identify me or my organisation.

I understand that I have the right to check the transcript of my interview and to provide feedback at any time.

I understand that recordings and transcripts of the interviews will be destroyed two years after the completion of the project.

I understand that the results from this research may be used as a basis for conference papers or publication in scholarly journals. A copy of the final report will be available online in the Victoria University of Wellington institutional repository and may be supplied on request to academics and professionals in New Zealand and overseas.

Signed:

Name of Participant:

Date:

I would like to receive a summary of the research findings when completed. ☐