What's on the telly?
Delivery of offair television content to students via online video streaming at the University of Queensland

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Abstract
What's on the telly? Neighbours, NCIS, Top Gear? What to watch on television is a common question asked nightly across the country, by television viewers. Some of these viewers are academics at the University of Queensland, who are inspired to use television content to support student learning. This paper illustrates issues which the Multimedia Service of the University of Queensland Library has encountered in delivering offair content (recorded free-to-air and subscription television and radio broadcasts) to academics and students via online video streaming technology, in accordance with the Screenrights licence.
Introduction

Since 2005, the Multimedia Service at the University of Queensland Library has delivered offair television content via video streaming technologies to academics and students.

This paper will address the issues involved in the delivery of offair video streams, by discussing how technological advancements have altered Multimedia services, offair production processes and the technical knowledge required of Multimedia staff. Evidence of how these technological advancements are affecting academics and students at the University will also be presented.

Background

Before offair video streaming can be discussed in its current role of supporting scholarship at the University of Queensland, it is necessary to briefly discuss what is video streaming, what is offair content and also to outline the history of the multimedia collection and multimedia services provided by the Library.

What is video streaming?

According to Mollison (2010), video streaming is a continuous stream of video data sent via the Internet and displayed on a viewing device in real time.

What is offair content?

Offair content refers to video and audio recorded from Australian free-to-air and subscription television and radio broadcasts.

Multimedia Collection

As at November 2011, the University of Queensland Library holds over 38000 offair and commercial multimedia items, which it began collecting in 1973 (East 2006, p. 14). The majority of the collection is held in the Social Sciences and Humanities Library on the St Lucia campus. This collection contains approximately 24000 VHS tapes, 8000 DVDs, a handful of Blu-ray discs, and a plethora of other formats including 16mm films, LPs, audiocassettes and U-matic tapes. The library also holds a steadily growing collection of over 350 offair and University of Queensland produced online video streams.

Multimedia Service

Corporate memory recalls the Library Audio Visual Service was created in about 1975 to manage the new collection. The service was renamed in the mid-1990s as the Multimedia Service, and continues to provide support for teaching and research, by recording offair programs from television and radio sources, providing and maintaining viewing equipment, responding to the daily multimedia screening needs of academics and the purchasing of multimedia resources.
Offair collection development

Library collection development of multimedia has always been a challenge, and many decisions about its acquisition, format, content, accessibility and suitability for library readers is required. For educational institutions, there is also the availability of offair content that further influences multimedia collection development.

The Copyright Amendment Act 1989 introduced Part VA to the Copyright Act 1968. Part VA makes recording of offair content by educational institutions possible. The Copyright Amendment Act 1989 also established Screenrights, the statutory body appointed to administer Part VA, through the issuing of licences, collection of annual licensing fees and the distribution of royalties to copyright owners of programs kept by educational institutions. Part VA and in turn the Screenrights licence came into effect on 29 January 1990, and anything recorded off television and radio after this date, may be kept, edited, copied, converted, and communicated as required to support scholarship.

In 1991, members of the Queensland Audiovisual Subcommittee of the Australian Council of Libraries and Information Services were concerned with how the newly enacted Screenrights licence would influence decision making of offair collection development. Many of the offair issues detailed by Cribb (1991, p. 8) are still pertinent, for example:

- who records the programs for the institution?
- who decides which programs to keep?
- who pays for the recordings to be made?
- is it cheaper to purchase content commercially than to produce an offair version?

Any answers to these collection development questions would be the same today as they were in 1991 if not for subsequent amendments to copyright law and the development of video streaming technology.

In 2000, further amendments were made to the Copyright Act 1968 through the Copyright Amendment (Digital Agenda) Act 2000, which affected the communication of offair recordings. The amended legislation now allowed the “communication” of offair content online (Screenrights 2007), but limits access through username and password protected networks to staff and students of the institution recording the content (Australian Copyright Council 2009).

At the same time Internet-based video streaming technologies such as Macromedia Flash and Windows media video player were rapidly being developed (Gay 2011; Microsoft Corporation 2011).

For educational institutions producing offair content, the legislative amendments and development of video streaming technologies unleashed the potential of offair content for use in teaching and learning. Collection development criteria were also affected by these changes, especially the debate around the recording of offair content versus the acquisition of commercial video products.
It can be cheaper to purchase a commercial video title than to record and process the same title as an offair item. However, copyright restrictions on commercial titles hamper any possibility of editing, copying or making this content available online as a video stream. In contrast, an offair recording, once obtained, may be copied, edited and communicated online as much as required, thereby making offair recordings infinitely more valuable and useable in the modern educational environment.

**Copyright and pre-Screenrights offair content**

As promising as recent copyright amendments have been for offair recordings, there are still lingering copyright issues for older offair recordings of which the University of Queensland has a large exposure. The Australian Copyright Council (2009, p.2) has stated that offair programs recorded prior to the start of the Screenrights scheme, 29 January 1990, from either radio or television are now technically infringing copies, and are not covered by the Screenrights scheme. Pre-Screenrights copies may be kept in the library, lent and played in class, but are not allowed to be copied or format shifted. The Australian Copyright Council (2009, p.2) explains that in some cases, a pre-Screenrights offair may be copied or format shifted in reliance on Section 200AB of the Copyright Act 1968.

Section 200AB introduced in the Copyright Amendment Act 2006, provides a measure of flexibility for educational institutions to attempt to save pre-Screenrights offair recordings and other in copyright material no longer commercially available.

The University of Queensland Library has used this provision on several occasions to convert these types of material to new digital formats for the purposes of teaching. However, the application of 200AB on offair and commercial recordings is on a case-by-case basis and for it to be successful, it must meet strict criteria. These criteria essentially attempt to protect a copyright owners’ right to future earnings from their content. The complex issues involved in the application of 200AB necessitate that final approval for its use is the decision of the appointed copyright lawyer for the University. As a result, it is unlikely that all of the many thousands of pre-Screenrights VHS offairs held by the University will be preserved for the future.

Library applications to apply section 200AB to multimedia material have not always been successful. One particular instance involved the highly influential 1987 program called “The Moonlight State” from the Australian Broadcasting Corporation’s (ABC) news program “4 Corners”. The program exposed high levels of corruption in the Queensland police force and contributed to the establishment of the Fitzgerald anti-corruption enquiry. Since this program was broadcast, VHS copies of the pre-Screenrights offair recording have been heavily circulated for use in journalism and political sciences courses. When section 200AB became available it was in the Library’s interest to exploit its potential by converting the recording to DVD and streaming it online. However, the application was rejected because the copyright owner, the ABC, had begun to sell this program on DVD from its archives. This prevented the application of section 200AB, because to do so would infringe the copyright owners’ ability to gain financially from their own content. As a result, the Library now only holds this program as a commercial DVD product purchased from the ABC without the ability to stream online.
The availability of offair video content to library readers is only possible through the capturing of television broadcasts. The recording technology that makes this a reality has changed greatly in recent years.

**Offair recording**

**Capturing the analogue past**

The switching off of the analogue television signal marks the end of an era in Australian television history. Looking back at how offair content was captured during the analogue past highlights how far recent technological changes have taken us.

Initially, in the 1970-80s, offair television content at the University was captured using a combination of bulky but high quality U-matic recorders and first-generation VHS videocassette recorders (VCRs) with elaborate independent manually-controlled timers to schedule recordings.

In the early 1990s, the Multimedia Service retired its U-matic recorders and replaced them with more sophisticated VCRs, with better television recording features. From then until 2005, the Multimedia Service employed approximately 15-20 VCRs, which were manually programmed daily, to capture offair content. Content was recorded onto VHS tapes from every available free-to-air television channel, and also from Foxtel when it became available, to meet the increasing demand for television content by academics and collection development librarians.

Processing of VHS recordings was limited and involved only the straightforward copying of content from the master videotape to another VHS tape appropriate in length to the duration of the program. No branding of the finished video with the University logo was possible and removing commercials was only done in a very limited way, if at all, due to the time-consuming nature of the work and imprecise results from the VCR technology available in the library.

**The dawn of the digital television era**

In the mid-2000s, the University of Queensland Library moved to take advantage of IT developments and the rise of digital television, and shifted its offair operations into the digital era.

Digital television in Australia began broadcasting in 2001 (Digital Switchover Taskforce 2011). The Multimedia Service did not switch to a computer-based recording environment until late 2004. The switch to computer-based recording was a complicated process, and was brought to fruition by former Multimedia Librarian Michael Fagg and Network Engineer Daniel Callan, of the Library Technology Service.
Planning for computer-based recording

In the process of switching to computer-based recording, research was conducted by Fagg and Callan to ensure that the most efficient and cost effective setup was obtained. To inform the adoption of computer-based recording by the Multimedia Service, Fagg conducted a review on the limited available literature on the topic, and also consulted with IT professionals and read video enthusiasts’ forums on the Internet. These last two sources are still the main sources of information for informing the Multimedia Services technological development.

Study visit

In early 2004, a study visit to the Queensland University of Technology (QUT) revealed a similar approach by both institutions to bridge the analogue digital recording divide, with the use of stand-alone hard drive recorders as a means to record offair content.

Hard drive recorders, are a natural replacement to the VCR, and well suited to a home recording situation. However, these devices did not create the efficiencies and benefits that were hoped for in a replacement offair recording set-up. Typically these devices have limited hard drive storage capacity, require manual scheduling of recordings, early versions only recorded one television station at a time and require that content is burnt to DVD to get it off the device. The Multimedia Service use of this technology was and still is, in the recording of Foxtel offair content.

Through the research and study visit, it was determined that the future of offair recording lay in the power and flexibility of computers using TV-capture cards, set and forget scheduling/recording software, large expandable networked storage, and DVD authoring/editing software.

Therefore, towards the end of 2004 the Multimedia Service conducted a short trial of computer-based recording, with VCR recording running in parallel as a backup. The trial was successful and the Multimedia Service embraced the new technology.

Advantages of a computer-based recording system

Computer-based recording has many advantages over an analogue VCR setup or even a hybrid analogue/digital hard drive recorder. Some advantages include the ability to:

- automate recording processes
- record hundreds of hours of offair content on large capacity hard drives
- instantly view recorded programs
- instantly copy and process recordings without loss of quality
- supply hours of digital broadcast files to researchers on external hard drives
Recently, Callan (2010, pers. comm. 20 May) described the technical details of the offair computer-based recording infrastructure.

**IT infrastructure**

- six recording PCs (Dell Optiplex, Pentium 4, Dual core processors, Windows)
- recording PCs use Nebula digital video capture cards – PCI model
- separate antenna connection for each PC split from a single digital antenna
- antenna uses an RG12 coaxial cable from the roof and changes to an RG6 cable at the IT server room. The cable then connects to an 8-point splitter (f-type connections) that feed the digital television signal to all recording PCs
- no form of powered signal amplification is used

**Digital television recording process**

Callan continues with the following description of the recording process:

- each PC uses the DigiTV (Nebula) software to schedule and record content
  - approximately 400-500 hours recorded per week
  - content from all major free-to-air stations and other selected channels
  - recording is possible from standard and high definition sources
- recording software DigiTV separates the programs into individual mpeg files
  - files are automatically named using “Now & Next” information broadcast within the digital television signal
- recording PCs
  - save recordings locally on a SATA disk (250 gigabytes)
  - transfer previous day’s recordings from the local disk to designated channel folders (ABC1, ABC2, 9, 7 etc.) on the multi-terabyte storage area network

**Differences in offair operations**

Study visits to QUT (now computer-based) and consultation with other inter-state offair producing institutions continue periodically. This activity helps to inform internal reviews of the technical setup and processes employed by the Multimedia Service to ensure continued best practice measures. Any differences noted, in the technical setup or the processes used by other institutions for the recording and processing of offair content, typically come from variations in the hardware and software chosen. These variations only provide another equally valid way to record and process the nationally standardised digital television signal, and do not represent a missed technological opportunity.

Computer-based recording of offair content has led to the development of new techniques and processes that were not required in an analogue recording environment. The following is a brief explanation of the offair production processes employed by the Multimedia Service as at November 2011.
Offair processing

Requests

Requests are received from academics, researchers and librarians, usually generated from weekly emails sent by the Multimedia Service highlighting recently recorded television programs.

Demuxing

The requested program broadcast file is then demultiplexed (or demuxed), using open source software known as Project X (http://sourceforge.net/projects/project-x/). This process unpacks the broadcast mpeg transport stream container file into its elemental parts, video (.m2v), audio (.mp2) and closed captions (.srt). This process enables the file to be edited and converted to other file formats and burnt to physical media.

DVD authoring

Using commercial DVD authoring software by TMPGEnc, known locally as Tsunami, the elemental files are then edited to remove commercials, chaptered at 2 minute intervals, customised with a University of Queensland branded menu and joined together again or multiplexed into a .vob container file which is the core file structure of a DVD. The .vob file is then burnt onto blank DVD media.

Video streaming

The new DVD is then processed through Handbrake (http://handbrake.fr/) which creates a lower quality version suitable for streaming. Use of customised output presets allow for the quick setup of the video, audio, aspect ratio and progressive streaming quality settings of the resulting .mp4 container file with video content encoded using the h.264 codec. The .mp4 file is then uploaded to the Library media server where it obtains a URL.

End-processing

The new offair DVD is then catalogued with its broadcast information, a summary and cast and crew details. A label with the title and broadcast information is printed directly onto the DVD, and a jacket is printed with similar information plus Screenrights-required copyright text. The stream URL is then linked to the new DVD catalogue record. Through the linking, the content source of both the DVD and stream is easily identifiable as required by the Screenrights Licence.

This brief outline demonstrates that the processing of digital television broadcasts is more complex than processing analogue VCR recorded broadcasts. The following discussion delves further into this complexity by exploring the video streaming process.
Video streaming process

Background

Video streaming began as an extra Multimedia service in 2005 to support teaching and learning, and subsequently as a means to increase access to the wealth of off-air content in the Library collection.

To produce the first generation of video streams, the Multimedia Service employed DVD Zip 4.0 (commercial software) to create .wmv (windows media video) files. The Windows media video format and file type were appropriate initially in a user environment dominated by Windows-based computers.

However, by 2010 Internet and video technologies had advanced and diversified into a plethora of formats, container file types, and codecs. Codecs are used by programs like Handbrake to convert and encode video files from one format to another and media software players use them to interpret and play the many digital video formats available.

Out of this diverse field, two technologies became prominent: .mp4 container files and the h.264 codec. The following factors motivated the Multimedia Service’s shift from Windows media video to .mp4 h.264 encoded streaming files:

- .mp4 container files can be streamed
- .mp4 container files are widely favoured on the Internet
- .mp4 container files have greater interoperability across mobile devices
- .mp4 files can be played on a wide variety of software media players
- h.264 codec offers better quality video at lower file sizes (H264info.com 2010)
- changing operating systems market and the rise of mobile devices

To create the second-generation of .mp4 h.264 encoded video streams the Multimedia Service employs the open source software Handbrake.

Streaming - quality settings

The establishment of appropriate quality settings in Handbrake was crucial as they have a direct impact on stream processing and playback over an internet connection. The following points were considered when establishing quality settings:

- the greater the stream quality, the greater the file size
- the greater the stream quality, the longer it takes to encode to .mp4
- the greater the file size, the more server storage space required
- the greater the file size, the more the user has to download
- the greater the file size, the more bandwidth used, the greater the chance playback will fail

The Multimedia Service established the following stream quality settings: video bit rate - 600 kbps, audio bit rate - 128 kbps, which typically result in a 220-250 megabyte file size per hour of content. Programs over an hour in duration are divided into smaller parts to reduce file size, which assists stream playback.
Stream URL creation

Once an offair DVD has been encoded in Handbrake, the stream .mp4 file is uploaded to the Library media server where it obtains a unique URL required for cataloguing. To assist Multimedia staff in the upload and stream URL creation process, Callan developed an intranet interface known as “Stream Admin”.

Previously all streaming files were uploaded to the media server by Library IT, who also generated the stream URL. The implementation of the Stream Admin interface now gives Multimedia staff complete control over the stream creation process and enables them to:

- upload files to the media server
- create the stream URL, for example
- create a stream playlist
  o where stream titles, summaries and appropriate copyright text are displayed
  o where multiple streams can be linked together in a viewable series
- create preview images for the playlist
  o images used to improve visual appeal of playlists
- generate output of URL details
  o an email and .csv (comma separated value) text file containing URL and bibliographic details are automatically generated from the interface to assist cataloguing

Stream cataloguing

Since 2005, stream URLs and other associated playback requirement messages have been placed in the MARC 856 field of catalogue records, but the adoption in mid-2011 of the Electronic Resources Management (ERM) module in the Innopac Millennium system now make this unnecessary.

The ERM module is designed to help libraries co-ordinate their electronic resources. At the University of Queensland Library, the ERM module is used to upload data and create records that manage ebook and journal holdings in the catalogue, but now it is also being used to upload video stream URLs.

The ERM module is used initially to create a resource record to which other types of records are attached, such as holding check-ins, order and bibliographic records. The resource record stores information associated with the content of the check-in records, such as copyright, technical, and licence details. The information in the resource record is only stored once, and if it needs to be updated, any records linked to the resource record will automatically display the new information.

Stream URLs are added to the catalogue through the loading of the .csv files produced by the Stream Admin interface into the ERM module. During the loading process the ERM module, which can upload a single file or batch load multiple .csv files, creates check-in records to hold the stream URL and any other data about the stream such as episode number or title. Each check-in record is also linked to the
source DVD bibliographic record and also the offair ERM resource record. The final bibliographic record then displays the:

- fully catalogued DVD
- stream URL from associated check-in record
- technical playback requirement message pulled in from the resource record
- link to the resource record

If the resource record link is accessed, all other streams linked to it can be seen.

**Stream preview image**

The Stream Admin interface also produces a preview image from every .mp4 file attached to a stream playlist. The images appear in the playlist adding visual appeal.

Prior to the adoption of the ERM module, the graphic representation of video streams in the library catalogue was investigated. It was hoped that the first preview image in a playlist would appear in the library catalogue as a pseudo-YouTube looking video. The YouTube effect was achieved through development of intricate HTML code designed to position and overlay the preview image with a generic play icon. The code also linked the preview image to the stream URL. The Stream Admin interface was adapted to generate the code, which it altered whenever it created preview images for new streams. However, after testing the investigation revealed that the positioning elements in the HTML code would create maintenance issues requiring the manual correction of stream records if the appearance of the catalogue changed.

The adoption of the ERM module provided a simple solution to graphically representing streams in the catalogue. ERM created resource records have private and public note fields. A public note, seen on all linked records, can be used to display a single static image. A universal play icon was chosen as the most efficient means of achieving the goal of graphically representing video streams in the library catalogue. The icon replaces the previous stream text link labelled “View Program”.

**JW Player**

Viewing of streams and playlists is made possible through the use of JW Player, a popular open-source program for streaming video and audio. To improve access and interoperability of streams across diverse IT platforms it was decided in July 2010 to change the streaming video format and player away from Windows media to JW Player.

JW Player is built on Adobe Flash technology, and supports any file format currently allowed by Adobe Flash Player and HTML5-compliant browsers and it also supports XML playlists (LongTail Video 2011). The two main reasons for choosing JW Player were its support of .mp4 h.264 encoded files and its XML playlist functionality, which the Stream Admin interface now exploits.
As at November 2011, Multimedia Service produced streams are not viewable on Apple mobile devices. The reason for this issue stems from the fact that Apple mobile devices do not support Flash technology upon which JW Player is built. A solution to this issue is under investigation. The solution will most likely rely on additional java scripting code embedded into the video stream web page. In theory, this code will detect Apple mobile devices and force the device’s own Internet browser, via non-Flash-based HTML5 video code, to become the default video player, thereby overcoming the issue.

Summary of technological changes

Advancement of technologies involved in television recording, video processing/editing, streaming and cataloguing have profoundly changed the technical operations of the Multimedia Service and can be summarised as follows:

The use of computer-based recording has allowed Multimedia staff to:

- record and store more content from the growing number of digital television stations
- see instantly what programs have been recorded
- easily set and schedule block recording times once only, on recording PCs
- easily create research offair video collections for academics and researchers

The use of video editing and streaming software has allowed Multimedia staff to:

- have complete control over the presentation of resulting DVDs and streams
- process television programs efficiently to DVD and stream formats

The use of the Stream Admin interface has allowed Multimedia staff to:

- manage the entire stream creation process
- upload the stream file to the media server and generate a URL without delay
- speed up cataloguing and access to streams

The use of the ERM module to manage stream data has allowed Multimedia staff to:

- efficiently upload single or multiple streams via .csv files
- easily maintain resource records with copyright and playback requirements
- manage retrospective stream URL updates with minimal work

Library readers benefit from these technological advances because they can now:

- ask for almost any amount and type of broadcast programming for research
- have digital recordings supplied on memory stick or external hard drive
- have streams quickly and efficiently produced for courses
- have access to streaming video content 24/7
- view streams on a wide variety of flash enabled IT devices
Advancements in video hardware and software technology also come with an implicit demand for Multimedia staff to advance their own technical knowledge and skills.

Staff Knowledge

The rise of the Internet and video technologies has seen fantastic growth in the delivery of video content through sources such as YouTube. However, the technical knowledge and skills required to provide this content and make it available online are challenging and constantly changing. Though traditional library knowledge and skills are of great assistance to Multimedia staff, they are not necessarily sufficient to support the technical delivery of an off-air service.

Multimedia staff knowledge issues

Library staff who come to work in the Multimedia Service are usually experienced in library circulation and course material preparation, and have a firm knowledge base relating to issues in these areas.

However, when they receive orientation in the services, procedures and knowledge required in the Multimedia Service, they typically face a steep learning curve. Experience has shown that knowledge difficulties arise in areas where there is:

- limited exposure to other traditional library skills that are useful for Multimedia work, such as acquisitions, cataloguing and document delivery, which is due to centralisation and demarcation of workplace services and duties
- limited knowledge of copyright and the requirements, features and limitations of the Screenrights licence that underpins the actions of the Service.

However, the learning curve is at its steepest when there is a lack of awareness that television recording technologies have moved on since the age of the VCR. In most instances, training and on-the-job experience can resolve these issues. The following discussion highlights the level of technical knowledge that staff are required to embrace.

Previously the minimal level of technological knowledge required by staff was the ability to program a VCR. Now it requires the acquisition and employment of new and different technical knowledge. Most of the time, processing staff do not need to know the theory behind the h.264 video codec or even how Handbrake uses it to encode video. However, staff do need to know when and how to employ a diverse range of technologies to perform a variety of activities, such as processing new off-air recordings, converting VHS tapes, capturing Foxtel recordings, ripping and copying off-air DVDs, and creating streams.

For example, staff need to be comfortable using and comprehending at least 10 different pieces of hardware used in recording, storage and testing videos and 15 pieces of software (open source and commercial) to process and document off-air recordings effectively. Table 1 illustrates the hardware and software used in the processing and streaming of a new off-air DVD.
### Table 1

<table>
<thead>
<tr>
<th>Processes</th>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVD authoring</td>
<td>PC – file processing</td>
<td>Project X – demuxing</td>
</tr>
<tr>
<td>Streaming</td>
<td>Network storage drive</td>
<td>Tsumani – DVD authoring, editing</td>
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<td></td>
<td>TV – testing DVD</td>
<td>Handbrake – streaming</td>
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<tr>
<td></td>
<td>DVD player – testing DVD</td>
<td>VLC media player – testing stream</td>
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<tr>
<td></td>
<td>Printer – DVD jacket/label</td>
<td>Stream Admin URL creator</td>
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<td></td>
<td></td>
<td>Offair database – documentation</td>
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<td></td>
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<td>Millennium cataloguing module</td>
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<td></td>
<td></td>
<td>Printer software – DVD jacket/label</td>
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<tr>
<td>2 processes</td>
<td>5 pieces of hardware</td>
<td>8 pieces of software</td>
</tr>
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</table>

Technological change has increased the complexity of knowledge, skills and processes required to produce offair recordings. The complexity can be daunting for staff but can be overcome with effective training. Ultimately, the complexity for staff is balanced by the increased benefits for readers such as having access to hundreds of hours of broadcast content available in DVD, digital file and stream formats.

**Multimedia Librarian knowledge issues**

The knowledge required by processing staff is filtered by the knowledge and experience of the Multimedia Librarian. Experience has shown that the Multimedia Librarian in addition to their other traditional library duties is required to delve further into the complex knowledge and skills required to provide support, guidance and leadership in the delivery of an offair service. This situation is best illustrated with an automotive analogy.

The Multimedia Librarian needs to be an experienced driver (processing)

- be able to perform all processing tasks
- communicate and train staff effectively in procedures and policies
- be able to create detailed procedures

The Multimedia Librarian needs to be an experienced mechanic (problem solving)

- resolve technical issues that arise during processing
  - corrupt broadcast and streaming files
  - errors arising from VHS conversions
- implement or alter procedures based on changes in technology
  - new versions of software
  - new recording hardware
• develop methods of best practice
  o ensure efficient use of technologies to reduce processing costs
  o ensure that video stream quality settings (bit rates, codecs, file types) are employed appropriately to maximise playback potential
  o ensure that requests for offair programs are filled appropriately either from our own recordings or through the offair Informit TV News database
• ensure that broadcast content is captured and deleted appropriately
  o recording schedules are maintained and updated
  o storage server space is maintained at appropriate level
• ensure that documentation is correct
  o offair DVDs and streams are catalogued appropriately

The Multimedia Librarian needs to be an experienced navigator (experimenting)
• explore how offair streams can be embedded into Drupal-based web pages
• investigate new hardware and software that will improve processing efficiency
• experiment with technologies to find alternative ways to capture and process content when existing methods are not effective. For example recording continuously from Foxtel for over 168 hours to support a research request
• find other sources of offair content when IT infrastructure goes offline such as during the Brisbane floods January 2011

The Multimedia Librarian needs to be an experienced sales person (communicating)
• communicate effectively about services to academics and other librarians
• communicate effectively with IT support
• communicate effectively with library management
• resolve copyright issues - 200AB, seeking copyright owner permissions
• staying up to date with industry/vendor developments

The knowledge and skills required by Multimedia staff to provide offair recordings in an educational environment has dramatically changed since the days of the simpler, analogue VCR recording. There is more to know and stay on top of than ever before, but embracing this new technical knowledge can only be beneficial to the careers of all library staff involved in the delivery of offair services. However, the ultimate beneficiaries of the changes in technology, knowledge and skills are library readers, the academics and students.
Video streaming usage

The Multimedia Services’ aim is to provide academics and students with offair services and products that are of a high quality and conveniently accessible. Since 2005, the Multimedia Service has been delivering conveniently accessible offair and University produced content, through video streaming technology. Academic and student usage of this service is strong and continues to grow.

Why provide video streaming?

Provision of offair video streaming services by the Multimedia Service to academics for courses may be argued as an unnecessary service. This argument stems from the view that academics now have access to web 2.0 video streaming technologies, like YouTube, as a mechanism to host their own video and as a source of video content for teaching. Further to this, academics also now have greater access to content via Internet catch-up television services such as ABC iView.

Some academics are likely to take it upon themselves to provide video from these sources to their students and bypass available Library services. This is no cause for alarm, or reason to abandon our offair streaming services. As at times, YouTube is the only option for academics to access particular teaching content that the Library will never be able to legally record or purchase commercially. To assist academics in the use of such content the Library conducts Blackboard training sessions on how to link YouTube and offair video streams in their course sites.

However, when academics wish to use television content, news, dramas, feature films, and documentaries it is in their best interest to make use of promoted Library offair recording and streaming services because:

- the Multimedia Service offers an offair requesting service for academics and takes care of all the technical aspects of recording, streaming and distributing of offair content for courses
- the Library has the IT knowledge and infrastructure that is not easily available or accessible to academics at the University to deliver content themselves
- the Library provides offair video content to academics and students that is legal, and where possible negotiates 200AB usage or copyright permission to stream commercial video from the collection to support teaching
- the Library co-ordinates copyright for the University alleviating academics of the yet another administrative duty

The other flaw in the argument is in relation to catch-up television services on the Internet. Though these services offer an immediate benefit to people who miss the initial broadcast, they are not suitable in a teaching environment for the following reasons:

- catch-up services are typically bound by licensing restrictions, with content only available online for 2-3 weeks after broadcast before it is removed
- catch-up services cannot always stream everything that has been broadcast
- catch-up content cannot be legally downloaded, edited, copied or kept for future use
Offair or licensed commercial video content delivered in a timely manner, through a co-ordinated centralised secure video streaming service, as provided by the University of Queensland Library, is more feasible than having a multitude of academics providing similar content to students without proper IT facilities, support or copyright accountability.

Video stream usage statistics

As at the end of November 2011, the Library streams over 350 offair programs and University of Queensland created training videos. Stream content covers news/current affairs, instructional training, feature films and documentaries on a wide variety of topics.

Usage of streams has grown since 2005, and reached over 10000 views for the first time in 2007. Available figures from 2008 to November 2011 show typical usage of 13000 views annually. Table 2 illustrates total stream usage by staff and students, and the number of streams accessed monthly from January 2009 - November 2011.

Table 2

<table>
<thead>
<tr>
<th></th>
<th>STREAM USAGE STATISTICS JANUARY 2009 – AUGUST 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2009</td>
</tr>
<tr>
<td>JAN</td>
<td>215</td>
</tr>
<tr>
<td>FEB</td>
<td>296</td>
</tr>
<tr>
<td>MAR</td>
<td>1313</td>
</tr>
<tr>
<td>APR</td>
<td>1330</td>
</tr>
<tr>
<td>MAY</td>
<td>1136</td>
</tr>
<tr>
<td>JUN</td>
<td>782</td>
</tr>
<tr>
<td>JUL</td>
<td>190</td>
</tr>
<tr>
<td>AUG</td>
<td>946</td>
</tr>
<tr>
<td>SEP</td>
<td>1686</td>
</tr>
<tr>
<td>OCT</td>
<td>1675</td>
</tr>
<tr>
<td>NOV</td>
<td>3529</td>
</tr>
<tr>
<td>DEC</td>
<td>99</td>
</tr>
<tr>
<td>TOTAL</td>
<td>13197</td>
</tr>
</tbody>
</table>

Variations of usage can be attributed to changes in course offerings, assignments, and dates of University holidays.

Course stream usage

The potential of streaming creates instant appeal for academics. Typically, only one or two streamed programs are requested for a course where the academic wishes to illustrate particular points. However, there are a few courses where academics seek to use multiple offair streams.
**Media Studies – MSTU2008**

MSTU2008 “Television & Popular Culture” in semester 1, 2011 had an enrolment of 205 undergraduates. The academic for this course requested 13 television programs to be streamed. These streams covered content such as Brisbane flood news, comedies, dramas, and reality shows such as *Modern Family*, *Packed to the Rafters*, *NCIS*, *Breaking Bad*, *Top Gear*, and *Biggest Loser Families*.

In the past, the Multimedia Service produced many DVD copies of the offair programs requested for MSTU2008. However, circulation usage figures for the DVDs were never as healthy as they are for the streams. Table 3a and 3b contains usage figures for the 13 teaching weeks of first semester 2011.

**Table 3a**

<table>
<thead>
<tr>
<th>Streams</th>
<th>Students</th>
<th>Views Mar-June 2011</th>
<th>Average views per student</th>
<th>Average view per stream</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>205</td>
<td>3148</td>
<td>15</td>
<td>242</td>
</tr>
</tbody>
</table>

**Table 3b**

<table>
<thead>
<tr>
<th>Stream</th>
<th>Most viewed</th>
<th>Stream</th>
<th>Least viewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breaking Bad Episode 1 Season 3 “No Mas”</td>
<td>630</td>
<td>Biggest Loser Families</td>
<td>9</td>
</tr>
</tbody>
</table>

As can be seen, the usage figures are impressive. It is expected that usage of offair streams in courses will increase in coming years, as awareness of the service grows among academics.

**Reflections and future developments**

Over its long years of operation the Multimedia Service in its different incarnations, has dedicated itself to providing quality offair and audiovisual products and services to academics and students at the University of Queensland to support teaching and research.

The Multimedia Service during this time has adapted to significant technological and legislative advancements, which have profoundly changed services, processes, staff technical knowledge and the way in which offair resources are accessed and used.

In the future, the Multimedia Service will continue to strive to provide efficient and quality offair resources to the University, and will actively explore the following areas of interest:

- implementation of stream playback on Apple mobile devices with HTML5
- inclusion of closed captions within offair DVDs and streams
- continued promotion of offair content and streaming to academics
- acquisition of more server storage space to expand offair stream collection
ongoing investigation into technologies to improve processing and delivery of offair content.

So what’s on the telly? This is a good question, and as long as offair content is required, the Multimedia Service will continue to provide it to enrich scholarship at the University of Queensland.

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- Noela Yates and Jennifer Creese – Librarian
- Michael Fagg – Former Multimedia Librarian
References


