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An evaluation of streaming digital video resources in on- and off-campus engineering management education

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Abstract

A recent television documentary on the Columbia space shuttle disaster was converted to streaming digital video format for educational use by on- and off-campus students in an engineering management study unit examining issues in professional engineering ethics. An evaluation was conducted to assess the effectiveness of this new resource. Use of the video was optional, and about half of the class reported using the video, though usage was 90.0 percent for off-campus students. Most on-campus students accessed the video on-line, while all off-campus students accessed the video via CD-ROM. Off-campus students rated the educational value of the video higher than on-campus students, and were more likely to indicate that the video helped them understand the issues being studied. Most students were able to view the videos without any technical playback problems.

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1. Introduction

In an undergraduate engineering management study unit with both on-campus and off-campus student enrolled, a commercially produced video about the Challenger space shuttle disaster had been used in on-campus tutorials to highlight issues relating to professional engineering ethics, but due to copyright restrictions this resource could not be distributed to off-campus students. When a recent documentary on the Columbia space shuttle disaster was broadcast on television, copyright provisions for educational use meant that a digital video version of the documentary could be communicated to all students. As this was the first time streaming video resources had been used in this study unit, a formal evaluation of the effectiveness of these new resources was conducted. This paper presents the streaming digital video production process and the results of the student evaluation.

2. Digital video in education

The applications and potential benefits of the use of video in teaching and learning are well documented in the literature (Marchionini, 2003) (Shephard, 2003). It is described as a ‘powerful’ medium that can provide narrative visualization and can engage multiple senses of learners simultaneously. The literature documents educational applications incorporating videotapes, digital video and on-line video in disciplines as diverse as
management (Marx & Frost, 1998), physical education (Mitchell, 2001) and medical education (Garrison, 2001). Marx and Frost (1998) suggest that video can be a powerful motivator and context setter for student learning, citing examples of Martin Luther King’s ‘I have a dream’ speech or the Challenger space shuttle disaster. Video has been particularly important for distance education (Marchionini, 2003) - the U.S. National Center for Educational Statistics reported that in 2000-2001 51% of all U.S. distance education programs employed some form of video teaching resources (Waits & Lewis, 2003).

Traditional forms of educational video include film, broadcast television and video cassette playback. Analogue video disks allowed video resources to be integrated into computer-based learning, but this technology was relatively expensive and did not become widespread (Boyle, 1997). With the advent of digital video, video resources can be distributed to students via CD-ROM or DVD, on-line via the Internet, and embedded within other computer-based learning resources. Compared to traditional forms of video which are viewed primarily in a linear sequence, digital video permits more effective interactivity and control, as video elements can be quickly selected by the user, or controlled by a computer program, in any desired sequence. The technology for the production of digital video has become relatively low-cost and easy to use, allowing educators to film, edit and produce their own video resources (Mitchell, 2001) (Essex & Hallett, 2002). Although, while the technical requirements for digital video production may now be less demanding, the production of quality content still requires appropriate expertise (Marchionini, 2003).

Digital video files may be large in size and, until recently, the time required to download these files for playing may have been impractical for live classroom playback or efficient use over a modem connection (Deal, 2003). This limitation has been overcome by the development of ‘streaming video’ formats that permit video playback to commence, while the file download proceeds concurrently with viewing (Shephard, 2003). Digital video
can be streamed from a computer hard disk or a CD-ROM, but streaming video has been a key enabling technology for the distribution of video over the Internet - video can be streamed effectively over even moderate speed Internet connections (Marchionini, 2003).

The ability to communicate educational resources to students using digital video raises questions about copyright that are analogous to the communication of print-based resources to students. In the U.S., ‘webcasting’ of audio and video involves a number of intellectual property and copyright issues (Gasaway, 2003), and on-line distribution of educational video using streaming technologies involves consideration of the ‘Fair Use Guidelines’ of the Copyright Act, the Digital Millennium Copyright Act and what is contractually permitted under each content vendor subscription license (THE Journal, 2003).

In Australia, historically, educators have enjoyed some freedom with the normal provisions of the Australian Copyright Act in relation to print materials for education. However, these freedoms applied to facsimile copying only, they did not extend to reproduction or transmission via electronic means. In 2000 the Australian federal parliament passed a range of amendments to the Copyright Act, which came into effect in March 2001. Amongst these amendments were the ‘Digital Agenda Amendments’. The intention of the amendments was to permit the digitization and transmission via digital means, including the Internet, of copyright material that would have been permitted in print form only under the previous ‘fair use’ copyright provisions that applied to educational institutions.

In Australia, the educational use of video material that has been taped from broadcast television is facilitated by the Screenrights organization (www.screen.org). Educational institutions that have a Screenrights license can make an ‘off-air’ recording of a television program and then use the video material for educational purposes, including distributing copies to students. Another development in this area is collections of digital video resources
that are freely re-distributable for education purposes without copyright or license limitations, such as the Open Video Digital Library project (www.open-video.org) which includes not only digital video content, but facilities to search and preview video segments (Marchionini, 2003).

3. Streaming video in engineering management education

The Deakin University School of Engineering and Technology offers three-year Bachelor of Technology (BTech), four-year Bachelor of Engineering (BE), Masters and Doctoral engineering programs in flexible delivery mode. The undergraduate programs are delivered in both on-campus and off-campus modes. The Institution of Engineers, Australia is the professional body that accredits undergraduate engineering programs in Australia, and included in its required attributes of a graduate is understanding of professional and ethical responsibilities and commitment to them, and in its program structure and content requirements is integrated exposure to professional engineering practice (including management and professional ethics) (Institution of Engineers Australia, 1999).

The study unit SEB121 – Fundamentals of Technology Management, for which the author has academic responsibility, is a first-year/first-semester unit that includes in its syllabus coverage of the history of technology, technology and society, the nature of the professions, professional engineering practice, the management of technology, ethics and morals, and professional ethics. In engineering programs, the case study of the 1986 Challenger space shuttle disaster is often used to highlight these issues, as well as the nature of complex technological systems, risk, the relationship between management and

For many years, SEB121 has employed a commercially produced educational video to highlight and explore the ethical issues associated with the Challenger disaster. However, this video resource was really only useful for on-campus tutorial classes, as only a single library copy was available for all off-campus students to borrow. In 2003, two events occurred. Firstly, the space shuttle Columbia disintegrated on re-entry into the Earth’s atmosphere, initiating an investigation that identified a range of technological, political, financial, management, ethical and other factors over more than three decades that contributed to the disaster. This created a new and enhanced engineering practice and ethics case study that incorporated both space shuttle disasters. Secondly, in late 2003, a comprehensive documentary on the Columbia disaster was broadcast on Australian television (Hearle, 2003), creating an opportunity to capture an off-air recording of this up-to-date video resource (the ‘Columbia video’) that would be able to be distributed to all SEB121 students, both on- and off-campus.

There is advice in the literature for intending developers of digital video resources in higher education. Essex and Hallett (2002) suggest ten steps, and this framework will be used here to outline the development process used to capture the Columbia documentary in digital video form:

1. Develop a project timeline - it is important to allow adequate time - this aspect was constrained by circumstances; the television documentary was aired in late September 2003, and the digital video resources had to be ready for use by students in mid-March 2004;

2. Find funding - equipment and/or services may need to be purchased - in this case, the author had access to the required recording and production hardware and software, as
well as the expertise to produce the digital video. Blank recordable CD-ROMs had to purchased to record and send the digital video to off-campus students;

3. Plan ahead - digital video production requires many specialized skills and a range of contributors may need to be organized - in this case, the author took on most production roles, but did require the assistance of university audiovisual staff to make the original off-air recording, and did consult university copyright specialists to confirm the content labeling format required by the applicable copyright laws;

4. Know your audience - how will students access the digital video? - prior research with students enrolled in this class indicated that rates of access to computers and the Internet, and regular usage of computers and the Internet were high (Palmer, 2000) (Palmer & Bray, 2001), so it was expected that students would be capable of using the digital video resources;

5. Make output choices - the distribution medium should be based on the capabilities of the intended audience - it was decided that the digital video format would be Windows Media Video files, as all on-campus computer laboratories supported Windows Media Video playback, and all students where supplied with copies of the Windows Media Player version 9 for playback on both PC and Macintosh computers. It was decided that an on-line streaming version of the video files would be available for students with broadband Internet access, and, CD-ROM copies of the files would be sent to all off-campus students, to cater for remote students without broadband Internet access;

6. Make hardware choices - a video production computer with a fast processor, a large amount of RAM and a ‘Firewire’ (IEEE 1394) digital video interface are required - the author had recently acquired such a computer system;
7. Make software choices - video editing and compression software is required - another factor in the choice of Windows Media Video as the file format for video distribution was the availability of the Windows MovieMaker digital video editing package bundled with the Windows XP operating system. This package facilitates the capture of digital video into the computer from an external source (digital video camcorder), story board-style editing of the video, and production of the compressed Windows Media Video files;

8. Build in evaluation - an educational digital video development project should build in an evaluation of both technical and educational aspects - the planned evaluation and results obtained are described in this paper;

9. Plan for research - development and evaluation of streaming video projects should be considered a valid part of the research agenda of academic staff - this was certainly the approach taken by the author; and

10. Showcase work and establish collegial network - digital video development projects should be publicized to increase awareness and facilitate collaboration - the author has commenced demonstrations of the digital video project documented in this paper. Discussions are underway into the feasibility of collaborating with other academic staff teaching first year units to produce a single CD-ROM containing digital video resources that could be distributed to all commencing students.

In summary, the process employed to produce the digital video version of the documentary was:

- request the university audiovisual department to make an off-air recording of the documentary broadcast - the recording was on VHS video tape;
- play the VHS video and record it to digital video tape using a digital video camcorder;
- transfer the digital video to a computer via a Firewire (IEEE 1394) interface;
• edit the 45 minute program into four 11-12 minute sections and add the required copyright notice to the beginning of each video section;

• output the digital video sections to compressed Windows Media Video files;

• upload the digital video files to the university on-line course management system (CMS) so that students with broadband Internet access could access streaming video playback; and

• produce CD-ROM versions of the digital video files to send to off-campus students.

Supporting items 8, 9 and 10 of the development framework above, Shephard (2003) suggests that, while there is much ‘research and development’ going on in the area of streaming video in the support of student learning in higher education, there is only limited formal evaluation and reporting of results in the literature being undertaken. As this was the first time streaming video resources had been used in SEB121, it was planned to conduct a formal evaluation of the effectiveness of these new resources.

4. Methodology

Shortly following the point during the semester where the Columbia video was applicable to the unit study activities, a survey was conducted that sought responses under the following categories:

• demographic information – age; gender; course of study; location of study; did you use the video?;

• technical matters – type of computer; did you install new software?; did you stream the video on-line or play from the CD-ROM?; and
• the video resources – ease of use; value to learning; most useful aspects; least useful aspects; nature of any problems.

The survey was conducted as a classroom questionnaire for on-campus students, and for off-campus students the questionnaire was sent in the mail with a ‘reply-paid’ envelope so their completed questionnaire could be returned at no cost to the student. As required by the University research ethics approval process, participation in the survey was anonymous and voluntary, there was no link between questionnaire participation and unit grade result, and no possibility of associating any response with any student or student academic result.

5. Results and discussion

5.1 Demographic information

Table 1 presents a summary of the survey group demographic information. The gender, course of study and mode of study characteristics of the entire commencing class group where known, permitting a comparison of the population and respondent groups. The population and respondent groups were both relatively large, independent and random, permitting a chi-square test of homogeneity. There was no significant difference between the respondent and population groups on any of the demographic characteristics surveyed. The good match between the demographic characteristics of the sample and population groups suggests that valid conclusions about the population group can be inferred from the respondent group.

[Table 1 about here]
Of the respondent group, 47.3 percent indicated that they used/viewed the digital video resources. In university education there is no direct compulsion for students to use a particular learning resource or complete a particular activity. They do so based on their own assessment of the strategic educational value of the resource/activity. In this case, about half of the students elected to view the video resources. However, the usage rates varied significantly between on- and off-campus students. 37.8 percent of on-campus students compared to 90.0 percent of off-campus used the video; this was significantly different ($\chi^2_1 = 8.95, p < 0.003$). The perceived difference in value of the video resources between on- and off-campus students will be explored further below. It is known that students respond strategically to assessment tasks - they are more likely to complete activities that are directly associated with assessment (James, McInnis, & Devlin, 2002). In the future, to encourage a higher rate of student use of the video resources, they could be more directly linked to an assessable unit task.

5.2 Technical matters

Of those respondents that used the video resources, 96.2 percent indicated that their computer was a PC, no respondents reported using a Mac, and a single respondent indicated their computer type as ‘Other’, but did not specify the type. Of those respondents that used the video resources, 26.9 percent indicated that they had to install or upgrade their Media Player to be able to view the video. While most Windows-based computers would be expected to have some version of the Media Player installed, the digital videos were produced using the version 9 Media Player compressor-decompressor (codec), which is only supported by recent versions of the Media Player, requiring some students to upgrade.
Additionally, given that the version 9 Media Player was distributed to all students, some students may have taken the opportunity to upgrade their computer’s Media Player to the latest version, regardless of whether they actually needed to or not. Of those respondents that used the video resources, 24 percent indicated that they had to upgrade the Media Player codec installed on their computer. Without the version 9 codec installed, the video would not play successfully, though some older codecs would play the audio track. It was known that at the time of the use of the video resources, the on-campus computer laboratories did not have the version 9 codec installed, requiring on-campus students to confirm an automatic codec upgrade process before their first playback of the video.

Of those respondents that used the video resources, 57.7 percent indicated that they played the video on-line from the university CMS via broadband Internet access, and 34.6 percent indicated that they played the video from the CD-ROM version supplied to off-campus students. These percentages match closely the study mode proportions of respondents that used the video resources - on-campus 65.4 percent; off-campus 34.6 percent. The significance of the link between mode of study and source of access is confirmed by the respondent statistics: video played on-line - on-campus 88.24 percent; off-campus 0.0 percent ($\chi^2_1 = 18.77, p < 2 \times 10^{-5}$); and, video played from CD-ROM - on-campus 0.0 percent; off-campus 100.0 percent ($\chi^2_1 = 25, p < 6\times 10^{-7}$). Practical playback of the video resources required a broadband Internet connection, which on-campus students have access to in the university computer laboratories. Due to a combination of price, competition and geography factors, the uptake of home broadband Internet connections in Australia is comparatively low (Crowe, 2003). Some off-campus students would have access to broadband Internet at their place of employment, but this is unlikely to be a convenient location for the playback of a 45 minute video documentary, hence CD-ROM would be expected as the preferred playback source. The sources of indicated access above do not
sum to exactly 100 percent, and do not exactly match the study mode proportions of respondents that used the video resources, because the videos were available for download by on-campus students, such that on-campus students could download the files from a university computer laboratory and take them home for off-line viewing at a time more convenient for themselves. Of those respondents that used the video resources, 84.6 percent indicated that they were able to view the videos without any problems. Playback problems indicated by respondents will be identified below.

5.3 The video resources

Respondents who used the video were asked to indicate on a scale of 1 to 5 (1 = very difficult; 5 = extremely easy) the ease of use of the video resources. The mean respondent rating was 3.9, with a standard deviation of 1.09. This suggests that students generally found the digital video resources easy to use, and is consistent with 86.6 percent of video users indicating they were able to view the video without any problems. Respondents who used the video were asked to indicate on a scale of 1 to 5 (1 = not valuable; 5 = extremely valuable) the value of the video resources to their learning in the unit SEB121. The mean respondent rating was 3.5, with a standard deviation of 0.93. This suggests that those students who used the video resources found them useful. Examining the results more closely reveals a significant link between mode of study and perceived value of the video resources. The rating distributions for on- and off-campus students were independent, approximately normally distributed and had approximately the same variance, permitting a one way analysis of variance. The mean on-campus rating of the value of the video was 3.2 (standard deviation 0.88) and the mean off-campus rating of the value of the video was 4.0 (standard deviation 0.87), this was significantly different ($F_1 = 5.19, p < 0.033$).
Respondents were asked to indicate what aspects of the video resources they found most useful, what aspects of the video resources they found least useful, and what problems, if any, they experienced using the video resources. Table 2 and 3 summarize the responses obtained and their frequency of reporting, for both on- and off-campus students.

On-campus students were more likely to report that the video resources were useful as extra information on the topic, whereas off-campus students were more likely to report that the video resources were useful in helping them to understand the issues involved with the topic. This may be due to the fact that on-campus students have easy access to not only the printed study materials, but lectures, tutorials, academic staff and the Library, and, the on-line video resources may be just another source of information. Whereas, off-campus students traditionally receive only the printed study materials, and the arrival of the video resources may provide an alternate source of material that provides a complimentary viewpoint on the topic of study. This is perhaps supported by off-campus students reporting that the video case study was better than just reading about a topic in printed study materials. There is evidence in the literature, for science and technology courses, of off-campus/distance education students indicating that video resources have significantly aided their understanding of theoretical concepts (Joshi, Bar-Cohen, & Bhavnani, 2000; Murphy, 2000), and, where comparative evaluations have been performed between on-campus and off-campus students, of off-campus students rating the value of video resources higher than their on-campus peers (Murphy, 2000; Walters & Reed, 1997).

Interestingly, the only ‘least useful’ aspect of the video resources reported was that the video was too long. In developing the digital video of the Columbia documentary, it was
noted that the literature recommends short video segments to maximize learners’ concentration (Shephard, 2003). So, the 45 minute program was cut into four shorter video segments of 11-12 minutes duration that could be viewed at different times if desired. It is noted that, even though today’s students have grown up in a visual environment of television, movies and video games, there is evidence that their concentration on video learning resources is less than for printed material, and less again for video material that is viewed as ‘recreational’ rather than instructional (Marx & Frost, 1998). This may be another reason to, in future, associate some form of direct assessment with the Columbia video, to avoid some students viewing it as ‘optional’ in their studies.

A number of students reported problems using the digital video. Some of the reported problems seem to relate to student misunderstanding of technical issues; all Deakin students were supplied with the software required to view the movie, including both PC and Mac versions of the required Media Player, and students were advised that they may be requested to confirm the upgrade of the Media Player codec to version 9. The other principal ‘problem’ reported was the video quality, though this is more related to student expectations than any real technical problem with playback - perhaps another symptom of students who have grown up in a visual environment and now have high expectations of video in all contexts. The digital video resources created had the following technical specifications:

- video: 320 x 240 pixels, 24 bit color, 25 frames per second; and
- audio: 44 KHz, 16 bit, stereo.

This resulted in the entire 45 minute documentary being compressed into four Windows Media Video files totaling approximately 60 Megabytes in size. This comparatively small file size suggests that there is scope in the future to increase the screen playback size of the video while still maintaining a manageable volume of data to communicate to students.
Though, the desire to increase the playback quality has to be balanced against the (often unknown) capability of the off-campus students’ computers to provide the processing power actually required to reproduce a large, high quality digital video image on-screen.

The Windows Media Video format chosen for the streaming digital video operates without requiring any special streaming video server; when a student selects a video file from the CMS, the Windows media player is launched and it controls both video playback and file streaming transfer. This means there were no detailed external statistics available on student usage of the digital video resources. However, the CMS did provide some basic usage statistics. Of the 171 ‘components’ (pages, files, URL links, announcements, quizzes, etc.) identified in the CMS as associated with this study unit, the page containing the links to the on-line videos was accessed 157 times, making it the 31st (out of 171) most accessed component. Given that this page was located in the third level of the page hierarchy for this unit (1 - Unit home page; 2 - Learning resources, etc.; 3 - Columbia videos), that places the videos amongst the most access components, just behind the home page (where every session starts), the second level pages (which aggregate the detailed unit resources and have to be passed through frequently) and some frequently accessed and/or ‘compulsory’ pages, such as assignment submission tools and sample assignment files. On the basis of ‘average time per visit’ the page containing the links to the on-line videos was ranked fifth (out if 171), behind a number of resources which are required to be viewed for extended periods, including two on-line multi-choice tests, a tutorial on using the Library and instructions for submitting assignments on-line. These results suggest that the on-line video resources were given a relatively high priority/value by the class as a whole.

5.4 General
Following completion of this project, reflection on Essex and Hallett’s (2002) proposed ten step methodology for the development of digital video resources has shown that steps one to seven are essential for project success, though not all are straightforward or easily achieved. Choices made during the planning phase, such as the digital video file format, will largely determine the success or failure of the project. Perhaps the most crucial step is step four - ‘know your audience’. Careful consideration of the location, skills level, access to computer resources, type of Internet connection and other characteristics of the student group will help in making appropriate project planning decisions. While steps eight to ten may not be essential for projects success, they form an action research methodology that seeks to critically evaluate, improve and disseminate the technical and education issues associated with the project, and hence, are strongly recommended.

6. Conclusions

Based on developments in digital video production and educational copyright provisions, a streaming video resource was developed to complement existing study unit content for both on- and off-campus students in engineering management. To assess the success and value of this new development, a formal evaluation was undertaken. Use of the video resources was optional, and about half of all students indicated that they used the video, though the reported usage rate for off-campus students was 90.0 percent. The videos were available on-line for streaming from the university’s course management system, and a CD-ROM version was also sent to off-campus students. A majority of on-campus students accessed the videos on-line via the university computer laboratories, and all off-campus students accessed the videos from the CD-ROM. The mode of access was probably related
to the student’s source of access to broadband Internet. The mean student rating of the educational value of the video resources was high, but the rating given by off-campus students was significantly higher than on-campus students, suggesting that the video offered a valuable complement to the printed study materials received by off-campus students. This was reinforced by off-campus students most frequently reporting the most valuable aspect of the video resources as ‘helped to understand the issues’, whereas the most frequent response for on-campus students was ‘information on the study topic’. The only least useful aspect report by students was that the ‘video was too long’. 84.6 percent of students reported that they were able to view the videos without any problems, and this generally problem-free use of the video resources is supported by the fact that the only significant playback problems reported by students were actually perceptions about the ‘quality’ of the video.

In the future, directly associating use of the video with an assessable task may increase student usage rates. The comparatively low presence of home broadband Internet access in Australia means that distribution of the video resources on CD-ROM to off-campus students will continue to be required. The generally high rating of the educational value of the video resources indicates that it is a worthwhile learning resource, especially as a supplement to printed study materials for off-campus students. Options for increasing the ‘quality’ of the video playback image will be investigated.

References


### Survey group demographic information

<table>
<thead>
<tr>
<th>Number of valid responses</th>
<th>Total class enrolment</th>
<th>Response rate</th>
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<tr>
<td>55</td>
<td>120</td>
<td>45.8 percent</td>
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<table>
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<th>Mean age</th>
<th>Standard deviation</th>
<th>Age range</th>
<th>Median Age</th>
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<td>21.0 years</td>
<td>5.23 years</td>
<td>17 to 40 years</td>
<td>19 years</td>
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<table>
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<tr>
<th>Characteristic</th>
<th>Respondent sample</th>
<th>Class population</th>
<th>Chi-square test</th>
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<tr>
<td>Female</td>
<td>10.9 percent</td>
<td>10.0 percent</td>
<td>$\chi^2_1 = 0.03, p &gt; 0.85$</td>
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<tr>
<td>Male</td>
<td>89.1 percent</td>
<td>90.0 percent</td>
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<tr>
<td>Engineering</td>
<td>77.4 percent</td>
<td>69.2 percent</td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td>20.7 percent</td>
<td>27.5 percent</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1.9 percent</td>
<td>3.3 percent</td>
<td>$\chi^2_2 = 1.27, p &gt; 0.53$</td>
</tr>
<tr>
<td>On-campus</td>
<td>81.8 percent</td>
<td>78.3 percent</td>
<td></td>
</tr>
<tr>
<td>Off-campus</td>
<td>18.2 percent</td>
<td>21.7 percent</td>
<td>$\chi^2_1 = 0.280, p &gt; 0.59$</td>
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Table 2

Reported most useful, least useful and problem aspects of video resources - on-campus

<table>
<thead>
<tr>
<th>What aspects of the video resources did you find most useful?</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information on the study topic</td>
<td>5</td>
</tr>
<tr>
<td>Helped to understand the issues</td>
<td>1</td>
</tr>
<tr>
<td>Availability of the video</td>
<td>1</td>
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<table>
<thead>
<tr>
<th>What aspects of the video resources did you find least useful?</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>Video too long</td>
<td>3</td>
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<table>
<thead>
<tr>
<th>What problems did you experience?</th>
<th></th>
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<tbody>
<tr>
<td>Poor video quality</td>
<td>1</td>
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<tr>
<td>Video too small</td>
<td>1</td>
</tr>
<tr>
<td>Didn’t have the software required to play the video</td>
<td>1</td>
</tr>
<tr>
<td>Video froze during playback</td>
<td>1</td>
</tr>
<tr>
<td>Video didn’t work on a Mac</td>
<td>1</td>
</tr>
<tr>
<td>Video didn’t work in computer lab - said ‘had to upgrade codec’</td>
<td>1</td>
</tr>
<tr>
<td>What aspects of the video resources did you find most useful?</td>
<td>Frequency</td>
</tr>
<tr>
<td>-------------------------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Helped to understand the issues</td>
<td>4</td>
</tr>
<tr>
<td>Video case study better than just reading theory</td>
<td>2</td>
</tr>
<tr>
<td>Information on the study topic</td>
<td>1</td>
</tr>
<tr>
<td>Understanding the aerospace industry</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What aspects of the video resources did you find least useful?</th>
<th>Frequency</th>
</tr>
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<tbody>
<tr>
<td>Video too long</td>
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