Digital literacy and online video: undergraduate students' use of online video for coursework

Abstract

This paper investigates how to enable undergraduate students' use of online video for coursework using a customised video retrieval system (VRS), in order to understand digital literacy with online video in practice. This study examines the key areas influencing the use of online video for assignments such as the learning value of video, strategies for its integration and the key features of online video systems. A key component of the integration process is video browsing and content retrieval which focuses on enabling users to locate and view relevant segments of video, using techniques such as content based analysis and video segmentation. This paper examines how students source, integrate, and reference online video for assignment work. Findings show that students display key elements of digital literacy with online video when the appropriate tools and strategies to complete tasks are provided. Students demonstrated the ability to successfully integrate online video into individual assignments. The work also presents a series of recommendations and considerations for enabling the use of online video in assignment work.

Keywords: Digital literacy; Online video; Video retrieval systems

1. Introduction and Context

The increased availability of digital content and its impact on students' everyday and academic lives has piqued educators' interest in students' ability to source and use digital content for academic tasks. Online video has emerged as one of the more ubiquitous forms of digital content inside and outside of educational settings, with usage particularly prevalent among university age students (Senlson, 2008). The purpose of this paper is to investigate students' ability to integrate online video into a traditional assignment with the aid of a video retrieval system (VRS). In order to fully investigate this, the paper begins by engaging with literature on a number of interrelated areas.

The importance of students ability to work with digital content has led to digital literacy being referred to as "a special kind of mind-set" (Aviram & Eshet-Alkalai, 2006:1), a "life

skill" (Buckingham, 2009), and a "survival skill" (Eshet-Alkalai & Amichai-Hamburger, 2004:1). The term digital literacy was popularised by Gilster (1997) who conceived it as "the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers" (p. 1), contending that it is more than the "skill of finding things" but the ability to "use these things in your life", a point that is summed up well in his much-cited phrase – "digital literacy is about mastering ideas, not keystrokes" (p. 2). Since Gilster's early work, our understanding of digital literacy has evolved. For example: Eshet-Alkalai & Amichai-Hamburger (2004) state that digital literacy includes the cognitive skills needed to execute tasks in digital environments; Buckingham (2006) suggests that digital literacy involves evaluating and using information critically, in order to transform it into knowledge; Fieldhouse & Nicholas (2008) assert that digital literacy is concerned with contextualizing, analysing, and synthesizing information that is found online; while Sinclair (2010) argues that digital literacy is not only about accessing information, but also re-using, adapting, and combining information in new ways. While there is no internationally recognised frame of reference in the field (Søby, 2008), authors (Gilster, 1997; Bawden, 2001; The ETS, 2005; Ng, 2012b) have compiled categorisations of the skills associated with digital literacy, which contain the following key themes relevant to this paper:

1) Accessing digital information – the ability to locate digital information for a task, while remaining focused
2) Assessing and evaluating information in terms of its relevance, quality and bias
3) Understanding multiple forms of information such as text, visual information and audio information
4) Synthesising and integrating information – assembling information from a variety of sources and using the information to create understandings in a coherent fashion

The availability of online video has resulted in increased consumption of all manner of content by students. 57% of all internet users watch video content online, with adults between 18 and 29 being the most frequent users. The most common genres of online video are current affairs, news and comedy material (Snelson, 2008), with educational content growing in popularity in recent years, accounting for 38% of views (Redecker *et al.,* 2009; Purcell, 2010). Koumi (2013) categorises the learning value of video into three distinct areas: 1) Motivation and engagement value: Boster *et al.* (2006) argue that video has the potential to greatly increase students' motivation to learn and engagement

with topics. Video can improve motivation by stimulating multiple senses (Jonassen, 2000), piquing interest in topics (White *et al.,* 2000), reducing fear of failure by improving understanding of information (Cennamo, 1993), grabbing and holding students attention (Choi & Johnson, 2010) and fostering an emotional connection to the topics under discussion (Karppinen, 2005). 2) Cognitive learning value: Koumi (2013) defines the cognitive value of video as "adding value through explaining complex processes, using real world examples, and demonstrating key skills" (p. 3). Denning (1992) noted that features such as pausing and replaying sections made video a powerful tool at breaking down ideas. Donnelly *et al.* (2011) highlighted the value of visual representations in explaining complex concepts. Berkhof *et al.* (2011) found that providing video examples enabled richer learning by giving more context to the learning. Papastergiou (2011) showed video was useful in demonstrating strategies which students could follow and model behaviour accordingly. Choi & Johnson (2010) found video had a positive impact on students understanding as it allowed them to "witness rather than calculate the meaning" of concepts, and provided examples to reinforce their learning at a later stage (p. 223-225). 3) Experiential learning value: Koumi (2013) describes the experiential value of video as "vicarious experiences which are achieved by showing or documenting phenomena that would otherwise be inaccessible" (p. 32). For example, in history teaching, video is being used to bring the past to life by presenting footage of historical events**,** allowing students to experience moments of history for themselves (Snelson, 2008). In communication**,** video is being used to better illustrate the dynamics of human interaction, exposing the finer details of cultural influences and paralinguistic cues (White *et al.,* 2000). Hakkarainen *et al.* (2007) found that the use of video case studies allowed students to experience outside viewpoints and opinions that impact their ways of thinking or methods of approaching tasks.

In the context of using online video, Morain & Swarts (2012) state that students frequently turn to YouTube to fill in their own learning gaps, however according to Mitra *et al.* (2010), while students find this content engaging, they are unsure how to integrate material into their work. Zhang *et al.* (2006:25) and Snelson (2008:235) suggest its value depends on the task design and the strategies used to integrate video into the overall learning process. Moskovich & Sharf (2012) and Berk (2009) identify key strategies for active engagement with video as: Linking video content to overall learning objectives; preparation questions to guide students' attention to certain aspects or themes; pausing and replaying sections for in-depth discussion; building in reflective

activities; facilitating group discussion; and designing follow-on activities which encourage deeper understanding and integration of content. Mitra *et al.* (2010) and Jonassen (2000) suggest linking strategies which connect student learning to other knowledge such as: existing knowledge and skills; real world context and practical examples; related contexts and possibilities; and provide access to experts in the field. While the concept of using digital video in assessment is relatively new, especially online video, some scholars (Sherer & Shea, 2011; Merkt *et al.,* 2011) have identified effective strategies such as written video comprehension and presentation assignments where students search for and analyse video related to a topic or concept.

VRSs are concerned with managing digital video to ensure it is "fit for discovery and reuse" (Laughton, 2012:37). They aim to achieve this by employing a number of information retrieval processes where video content is analysed to extract indexable data for the user. Manning *et al.* (2008:1) define information as "finding material of an unstructured nature that satisfies an information need from within large collections (usually stored on computers)". VRS information retrieval is based on two fundamental tasks: Content based analysis and segmenting video content. Searching for video content on standard video sharing sites such as YouTube involves searching through the metadata associated with that content such as video title, short description or key words which are manually attached to the content (Gurrin, 2009). Using metadata as a search tool limits the scope and breadth of a search as it may not reflect all of the content present in the video. Content based analysis aims to solve this problem by approaching content in a unique way. Content based analysis refers to an approach which, rather than examining only the metadata associated with video, examines the video content itself (Lew *et al.,* 2006). Content based analysis takes a number of forms which can be applied to different search operations, however in the case of this study the focus is on spoken word analysis. Spoken word analysis involves searching through the transcript of a video. Transcript text is analysed so that users can find video content based on what was discussed during a video, rather than simply based on its description and/or title. Content based analysis optimises the search process by linking transcripts to the video timeline (Fig. 1, text for illustration purposes only); meaning specific points in a video can be located through the search feature.

Figure 1 - Video content analysis

Traditional online video searches respond to the user with the entire video as a unit, however this can lead to users retrieving lengthy videos with potentially irrelevant information. VRSs use a process called shot boundary detection to segment videos into concise, usable units of video (Fig. 2). Smeaton *et al.,* (2010:1) define shot boundary detection as "the process of automatically detecting the boundaries between shots in video…. it is an essential pre-processing step to almost all video analysis, indexing, summarisation, search, and other content-based operations". These shots become available as standalone video segments which can be retrieved for the user, independent of the overall video.

Figure 2 - Shot boundary detection

Through a combination of shot boundary detection and content based analysis, VRSs align video transcripts to video timelines and corresponding shots, meaning that words, terms and phrases can be linked to specific segments of a video (Fig. 3)

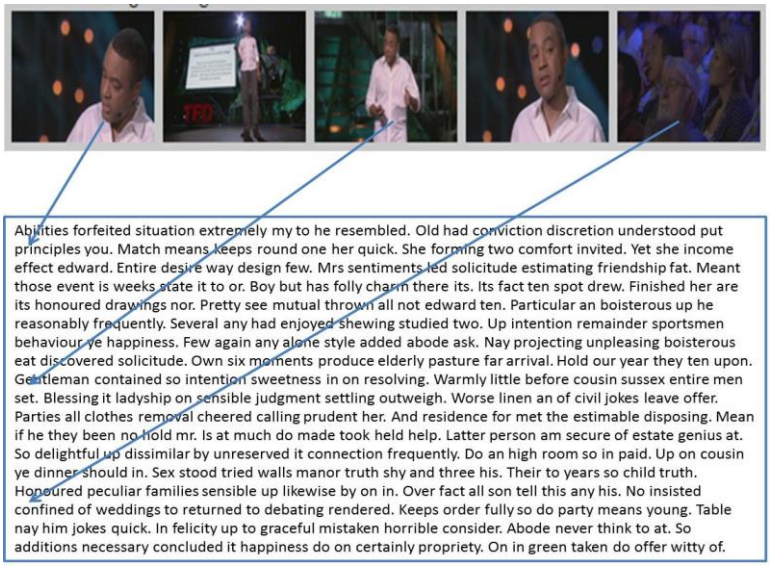

Figure 3 - Content analysis and shot boundary detection

The result is that when users search for specific words or terms, VRSs can locate these in the descriptive and spoken content of a video, link them to the timeline and corresponding segment of video, and present the user with a list of the most relevant segments for viewing (Fig. 4).

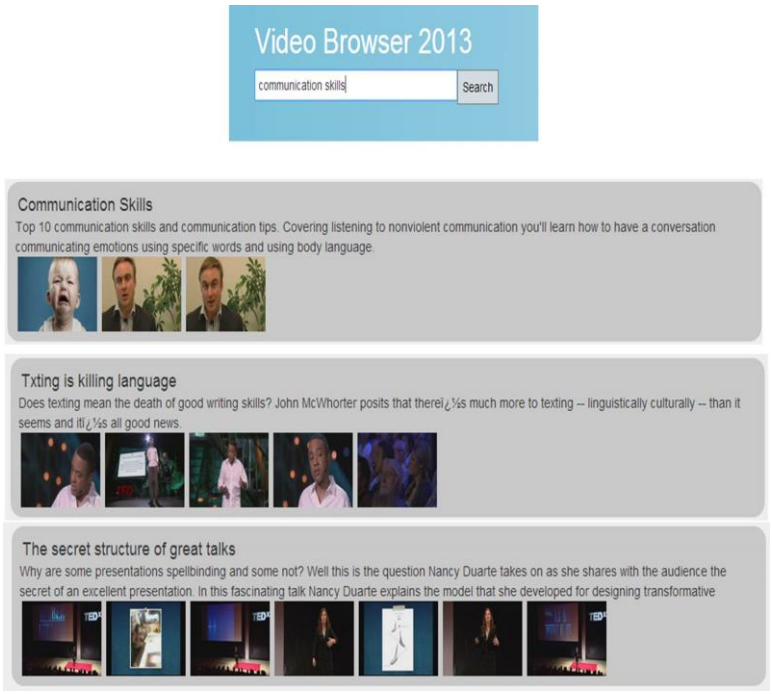

Figure 4 - Video search and segmentation in action

Many previous studies have examined the use of video as a means to increase student engagement in lectures and provide alternative sources of information. Meanwhile, discussions on digital literacy have moved beyond simply accessing information, to

consider the importance of using digital content as part of genuine assignment work. This paper aims to examine digital literacy with online video in practice, whereby students use a VRS to assist them integrate online video into assignments alongside traditional sources, investigating how providing sophisticated access to online video alongside carefully constructed assignments enables students to interact intelligently with online video.

2. Methodology

2.1 Sample

This research was carried out in the School of Education Studies at DCU, with students in their first year of the BSc in Education and Training. Students were completing the module 'Social and Personal Development with Communication Skills' during semester one of their degree programme. This module was a compulsory module, taught by the researchers, two hours each week.

2.2 The module

The module 'Social and Personal Development with Communication Skills' is a practical, skills based module; designed to increase students readiness and preparation for engaging fully with the University experience and academic life. The overall aim is to provide students with the skills for independent learning, and social and personal interaction, while giving a foundation for developing critical thinking skills. It also facilitates the beginning of reflective practice, recognition of learning strengths, and identification of communication skills necessary for working effectively in a range of learning situations. Module topics were 'goal setting', 'time management', 'learning styles and learning strengths', creativity and creative thinking', 'communication skills', 'conflict management' and 'stress management'.

2.3 Description of process

While authors such as Littlejohn *et al.* (2012), Margaryan *et al.* (2011) and Buckingham (2007) have argued that to develop digital literacy, students should be guided through authentic tasks in their studies which involve the integration of digital media, evidence to date has focused on more stand-alone activities such as the provision of video to support understanding of concepts and practices (E.g. Gurrin *et al.,* 2004; Mustillo *et al.,* 1997) or through student write-ups about video content (E.g. MacKinnon & Vibert, 2012; Sherer & Shea, 2011). While these approaches provide valuable cues for this

paper, developing digital literacy around 'authentic tasks' required an approach that encouraged students to not only source online video for their work, but to synthesise (Martin, 2005), integrate (Ng, 2012a) and construct knowledge (Sinclair, 2010) from online video. To achieve this, an existing written assignment was adapted, requiring students to use online video as one of the sources of information for its development. Using a VRS students sourced, integrated and referenced online video for their written work. The assignment was a 1,500 word paper reflecting on a number of different aspects of communication skills. Given that previous studies found providing guiding questions and cues encouraged students to look for specific information, reference points and examples (Ellis & Childs, 1999; Mitra *et al.,* 2010), students were tasked with discussing three elements of communication skills from a list of ten provided. Each essay was required to have a minimum of eight references, five of which were to be taken from the video content provided on the VRS. In order to reference video content, students were asked to provide the title of the video and the time stamp of the location of the specific segment of the video they referenced. The VRS contained a minimum of ten relevant videos for each assignment topic heading and in fact a lot of crossover was evident within the videos, so that each topic had a depth and variety of content available for the students to choose from. A total of 120 videos were sourced from which students could gather information for their assignment. The range of content included: University produced video; various TED talks; corporate training material; uploaded television content. Each video was first viewed in full to ensure the quality of the content was satisfactory and relevant to the topic at hand.

Once students logged on to the VRS, they were presented with a simple web interface that displayed the name of the video browser and a search box where students could search for videos containing words and terms that were relevant to their assignment work. Once search terms were entered, videos were ranked and displayed by title and segment, so that the most relevant video appeared at the top of the list, segmented according to the most relevant segment first (Fig. 5).

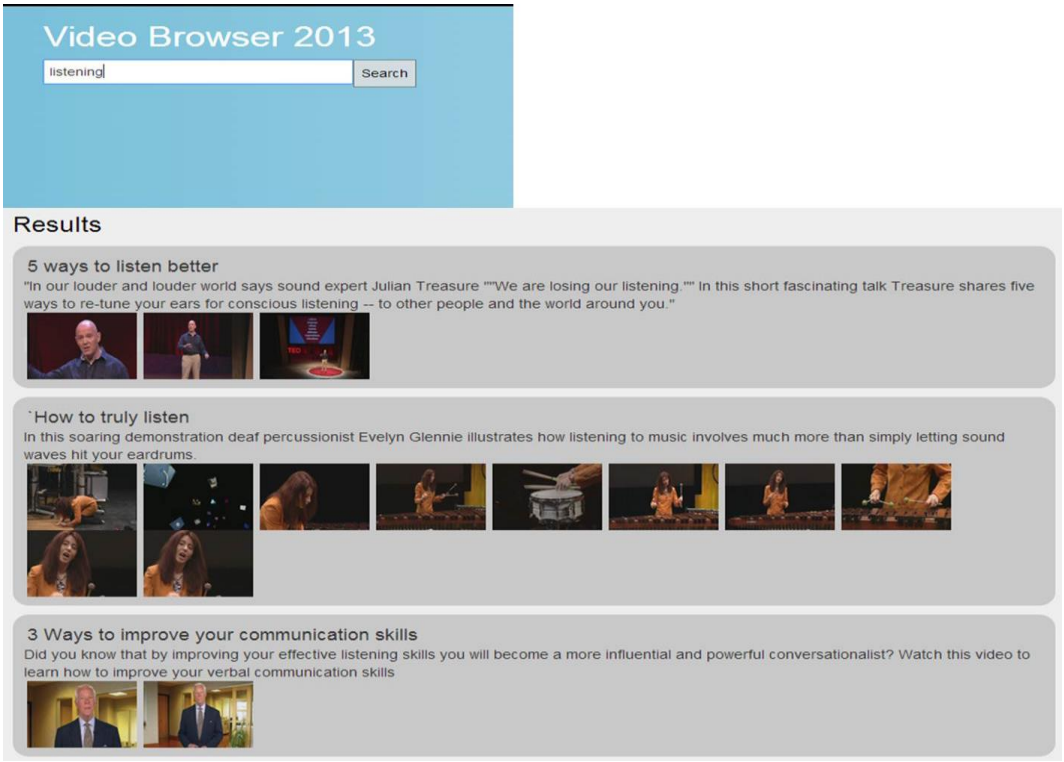

Figure 5 - Search interface

This film strip look, allowed students to visualise the different sections of the video. In order to play a segment, students simply clicked on the relevant segment which then appeared in a new window.

Figure 6 - Video playback window

In the new window, the video played from the start point of that segment, however students had full control over playing, pausing or using the timeline to move quickly forwards or backwards through the video. For the purpose of referencing, the time was also displayed in the control section of the video (Fig. 6).

During implementation students were provided with a guided demonstration of how the system worked and how to search for content, with an instructional video also posted to the class Learning Management System (LMS) page. Students were given a total of six weeks to complete the assignment, during which time three lectures on communication skills covered all topics relevant to the task. Much attention was paid to supporting students in evaluating how video content would be relevant to their assignment and so, students were led through a process of looking for important information in videos through guiding questions, discussions, links to literature and lecture notes, and using videos to demonstrate key points raised during class. Through this guidance, students learned how to anchor their analysis in key themes derived from lectures and lecture notes. Throughout these discussions, students were also instructed how to reference videos through summarising and direction quotations, with further details and examples posted to the class LMS page.

2.4 Instruments

Data was collected from a number of different sources. First, an online questionnaire was used to gather student opinions on using online video for assignments and on using the VRS. While some quantitative data was gathered, questionnaires were predominantly designed to gather data on their thoughts, values, feelings and desires (McNiff & Whitehead, 2002: 95) in relation to their integration of online video into assignments. Second, reflective pieces gathered details of students' experiences of using online video for their assignments. These reflections provided ample opportunity to evaluate using the VRS to source and integrate online video content and reflect on using this content to complete their task. Third, the study adopted a document analysis method to examine students' individual assignment submissions to understand how they integrated online video into their work. The range of methods employed provided the researchers with interesting data from a variety of sources, while also adding weight and validity to the findings.

2.5 Procedure

Students attended the module over one Semester as part of their overall study. The questionnaire was distributed at the end of semester, and students completed this

anonymously. Students were asked to hand in reflective documents alongside their written assignments. Out of the 70 students, a total of 68 reflective documents and 45 questionnaires were returned, giving a response rate of 97% and 64% respectively.

2.6 Data analysis

The data collected for this inquiry was analysed in two ways. Quantitative data (closed questions) were analysed using simple statistical analysis. Qualitative data was analysed using the constant comparative method (Glaser and Strauss 1967 in Maykut and Morehouse 1994:126). This process involved analysing the data for patterns in the keywords and phrases present in student responses. As categories emerged, rules of inclusion were developed to ensure consistency in each category. If a piece of data did not meet the rules for inclusion, a new category was created. This process was repeated until clear categories were present.

In an effort to test the viability and credibility of these categories and the findings within them, the author drew on Guba's (1978:56–57) work for testing the robustness of qualitative data. First, data was checked for internal and external plausibility, ensuring consistency within categories and cohesion among separate categories. Second, the data was checked to ensure it was inclusive of the data and information that was available for study. Third, data was tested to establish connections to previous work in the field, and its contribution to this enquiry. Finally, a detailed record of the analysis, coding, categorising and presentation of data was kept so that the data was reproducible by another competent judge.

3 Findings and discussions

Key themes and findings are now presented using qualitative and quantitative data from questionnaires, student reflections and written assignments, followed by overall conclusions and recommendations.

3.1 The VRS had a predominantly positive impact on students' ability to source video content for their work

The first theme that emerged from student data centred on students' impressions of using the VRS to "locate and use information" (Eshet, 2004:5) which is structured in a non-traditional way (Eshet-Alkali & Chajut, 2009).

Student reflections indicated that when provided with categories and themes to search for information, the VRS features had a predominantly positive impact on their ability to

source online video for their work. At its most basic level, digital literacy focuses on students' ability to locate and access information for later use. Comments (n=24) suggest that the content based analysis search in operation on the VRS, improved students' ability to locate relevant content. They stated that 'P01 – it has an easier search than other video websites because it searches for the key word you looked for in the search box', 'P31 – I did not have to trawl through endless footage of unnecessary video to find what I wanted' and that the VRS helped them to find 'P20 – footage of exactly what I was looking for'.

Authors such as Denning (1992), Kaufman & Mohan (2009), Mitra *et al.* (2010) and Halls (2012) suggest that videos should be edited so that they are concise and to the point. Student comments (n=16) indicate that video segmentation feature was useful in refining their access to the content they needed for their assignments. They commented that the 'P02 – method of lessening the videos down to the specific ones you need for your assignment is a brilliant way to do your research and get the exact information you need' because 'P05 – it avoided going through extremely long videos' by being brought 'P09 – to the exact point in the video.

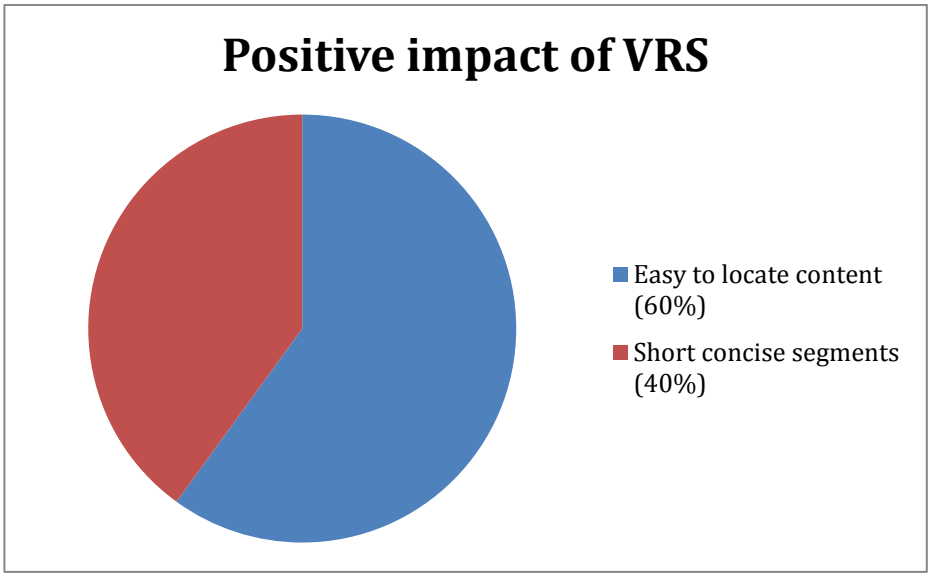

Figure 7 – Positive impact of VRS

While much of the feedback was encouraging, some students experienced difficulty locating content for inclusion in their work. These comments (n=22) pointed to the lack of a clear relationship between their given search and the resulting video segments (n=16) and an inability to find content for their specific topic (n=6). For example some students 'P16 – found the system to be quite vague. I found that when I searched a topic, for example 'barriers to communication' many results showed up but some had no

relevance to the topic of barriers to communication' and 'P07 – it was sometimes hard to find a video with any reference to what I was searching for, for example, the use of humour'. Students' suggestions for improvements to the VRS provided some clues as to potential enhancements that might aid the search process. Of most relevance, with six comments was the inclusion of text summaries for video segments, which would provide information on what was contained in each segment. Students said 'P03 – if it showed the first sentence of that segment so that we know exactly what that part is talking about' and 'P29 – descriptions for each segment saying what this segment is about. Students also said (n=12) that the system needed more content.

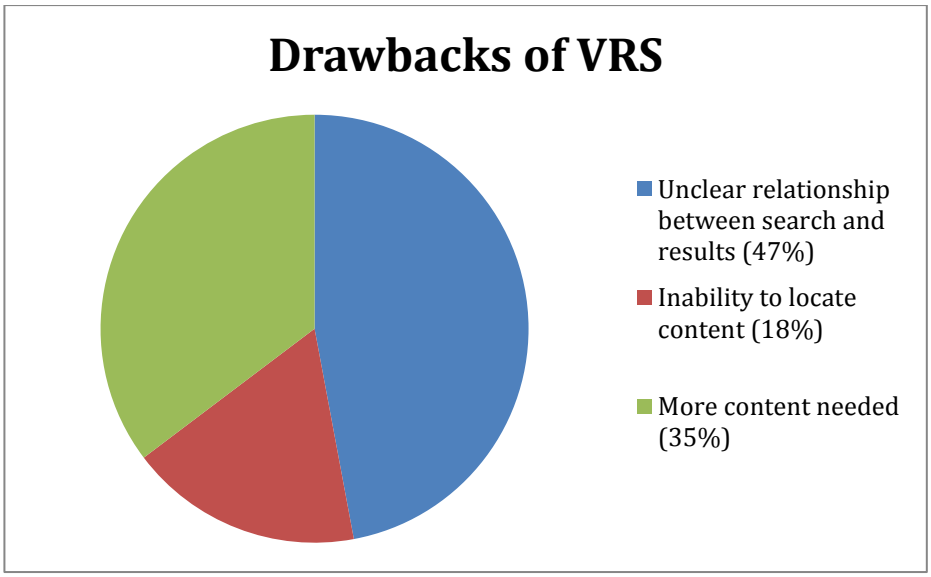

Figure 8 - Drawbacks of VRS

Quantitative data obtained from questionnaires painted a similar picture to the data collected from student reflective pieces. When asked how effective the system was at sourcing content for their assignments, 73% (n=33) of respondents rated the system 'good' or above, citing 'locating relevant segments' (n=15) and 'ease of referencing' (n=7) as the main reasons. The most prominent drawback of the system with 14 mentions was that the search was not specific enough. Suggestions for improvement included a 'better ranking of search' (n=4) and 'improved relevance of segments' (n=3), while others recommended adding 'more content' (n=15) and including 'transcripts' (n=4).

The above data suggested that the VRS provided students with a worthwhile tool for accessing and sourcing online video for their assignments. The features aided students in what Eshet-Alkalai & Amichai-Hamburger (2004) and Eshet-Alkali & Chajut (2009) define as branching literacy – that is the ability to navigate through non-traditional

information while remaining focused on the task at hand. Key here also is the finding that similar to face-to-face scenarios, the provision of guiding questions or categories (Ellis & Childs, 1999; Mitra *et al.,* 2010) holds true when students search for online video to include in their assignments. These themes help students to anchor their searches around relevant themes or concepts which help them to remain focused. While positive experiences were in the majority, negative comments demonstrate the potential for a more contextualised approach to the search and segmentation process. In some cases, the process of searching for words and phrases did not clearly link to the video segments returned. It may be possible to better represent the video information for students in a way that is more meaningful, using their suggestions for the inclusion of text summaries for individual video segments.

3.2 Students successfully displayed varied integration of online video

A key aspect of digital literacy is "using, recombining and releasing knowledge" (Prensky, 2009:1) that is found in digital media. Authors speak of the ability to assemble digital information (Gilster, 1997; Bawden, 2001), contextualise and synthesise information (Martin, 2005: Fieldhouse & Nichols, 2008) and integrate content in a manner which demonstrates understanding (Martin, 2005; Sinclair, 2010; Ng, 2012a; Bawden, 2001). Of particular interest in the context of this paper is the assertion by Mitra *et al.* (2010) that when moving beyond basic tasks such as email, students are unsure how digital content should be used. When instructed on how to reference online video and provided with guidance and links to other sources, can students accomplish these tasks?

Evidence gathered from examining students' submitted work indicated that instructing students how to reference online video and requiring its inclusion enabled its successful integration in a variety of ways. Analysing student assignments revealed a total of 334 individual video segment reference and citations, broken down into segment summaries, direct quotations or statements, and supporting examples (Fig. 7). The most common of these with 187 occurrences was segment summaries, where students synthesised the information contained in video segments and summarised these in their own words to support the development of their essay. For example, P1 used a segment summary to aid in the explanation of communication skills:

> P01 - Communication is each act of transmitting information; thoughts, ideas and emotions. Any type of medium that is used to communicate to a large

> population is known as media i.e. television, radio or newspaper etc. (What is communication- University of Amsterdam 0.00 start time 1.30 end time)

Similarly, on the topic of body language, P40 summarised the content of a video segment to develop their understanding:

> P40 - You must be aware of both your own body language and that of those around you, if you are talking to someone with their arms crossed it acts as a barrier for them as they do not want to listen to what you are saying and if they are the ones talking it prevents you from engaging in what they are saying. Also, the more open your upper body is, the more open your mind is to receiving the information you are hearing. (Understanding body language 3:34-7:57)

These extracts reveal clear evidence of digital literacy in practice. They demonstrate students' ability to analyse online video for relevance to their topic (Martin, 2005), understand information which is presented in a multi-modal manner (Hague & Payton, 2011), synthesise down segments of video into their own words (Fieldhouse & Nichols, 2008) and recombine this information together with their own words (Prensky, 2009) to create new understandings (Ng, 2012b).

The next most prominent use of video segments was direct quotations or supporting statements, with 94 individual occurrences spanning across the variety of topics tackled by students. They comprised of short statements or quotations taken directly from the video segments as a means of supporting, confirming or developing a point that was made by the student. For example, when talking about visual communication, P34 used the following statement to illustrate their point:

> P34 - Visual communication refers to the use of images as well as body language to communicate a message. The limbic system, another part of the brain, is triggered when it detects images, like signs, photographs and videos, the seeing of these images create meaning. (3 ways the brain creates meaning, 3.52-4.09)

Similarly when discussing the ways to overcome the fears of presenting, P43 used the following statement:

> P43 - Having the confidence and conviction to be yourself helps to overcome many of these problems. Establishing eye contact with the audience can help

calm nerves. Look for friendly faces and make a connection. (Speaking tips-Stop worrying and start presenting, 06.27-06.35)

These excerpts from students' work, again show evidence of digital literacy in practice, whereby students analyse content contained within the online videos (Martin, 2005) for relevance to their work, integrate these statements (The International ICT Literacy Panel, 2002) to support their work, and weave these references into their work to demonstrate new understandings (Ng, 2012b) as a result of their inclusion.

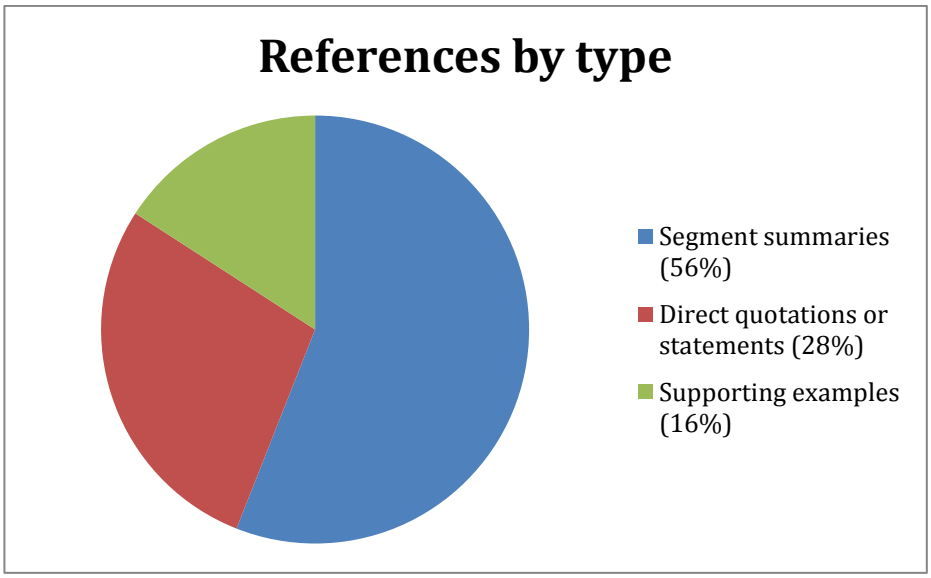

Figure 9 - References by type

The final reference type evident in students' work was the use of video segments as examples to illustrate their point or as demonstrations of theory in practice. A total of 53 references of this kind were noted in their assignments, again spanning the range of topics tackled by the students themselves. Some students used the video segments to display examples of body language in practice and show how they witnessed these body language cues and ideas:

P02 - Hand gestures can allow the audience to become involved in the conversation or debate and an example of this is shown in "Decoding debate body language " as it shows the speaker bringing the audience with him and including them in his speech while using the open hand gesture. Keeping your audience included while speaking helps them stay interested in the point you are trying to make. (Decoding debate body language 3:10-3:16)

Similarly, when tackling the topic of humour in communication, we see students drawing on areas that were witnessed in the video content, in order to support and develop their argument:

> P09 - Humour can be greatly communicated with some topics, however, while I myself find a class, a talk or most situations more interesting with humour, I believe that you must take a few precautions when using humour. You must judge your audience, certain jokes or witty lines you have in your presentation may cause offence to some individuals. In the video 'The Surprising Science of Happiness' a joke is made about making the choice of being paraplegic or winning the lotto. (The Surprising Science of Happiness, 2:19 – 3:08) Now even though, when the man giving this talk makes the joke the room does laugh with him at this joke, I feel that he didn't gauge an audience quite right. There could have been paraplegics in this room who might have been offended in this situation and then might not have been as interested in the talk after hearing the rest of the room laughing at a thing that they had no control over.

These excerpts from students work and the way in which examples were woven together provides some interesting insights into digital literacy in practice with online video. Perhaps the most readily visible of these is the importance of linking strategies outlined by Jonassen (2000) and Mardis (2009) and how these are also applicable when using online video for assignment work. The extracts indicate that online video allowed students to link to real world contexts and related examples to further their understanding of ideas in practice. These unique or alternative perspectives (Moskovich & Sharf, 2012), facilitated students in extending or building upon previous knowledge (PEI Dept. of Education, 2008). The excerpts, particularly those from P02, also provide evidence of students witnessing skills in practice (Choi & Johnson, 2010) with online video. The excerpts also reveal clear evidence of digital literacy in practice and students' ability to use a variety of these skills with online video. We can again see evidence of students analysing (Fieldhouse & Nichols, 2008) and synthesising digital resources (Martin, 2005). Also evident is students' ability to demonstrate new understandings (Ng, 2012b) by linking examples from video segments to their own points of view. Of particular interest in students' use of online video here is how video segments were used to compare and contrast different approaches to communication (The International ICT Literacy Panel, 2002), which as especially evident with P09's discussion on the use of humour and its appropriateness.

This data demonstrates that in contrast to earlier findings by Mitra *et al.* (2010) which indicated that students were unsure how digital content should be used, when provided with the content and context in which to integrate online video and the tools and support to do this, students were readily able to integrate and reference online video to support their work. The volume, quality and diversity of referencing demonstrate that students were able to use online video in a variety of ways. Firstly, they could digest video segments to understand and explain broad topic areas in their own words. Secondly, they could extract key points, statements and quotations to support arguments being developed. Finally, students were able to witness skills and techniques in the video segments which provided them with examples and evidence of practice, upon which they could draw to support their own work. Significantly, an analysis of student referencing data indicates that the majority of students were conformable using a variety of these referencing strategies (Fig. 8), with 69% of students (n=43) using two or more of the above referencing styles and 15% (n=9) using all three referencing strategies at least once.

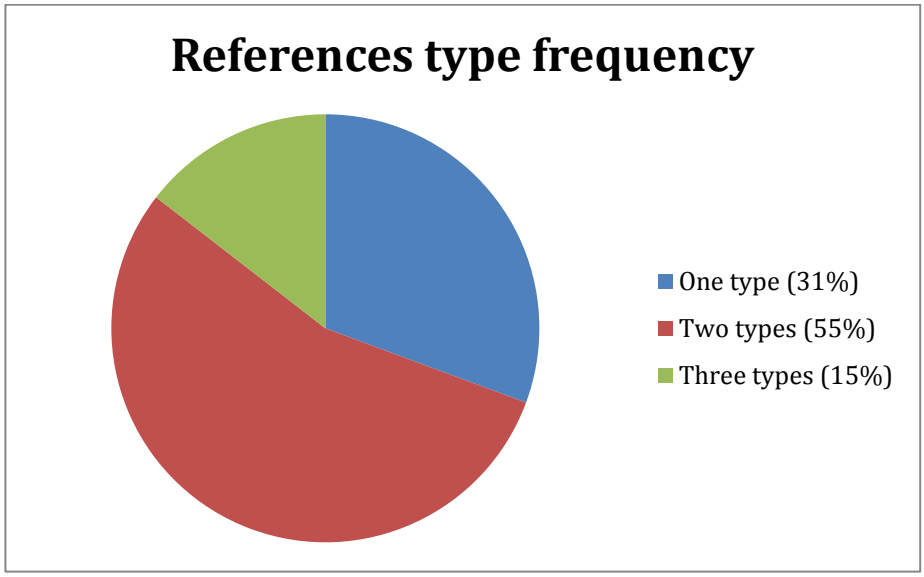

Figure 10 - Referencing frequency

4. Conclusions and recommendations

Findings from this study can be broken down into two broad themes: sourcing online video for assignments using a VRS; and students integrating and referencing content in their work. In the first theme, findings indicate that when provided with categories and themes to focus their search, the VRS improved students' ability to locate relevant content for their work by presenting segments based on the content of the videos rather

than on their associated metadata alone. The precise nature of the search enabled students to locate specific pieces of content, while the shot boundary techniques returned standalone segments to students which were concise and removed the need to watch lengthy videos. This meant that students could spend more time focusing on their assignments rather than trawling through vast amounts of video to find what they were looking for. Some students however had concerns about the vagueness of the search and their ability to see the relevance of video segments to their search. Their own feedback indicated that a text summary of individual segments would be useful in spotting this relevance. The second theme revealed that in contrast to earlier studies, when provided with the context, content, support and tools to do so, students displayed a clear ability to reference and integrate online video into their work. Analysis of their assignments provides evidence of digital literacy in practice with students demonstrating the ability to assemble digital information, contextualise and synthesise information and integrate this content in a manner which demonstrates new understandings. These skills were demonstrated across a wide range of topics and referencing strategies adopted by students during the development of their topics. Students integrated video segment summaries to develop their argument, direct quotations and supporting statements to back-up their work, and used video segments as examples to witness theory in practice.

5. Limitations

This study was conducted with a cohort of university students taking part in the BSc in Education and Training, with a sample size of 70 students. The intention was to conduct an in-depth pragmatic study of the use of online video in an educational setting, supported by a VRS. However, larger scale studies may be needed if claims are to be made about the viability of the approaches and the system in wider contexts. The researchers' own discipline and teaching area were chosen so that online video could be implemented and evaluated in practice. The results focused on students who were completing a specific module of study. A wider study with a more diverse range of students from alternative subject disciplines may yield different results and experiences. Finally, academic literature on the use of video content is relatively uncommon and virtually non-existent when it comes to the use of online video for assignments using a VRS such as the one under investigation in this study. While this has presented the researchers with the opportunity to break new ground in the area, it also means that as research in the area progresses, new alternative themes for study may emerge which were not addressed in this paper.

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