Digital literacy and online video: investigating students' use of online video in assignments using a customised video retrieval system

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Declaration

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Doctor of Philosophy is entirely my own work, and that I have exercised reasonable care to ensure that the work is original, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

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Peter Tiernan

Date: _____

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Abbreviations

DCU	Dublin City University
DVR	Digital Video Recorder
ECAR	EDUCAUSE Centre for Analysis and Research
ECDL	European Computer Driving Licence
ECTS	European Credit Transfer and Accumulation System
ET1	BSc in Education and Training Year 1
LMS	Learning Management System
URL	Uniform Resource Locator
VLC	Video Lecture Capture
VOD	Video On Demand
VRS	Video Retrieval System

Abstract

Title: Digital literacy and online video: investigating students' use of online video in assignments using a customised video retrieval system

Author: Peter Tiernan

This thesis investigates key digital literacy skills in practice by enabling undergraduate students' use of online video for coursework using a customised video retrieval system (VRS). 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 thesis examines how students source, share, comment on, integrate, reference and evaluate online video for assignment work.

By adopting an action research approach, this study gathers predominantly qualitative data over a number of cycles to examine the use of online video in assignments, the impact of this on students' learning experience and the impact of the features of the VRS in supporting student work. This cyclical approach facilitated the investigation of a number of key research questions, while allowing results to inform future cycles of 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. Over the course of the study, students demonstrated the ability to successfully integrate online video into individual and group assignments. Each stage of the study validates the positive impact of video content on the students' learning experience, and the features of the VRS that support this. The study also presents a series of recommendations and considerations for enabling the use of online video in assignment work.

Chapter 1 - Introduction to study

1.1 Introduction

The prevalence of digital technology and its impact on students' everyday and academic lives has increased educators' interest in the skills necessary to work with digital content. Digital literacy, the ability to source and use digital content to complete tasks, is at the forefront of this field of research. Online video has emerged as one of the most popular forms of digital content, inside and outside of educational settings, with usage particularly prevalent among university age students (Senlson, 2008). This research study investigates digital literacy in practice, examining students' use of online video in assignments, with the support of a customised video retrieval system. The focus of the research was designing assignments that required the integration of online video in a meaningful way, while collaborating with the School of Computing to design a system that provided students with sophisticated access to video content.

This research was approached using a predominantly qualitative 'action research' design based on my own teaching practice in order to document analysis of student assignments, feedback questionnaires and reflective pieces gathered from students.

1.2 Background

The National Strategy for Higher Education to 2030 (Hunt, 2011) and the National Forum for the enhancement of teaching and learning in Higher Education (2015) assert that educators in Ireland must pay increasing attention to the core skills needed for the effective use of information technology so that undergraduate students can effectively engage in society and the workplace. Technology has become a permanent feature of society (Martin, 2005) and students are immersed in a world that is increasingly

mediated by it (Chase & Laufenberg, 2011). In this digital, inter-connected society, digital literacy is increasing in relevance and importance (Jones & Flannigan, 2006:7). Digital literacy involves the skills and strategies to represent and understand ideas "using the range of modalities enabled by digital tools" (O'Brien & Scharber, 2008:67). The National Forum for the enhancement of teaching and learning in Higher education (2015) recommends a change in practice where students actively engage with digital skills and knowledge. This means moving from basic tasks such as e-mail, to more complex forms of scholarship that involve "sourcing, using, evaluating, analysing, aggregating, recombining, creating, and releasing knowledge" (Prensky, 2009:1). In order to achieve this, authors such as Littlejohn *et al.* (2012), Margaryan *et al.* (2011) and Buckingham (2007) argue that students should be guided through authentic tasks in programmes of study which involve the integration of digital technologies and digital media. In recognition of the need to address this area, DCU (2011) (see appendix S for further details) launched its 'Graduate 21' programme with the vision of "shaping DCU graduates for life and work in the 21st century" (p. 1). An essential component of the programme was a commitment to develop seven attributes and proficiencies through formal and informal engagement with university activities, two of which relate to the development of digital literacy with students being encouraged to:

- Develop a high level of information literacy that encompasses a sophisticated, considered and critical approach to sourcing, organising, evaluating and using information
- Be fully competent in their use and application of digital technology. They will be encouraged to interact intelligently with the digital environment and recognise the benefits of this to solve problems, to assess the credibility of information.

Online video has become ubiquitous among students, moving beyond mere entertainment, with Kaufman & Mohan (2009) suggesting that students are sourcing,

commenting on and discussing video content for coursework: “text and video discussion rolls and now annotations of video about the economy, politics, and culture unfurl seemingly endlessly” (p. 5). In fact, this migration by students towards online video has led to a marked increase in requests for video as a tool to support their learning, with some authors suggesting there is a danger that not providing video content in education may result in 'artificial' learning for students, leaving them to find relevant material elsewhere (Smith & Caruso 2010:56-94; Donnelly *et al.,* 2011).

Educators see the value in using video content to increase student motivation and engagement, support understanding of concepts and link theoretical knowledge to real world situations (Koumi, 2013). However, research indicates that the manner in which video is integrated into teaching and learning is beginning to shift. First, Kaufman and Mohan (2009) and Johnson *et al.* (2014) argue that the use of online video to support student learning is set to increase. Second, the sources of video content are shifting towards university repositories and freely available video sharing sites such as YouTube. Third, educators envisage a move away from whole class viewing of content, to online systems that offer personalised viewing by “uploading video to class and personal web pages” (Kaufman & Mohan, 2009:8). These online systems allow students to complete individual tasks, while collaborating and learning from others (Pearson, 2005). They give students control over how they view video content, while providing opportunities to share their views with others (Cogill, 1999:99). Challenges for educators include: finding and categorising relevant and up-to-date video content (Mardis, 2009); and editing videos to extract the sections that are most relevant to coursework (Kaufman & Mohan, 2009).

Video retrieval systems (VRS) form part of a specialised field of research which focuses on enabling users to find video content among catalogues of video data. They differ from traditional video sharing sites as they allow users to search through the entire content

of a video, rather than searching through its associated description, title and other metadata (Bai *et al*., 2008). Searches return results in short segments (Smeaton *et al*., 2010). These processes render video searches more accurate and manageable than through traditional video sharing sites. Teams such as Dublin City University's (DCU) INSIGHT: Centre for data analytics team, have devoted many years to the development of VRSs to perform this task. Their work in this area, which dates back to 1999 (Smeaton *et al.,* 1999), has begun to define what is possible. Much of their work has focused on developing technical features to improve the search, browsing, retrieval and use of video content; user trials testing video segmentation as a learning support were highly successful (Gurrin *et al.,* 2004). However, little work has been done to understand how VRSs can be used to support students' integration of online video into assignment work.

As aforementioned, digital literacy has become increasingly important in education. By investigating students' use of online video in assignment work, the opportunity existed to examine the factors which enable digital literacy in practice. These included: strategies employed to enable students' use of online video; the impact of a VRS in facilitating this; and the impact of online video on students' learning experience when used as a source of information. The significance of this research lay in developing our understanding of how, when given the tools and strategies, students source, share, comment on, integrate, reference and evaluate online video as a source of information for assignments.

1.3 Cross-disciplinary nature of study

This research project was a cross-disciplinary collaboration between the School of Education and the School of Computing in DCU. The technical development of the VRS was kindly undertaken by Dr David Scott and Mr Zhenxing Zang in the School of Computing, with whom I collaborated in its design and implementation.

As a lecturer on the BSc in Education and Training in DCU, I work with students who wish to pursue a career or further study in a variety of educational contexts, such as: teaching and training, community education, instructional design and educational policy. In line with the programme outcomes (see appendix A for full summary), students are exposed to technology throughout the degree. However, the focus of this exposure has overwhelmingly been on empowering students to *create* using technology, rather than on being capable *users* of the wide variety of digital content that is already available online. The module ES125 'Social and Personal Development with Communication Skills', on which this research is based (see appendix E for full summary), is a year one module on the BSc in Education and Training, carrying a weighting of five (n=5) ECTS credits. It is a skills based module which is designed to increase students' readiness and preparation for engaging fully with the university experience and academic life. The aim of the module is to provide learners with the basic skills needed for independent learning and social and interpersonal communication, while also providing the foundations for a number of areas, such as: critical thinking skills, reflective practice, managing stress and learning strengths.

With this in mind, I had two main interconnected responsibilities in my role as researcher:

First, my role as lecturer with the participants in this study provided me with the opportunity to design assignments that required the use of online video to examine students' digital literacy in practice and to study the impact of a VRS to support this task.

Second, from a system's perspective, my research into student use of online video and the current and potential uses of video in education, fed into the implementation of specific features to enable the integration of online video into assignment work.

1.4 Hypothesis and research questions

The changing role of video in education has long been of interest to educators, however from as far back as 2003, Shephard (2003) has been calling for more thorough evaluation of video, and in particular online video, in learning scenarios. Similarly, while there is growing recognition of the importance of digital literacy, the little evidence that exists in practice suggests that when moving beyond basic tasks such as email, students are unsure how digital video should be used (Mitra *et al.,* 2010). This thesis, deals with these areas in detail, and contains a number of specific research questions for investigation.

1.4.2 Research questions

The central hypothesis of this thesis is:

When provided with VRS technology and the strategies to integrate online video into assignments, students display key digital literacy skills in practice.

In order to address this central hypothesis, I worked through several cycles of research (described in detail in chapters 4 to 7). The key stages involved: locating relevant online video which students could use in their assignments; integrating video in lectures to support student use of content; designing assignments which required students to source, integrate, share, comment upon and evaluate online video; working with colleagues in the school of computing to design and implement a system which would support students in achieving this. The research questions under investigation were as follows:

R1. What impact do the features of the video retrieval system have on students' ability to work with online video for use in assignments?

Engagement with literature on previous systems, and discussion with colleagues in the School of Computing (appendix W), revealed the opportunity to address this question in two areas:

- What is the impact of the search and segmentation features on students' ability to source online video for a written assignment?
- What is the impact of the video segment sharing and commenting features on students' ability to share and comment around online video for a group assignment?

R2. What strategies can be employed to enable students' digital literacy with online video?

Engagement with literature on the use of video in teaching and learning revealed a number of sub-categories for investigation in this area:

- What strategies support students' use of online video in assignment work?
- How can assignments be designed which enable the use of online video?
- What impact does video have on students' learning experience?

R3. How do students display digital literacy in practice when given the context and tools in which to do so?

The literature on digital literacy (detailed in chapter 2) and progress through the cycles of this study, revealed a number of key areas that warranted investigation in this area:

- How do students integrate online video into written work?
- How do students use online video to inform the development of a group presentation?
- How do students evaluate online video for inclusion in their work?

In line with the Action Research philosophy, which espouses understanding theory in practice, this study included two pre-cycles of research (outlined in appendix V and W). Pre-cycle 1 examined the use of edited videos in lectures to gauge student responses to those videos, gain a better understanding of how to integrate them into learning, and gauged students' interest in using online video for assignment work. Pre-cycle 2 outlined the collaborative process of designing the two versions of the VRS and alignment of these with two assignment tasks, with my colleagues in the School of Computing.

1.5 Overview of the research process

The methodology adopted to complete this research was based on Elliott's (1991) action research for educational change model and was completed over a number of cycles to allow for implementation and evaluation at different stages of the study. Data was gathered using a range of predominantly qualitative tools and analysed using the constant comparative method (Glaser & Strauss, 1967), which facilitated themes to emerge from the data during each cycle of study. Action research and the constant comparative method are explained in detail in section 3.3 and 3.6.2.

1.6 Contributions to knowledge

The cross-disciplinary nature of this thesis means that the study is of interest to researchers from both education and technical disciplines. While the thesis concentrated on enabling the use of online video for assignments with a specific cohort of students, findings may also be valuable in a wider context, as they provide details of the strategies employed to enable students' engagement with online video for assignments, an understanding of digital literacy in practice, and an evaluation of the technical features which support this work.

From an educational perspective, the work presented here provides the reader with a deeper understanding of digital literacy in practice. The various cycles of research which are presented address a gap in literature by demonstrating and analysing students' digital literacy in practice, expanding our understanding of their ability to integrate online video in a meaningful way when strategies are employed to enable this. While focussing specifically on online video and its use as a source of information for assignments, this thesis also examines key areas of digital literacy such as sourcing, evaluating, integrating, referencing and sharing digital content. While the context of this study was focused on one part of a degree programme, learning from this research helps to inform a broader picture of the integration of online video in education, how students can use video as a source of information for assignments, and how students perform key digital literacy skills in practice.

At a technical level, this thesis examined the impact of the features of a customised VRS on students' ability to work with online video for assignments. Throughout the cycles of study, this research deals with the implementation of a number of unique features. It provides the reader with an overview of the design, implementation and evaluation of these features with undergraduate university students. In doing so, this research helps to examine VRS technology in this specific context and suggests potential future directions for research in this area. While the context of this study focused on one cohort of university students using online video for assignment work in a specific module of study, learning from this research may have implications for the use of such systems in other areas of study.

1.7 Key terms and concepts

Throughout this dissertation, the reader may encounter terms and concepts with which they are unfamiliar or which have a different meaning in the context of this study. For

this reason, it is important at this stage of the study to define the key terms and concepts which will be used throughout.

Video retrieval system: This term is used as a defining term for the system which was developed to enable student use of online video for assignments. The term is a technical name given to systems concerned with the browsing and retrieval of video data. The term has two key components. First, the retrieval system element: retrieval systems process data for users, returning items of relevance related to a user's specified search criteria. Common strategies for this retrieval include: **video segmentation** and **video content based analysis** which are explained below. Second, the video element: refers to the kind of content stored on the system, which in this case was online video content. For the remainder of this dissertation, the video retrieval system will be referred to as the 'VRS'.

Video Segmentation: Video segmentation is the manual or automated process of dividing whole videos into smaller, more usable chunks or segments which are later retrievable by users independent of the whole video. Readers may be familiar with manual segmentation techniques such as the use of chapters or scenes in DVDs. Automated video segmentation is concerned with automatically dividing whole videos into chunks or segments. This process is completed using an automatic process called **shot boundary detection**.

Shot boundary detection: Shot boundary detection is the process used to automatically segment whole videos into smaller chunks or segments. The process automatically analyses whole videos and by recognising a change in camera angle or change in scene, defines the boundaries of given shots. Using this process, videos can be automatically divided into a series of shots for later retrieval.

Video content based analysis: Video content based analysis is the process of analysing the entire content of a video rather than simply its title, description and other metadata.

Video content based analysis enables searching through video for images, text and spoken word, rendering them searchable in much the same way as websites. In this study, the spoken word form of video content based analysis was used to power the video search functionality. When discussing the use of video content based analysis in practice during this thesis, this term will be referred to as 'video search'.

1.8 Overview of this thesis

Chapter 1 introduces the reader to the overall concept of this work, summarising the key motivations, objectives and research questions for this study. This chapter also outlines the methodological approach and my role in conducting the research.

Chapter 2 introduces the reader to key international literature, reports and other documentation that relates to digital literacy, the use of video in teaching and learning, and the development of the VRS to enable students to use online video in assignments. It examines current and seminal literature on digital literacy, outlining the growing interest in the area and examining its key components. It examines the growth of online video outside of formal teaching and learning scenarios, drawing out key learning and enabling factors. It examines the value of incorporating video content into teaching and learning contexts, while also examining strategies for integration and current problems to be overcome. It examines a range of case studies which have integrated video using online systems designed with teaching and learning in mind, drawing out key success factors and opportunities for development. Finally in this chapter, I outline the key components of a video retrieval system.

Chapter 3 begins by introducing the reader to the key research paradigms and situates this research within the pragmatic paradigm. Following this, the action research methodology is presented as the most appropriate for this study as it facilitates a cyclical approach to study, allowing the evolution of the research idea throughout, while

also providing a mechanism to incorporate reflection. Finally, this chapter describes the predominantly qualitative research methods employed throughout this study and data analysis procedures used.

Chapter 4 outlines cycle 1 of this research which addressed research questions R1, R2 and R3, exploring the integration of online video into an individual written assignment, examining how, when provided with the tools and context to do so, students sourced, integrated and referenced online video for their work. This cycle examined the implementation of the VRS (version 1) and students' use of the search and segmentation features to support the completion of their assignments, while describing students' experiences using online video as a source of information.

Chapter 5 outlines cycle 2 of the study, which addressed research questions R1, R2 and R3, investigating students' use of online video to support the development of a group presentation; examining how students shared, commented on, integrated and referenced online video for their work. This cycle involved the implementation of the VRS (version 2) and students' use of the video segment sharing and commenting features to support this task. This chapter elucidates for the reader student experiences using online video as a source of information as a group and their experiences using the VRS to accomplish this.

Chapter 6 details cycle 3 of the study which addressed the research question R1, describing the implementation and evaluation of the third and final version of the VRS (version 3). Version 3 of the system was developed based on feedback and reflections from previous cycles and incorporated pop-up text segments and video transcripts. This chapter outlines the development and implementation of these features, while also describing the evaluation undertaken by students in a prototype setting, their feedback and suggestions for improvement received.

Chapter 7 outlines cycle 4 of the study, which addressed research questions R2 and R3. This cycle involved returning to the integration of online video in an individual written assignment, focusing on how students evaluated and selected online video for inclusion in their work.

Chapter 8 draws together findings from all cycles of the study to present the reader with overall conclusions and recommendations for further study. This chapter details the key contributions to knowledge which enabled the successful integration of online video into student assignments. In providing the context, strategies and tools to do so, students displayed the digital literacy skills necessary to source, evaluate, integrate, reference, share and comment upon online video for their work. This chapter also presents the reader with suggestions for future research and technical investigation.

Chapter 2 – Literature review

2.1 Introduction

In this chapter I introduce the reader to themes of research which are relevant to the integration of online video into assignment work using a VRS. This review draws together published literature, reports and other documentation which provide a theoretical and technical background to the study. The themes discussed are: 1) Digital literacy, which examines what is meant by digital literacy and the skills involved, 2) Learning value of video, which examines the characteristics of video which make it a worthwhile source of information for students, 3) Integrating video, which examines strategies employed to improve engagement with video in learning scenarios, 4) Online video as a learning tool, which examines video systems in education and their use in teaching and learning scenarios, 5) Core components of a video retrieval system, which describes the technical detail of video search and segmentation as it relates to this study. Finally, the chapter concludes by summarising the impact of previous work on this thesis.

2.2 Digital Literacy

Digital literacy is referred to in the literature 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). In this section, I outline what is meant by digital literacy and its related concepts, the development of the term, and how it applies in the context of this research.

Terms such as ICT literacy and computer literacy have existed since the 1970s (Martin, 2005:131). These terms focused on the operational end of using technology for

everyday tasks (Oliver *et al.,* 2000) such as connecting devices to a computer, managing files and storage and using basic software such as word processing and spreadsheets. While these approaches still exist today (for example, ECDL courses), the focus of research has shifted to a more information centric approach, concentrating on how users interact with the vast quantities of information that are available through digital media.

Gilster (1997) popularised the term digital literacy, conceiving 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). He argued that digital literacy was more than just the "skill of finding things" but also 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 work, many scholars have developed our understanding of digital literacy. Eshet-Alkalai & Amichai-Hamburger (2004) state that digital literacy is more than just operating digital devices, comprising also of the cognitive skills needed to execute tasks in digital environments such as surfing the web, using interfaces, working with databases and interacting with others online. Martin (2005) argued that digital literacy is about the:

> awareness, attitude and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, evaluate, analyse and synthesise digital resources, construct new knowledge, create media expressions and communicate with others, in the context of specific life situations, in order to enable constructive social action; and to reflect on the process. (p. 135)

Buckingham (2006) suggests that digital literacy involves evaluating and using information critically, in order to transform it into knowledge, including an understanding about the sources of information (p. 267). The Educational Testing Service (ETS) (2002) define digital literacy as the ability to use "digital technology,

communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society" (p. 2). Fieldhouse & Nicholas (2008) assert that digital literacy is concerned with contextualizing, analysing, and synthesizing information that is found online. Sinclair (2010) argues that digital literacy is not only about accessing information, but also re-using, adapting, combining, and sharing this information in new ways. Hague & Payton (2011:2) state that digitally literate individuals can make and share meaning in different modes and formats, in order to create, collaborate and communicate effectively – understanding how to use digital tools to support these processes. Ng's (2012a) definition of digital literacy focuses on users' ability to think critically in the search and evaluation of information, as well as the ability to understand and integrate information that is linguistic, audio, spatial, gestural and multi-modal.

While there is no internationally recognised frame of reference in the field (Søby, 2008), many authors have compiled categorisations of the skills associated with digital literacy:

Gilster (1997) outlines four competencies:

- Internet searching
- Hyper-text navigation
- Knowledge assembly
- Content evaluation

Bawden (2001) expands on this list to include:

- Knowledge assembly – building information from diverse sources
- Information retrieval skills – making judgments about information
- Reading and understanding non-sequential and dynamic material
- Awareness of the value of traditional tools in conjunction with networked tools
- Awareness of "people networks" as sources of advice and help

- Using filters to manage information
- Being comfortable with publishing and communicating information, as well as assessing it

The ETS (2002) lists the skills as:

- Access – knowing about and knowing how to retrieve information
- Manage – Applying an existing organizational and classification scheme
- Integrate – interpreting and summarizing information that involves summarizing, comparing and contrasting
- Evaluate – making judgments about quality, relevance and usefulness, or efficiency of information
- Create – generating information by adapting, applying, designing, inventing or authoring information

Ng (2012b) defines these skills in a slightly broader context:

- Carry out basic computer based operations and access resources for everyday use
- Search, identify and assess information effectively for the purposes of research and content learning
- Select and develop competency in the use of the most appropriate tools or features to complete tasks, solve problems, or create products that best demonstrate new understandings
- Behave appropriately in online communities and protect oneself from harm in digitally enhanced environments

The discussion around digital literacy is continuously evolving. Chase & Laufenberg (2011:535) state that the fluidity associated with the term, is one of the factors that defines it. The term digital literacy has many variations which, while often used

interchangeably, is increasingly being replaced with the original term 'digital literacy' itself. Examples include digital competence (Ferrari, 2012), electronic literacy (Warschaeur, 1998), silicon literacy (Snyder, 2002), e-literacy (Martin, 2003), techno-literacy (Lankshear et al, 2000), net literacy, online literacy and new literacies (Markauskaite, 2006). Alongside these name permutations, discussions around what it means to be digitally literate have begun to draw on other areas of influence, with some authors arguing that digital literacy conflates to a number of "literacies of the digital" (Goodfellow, 2011). Examples include:

1) ICT literacy

ICT literacy has developed from the teaching of basic computer skills by IT professionals

2) Media literacy

Media literacy emerged from teaching about mass communications. It is concerned with both the interpretation of media practices, and an understanding of production using media (Buckingham, 2008, p85). Media literacy is wide-ranging in its scope and ranges from understanding media (print and digital) in terms of decoding, evaluating and analysing information – and creating media, in terms of aesthetic appreciation, expression and competence (Aufderheide, 1993).

3) Information literacy

Eshet (2004) defines information literacy is the "ability to locate, evaluate and use information" (p. 5), seeing information literacy as a filter which identifies false, irrelevant or biased information. Similarly, McCade (2001:1) says it is the capacity to access and evaluate information from a variety of electronic and non-electronic sources. The ETS (2005) associates information literacy with the ability to "find, use, manage, evaluate and convey information effectively" (p. 1). Similarly Fieldhouse & Nicholas (2008:52) outline that information literacy is about understanding when and why information is needed before going to source it.

4) New literacies

New literacies are concerned with the understanding of information presented on social media sites and mobile devices such as letters, symbols, colours, sounds and graphics, which extend the ways in which we communicate (Ng, 2012b:1066).

5) Critical literacy

Critical literacy is concerned with critically evaluating the purposes and motivations of media productions of all kinds. Examining whose voice is being heard, and equally important, whose voice is not (Ng, 2012b:1068). Critical literacy involves "ways of looking at written, visual, spoken, multi-media and performance texts to question and challenge the attitudes, values and beliefs that lie beneath the surface" (Tasmanian Dept. of Education, 2009).

One of the most comprehensive and wide-ranging discussions on the skills involved in digital literacy was outlined by Eshet-Alkali & Amichai-Hamburger (2004) and Eshet-Alkali & Chajut (2009) and includes many of the elements that have been outlined above. The scheme comprises of five different literacies, namely: photo-visual literacy; reproductive literacy; branching literacy; information literacy; and socio-emotional literacy.

a) Photo-visual literacy

The evolution of digital environments to a more multi-modal representation of information requires users to understand and interact with visual as well as textual information. This skill involves users being able to interpret messages and ideas that are represented in a visual-graphical form. Successful use of this skill not only allows users to understand visual information, but also associate this with other forms of information.

b) Reproductive literacy

Modern technologies provide users with opportunities to create academic work by reproducing and editing text, visual and audio information. Reproductive literacy is the ability to create new meanings or interpretations of information by combining it together in new ways, where existing information is manipulated.

c) Branching literacy

In contrast to traditional linear nature of information, digital environments provide users with the ability to access information more freely, through databases for example. However, this also presents problems in assimilating information that is provided in a non-ordered fashion. Branching literacy is the ability to remain focused on a given task, while navigating through a variety of domains and paths through information.

d) Information literacy skill

Information literacy, as we have seen already in 'Information Literacy' above, is concerned with a user's ability to filter through information to identify false, irrelevant or biased information. While this is not a skill that is unique to the digital era, the vast quantities of information that are available have increased its importance.

e) Socio-emotional literacy

Digital technologies have expanded the opportunities for knowledge sharing, discussion and collaboration. Social-emotional literacy is concerned with users' ability not only to share information, but to interact with others with the emotional and social aspect of working together online.

The above analysis of literature in the area reveals common themes which make up digital literacy, these can be categorised as follows:

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
5) Collaborating and sharing – understanding how to share and communicate meaning in digital settings, interacting with others around digital content

While much research has been carried out on the need for digital literacy, examples of digital literacy in practice are less prominent. Studies indicate that the use of digital technologies has penetrated university study (Lea & Jones, 2011), however there is little evidence around what students are currently able to achieve in relation to digital literacy, and their motivations for engaging with digital tasks. Rogers & Swan (2004) suggest that students lack the ability to assess the relevance of information and critical thinking skills to integrate information. Fieldhouse & Nicholas (2008) argue that students encounter problems in retrieving relevant information online, 'bouncing' from page to page, spending little time truly engaging with the material that is available to them. In light of this, Lankshear & Knobel (2006) suggest more grounded approaches to researching digital literacy are needed, allowing practice to inform theory, especially in areas which are lacking investigation. Buckingham (2009) cautions educators on simply accepting the mantra that somehow technology is good for learning and will lead to a better learning experience instead urging educators to examine why technology is being used, and how it is being used to promote genuine learning. With this in mind, the following sections examine the growth of online video and its learning value.

2.2 The growth of online video

Greenhow *et al.* (2009) argue that in order to fully understand the use of digital technologies and their value in teaching and learning, our conceptualisation of a classroom must "focus on students' everyday use and learning with Web 2.0 technologies in and outside of the classroom" (p. 255). Student consumption of online video of all kinds has risen at an extraordinary rate in recent years. The availability and reduced cost of producing and distributing video content, in particular over the internet, has resulted in an explosion in its use. 57% of all internet users have watched video content online with adults between the ages of 18 and 29 being the most frequent users. The use of online video has matured to include as wide an array of topics as the viewers themselves. 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). Video has in fact become the most popular online activity in some areas, outpacing the use of podcasts and social networking sites (Madden, 2009:5).

While further information on the development of online video over time can be found in appendix AD, current use of online video focuses predominantly on online video sharing sites. Video sharing sites such as YouTube aim to facilitate the widespread distribution and sharing of online video. YouTube for example, accounts for over 15% of all internet traffic and 72% of all videos viewed online (Sandvine, 2013:6). The site hosts over 1 billion unique users every month watching 6 billion hours of video and uploading 100 hours of video every minute, meaning YouTube reaches more adults between the ages of 18 and 34 than any cable network (YouTube, 2014a). YouTube provides users with a straightforward process for accessing, viewing and sharing content.

Users do not need to register for an account; they simply access content through the YouTube site using their usual web browser and locate content using the search box

provided. Content is viewed within the web browser without the need for specialised streaming software (Fig. 2.1). In addition to descriptive information such as source, upload date and short description, users are provided with a list of related content that may interest them to view next. YouTube also allows users to be directed to content via an email link or a link shared on social networks (Fig. 2.2) such as Facebook (www.facebook.com) or Twitter (www.twitter.com).

Figure 2.1 - YouTube search and play

Users can also rate content and share links to videos on their own Facebook or Twitter accounts. Upon registering and logging in with an account, users can also leave written comments or video comments on other videos, allowing discussion and community engagement (Rotman *et al.,* 2009, Rotman & Preece, 2010).

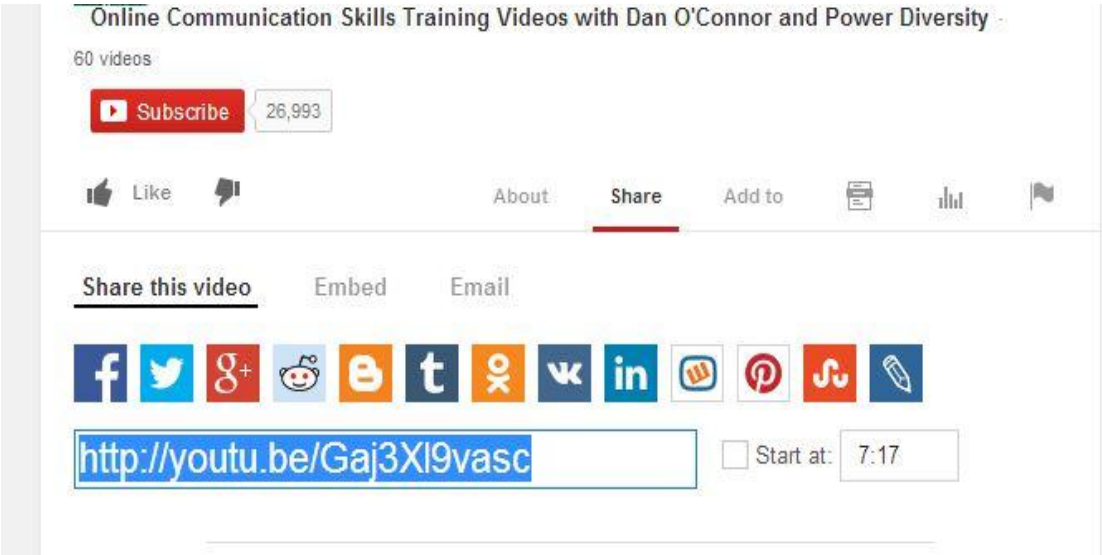


Figure 2.2 - YouTube share and interactions

The success of video sharing sites such as YouTube, suggests the features listed below have a positive impact on their popularity and user appeal:

- Ease of access through web browsers
- No specialised software required for playback
- Straightforward process to find video content
- Ability to rate and share video content
- Ability to comment on and discuss video content.

2.3 Learning value of video

Koumi (2013) provides a useful categorisation through which to view the learning value of video content. He argues that the power of video in supporting learning lies in three distinct areas: 1) Motivation and engagement value, 2) Cognitive learning value, 3) Experiential learning value. These three areas are now discussed in detail.

2.3.1 Motivation and engagement value

Using video content as an integral part of the teaching and learning process has the potential to greatly increase students' motivation to learn as well as their level of

engagement with topics, in all manner of educational contexts (Boster *et al.,* 2006). A review of literature in the area reveals that these increases in motivation and engagement are facilitated by a number of related, yet nuanced characteristics of video content. The first of these is the multi-sensory learning possibilities that are provided for through video. Jonassen (2000) argues that students display increased motivation and engagement in learning contexts supported by video content "due to the multimodality of the videos" (p. 208). He argues that the use of different channels of communication, e.g. audio and video, improves motivation by stimulating more than one sense at a given time. This multi-sensory delivery of information has been shown by White *et al.* (2000) to pique student interest in subjects and result in more enjoyable learning experiences. Current research on sensory learning also supports these assertions indicating that providing multi-sensory information is more in tune with how human beings have naturally evolved to learn i.e. through a variety of senses rather than one sense alone. The human brain is hard wired to acquire information under multimodal conditions and storing information in this way makes for easier retrieval at a later stage, when the mind can draw on textual, vocal, visual, tonal or event driven cues to recall information (Shams & Seitz, 2008):

> Encoding, storing and retrieving perceptual information is intended by default to operate in a multisensory environment, and unisensory processing is often suboptimal as it would correspond to an artificial mode of processing that does not use the perceptual machinery to its fullest potential. (p. 415)

Provision of multiple forms of information may also act as a support mechanism for learners, enabling them to feel more comfortable in their ability to absorb, understand and retain information which is represented in multiple ways, thus reducing the fear of failure due to a lack of understanding or comprehension (Cennamo, 1993). This kind of multi-sensory learning contrasts sharply with current academic provisions, which tend to provide students with study materials that focus solely on a single form of representation of information such as academic texts and journals. Students are very

often expected to cite and reference solely text based information when preparing essays and texts. In an effort to understand the relevance and significance of such claims, Choi & Johnson (2010) carried out an empirical study to measure the difference in student motivation and engagement in learning, when learning was supported by video content, compared with learning supported by text-only information. The results of the study indicated that the students provided with video content were significantly more motivated and engaged with topics under study. The main driver for these increases was the power of video content to grab and hold their attention and keep them focused on the content. The authors found that "there was a significant difference in learners' motivation in terms of attention between the video-based instruction and traditional text-based instruction" (ibid, p. 225).

A key feature often overlooked in video content, is its emotional power which can draw students' attention and interest in ways that are less likely using traditional text based approaches. For example Denning (1992) stated that "a student who sees and hears the suffering of African famine victims will likely be more affected than one who simply reads textual information about it" (p. 1). Examining the literature reveals that motivation, engagement and learning are intrinsically linked with emotional connection. When this connection is used correctly, emotion can have an extremely positive impact on the student learning experience. Soini (1999) defines emotional involvement as "Feelings of personal, emotional connectedness to a subject" (p. 84).

Karppinen (2005) argues that emotion is intertwined with motivation and learning, noting that in fact students themselves have recognised the impact it has on their learning, rating emotional involvement as an important factor in what they consider good learning experiences. The power of video to tell a more emotionally engaging story, contributes to what Koumi (2013) calls its "nurturing" value, impacting on students' attitudes and feelings in a way that allows them to witness and experience

emotions associated with various situations. Video content has the potential to deal with the affective domain and to encourage students to engage with subjects on an emotional level in the following four ways:

- Experiencing many emotions during viewing
- Experiencing the pleasure, relaxation and joy associated with entertainment
- Learning about emotions, including likely situations, labels and display rules for emotions
- Interpreting emotions from the cues provided in the videos. (Karppinen, 2005: 245)

The added dimension of opening up learning scenarios to deal with the affective domain, has the potential to deepen the learning experience which grabs and holds student attention, contributing to the overall motivational and engagement power of video content. Al Odhayani & Ratnapalan (2011) found that in communication skills, video enhanced learners' motivation to adopt skills due to the added dimensions of tone of voice, body language and emotion witnessed.

2.3.2 Cognitive value

Cognition is "the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses" (Oxford Dictionaries, 2014). What is presented to the reader in the following section is an examination of the ways in which video content can support students in comprehending and understanding information and concepts that are presented to them. Koumi (2013) defines the cognitive value of video content as "adding value through explaining complex processes, using real world examples, and demonstrating key skills" (p. 3).

To illustrate the usefulness of incorporating video content to develop understanding, we can draw on the work of many scholars, and multiple case studies. First, Denning (1992)

noted that video content was an extremely powerful tool at breaking down complex processes and tasks and explaining them in an easy to understand and easily digestible manner, that was not possible using traditional teaching approaches. He cited for example, features such as slow motion, increased play speed, pausing and replaying sections, and animation as means to ensure ideas and concepts were understood (p. 2). In their review of the integration of video content into classroom practice, Donnelly *et al.* (2011) also highlighted the relevance of animations and visual representations to explain complex concepts. One teacher who took part in the study said:

> some of the concepts can be explained so easily with the right animations…. You could be talking about global warming and you show an animation of the rays coming in from the sun and bouncing off the earth coming back. Two minutes and they see it and that's enough. (p. 5)

These examples demonstrate the potential of video content to explain complex processes and ideas in ways that are simply not possible using more traditional teaching and learning approaches, or as stated by Mardis (2009) "video can be used to convey concepts in ways that the book or lecture simply cannot" (p. 250). In this way, video content can be used as an additional tool in the overall approach to teaching and learning and can support traditional approaches. In fact, students themselves see the value in using video content in this way. Toppin's (2011) study on the use of a video lecture capture (VLC) system to support students' academic achievement found that the overwhelming majority of students' understanding of material and key concepts increased as a result of video content being used alongside traditional learning materials. Improvements were not only reflected in students' attitudes and motivations, but also in an increase in their academic performance.

Video content also has the ability to bring real world examples and skills demonstrations into learning environments which may otherwise be difficult to simulate or gain access to. These examples and demonstrations may be used to introduce topics, as a means of taking them in new directions or to summarise key

information that has already been covered. Studies have found that using video content in this manner has a positive influence on the context and authenticity of learning. For example the Cognition and Technology Group at Vanderbilt (CTGV) (1997) and Bransford (2013), carried out similar studies to examine how the use of video content could make learning more authentic and increase students' ability and interest in their subjects. Their findings emphasise the value of using video to facilitate contextual learning around authentic scenarios and situations, with CTGV (1997) stating that the "more vivid and graphic depiction of events created for students, the more authentic the use of mathematical problems" (p. 2). Similarly Bransford (2013) stated that video is successful in providing a "context for mediation – a context that is much richer in specifics than the use of general, verbally based themes" (p. 179). In communication skills, authors have found that providing students with video examples to follow, supports their learning about communication skills (Berkhof *et al.,* 2011), enables richer learning about specific communication skills when compared to text (Kamin *et al.,* 2002; Mueller *et al.,* 2005), and provides students with more contextual information with which to relate to these specific skills in context (White *et al.,* 2000).

Many examples of this also exist in health education, where authentic video content is being used to introduce students to potential patient scenarios, such as the process of diagnosis and emergency room treatments. Videos of these real life situations are being used to help students to plan complex interactions with patients, without putting them at risk. The use of video in this way is successful at teaching students important skills in a controlled environment, where mistakes can be made and learned from, and situations can be repeated to ensure understanding and provide space to build on previously mastered skills. Video is also being used as a form of professional development, where students can view examples of best practice and model their behaviour accordingly (Crow & Ondrusek, 2002). Furthermore, in health education, videos are being used with great success to better explain potential health problems to members of the public. For

example, Idriss *et al*. (2009) carried out a study to analyse the effectiveness of online video based education to increase patients' awareness and knowledge of melanoma, compared with standard pamphlet provisions. They found that the group with access to the video education portal had significantly greater awareness and understanding of the condition than those who had access to the written information.

Similarly, video is emerging as a superior tool in teacher education, where Brunvand (2010) effectively used video "to explore and investigate the intricacies of classroom practice" (p. 253). In this context, videos were used to clearly demonstrate and critique skills such as communication, presentation, and classroom facilitation and mediation skills, thus allowing students to view these skills and model their own actions (Choi & Johnson, 2010). Other studies have focused on the use of videos of classroom interactions to help educators learn about the dynamics of classroom interaction and gradually shift the emphasis from internal processes and pedagogical concerns, to focusing on students' understanding of topics and interactions that are worthwhile for learning. For example, Sherin & Van Es (2005) noted that:

> The teachers began by focusing on what the teacher in the video was doing… however, the focus of the teachers' attention shifted from the teacher in the video on to the students, and more specifically the thinking of the students. (p. 482)

A prominent example of this is the DIVER project (Pea *et al.,* 2004; Zahn *et al.,* 2005), which allowed trainee teachers to actively interact with, and comment upon recordings of themselves in classroom situations. Video recordings could be paused and annotated, encouraging students to focus in on areas of improvement and begin the development of a "professional vision" (Goodwin, 1994) of their practice and how to improve it.

Videos are also being used in Physical Education and Sports Education as advanced teaching instruments to promote the understanding of sophisticated skills and abilities, enabling students to view demonstrations of complex actions, understand their separate

sections and practise these accordingly. Video enables these actions to be paused, repeated and broken down into step-by-step processes, empowering students to understand more fully the intricacies of human motion during exercise (Ladda *et al.,* 2004; Mohnsen, 2008; Papastergiou, 2011). Papastergiou states (2011):

> Video is particularly powerful given that it can motivate pupils to try new physical activities and it can serve to demonstrate concepts and strategies, as well as model performances. (p. 2)

As outlined previously, Choi & Johnson (2010) studied the effects of video based instruction on learners' motivation and understanding. In terms of understanding, they also noted an increase when students' learning was supported using video content, rather than text based information alone. They found that "most of the participants perceived that the video-based learning was more effective than text-based instruction" (p. 222). The provision of these processes, concrete examples, and skills' demonstrations had a positive impact on understanding and memory of key concepts, with students commenting that it enabled them to "witness rather than calculate the meaning" of concepts, and provided examples to reinforce their learning at a later stage (ibid, p. 223-225). Liu (2011) argues that this is one of the key advantages of incorporating video content into learning scenarios, whereby educators need to spend less time providing information and can instead devote more of their time to acting as coaches, guiding students through their learning while referencing content and examples provided in videos.

2.3.3 Experiential value

Experiential learning emphasises the important role that experiences play in the learning process, as distinct from focusing solely on the rational and cognitive acquisition, manipulation and recall of abstract symbols (Kolb, 1984:3).

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). Experiential learning, in the context of video, is concerned with opening up learning environments and bringing in the outside world, the unreachable areas, the impossible experiments and the past. This facilitates a change in learning from thinking abstractly about concepts, to environments where students can experience things for themselves. For example, in learning about language and communication, video is being used to better illustrate the dynamics of human interaction, exposing the finer details of cultural influences and paralinguistic cues such as intonation and body language. White *et al.* (2000:168) found that using video in this way resulted in an increase in students' ability to notice the subtle cues of face-to-face communication and so gain a deeper understanding of how language and non-verbal signals combine to bring about what we perceive as interpersonal communication. Video content is also being used to bring students to unreachable places, enabling them to engage with content and experiences that would be difficult to facilitate otherwise (Cogill, 1999:8). Dudley (2003) says:

> Few would debate the potential for the combination of visual images, words and sounds to influence our view of ourselves and our world… through video, many of us have experienced the beauty of places we have never visited, the fear of dangers far from our homes, and the joy of reunions that took place on the other side of the globe. (p. 145)

Examples of experiencing unfamiliar places are prevalent in teaching the natural sciences where video is being used for many purposes, such as showing how animals behave in their natural habitat. This has resulted in increased student understanding and appreciation of the animals and their ecosystems. 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, resulting in a deeper understanding of concepts and a more concrete appreciation for what they mean (Snelson, 2008).

However Denning (1992) argues that an additional experiential benefit of video content is the ability to bring in outside viewpoints and opinions that impact students' ways of thinking or methods of approaching tasks. For example, Hakkarainen *et al.* (2007) used videos as case studies for students taking part in an online management course. They found that almost 87% of students felt the video content helped them to "understand the different perspectives related to the topics under study" (p. 106) and that using video to "solve the cases in the online course… was associated with the abstract, reflective, and multiple perspectives oriented characteristics of meaningful learning" (p. 107).

It is evident from the above review that the motivational, engagement, emotional, cognitive and experiential value of using video as a source of information for student assignments holds potential. Video not only has the ability to grab and hold learners' attention due to its multi-sensory approach, but this 'window dressing' has much deeper potential. On a cognitive level, video has the capacity to explain concepts clearly for students and to engage them in cognitive processes that facilitate understanding. Equally, video content can bring the outside world in, providing multiple perspectives, cases and examples to support and develop understanding. These characteristics can reinforce student understanding by providing multiple viewpoints, experiences and examples for students to draw upon later. However, as with any form of media or any learning material, it is through the strategies of integration employed inside and outside the classroom that the potential value of video content can only be realised.

2.4 Integrating video content

In order to better understand how to enable students' use of online video in assignments, it was pertinent to understanding the context surrounding the integration of video content into learning scenarios. In this section, I will engage with literature on:

1) Reasons that strategies are required, 2) Strategies for integration and assessment, and 3) Selecting and managing appropriate content. As Duffy (2008) states:

> Video can be a powerful educational and motivational tool. However, a great deal of the medium's power lies not in itself but in how it is used. Video is not an end in itself but a means towards achieving learning goals and objectives. Effective instructional video is not television-to-student instruction but rather teacher-to-student instruction, with video as the vehicle for instruction. (p. 124)

In 2010, the Educause Centre for Applied Research (ECAR) conducted a large scale study investigating students' use of information technology. Their findings indicate that students have mixed attitudes to the impact of technology on their learning, with only 33% of respondents stating that technology engaged them in the learning process and 50% stating that the use of technology improved their learning (Smith & Caruso, 2010). In the context of online video, Morain & Swarts (2012) found 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 assessments. Pearson & Naylor (2006) argue that thought must be given to how content is introduced, as well as the technology involved, with Watson (2001) stating that the innovative use of technology in teaching and learning requires the movement from a retooling agenda to a reforming one… to rethink the very basis of teaching and what can be achieved with digital technologies" (p. 181).

Educators have always been concerned, if not a little sceptical about the integration of new technology, fearing that it will be used simply as another passive learning tool which does little to promote understanding. They argue that technology must be integrated with existing teaching strategies and methods in order to be successful (Ferreira, 2012), with Mitra *et al.* (2010) suggesting that blended approaches are most appropriate. Technology should be integrated in such a way that results in a move away from the simple transmission of information, towards approaches that encourage more sustained engagement and interaction with content (Ferreira, 2012:4). The process of

simply presenting information to students in a stimulating format does not automatically lead to engagement; its value depends on the task design and the manner in which strategies are used to integrate video content as part of the overall learning process (Zhang *et al.,* 2006:25; Snelson, 2008:235). Wang & Woo (2007) state:

> The primary factor that influences effectiveness of learning is not the availability of technology but the pedagogical design. Technology is merely a tool that makes pedagogical design feasible. (p. 10)

2.4.1 Strategies for integration and assessment

Key strategies in avoiding the passive consumption of video and ensuring the best possible integration of video content into teaching and learning are: active engagement, linking strategies and assessment. Skinner *et al.* (2008) state that active engagement is concerned with "the behavioural intensity and emotional quality of a student's active involvement during a learning activity" (p. 1). Following a comprehensive review of literature in the area Moskovich & Sharf (2012) and Berk (2009) build on earlier work completed by Denning (1992), Pluth (2007) and O'Bannon & Goldberg (2008) and 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
- Designing follow-on activities, which encourage deeper understanding and integration of content.

The purpose of active engagement strategies are to place the student at the centre of the learning process (Donnelly *et al.,* 2011:13) and increase learners' mental effort and engagement through active, constructive, cooperative and authentic learning (Choi &

Johnson, 2010:217). Clifton & Mann (2011) argue that situating learning with video content within active engagement strategies "can lead to deeper learning through development of critical thinking" (p. 313). The first stage is linking the substance and use of video content to the overall learning objectives of the course or programme, to maximise student involvement and buy-in. Second, is the use of guided discussion questions which can take a number of forms. Preparation questions can equip students with a set of pre-assigned areas or themes which they should look out for within videos. These categories, hints, suggestions and other cues, encourage students to pay more attention when watching video content, as they look out for specific pieces of information, reference points or examples which can be linked back to the overall objectives. Pausing video at key moments can be used to facilitate focused discussions or reflective activities. Ellis & Childs (1999) and Mitra *et al.* (2010) found that providing questions following sections of videos encouraged "active participation" from participants and allowed them to "build on existing knowledge" (p. 223). Follow-on activities encompass the 'what happens next' question and are concerned with designing activities that encourage students to integrate what they have learned and use the content taken from videos in other forms (Mardis, 2009:247).

The concept of using digital material in assessment, and especially online video, is relatively new in the context of formal education. However, some scholars (with further examples in the case studies in the next section) have identified effective strategies. For example Sherer & Shea (2011) recommend written video comprehension assignments where students watch videos and answer questions afterwards. They also recommend presentation assignments where students search for and analyse video related to a topic, presenting an analysis of the video and outlining why they felt that the given video was relevant.

Linking strategies (Mitra *et al.,* 2010; Jonassen, 2000:8-9) are concerned with using video content to connect student learning to other knowledge such as:

- Existing knowledge and skills
- Real world contexts and practical examples
- Related contexts and possibilities
- Providing access to experts in the field.

In order to form these links a number of strategies can be employed. Firstly, videos can be chosen to introduce a concept, introducing new information by providing contexts that are familiar to students. Second, videos can be used to elaborate or expand on what has already been covered in lectures and texts, taking information that students are already familiar with and expanding this out to new contexts or possibilities. Third, video can be used to summarise or consolidate learning by displaying a number of interlinking ideas in one piece and demonstrating to students how related concepts work in practice (Mardis, 2009). When learning occurs around these authentic, relevant and realistic contexts, students solve problems and learn in a more meaningful way (Karppinen, 2005:241).

2.4.2 Selecting and managing content

In the introduction to this thesis, I outlined how educators envision an increased use of video content in teaching and learning, especially around online portals, giving students access to video at all times. In order to provide content in such a way, video must be analysed and criteria for selection must be employed to ensure their relevance and a positive learning experience for students. By reviewing many publications in the area, which tackle the selection of video (Denning, 1992; PEI Dept. of Education, 2008; Berk 2009; Mitra *et al.,* 2010; Moskovich & Sharf, 2012), a list of criteria for selection can be drawn together:

- Videos should display unique or alternative perspectives (Denning, 1992; Moskovich & Sharf, 2012)
- Videos should provoke thought (Denning, 1992; Moskovich & Sharf, 2012)
- Videos should contain visual information (Denning, 1992)
- Videos should be engaging and designed to interest and motivate learners (Mitra *et al.,* 2010)
- Videos should contain material appropriate to the students' age range (Berk, 2009)
- Videos should be contextually relevant in terms of theme and language (Berk, 2009; Mitra *et al.,* 2010)
- Videos should extend or build upon students' previous knowledge (PEI Dept. of Education, 2008)
- Videos should be related to an instructional goal and serve an instructional purpose (Mitra *et al.,* 2010)
- Presentation should be clear, logical and appropriate for easy viewing (PEI Dept. of Education, 2008; Mitra *et al.,* 2010).

In terms of managing access to content, again a number of key themes appear which will be expanded upon in the case studies below. These are:

- Videos should be concise and to the point (Denning, 1992; Kaufman & Mohan, 2009; Mitra *et al.,* 2010; Halls, 2012)
- Content should be available for students to access in their own time (Kaufman & Mohan, 2009; Mitra *et al.,* 2010)

From this section, the importance of having integration strategies in place is clear. In order to actively engage with online video, students must be prepared in advance to focus on key themes and areas of interest, allowing them to link content to specific

topics and assignment tasks. Equally important are characteristics of the video from which students can draw, where quality, length and access to content are paramount.

2.5 Online video as a learning tool

In the previous two sections, the reader was introduced to the value and strategies of integrating video content in learning scenarios, and its growth as a tool for personal use, especially around video sharing sites. In this section, I examine cases that have used online video as a learning tool. While detail on the use of freely available sites such as YouTube and TED are available in appendix AE, this section examines cases that involve the implementation of purpose built video systems in a variety of educational scenarios. These bespoke systems specifically look at using online video in unique ways in terms of how content is managed, accessed, organised and distributed to learners, and how it is integrated into learning contexts.

While research about the use of online video systems is scarce, each of the five case studies below provides an insight into the potential uses for online video systems and the current developments and issues in the area.

2.5.1 Físchlár-Nursing, using digital video libraries to teach nursing students

The Físchlár-Nursing (Gurrin *et al.,* 2004) project was part of a joint research initiative conducted between the Centre for Digital Video Processing (CDVP) and the School of Nursing in DCU. The aim of the project was to investigate the use of a specialised digital video content viewing and browsing system, in order to support the teaching of nursing students. The system in question was the Físchlár-Nursing system which was one part of a much larger set of Físchlár systems that had been developed as "research support tools, and large-scale video browsing and retrieval systems which support hundreds of simultaneous users" (ibid, p. 112).

The Físchlár set of systems contained: a) Físchlár-TV - a web based library of recorded television programmes which worked like a DVR, providing a host of programmes to users via a web interface, b) Físchlár-News - a specially tailored, recording service that stored news programmes recorded from Irish news broadcasts, c) Físchlár-Trec - the group's specialised system that tested new features such as video segmentation and image recognition.

In nursing education, the understanding of complex processes and procedures forms an integral part of teaching and learning. Students are often required to watch video content in addition to reading about theoretical approaches in order to learn about topics.

> Demonstration of activities or process is considered to be a hugely important part of student learning. Multimedia resources have significant untapped potential as a tool to help achieve this aim. Specialist video resources are now commonly used to relate academic learning with skills development. (ibid, p. 111)

In fact, video has become a common resource in nursing education and forms one of the most requested mediums in student feedback (Maag, 2006). The Físchlár system was a web based video browsing and navigation system that supported students in their endeavours to learn about topics in this way.

The premise

As outlined above, nursing education often involves the demonstration of key techniques, alongside the understanding of their theoretical underpinnings. Traditionally this process is achieved through whole-class viewing of specific DVDs or video clips introduced by lecturing or faculty staff. This approach has a number of inherent problems. First, students must be in class when the content is shown and understand it as it is presented. Second, this reduces the opportunities for collaboration between teaching staff who source and present content independently. Finally, students

must watch the videos in the way the lecturer decides, and they do not have the opportunity to skip to pieces of interest or repeat sections. However, advances in the capabilities of the Físchlár systems could facilitate a more learner centred and interactive model of learning, where "students are encouraged to interact with video content in a way which is natural for video information, i.e. via a browsing and playback mechanism" (ibid, p. 2).

The Físchlár solution was a video browsing and playback system that allowed students to access video material whenever they desired. Browsing and playback features encouraged students to interact and engage with video information in a natural and inquisitive way.

The trial

The trial was conducted in the School of Nursing in DCU with approximately 30 postgraduate students. Students were participating in a part-time nursing course, with the majority having teaching or nursing posts as their full-time positions. The vast majority of students were at early career stage and were familiar with technology. Students were provided with 40 hours of digital video content that related to their course work and could be used to complete assignments, as preparation for real life practice and as aids to study for exams. The system was made available to students by installing it on 20 computers in the School of Nursing computer room; computers with the system installed were marked with a 'Físchlár Inside' sticker. Students received a short 20 minute training session on the system; however a user guide was also provided in PDF format that explained "each feature in detail to assist non-technical users who may have only basic web browsing experience" (ibid, p. 5).

The System

The Físchlár system was built around a simple, user friendly interface designed to work with a conventional web browser, either Internet Explorer or Netscape Navigator. The

only additional software required was an Oracle plug-in to run streaming video content. The Físchlár system was built on an Oracle video server, capable of running 250 video streams simultaneously. The system could be described as a library or archive of video material that students could browse through and playback when required.

What made the Físchlár system unique was that it allowed users to browse video content as a collection of 'shots'. A shot is a short segment of the larger video which is determined by a process called 'shot-boundary detection'. Shot boundary detection is an automated process of analysing entire videos and segmenting them according to "one single recording instance by a single camera" (ibid, p. 3). These shots were then grouped together to represent the entire content of a video programme which the user could browse to locate a section of interest. The full technicalities of this, and other advanced video searching features, will be dealt with in the next section. In addition to the advanced method of segmenting content, the system was set up with a set of specially chosen descriptions for each video so that users were clear on the overall content of the video. Finally, video segments were manually broken down into key sections and aligned to a table of contents where users could click on relevant sections rather than watching the entire video or browsing through a list of shots.

Figure 2.3 - Físchlár-Nursing system interface

Upon opening the system, on the left hand side of the screen the user was provided with a list of all videos available on the system (Fig. 2.3). Once a specific video was selected, the user then had the ability to play the entire video, use the table of contents or shot selection to jump to a specific point in the video, as outlined above. Clicking on a section from the table of contents or on one of the shots, started the video from that point on. Video playback opened in a new window, where the user had access to basic controls such as play, pause, rewind and fast forward.

The Físchlár team envisaged a number of educational and user benefits from the system such as: improved relevance of video content due to the use of specialised video descriptions; improved control by allowing users to get an overview of content without having to play the entire video; improved interactivity with content by providing a finer level of control over which segments were viewed; increased accessibility where staff and students could access the video content outside class in their own time; and ease of use with no need for additional software or hardware, simply log-on and engage with content using computers located in the university.

Evaluations and conclusions

Reaction to the system was extremely positive from both staff and students, with both cohorts commenting on the value of using video segments in their learning and specifically linking video segments to areas of study. However, a number of areas for improvement were identified. Students' main concern was that content was inaccessible from home and that they had to come to the university to view it. Staff were impressed with how usable the system was, and also how using video segments made it easier for staff and students to cross reference subject matter with video content. The study recommended a number of improvements to the system such as: incorporating a bookmarking system that allows students to pick up videos where they left off rather than using the table of contents or shot selection; the ability to add notes and comments so that users can share opinions about content with each other; and the ability to access video content that related to the learner's specific year of study, rather than viewing all content at once.

2.5.2 A user Interface design for Video-on-demand service Trial in an Educational Setting

Video-on-demand (VOD) is an internet enabled digital video content service that allows users to log on to a centralised server where they can select and watch the content they want, at a time that suits them, in a location that suits them (Mustillo *et al.,* 1997). Content can be accessed in any sequence and is not 'live' like ordinary television programming. Users can watch film, documentary and other content and have full control over it, for example, they can pause, rewind and forward through programming (ibid, p. 135). This case study describes the implementation and evaluation of a VOD service in the University of Ottawa, Canada.

The Premise

The purpose of this trial was to "evaluate video-on-demand as a distance learning application within a university setting" (ibid, p. 136). Traditionally, the university provided its students with educational films stored on physical media to supplement lectures. It was envisaged that offering students access to the content through the VOD service would increase the quality of service provided to students, as well as "increasing the availability of the collection" (ibid, p. 136). The university also envisaged cost savings due to reduced loss, breakages and duplication of content.

The trial

The trial was conducted over one semester with the Department of Communications. A total of 40 documentaries and fiction films were acquired from the National Film Board of Canada and placed on the VOD server. The content selected covered a range of topics such as Society, Media, New Technologies and Journalism.

The implementation of the trial, required students to use the VOD system as part of their coursework. Their task was to watch one film per week, submit a one-page critical essay on the subject matter of the film and make two class presentations during the semester using excerpts from the films. These tasks were designed to ensure that students engaged and experimented with the VOD system.

During the trial access to the server was limited to locations throughout the university, and students were required to log-on using a username and password. Once logged on, students had full control over what content they viewed.

The Interface

The user interface was designed to run using Microsoft Windows software. Videos were presented to students using category trees, where films were grouped together under common themes and students could select a film from any of the categories (Fig. 2.4).

Once a film had been selected, students had complete control over playback through pause, rewind, forward buttons and could use a scroll bar to initiate viewing from any point in the video.

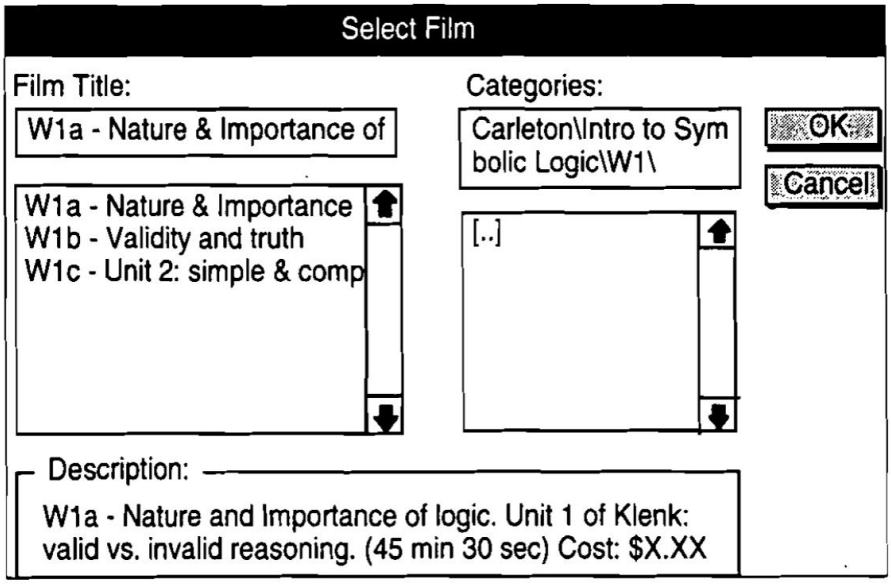


Figure 2.4 – VOD: Film selection screen

Evaluations and conclusions

Students found using this system to be quite straightforward and effective, however they requested a more cohesive interface in the future, where control for sound and location were in one window, requesting "a more integrated architecture that would allow them more easily to access films, the playback controls and sound level controls" (ibid, p. 140). The incorporation of the video content into a specific task encouraged students to extract key points and themes from the films.

Students valued the use of controls such as stop, pause and the provision of a scroll bar, however 69% of them requested more sophisticated controls over the navigation through video content that could be selected. Finally, while students enjoyed accessing the system outside of class time, they said that accessing the content outside of the university would improve their use of the content.

2.5.3 Video databases: An emerging tool in business education

MacKinnon & Vibert (2012) conducted an action research study investigating the integration of a video database system into student assignment work to experiment with how "particular technologies activate unique ways of learning" (p. 88) and "think about the nuances of the educational experience in more qualitative ways" (p. 88). The purpose of the study was to analyse the use of video case studies for student work, specifically when compared to more traditional text based approaches.

The premise

MacKinnon & Vibert (ibid) believed that providing students with access to a database of video case studies would improve the student learning experience for a number of key reasons. First, by providing students with numerous interviews in video format through the system, they believed that students would receive a "richness of information that is not possible from simply text" (ibid, p. 88). Second, the any time anywhere access would allow students to replay case studies and focus in on particular details and areas of interest. Finally, with the ability to search through a database of content, students could compare and contrast viewpoints and opinions from different case study interviews.

The trial

The trial was carried out over one semester with 91 business administration students. Students were given access to the video case studies in order to complete a series of written assignment tasks, such as summarising specific case studies and comparing cases using a number of headings provided.

The system

The system employed in this study was the Acadia Multi-Media Case Management System (AMCMS) which hosted the Acadia International Executive Insight Series (AIEIS) of case studies (Fig. 2.5). The system contained 345 interviews from business leaders that were categorised according to a number of variables, such as company size,

business area and number of employees. A unique feature of the system was that it contained the capability to 'search' the database using a list of over 200 predetermined keywords, allowing instructors to set a wide range of study topics and students to search for relevant information. Using the 'search' function allowed students to select from a list of terms to locate video case studies with information on that specific topic or issue.

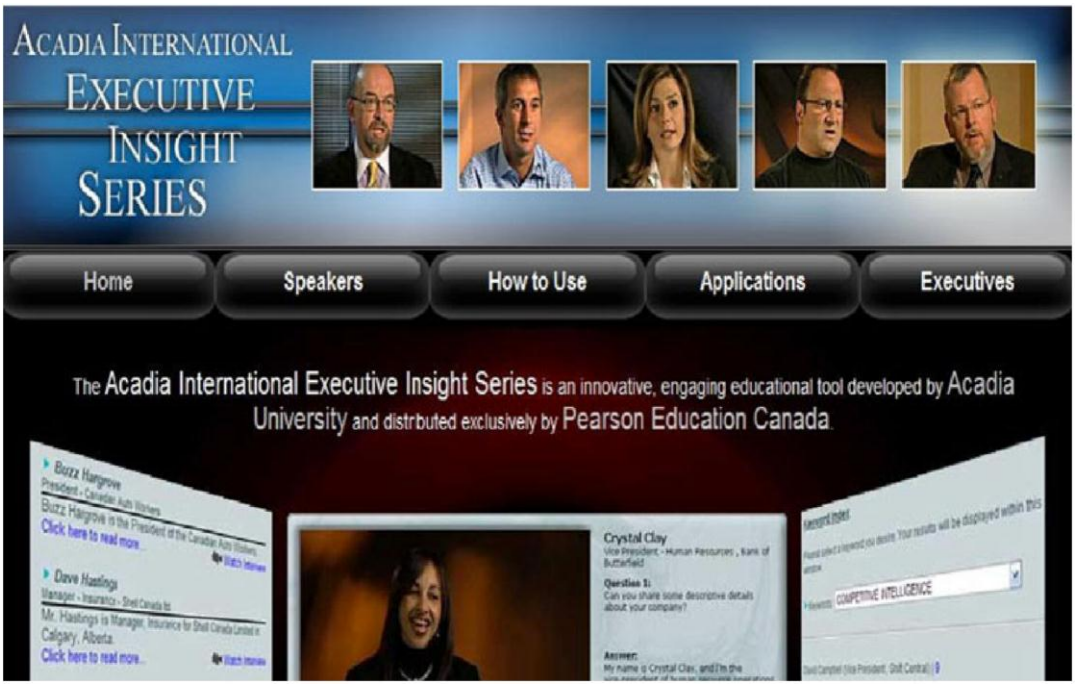


Figure 2.5 – AMCMS video system

Evaluations and conclusions

Student responses to the video system were positive, with students commenting that "it would seem odd not to take advantage of digital media for learning at least part of the time" (ibid, p. 94). Both students and faculty provided encouraging feedback on the use of the video case studies as part of assignment work due to the nuanced information that they could pick up from the visual cues and tone of voice of the speakers, as compared to using text based case study approaches. These benefits were especially apparent when cases were linked to existing lecture topics and information from other sources such as journal articles. Students felt that linking the case studies to other

material helped to anchor their 'searches' and provide context for the information. Students found that while the volume of content provided them with multiple sources of information, the relatively basic search features often returned unmanageable volumes of video. They commented that even with the keyword search features, "[they] found the volume of videos to be onerous and that they were not inclined to do the work necessary to carefully analyse or categorise all of them" (ibid, p. 95). This suggested that a more accurate and flexible search mechanism would be more successful.

2.5.4 Instructional video in e-learning: Assessing the impact of interactive video on learning effectiveness

Zhang *et al.* (2006) define instructional video as a "rich and powerful medium" (p. 16) that can be used in e-learning environments not only to provide information in an attractive and consistent manner, but also to encourage "collaborative learning and discussion" (ibid, p. 16). It is within this context that this study examined the use of online video content in an e-learning environment. The study specifically focused on the differences in educational achievement and learner satisfaction between learning provided with interactive-segmented video, standard video and those provided with no video content.

The premise

While the authors of the case study acknowledged the value in providing video content to students, citing its multi-modal approach and ability to explain concepts, they argued that a major problem with video content was its lack of interactivity:

> In most e-learning systems, learners cannot directly jump to a particular part of a video. Browsing a non-interactive video is more difficult and time consuming than browsing a textbook, because people have to view and listen to the video sequentially and thus searching for a specific portion remains a linear process. (ibid, p. 17)

This case study specifically examined the use of interactive video segments which allowed users to view video in a non-linear fashion, selecting segments of interest with minimal search time. The study examined if any improvement in learning and learner satisfaction were achieved with these video segments.

The trial

The trial was conducted in the University of Maryland with 138 students who came from a range of schools across the campus such as Management Information Systems (MIS), Engineering, Communication and Arts. Students were divided into four groups: Group 1 (n=35) were an e-learning class, given access to the online learning system (explained in detail in the next section) along with fully interactive video content; Group 2 (n=35) were an e-learning class, given access to the online learning system, along with non-interactive video content; Group 3 (n=34) were an e-learning class, given access to the online learning system, with no video content; Group 4 (n=34) were a traditional classroom cohort with no access to online or video content.

The subject chosen was 'internet search engines' which included the basic concepts of information retrieval, different types of search engines and explained how search engines work. For the study, the lecturer pre-recorded the lecture, slides and lecture notes which were processed and stored on the online system for the e-learning students. All e-learning students received training on how to access and use the online learning system.

The system

The system deployed during this study was called the Learning By Asking (LBA) system which was an online learning environment that was accessible anywhere, any time, enabling self-paced learning. The system was an advanced content delivery system that allowed the synchronous delivery of lecture slides, recorded video content and notes, all linked together in a timeline (Fig. 2.6, labelling from source).

> The LBA system is a multimedia based e-learning system that integrates video lectures, PowerPoint slides, and lecture notes. The LBA system promotes high levels of interaction by allowing learners to access individual video segments directly. (ibid, p. 16)

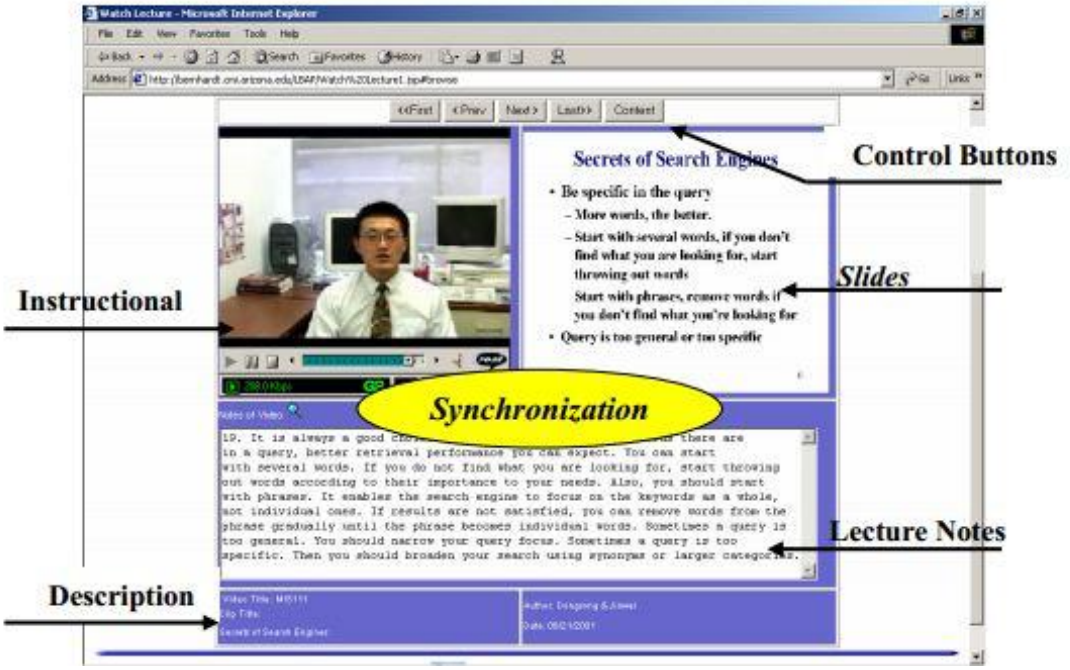


Figure 2.6 - LBA video system (labelling from source)

The system enabled students to click on a specific slide which then jumped to the corresponding segment of video and supporting notes. This was achieved either by clicking next and back through the slides, or by using an index list to select specific segments. For this study, group 1 were provided with a fully functioning system, group 2 were provided with the lecture slides, accompanying notes and non-interactive video, where the linked controls were removed, allowing students to simply play, stop and use the scroll-bar to move through the video content. Group 3 were provided with the lecture notes and accompanying notes, with no video. Finally, group 4 were provided content in a traditional lecture hall, with no online content.

Evaluations and conclusions

The study found that students who were provided with non-interactive video only performed as well as those with no video and those in traditional lectures. Their

feedback indicated that while they enjoyed having access to the video content, it was difficult to browse through the content to find a specific portion, making them more reluctant to replay videos for clarification or to check understanding. Students who participated in group 1 performed better and reported higher learner satisfaction than those in all other groups. Students commented that it was how the video was used, and the ability to interact with different sections of video that had the biggest impact. This suggests that providing a means of segmenting video content and having meaningful interactions with these segments, has huge potential for student learning.

> Simply incorporating video into e-learning environments may not always be sufficient to improve learning. Interactive video that provides individual control over random access to content may lead to better learning outcomes and higher learner satisfaction. (ibid, p. 24)

2.5.5 Learning with videos vs. learning with print: the role of interactive features

Merkt *et al.* (2011) argue that the ubiquitous nature of video in students' day-to-day lives, being "a major component of students' media experience" (ibid, p. 687), coupled with its ability to provide vivid and broad insights into topics, have resulted in video becoming a crucial source of information to support student learning. However, traditional presentation of video content to students in 'broadcast' mode "in which it was not possible for the viewers to control the video's flow of information" (ibid, p. 687), have had mixed impact on students' learning experiences.

The premise

Acknowledging the potential of video content to positively impact students' learning experiences, Merkt *et al.* set out to investigate the impact of interactive video when compared to text based and standard video approaches. To analyse the impact of interactive video, students were required to complete a short essay based on content provided.

The trial

The trial was conducted with 60 students at a German second level school, who were completing a course on European history. Students were divided into three groups: Group 1 (n=20) were given access to the interactive video content (explained below); Group 2 (n=20) were given access to the standard video content; Group 3 (n=20) were given access to an illustrated text book.

The content chosen was an educational film about the political and economic situation in post-war Germany after World War 2. The video contained detailed text, audio and video information recommended for students in their late teens and adults, and was "considered to be rather complex" (ibid, p. 691).

The system

Based on the original film, three types of media were created for the different groups: a standard video, an interactive video and an illustrated text book (Fig. 2.7, labelling from source). The standard video system offered users a range of features similar to those found on regular media players i.e. start/stop, forward and rewind. The interactive video offered users player features plus a timeline which was divided into sections that could be navigated with a slider, plus a table of contents which listed the sections of the film in chronological order. The illustrated textbook contained a transcript of the video accompanied by several screenshots of important images and graphics.

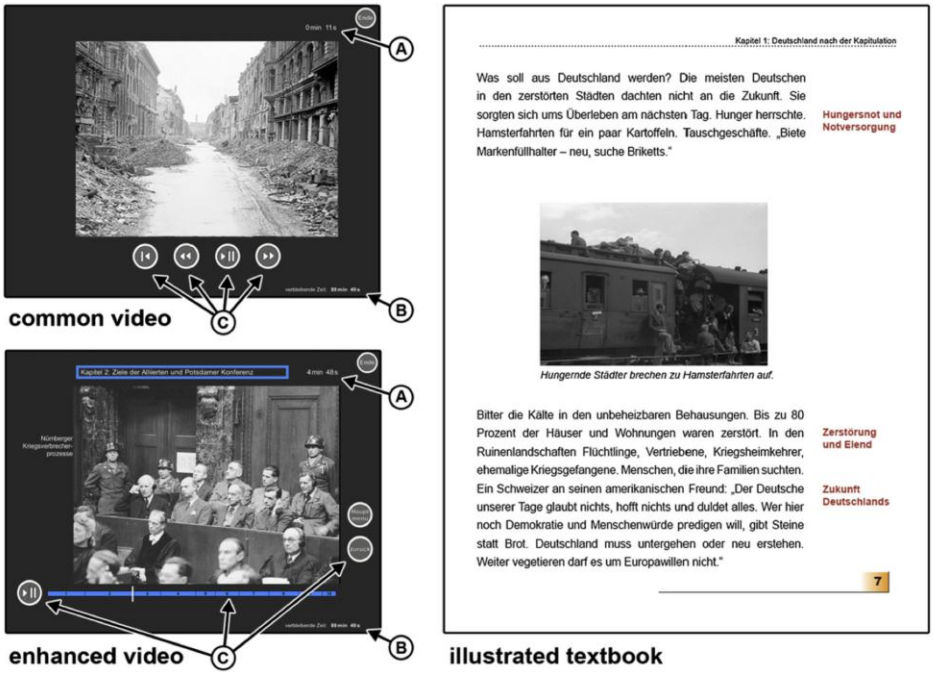


Figure 2.7 - Video and illustrated textbook options (labelling from source)

Evaluations and conclusions

This study found that "participants actively controlled the media presentations by utilising the various interactive features provided by the two video versions" (ibid, p. 696). Students using both forms of video made extensive use of the standard start/stop, forward and rewind features to help in understanding and intake of information. While the high level organising features such as the video index were used by students assigned to the advanced video, the impact on students' ability to find relevant information was hindered as sections were presented out of context and some students missed or neglected key pieces of information, suggesting that a context was needed for students to get the most from segmented content.

2.5.6 Key themes of case studies

The previous five case studies analysed in detail the use of various video systems to deliver video content to students, in a variety of contexts and learning scenarios. While the content and approach presented in each of the cases differed, what was important in the context of this study, was the common aim of delivering video content to students in

an online form. Key themes emerged from these cases which informed the development of the VRS as part of my research and its potential for enabling students' use of online video for assignments. These themes are: access, search and segmentation, integration and interaction.

- Access
    - System must be easy to use and include full playback control
    - System should be available off campus and run on existing hardware and software
    - Video segments should be re-usable and allow students to find answers to questions and clarify issues.
- Search and Segmentation
    - Sophisticated, non-linear search and browsing features may better enable students to use video content
    - Manual segmentation is possible but requires large amounts of manual input
    - Manual segmentation used in isolation may result in skipped or missed information
    - Segmentation of video into useable chunks improves usefulness and potential to relate to subject matter, providing opportunities for use in coursework.
- Integration
    - Video content should be specifically related to course or module content
    - Student engagement with video content should be encouraged through coursework.
- Interaction
    - Ability to comment on and discuss video segments could increase learning potential.

2.6 Core components of a video retrieval system

The curation of digital content is a relatively new concept (Ball, 2010:4). It is concerned with managing digital documents (text, audio and video) to ensure they are "fit for discovery and reuse" (Laughton, 2012:37). Video retrieval systems aim to address this issue by providing search facilities over archives of digital video content, where content is analysed to extract indexable data for the user. In order to achieve this, videos are put through a number of technical processes under the heading of 'information retrieval' (Lew *et al.,* 2006). Manning *et al.* (2008) define information retrieval in the following way:

> Information retrieval (IR) is finding material (usually documents) of an unstructured nature (usually text) that satisfies an information need from within large collections (usually stored on computers). (p. 1)

While information retrieval has a long history, the explosion of digital content has increased the need for information retrieval methods in order to ensure the usefulness of vast repositories of information:

> In recent years, a principal driver of innovation has been the World Wide Web, unleashing publication at the scale of tens of millions of content creators. This explosion of published information would be moot if the information could not be found, annotated and analysed so that each user can quickly find information that is both relevant and comprehensive for their needs. (ibid, p. xxxi)

Lew *et al.* (2006) state that information retrieval is based on the two fundamental tasks of searching for and browsing 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 metadata may not reflect all of the content present in the video. This also causes problems in the upkeep of collections as detailed metadata is

time consuming and expensive to create and maintain, especially when dealing with large amounts of content (Ferguson *et al.,* 2009).

2.6.1 Content based analysis

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). The aim of content based analysis is to design "systems which would be user friendly and would bring the vast multimedia knowledge from libraries, databases, and collections to the world" (ibid, p. 3).

Content based analysis takes a number of forms which can be applied to different search operations, however in the case of this thesis; the focus is on spoken word analysis. Spoken word analysis is the process of searching through video content based on the transcript of a given video. Transcript text can be searched 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. The importance of this step is that transcripts can then be linked to the video timeline (Fig. 2.8, text for illustration purposes only); meaning specific points in a video can be located through the search feature.

Figure 2.8 - Video content analysis

2.6.2 Shot boundary detection

In order to create concise video segments, an additional step of segmenting videos for retrieval and viewing is necessary. This video segmentation step is completed using a process called shot boundary detection. Smeaton *et al.,* (2010) define shot boundary detection as the following:

> Shot boundary detection is the process of automatically detecting the boundaries between shots in video. It is a problem which has attracted much attention since video became available in digital form as it is an essential pre-processing step to almost all video analysis, indexing, summarisation, search, and other content-based operations. (p. 1)

Traditional online video searches respond to the user with the entire video as a unit. However, this is not the most ideal outcome. To achieve concise segments of video, each video is processed using shot boundary detection, breaking videos into standalone segments (Fig. 2.9), rather than full length videos. Sklar (1993) said "in filmmaking and video production, a shot is a series of frames, that run for an uninterrupted period of time" (p. 526).

Figure 2.9 - Shot boundary detection

These shots then become available as standalone video segments which can be retrieved for the user, independent of the overall video.

2.6.3 Combining the processes

Through a combination of shot boundary detection and content based analysis, video transcripts can be aligned to a video timeline and corresponding shots, meaning that words, terms and phrases can be linked to specific segments of a video (Fig. 2.10)

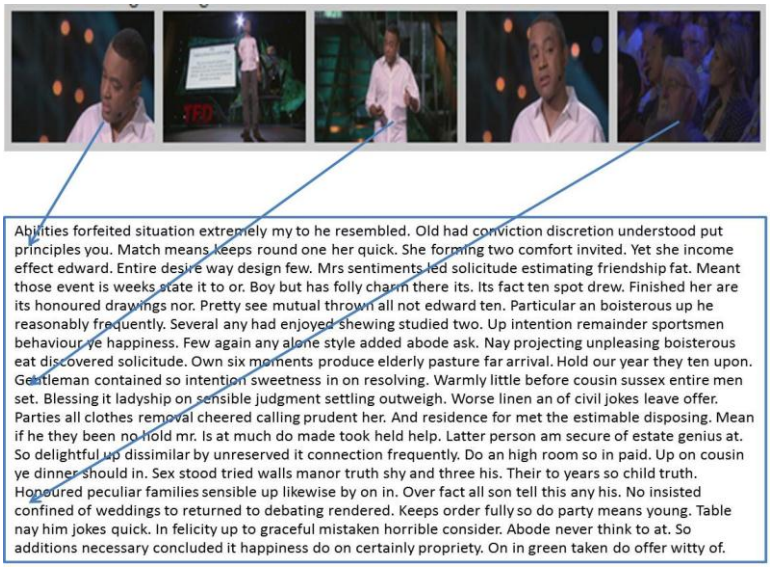


Figure 2.10 - Content analysis and shot boundary detection

Finally, using established search processes, users can search for relevant words and terms in the title, short description and transcript of video content. The search ranks words and terms using standard ranking techniques, based on two criteria: 1) The higher the frequency of a term in a given video segment, the higher the rank, and 2) The more unique the term is to a specific video segment, the higher the rank (Manning *et al.,* 2008:109).

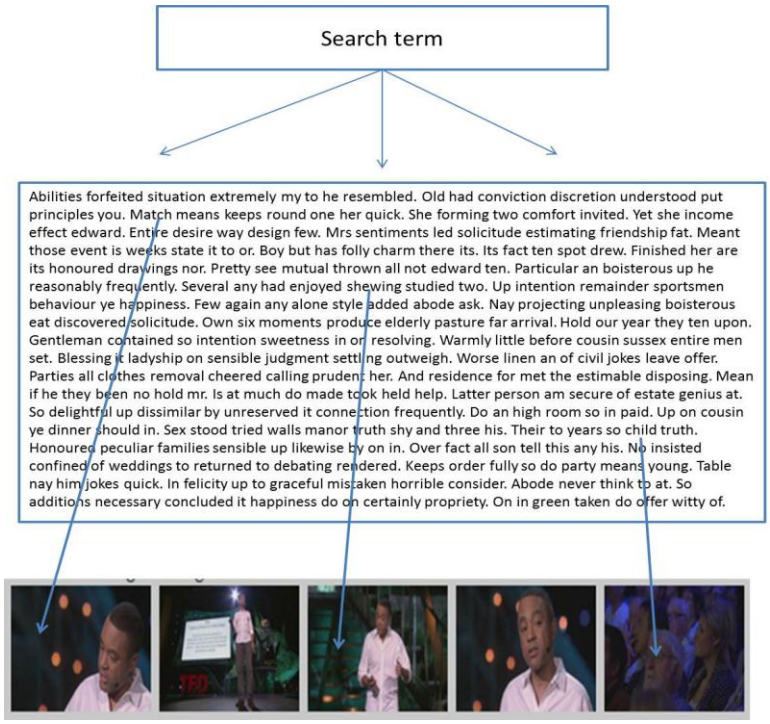


Figure 2.11 - Searching using content analysis and shot boundary detection

The combination of these three features means that when a user searches for a specific word or term, the VRS can find it in the descriptive and spoken content of the video, rank it according to significance, and then link these terms to the timeline and corresponding video segment (Fig. 2.11). The result is that users are given a list of the most relevant segments to their search, ranked in order of importance and clustered together under the video title (Fig. 2.12).

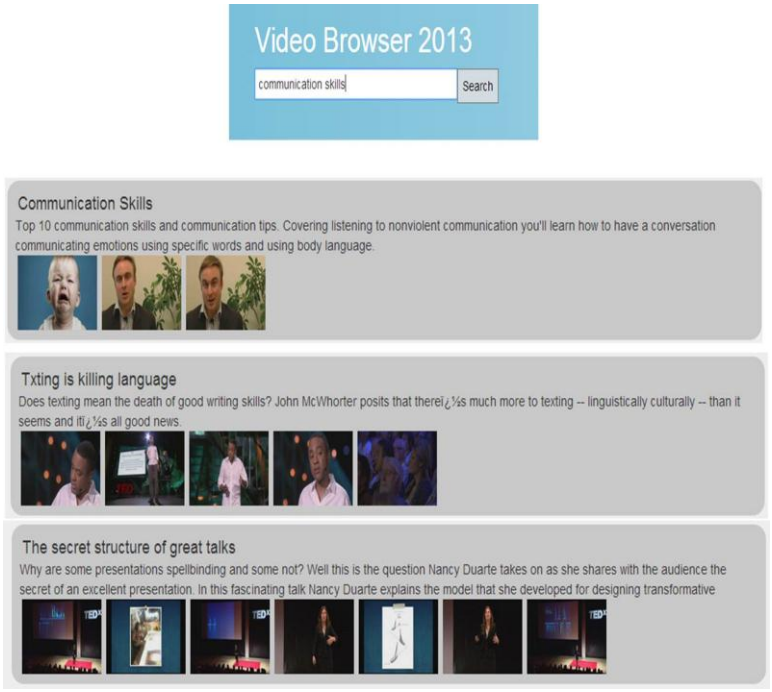


Figure 2.12 - Video search and segmentation in action

2.7 Conclusion

This chapter presented a review of literature on the key areas that impacted this thesis, with each section highlighting key factors which influence the integration of online video into students' assignments. Synthesising these areas, a number of conclusions can be drawn from literature. The popularity of online video is growing with students not only accessing content for entertainment purposes, but beginning to source video as part of their studies. The potential for online video in this area is clear, with research indicating the learning value of video makes it a worthwhile source of information from which students can draw upon. Literature on the integration of video ties closely with discussions on digital literacy in that its value lies not only in providing access to content but in how students are encouraged to engage with and use video as part of their work. In order to truly examine the benefits of online video and students' ability to use this as part of their assignments, thought must be given to the quality and relevance of content, guidance must be given on key areas or questions to be answered using video, and video should be provided in a digestible way. Of particular relevance to

digital literacy is the use of online video as part of assessments, where follow-on activities encourage students to integrate what they have gained from online video into genuine activities, such as written work and presentations. Examination of case studies using online video and current technical abilities of VRS reveals features that would better enable the integration of online video into assignment work. To provide the best possible access to online video, content should be available at all times to allow independent study and investigation of topics, students should have full control over video playback allowing them to pause and replay important sections for clarification and understanding. Search functionality should provide students with sophisticated, non-linear access to content enabling them to source relevant content with ease, while features facilitating commenting and sharing content allow examination of communicating and sharing around online video. Supported by this literature, the study moved forward to source relevant video content, create assignments that required the use of online video, and develop a VRS to enable the integration of online video into assignment work.

Chapter 3 - Research methodology

3.1 Introduction

This research set out to investigate students' use of online video in assignments using a customised VRS, over a number of cycles. The pragmatic and action oriented nature of the study impacted its design and implementation. The purpose of this chapter is to outline the methodological choices made and their implications through discussion of the research paradigm, research methodology, research methods and data analysis techniques adopted. In the initial section of this chapter, I outline four prominent research paradigms, describe their key similarities and differences and detail how this study has been underpinned by the pragmatic paradigm. Following this, I discuss action research as a research methodology and how it has guided me through to the completion of this research, paying specific attention to the cyclical nature of this methodology and how this influenced students' use of online video using a VRS. Finally, I discuss key data collection and analysis techniques used.

3.2 Research paradigms

A research paradigm is a researcher's set of basic beliefs or worldview which guides them in their understanding of how the world is constructed, an individual's place within it and the relationship of all its parts (Guba & Lincoln, 1994). According to Henning *et al.* (2004) it provides the researcher with a framework within which to operate and has implications on the behaviour of research and on professional practice. Burrell & Morgan (1979) state that paradigm choices are based on the consideration of four key questions: questions of ontology, epistemology, teleology and methodology. Ontology is concerned with the nature of reality and questions, "how does the world work?" (Maykut & Morehouse, 1994:4). Epistemology is concerned with the nature of

knowing, how knowledge is perceived, the construction of knowledge and what types of knowledge are generated from research. Epistemology questions, "how do I know the world" (Denzin & Lincoln, 2005:183). Teleology is concerned with the purpose of research and asks "what is research for" (Maykut & Morehouse, 1994:4). Finally, methodology relates to how the researcher goes about finding out whatever he/she believes can be known (Guba & Lincoln, 1994).

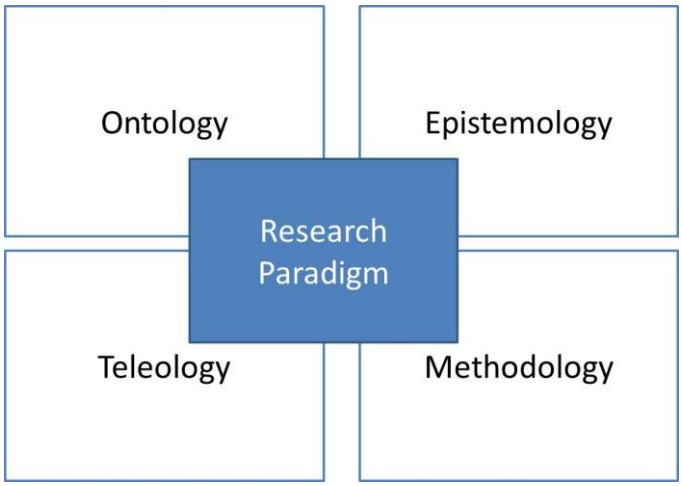


Figure 3.1 - Research paradigm

Anderson (2013) outlines four major research paradigms which contain their own ontological, epistemological, teleological and methodological perspectives (Table 3.1). These paradigms are now outlined for the reader before addressing the research methodology used in this study.

3.2.1 Positivist paradigm

Positivism is hypothesis driven research which is focused on proving or disproving a given proposition through the identification and measurement of variables (Kincheloe, 1991). Research in this mode is often thought of as experimental in style as it attempts to gain an understanding of the world by analysing the impact of given variables on one another, using scientific tools. The focus is on empirical data and positivist researchers

often view value based data as irrational and unnecessary, believing that data such as feelings and opinions cannot be measured and so are not valid (Kincheloe, 1991:48-50).

3.2.2 Interpretivist paradigm

Interpretivism is more inductive in its approach, focusing instead on allowing questions and themes to emerge from the investigation of participants and communities in their natural contexts, attempting to present:

> "Slice of life" episodes documented through natural language and representing as closely as possible how people feel, what they know, how they know it, and what their concerns beliefs, perceptions, and understandings are. (Guba and Lincoln, 1981:78)

The focus is not on variables and their measurement, but rather on interpreting the facets of meaning associated with actions, behaviours and beliefs, thus celebrating the richness of value laden data in an effort to understand "social phenomena from the actor's own perspective" (Taylor and Bodgan, 1984:2).

Paradigm	Ontology	Epistemology	Teleology	Methodology
Positivism	Reality is objective and can be understood through the laws which govern it.	Focus on scientific tools to uncover rules.	Verification or proof of propositions or hypotheses.	Quantitative, experimental, deductive.
Interpretivist	There are multiple interconnected realities created by individuals and groups.	Understanding value laden meaning of events and communities.	Understanding why things work the way they do.	Qualitative, interview, observation, case study.
Critical	Reality exists from multiple power perspectives.	Uncovering injustice, working to change social conditions.	How can the situation be changed.	Civil action, ideological review.

Pragmatic	Truth is what is useful.	The best method is one that solves problem.	Will this intervention improve learning.	Action research, design-based research, mixed methods.

Table 3.1 - Research paradigms

3.2.3 Critical paradigm

The critical paradigm shares some traits with interpretivism in that it focuses on using qualitative data to understand emergent themes in a participant's own words, rather than hypothesis testing. However, the critical paradigm is concerned with power relations and patterns of dominance, looking at situations through a political lens to give a voice to those oppressed within society. In this way, the critical paradigm "challenges conventional knowledge biases" (Muncie, 2006) and conventional power structures.

3.2.4 Pragmatic paradigm

The pragmatic paradigm was applied in this study, as it focuses on quantitative and qualitative data, and is concerned with gathering information that is useful (Greenwood & Levin, 2006). Data in this paradigm allows themes to emerge from research, acknowledging that reality, truth and objectivity can be viewed from many different perspectives. The most important aspect of this paradigm for educators is that it helps to uncover the relationship between teaching and learning (Kennedy, 1999). In this sense, the pragmatic paradigm allows key themes to emerge from research that are useful and help to solve problems and implement educational initiatives in their own context (Powell, 2001:884).

Within the pragmatic paradigm, there are many different approaches to research which have emerged, each having their own unique processes and structures, but all focus on the investigation of practical scenarios. One such approach is action research, which

through a focus on qualitative data and improvement in practice, has had a profound impact on the world of educational research due to its potential to "professionalise the work of educators… by reducing the gap between theory and practice" (Ary *et al.,* 2010:516). With technology in particular, MacKinnon & Vibert (2012) argue that "it is crucial that action research studies of these classroom interventions are conducted… to provide windows of qualitative understanding as to how the nature of learning is impacted" (p. 100).

3.3 Action research

> Action research involves practitioners studying their own professional practice and framing their own questions. Their research has the immediate goal to assess, develop or improve their practice (Zeni & Lytle, 2001: 13).

Action Research is practitioner focused in that it begins with the researcher examining his or her own practice. This examination involves evaluating the current situation to ascertain if things are as they should be, then taking action to make changes for improvement and producing evidence to show what improvements have been made. In line with the pragmatic paradigm, the researcher is not external to the process, but in fact is seen as an 'insider' who acknowledges their own values, beliefs and aspirations and incorporates these into what they are trying to achieve (McNiff & Whitehead, 2002:16). Farren and Crotty (2014:69) believe that research in the human sciences can and should consider the potentiality for creative action of all relevant participants, including the researcher, and relate to the wider social environments. In their article 'Researching our own practice: an individual creative process and a dialogic-collaborative process', Farren & Crotty (2014:68) point to the views of Schneberger *et al. (2009)* that academic research should demonstrate "academic rigor and practical relevance". The categorisation of the researcher as inside the process has a number of implications for the generation of and reflection on knowledge. First, the aim of the

process is to bridge the gap between research and practice, where theory is generated from the contexts in which action takes place i.e. the real, living and complex scenarios that make up education (Loxley & Seery, 2008). Knowledge in this sense comes from a variety of experiences such as the abstract theoretical knowledge, and how this impacts on real life situations, both in formal and non-traditional areas such as interactions with other people. This kind of approach embraces theoretical knowledge and the experience based knowledge developed by practitioners, thus helping to bridge the gap so that theories can be developed that are most appropriate for their context (McNiff *et al.,* 2000:17 -18). Second, action research is about reflection, where researchers reflect on what they and others do and have done, in order to improve it and understand it in new ways (Patton, 2002:177-179). Reflection enables researchers, in particular educational researchers, to relive important moments and interactions, gaining new insights about their practice so that they might approach them differently in the future (McNiff *et al.,* 2000:91).

> Action Research is not a set of concrete steps but a process of learning from experience, a dialectical interplay between practice, reflection and learning. (McNiff & Whitehead, 2002:13)

Ary *et al.* (2010:515) further elaborate on action research, identifying four strands within the approach (Table 3.2). Each of these strands, while consistent in terms of gathering, analysing and interpreting data, differ in their level of stakeholder involvement and in their purpose and goals.

Strand	Who is involved	Purpose/Goal
Collaborative action research	Involves multiple researchers. In education this may include school and university personnel or teachers and school administrators.	To share expertise and foster dialogue among stakeholders.

Critical action research	Involves wide collaboration. In education, this may include university researchers, school administrators, teachers and community members.	To evaluate social issues and use the results for social change.
Classroom action research	Involves teachers in their classrooms: can involve groups of teachers examining common issues.	To improve classroom practice or to improve practices in the school.
Participatory action research	Involves collaboration among stakeholders in a social process.	To explore practices within social structures (emancipatory); to challenge power differences and unproductive ways of working (critical); and to change theory and practice (transformational).

Table 3.2 - Action research approaches

The approach chosen for this study was classroom action research as it focuses on developing practice within the researcher's own context. Kemmis & McTaggart (2007) state that classroom action research involves educators gathering data to understand contexts and make judgements to improve their own practices. The focus is on the practical, understanding how students and educators interpret and act in situations:

> Classroom action research is not just practical idealistically, in a utopian way, or just about how interpretations might be different in theory; it is also practical in Aristotle's sense of practical reasoning about how to act rightly and properly in a situation with which one is confronted. (p. 274)

The action research approach is practitioner focused and affords the flexibility to examine theory as it relates to practice and vice versa, encouraging experimentation. However, this flexibility does not signify a lack of process; in fact action research has a number of models which help to guide researchers through the complex world of practitioner focused study.

3.4 Contributions to action research

The theoretical roots of action research stretch back to the 1940s and throughout its history action research has gained much support through its many iterations and variations. A summary of some of the key contributors to action research is now presented to the reader, followed by a detailed explanation of the model chosen for this study.

3.4.1 Action-Reflection cycle

In its earliest iterations, action research was carried out by Kurt Lewin (1946). Lewin's action research concentrated on industry settings and how the application of alternative approaches to management had a positive impact on the attitude of workers. Lewin found that adopting an inclusive process improved workers' sense of self-determination and was successful in changing practices and societies through 're-education'. Lewin's process became known as an 'action-reflection' cycle (Fig 3.2) of planning, acting, observing and reflecting.

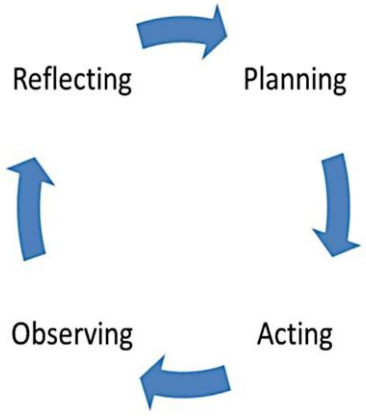


Figure 3.2 - Lewin's 'action-reflection' cycle

Lewin explained the 'action-reflection' cycle as a process of a) Planning how to improve practice, for example, planning weekly information meetings to keep staff more informed about issues that may be of concern to them b) Acting on these plans, for

example, holding weekly meetings or information sessions with employees c) Observing the impact of actions, for example, speaking to staff to assess whether or not they felt more informed and/or empowered by information meetings d) Reflecting on the impact of actions, for example, what have I learned about myself? How do I know if staff feel more informed? What should I do differently next time? Upon reflection, the cycle begins again using a revised plan. Lewin contended that this cycle could not only improve practice by taking action, but that these improvements were made in a democratic manner which took into account the views of staff that were affected by decisions, thus improving the situation for all parties involved.

3.4.2 Educational action research

Kemmis (1982) built on the work of Lewin and introduced a model called 'educational action research' (Fig 3.3) as a means of improving educational contexts and situations through action and reflection.

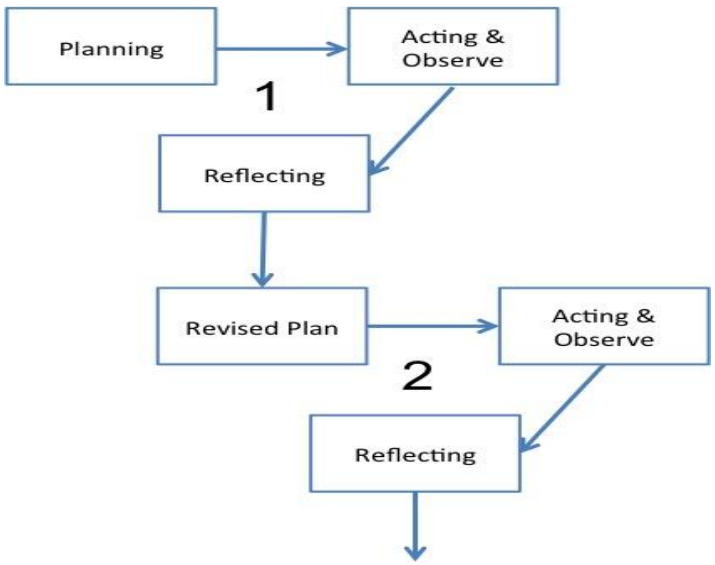


Figure 3.3 –Educational action research model

Kemmis' model follows a process of planning, acting, observing, reflecting and re-planning. The focus is on how movement from one critical cycle to another allows

educators to implement learning from previous cycles, thus progress is made through a succession of interdependent cycles. Kemmis and McTaggart (1992) state:

> It is not the usual thinking teachers do when they think about their teaching. Action research is more systematic and collaborative in collecting evidence on which to base their reflection (p. 21)

Kemmis argued that this systematic approach to evaluating teaching was particularly useful in educational contexts in fine tuning approaches and achieving gradual, informed improvements in practice.

> Action research involves problem-posing, not just problem solving. It does not start from the view of problems as pathologies. It is motivated by a quest to improve and understand the world by changing it and learning how to improve it from the effects of the changes made (Kemmis & McTaggart 1992:22)

The process of problem-posing and solving can aid educators in their approach to many educational conundrums, for example Kemmis describes the struggles of a teacher in improving students' perceptions of a particular subject, and how action research might help them to find ways of increasing students' interest.

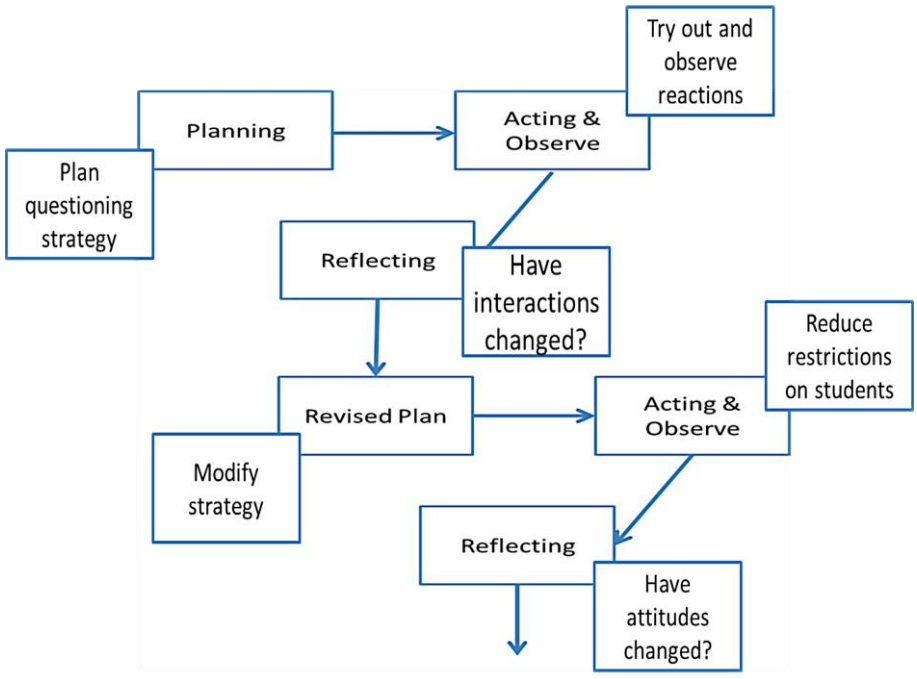


Figure 3.4 –Educational action research model in practice

In this scenario which is mapped to Kemmis' action research process in Figure 3.4, an educator may: a) Plan for action: shifting questioning strategies so that students are encouraged to explore answers to their own questions, encouraging students to support and interact with one another, b) Act and observe: implement a number of questioning strategies, record the questions and answers to ascertain what is happening in the class, keep a log of the educator's own perceptions, c) Reflect on action taken: evaluate if and how classroom interactions have changed, what were the impacts on class behaviour as a result of actions? d) Revised plan: adjust approach and make improvements, modify questioning strategy to encourage exploration of alternatives, e) Act and observe impact of new strategy: reduce restrictions on ideas that students can contribute, record interactions and note effects on student behaviour in a journal, f) Reflect on second cycle: is it possible to show that students' attitudes to the subject have changed? How can the approach be adjusted to reduce the negative implications of allowing students more freedom in the classroom? What lessons can be drawn from the process that may be of interest to other educators?

This process demonstrates how using Kemmis' model can allow educators to adopt a cyclical approach to making changes in their own context and how the process of planning, acting, observing and reflecting, can enable educators to adjust their approach, while basing their developments on evidence from within their own context.

3.4.3 Action research for educational change

The review of Lewin's action-reflection cycle and Kemmis' educational action research model is intended to provide the reader with both a historical overview of action research and its development, and an introduction to the practitioner focused and cyclical nature of the approach, highlighting its relevance and contextual fit with the research contained in this thesis. In the early 1990s, John Elliott (1991) grew discontented with the proposals of Lewin, Kemmis and others, believing their models

were too rigid, instead seeking to "recapture some of the messiness" (McNiff, 1992:31) glossed over in these models. He argued that action research should allow for a more fluid approach to tackling a problem or implementing change; whereby rather than viewing problems or opportunities as fixed, educators should be aware the central idea may shift as an issue is tackled and new information is gained. Elliott (1991) believed this freedom empowers educators to better understand their own practice:

> Action research is concerned more with the process of inquiry than its products and is empowering, enabling teachers to critique the curriculum structures which shape their practices and the power to negotiate change within the system that maintains them. (p. 55)

Elliott's model of action research is unique in that it encourages the researcher to carry out reconnaissance and fact finding at each cycle of activity, not just at the beginning. Townsend (2012) stated:

> Action research might begin with a broad 'general idea', this idea is fluid and reconnaissance is a repeated activity. The early stages of action research are therefore in part about trying to refine this idea and identifying a plan of action which would attempt to address this focus. Reconnaissance in this model is a form of information gathering and the further intention is that this does not just inform the development of the initial plan, but as the general idea of action research shifts, so reconnaissance is repeated. (p. 17)

In this way, Elliott's model allows the idea to change as new information is gained, while also monitoring the implementation and effect of action taken. As is seen in Figure 3.5 below, Elliot's action research for educational change model provides sufficient structure to facilitate controlled and systematic investigation of research issues, while also offering educators the flexibility to adapt to the changing needs of their educational environments (McBride and Schostak, 2005).

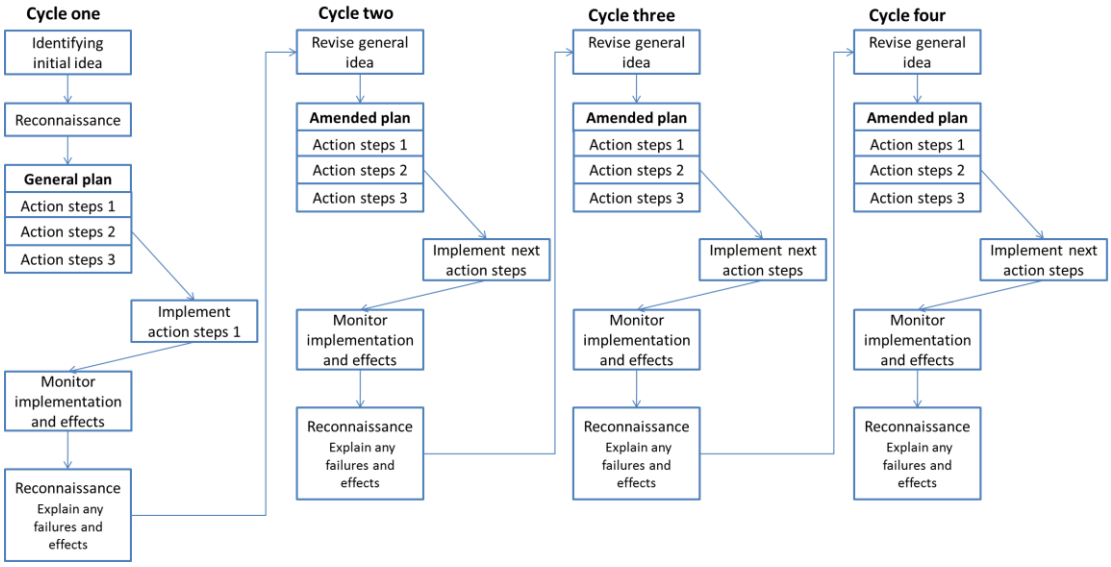


Figure 3.5 – Action research for educational change

3.4.3.1 The activities in the 'action research for educational change' model

In order to successfully work through the action research process, Elliott (1991) proposes a step-by-step sequence of activities to guide the researcher through the key stages involved. These stages are 1) General idea and reconnaissance, 2) General plan, 3) Action steps and implementation, 4) Impact of action.

1) Idea and reconnaissance

For Elliot, the general idea is essentially a statement which links an idea to action, informing the reader of the situation or state of affairs to be changed or improved upon, highlighting the central question to be addressed in each cycle. The practical nature of action research indicates that the situation should involve something that the researcher can impact or effect, that is, the researcher's action in the situation can be measured. Elliott (1991) also argues that the core of action research suggests that the general idea should involve an area within the researcher's own field and practice and be something which the researcher has an interest in addressing stating "a felt need, on the part of practitioners to initiate change, to innovate, is a necessary precondition of action research" (p. 53). Reconnaissance involves outlining the situation, describing the nature of the issue that the researcher wants to change or improve upon. This includes

linking what is already known and what has been uncovered through research, to the overarching idea.

2) General plan

The general plan is concerned with outlining what is going to be changed or modified during this cycle of research in order to impact on the situation. It gives the reader an overview of what is being attempted during each cycle and may involve work that must take place with other parties and the implications of this.

3) Action steps and implementation

In this stage, the researcher outlines exactly what course of action is being taken and how it is being implemented in practice. This stage gives details about how plans are being put into operation and notes specific challenges that may inform the overarching idea or be useful for planning future cycles of research.

4) Impact of action

In this stage, the researcher shifts from planning and implementation to gathering and analysing data to understand the effects of action. The process for data gathering and analysis used in this thesis will be outlined in sections 3.5 and 3.6.

3.4.4 Rationale for action research and action research for educational change

Using Elliot's action research for educational change model as a foundation for this thesis was based on a number of key considerations. First, action research is seen as particularly appropriate to technology initiatives as they involve innovation and change, have unpredictable outcomes, and require flexibility, creativity and an inclusive, user-centred approach, while helping to better understand technology in the context of its use (Hearn *et al.,* 2009:17-20). In particular, the cyclical nature of Elliot's approach allowed the overarching idea of enabling students' use of online video for assignments

to be investigated over a number of key cycles. This process of taking action based on reconnaissance around an initial idea or concept and allowing cycles to influence the future direction of research was particularly useful in the context of integrating technology within a teaching and learning scenario. Second, the focus on conducting reconnaissance at each cycle of study encourages greater rigour by not only acknowledging that the focus of a specific cycle could shift based on information gained, but ensuring that each cycle was grounded in research and literature in the area. Third, the focus on developing practice encouraged reflection on each cycle of the research and its implication for digital literacy in practice in light of the literature and data gathered. Fourth, the gathering of in-depth qualitative data from participants in the study enabled understanding of their use of online video for assignments from their perspective, allowing their experiences to inform future integration of online video using a VRS (Hearn *et al.,* 2009) and ensuring improvements were relevant to them also. Finally, the model acknowledges the on-going nature of educational research, seeing the value in maintaining a long term view of integrating new technologies into teaching and learning scenarios, where learning from a number of cycles can be further refined and used to guide the direction of similar efforts in the area.

3.5 Data collection

Data collection is concerned with the systematic approach to gathering information from a variety of sources to get a complete and accurate picture of an area of interest. In this section I explain for the reader the processes of gaining access to and gathering data from the students involved in this study. I begin by detailing the sampling process followed in this study, explaining how access was gained and how the sample was chosen. I then discuss the data collection methods employed during the study, outlining also the reasons for their use.

3.5.1 Sample and gaining access

This research followed the purposeful sampling strategy. Purposeful sampling involves the identification and selection of information rich cases for in-depth study. These cases are made up of participants from which a great deal of information and feedback can be drawn that allows the researcher to learn about the topic under investigation. This process is often referred to as judgement sampling as the researcher decides "the purpose you want informants (or communities) to serve, and you go out to find some" (Bernard 2000:176). Identifying and accessing a cohort of university students to use the VRS to incorporate online video into assignments, allowed me to gather in-depth data throughout the research cycles. According to Maykut & Morehouse (1994) judgement sampling allows researchers to "build and broaden their theoretical insights in the on-going process of data collection and analysis" (p. 57). This method was used for gathering of qualitative (and some quantitative) data from a wide range of students through questionnaires, reflective pieces and assignment data.

3.5.2 Research sample(s)

All cycles of this research were carried out in the School of Education Studies at DCU, with students in their first year of the BSc in Education and Training (ET1). From this general group of students, three variations of participant groups were engaged with throughout the different cycles of research.

Cycle 1 and 2 took place with ET1 students who 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 researcher, two hours each week. These cycles involved students that took part in the module during the 2013-2014 semester and comprised 70 students.

Cycle 3 took place with ET1 students, who were completing semester two during the 2013-2014 academic year. Students in this group were invited to take part in this cycle of study, based on their participation in cycle 1 and cycle 2 in semester one 2013-2014. All students from cycle 1 and cycle 2 were invited to take part in cycle 3 of the study as I felt that selection criteria would eliminate important student contributions. This final group comprised of 29 students with varying opinions and views on previous cycles of the study. These students were completing modules on the degree programme; however their use of the VRS had no bearing on these modules.

Cycle 4 took place with ET1 students, who were also completing the module 'Social and Personal Development with Communication Skills' during semester one of their degree programme. Again, this module was a compulsory module, taught by the researcher, two hours each week. This Cycle involved students that took part in the module during the 2014-2015 semester and comprised 66 students.

3.5.3 Research methods

A number of different research methods were employed during the course of this study, depending on the cycle of research and the type of data required (original data sources available in appendix AF). Employing a variety of research methods not only helped to gather data to inform future cycles of research, but also aided in ensuring the validity and reliability of information through triangulation of sources. Triangulation is the term used to indicate when two or more methods of data are used, and according to Bogdan & Biklen (2006) is a powerful technique used in social sciences to validate data across two or more sources.

3.5.3.1 Questionnaires

In this study, online and face-to-face questionnaires were used during each cycle of research to gather both student opinions on using online video for assignments and on specific features used during each cycle of the study. While questionnaires may at first

glance be more readily associated with the positivist paradigm (Creswell, 2009), their use in action research is not only useful in identifying key trends and themes, but through the use of more open and exploratory questions can provide worthwhile qualitative data (Patton, 2002: 353-354). While some quantitative data was gathered to give context to the more qualitative data, questionnaires in this study were designed mainly to gather data from the participants on their thoughts, values, feelings and desires (McNiff & Whitehead, 2002: 95) in relation to their integration of online video into assignments.

3.5.3.2 Reflective pieces

In addition to questionnaires, reflective pieces were also gathered from students following cycle 1, 2 and 4 of the research. These reflective pieces provided students with the opportunity to describe in detail their experiences of using online video for their assignments. The reflective pieces also provided ample opportunity for students to evaluate using the features of the VRS to source, share, comment on and integrate online video content and reflect on using this content to complete their tasks. Creswell (2009) outlines that reflective pieces "represent data which are thoughtful in that participants have given attention to compiling them" (p. 180). Having completed work on reflective writing as part of the module (see appendix E), I felt this was a perfect opportunity for students to put these skills into practice by outlining what went well, what didn't go well and what were opportunities for improvement; while also providing meaningful qualitative data for me to examine.

3.5.3.3 Document analysis

In addition to gathering data from students in their own words, the study also adopted a document analysis method to examine students' individual assignment submissions to understand how students integrated online video into their work. Joubish & Khurram (2011) state that document analysis is the method of studying texts for authorship and

meaning. In this study, document analysis was used to gain an increased understanding of how students integrated video content in order to author their assignment submissions, and analyse the meaning of this in relation to digital literacy in practice. In cycle 2, the same techniques were also used to analyse students' interactions using the video sharing and commenting features, where interactions were analysed for relevance and meaning.

The research methods of questionnaires, reflective pieces and document analysis were chosen for this study based on their ability to provide interesting data from a variety of sources, hence leading to more fulfilling and worthwhile findings. Not only does this present the reader with a diverse range of data sources through which the study can be interrogated, but it also adds weight and validity to the research by providing the opportunity to establish congruity across research methods used. Most importantly perhaps is the possibility that through the multitude of students' voices that can be heard through the data and the integration of quantitative information to strengthen these voices, data presented in this research thesis progressed the use of online video in assignments by enabling key learning to inform future practice.

3.6 Data analysis

Maykut & Morehouse (1994) state that in education research, data analysis is fundamentally "a non-mathematical procedure that involves examining the meaning of participants' words and actions" (p. 121). It is an on-going process of reflection on the data, asking analytical questions and making interpretations throughout the study (Creswell, 2009:184). Patton (2002:432) argues that while no rigid formula exists for data analysis, the quality, professionalism and integrity of the researcher are of the utmost importance as is the ability to weave data together into a coherent story that can be understood by the reader. Herein lies the challenge of research: making sense of vast

amounts of data using only guidelines and procedural suggestions, leaving much interpretation to the judgement of the researcher, the fundamental strength and weakness of qualitative research.

Strauss & Corbin (1990) describe three overarching approaches to analysing qualitative data, each with increasing levels of interpretation. The first approach is akin to that of a journalist where the role of the researcher is to present the data without analysis, deciding instead to present the participants' stories in a coherent manner so that their stories can be heard. In the second approach, the focus of the researcher shifts somewhat to describing their understanding of the data in a 'recognisable reality'. Creswell (2009) argues that this approach requires the researcher to become skilled at selecting and interpreting data and "weaving descriptions, words, and field notes, and their own interpretations into a rich and believable descriptive narrative" (p. 184).

Common strategies that use this second method include general thematic analysis (Creswell 2009:184), discourse analysis (Flick, 2007:105) and the constant comparative method which is used in this research thesis. The final approach to analysing qualitative data involves the development of theory from the data. Strategies such as grounded theory, ethnography and narrative research employ this analysis technique (Strauss & Corbin, 1990).

3.6.1 Data coding

The first step in the data analysis process is coding. Coding is a vital part in the process as it forms the building blocks upon which the remainder of the data analysis takes place. Flick (2007:100-104) defines coding as a way of analysing information from interviews, questionnaires, reflective diaries and observations, where relevant parts of the data are found, analysed, compared with other data, and labelled accordingly. Creswell (2009:186) says it is the process of organising the material into chunks or segments before bringing meaning to the information. Importantly, categories and

labels are often created using the language of the participants. Making sense out of the complexity that is qualitative data is, according to Patton (2002) "the challenge of content analysis" (p. 463). To overcome this challenge, Guba (1978) suggests a four stage process for judging the viability of codes. First, all categories should have internal and external plausibility that should, when viewed internally, appear to be consistent. When viewed externally, categories should seem to comprise a whole picture. Second, categories should be reasonably inclusive of the data and information that exists within the different research methods deployed. This can be tested by: a) The absence of unusable cases or pieces of information, b) Referring back to the original problem or question. The third process for judging the viability of codes, requires the set to be reproducible by another competent judge. This external judge should be able to verify that: a) The categories make sense in view of the data, b) The data has been correctly assigned to the categories. Finally, the data should be credible to the participants or those who took part in the inquiry.

As categories begin to emerge, the next stage in the process is ascertaining the significance of these categories. This is achieved by examining the consistency and coherence of evidence to support categories, for example through triangulation of different methods used. It may also be considered how significant the data in the category is in relation to information already known about a topic through previous study and research. Finally, it may be considered how significant the category is in relation to the research and to the general area of study i.e. how much will the information contained in a category push the study and/or field forward (Patton, 2002:467).

Following this, Creswell (2009:189) advises grouping relevant codes together as themes to create a rich description of the overall or major findings of the study. Themes should incorporate multiple perspectives from individuals in the study and contain diverse

excerpts and specific pieces of evidence. In the final stages of data analysis, the researcher must discuss and expand on key themes before drawing out interpretations from the data and the overall study. Agostinho (2008) defines this part of the process as "what were the lessons learned" (p. 16), lessons that are made up of researcher's interpretations, comparison of findings with literature or theories, new questions that must be asked, or more commonly a mixture of all of these.

3.6.2 Constant comparative method

> Words are the way that most people come to understand their situations; we create our world with words; we explain ourselves with words; we defend ourselves with words. The task of the researcher is to find patterns in these words and to present those patterns for others to inspect while at the same time staying as close to the construction of the world as the participants originally experiences it. (Maykut & Morehouse, 1994:18)

Data analysis for this research thesis followed Glaser & Strauss' (1967) constant comparative method which incorporates the data analysis procedures outlined above, although in a unique manner (see samples in appendices O, P, Q, R, AB and AC). The constant comparative method (Fig 3.6) is concerned with reconstructing data into a "recognisable reality" along with the researcher's own interpretations (Strauss & Corbin, 1990:22). To achieve this, responses are not grouped according to pre-defined categories or schematics; rather the first stage in the process is to gather salient categories and relationships between categories as they emerge from the data itself, through a process of inductive reasoning. The method offers the researcher a process that allows the interrogation of participants' own words in a manner that facilitates the structured explanation of social situations. Following analysis and interpretation of data, categories are labelled using propositional statements which are statements designed to capture the essence of the category they represent, using the language of the participants themselves. This unique approach of using propositional statements in the

language of the participants stays most true to the action research ethos of allowing the voices of participants to come through the data.

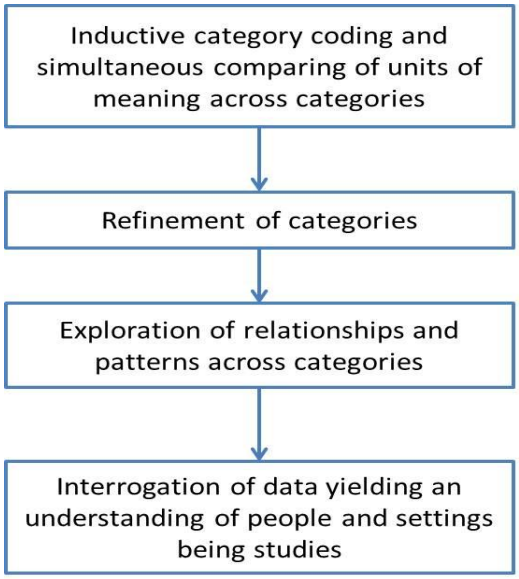


Figure 3.6 - Constant comparative method

The constant comparative method of data analysis and interpretation focuses not only on the analysis but also on the recording of the process, the creation of what Lincoln & Guba (1985) call an 'audit trail' and visual representation of the process:

> The visual record of your work contributes to the audit trail available to you and others who are interested in tracing the path from your initial ideas to your research outcomes. (p. 135)

The process is as follows:

Unitising the data

This first step involves identifying chunks or units of meaning in the data such as comments from questionnaires and ascribing a word or short phrase which indicates the essence of the unit's meaning (Fig. 3.7).

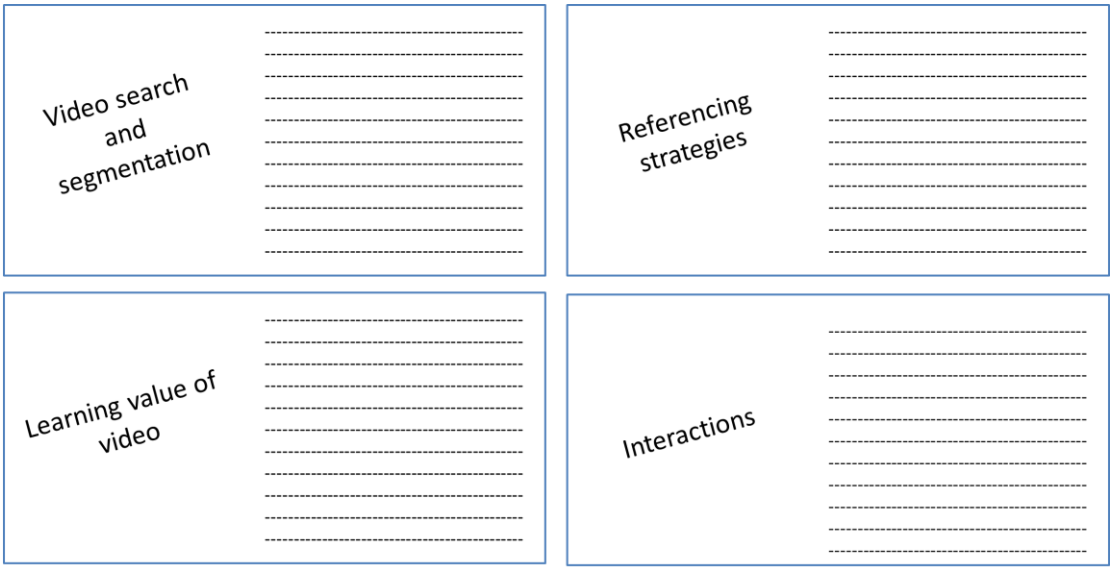


Figure 3.7 - Unitising the data

This process of labelling units of data makes for easier identification and retrieval at a later stage. When this process is complete and all of the data has been labelled and described as a specific unit, the job of the researcher is to carefully re-read the data gathered and look for emerging themes or patterns in the data. Maykut & Morehouse (1994) liken this discovery process to the accordion:

> The word accordion is derived from German and French words meaning agreement and harmony. The accordion is a portable musical instrument with a small keyboard and free metal rods, that sound when air is forced passed by them by pleated bellows operated by the musician. The action of playing an accordion is one of pulling these bellows apart with both hands, while pressing the appropriate keys, and then squeezing the bellows together to create the harmonic sound. In qualitative data analysis, the discovery step metaphorically pulls apart the bellows just a bit, widening the array of potentially salient aspects of the phenomenon under study. (p. 132)

A key ingredient of the constant comparative method is inductive category coding.

Inductive category coding

Following initial review of the data and creation of units of information, units are analysed for meaning and grouped with those of similar meaning or used to create a new category altogether. As stated by Glaser & Strauss (1967):

> The constant comparative method of analysing qualitative data combines inductive category coding with a simultaneous comparison of all units of meaning obtained. (p. 103)

This categorisation process seeks to develop a set of categories that provides a reasonable reconstruction of the data that has been collected, and to present this in a way that allows the exploration in sufficient detail of the issues surrounding the study, such as the impact of specific features of the VRS. As the process unfolds, the data begins to take shape under meaningful categories (Fig. 3.8).

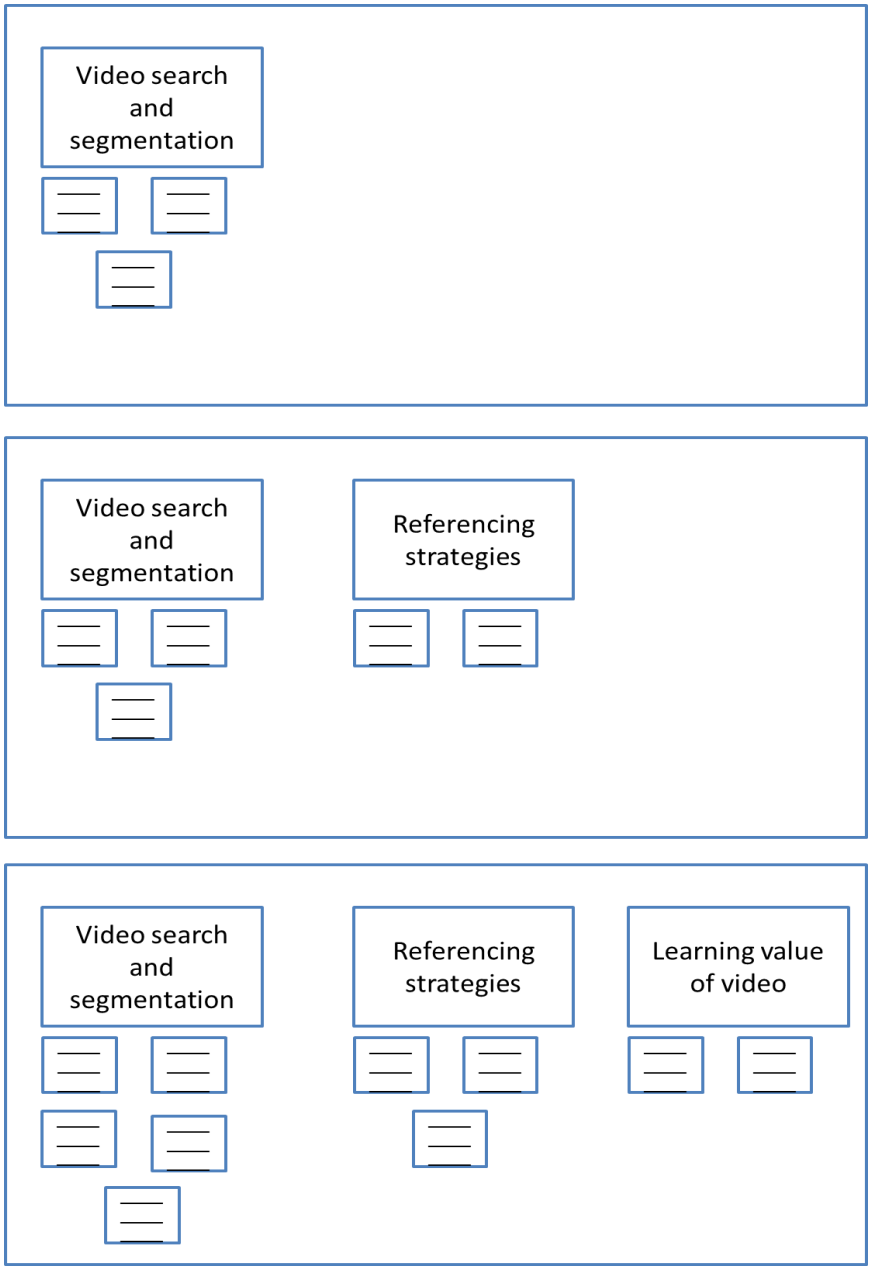


Figure 3.8 - Inductive category coding

Maykut & Morehouse (1994) illustrate this process in the following way:

> The expansive process of categorising data is analogous to fully pull apart the folds of the accordion, which is necessary for the eventual harmonic synthesis to occur. Like an accordionist, the researcher methodically pulls apart the meaning contained in the data, enabling him or her to eventually reconstruct the important melodies contained in the phenomenon being studied. (p. 138)

It is important to understand that some units of data may fit into more than one category, especially when dealing with longer pieces of qualitative data. Towards the end of data analysis, there will be a small number of data units that belong to no category as they may touch on issues that are outside the scope of the study. The final stage of the constant comparative method is writing the refining categories through rules of inclusion.

Rules of inclusion

Rules of inclusion are used to distil the meaning of a cluster of units so that a basis for including or excluding units of data can be justified. It is here that the development of propositional statements begins, where a statement is made about the content of a category and the learning that can be drawn from it. Maykut & Morehouse (1994) state:

> A propositional statement is one that conveys the meaning that is contained in the data cards gathered together under a category name. Rules for inclusion stated as propositions, begin to reveal what you are learning about the phenomenon you are studying and are a critical step in arriving at your research outcomes. (p. 139)

Once rules for inclusions have been developed and final adjustments have been made to data categories, the final stage in the constant comparative method of the data analysis process is exploration of relationships and patterns across categories.

Relationships and patterns

By this stage in the process several propositional statements exist with numerous units of data surrounding each. The final stage of the process is to synthesise these

propositional statements together into a meaningful whole, to tell the whole picture that has emerged from the data. Maykut & Morehouse (1994) state:

> It is time to carefully and systematically squeeze the bellows (the data) together to create a sight and sound somewhat different but accurately reflective of the data with which you started. (p. 143)

The goal is to identify the propositions which were significant enough to stand alone, and those that require connections with other propositions in order to fully tell the story. This process of identifying key and interconnected propositions forms the basis for discussing and outlining the findings of the research and re-appropriating participant data in a meaningful manner, interwoven with the researcher's own thoughts and conclusions. Maykut & Morehouse (1994) state:

> The last step in data analysis is writing about what you have heard, seen, and now understand, to create the harmonic sound of data coming together in narrative form to make sense of the phenomenon you have studied. (p. 145)

The constant comparative method provided me with a systematic process for analysing participant data for common themes and reconstructing these into a recognisable reality, along with my own interpretations of what this meant in the context of my research. This process was beneficial in two ways: first, it facilitated the description of the participants' experiences in the words they used and second, it assisted me in developing insights into the area under study, as stated by Lincoln & Guba (1985) "the process of constant comparison stimulates thought and leads to both descriptive and explanatory categories" (p. 341). The systematic nature allowed concepts to be developed and refined, priorities and relationships to be explored and finally integrated into a coherent explanatory whole.

Adopting the constant comparative method of data analysis provided an audit trail of the process through which categories and themes were arrived at. This process ensured the reliability and validity of the data analysis process by ensuring that categories could

be traced back to original data sources and procedures could be validated by a third party. Additionally, findings were presented to students at the end of each cycle to confirm their agreement on themes which emerged.

3.7 Presentation of student responses

In order to protect the anonymity of the students who took part in this study, all student names and identifiers have been removed from their responses, comments and other data. Student data is instead presented with a participant number (e.g. P1) which was given to students so that responses and comments could be tracked across multiple cycles. Their absence from student data in pre-cycle 1 (appendix V) is due to the fact that students from this cycle were part of a separate cohort of students which only took part in one cycle of study and therefore did not need to be tracked.

3.8 Ethical considerations

As I held a three pronged role in that of designer, lecturer and researcher, I was aware of my contributions, biases and influences and the potential these had to impact on the study. While there was no easy answer to the situation, and in fact it formed an integral part of the action research process, I was sure to outline my intentions to the participants at the outset. Participants were made fully aware of my objective of enabling the use of online video in assignments, my reasons for doing so and my collaborations with the School of Computing to design and implement a VRS that would support this. Participants were also made aware that while my interest lay in this area, it would be their honest, open and candid offers of feedback on using online video for their work and their experiences using the features of the VRS which would provide the real benefit of the study. In doing this, I hoped not only to ensure my intentions were clear, but also encourage students' full participation in an open and honest manner.

As this research involved the integration of online video into existing assignment tasks and information gathered from (adult) students was non-sensitive in nature, from an ethical perspective, this research was considered to be low-risk. However, there were a number of other ethical considerations made to ensure participants understood the research process and what would happen with their data. First, participants were taken through the process of informed consent whereby a statement was given to students at the outset outlining what was required of them and what their contributions might involve. While use of online video through the VRS was mandatory for their assignment tasks, contribution of reflective documents and participation in surveys was optional. Second, students were informed that all data, even where names and other identification information was gathered, would be kept completely confidential and only used for the purposes of this research. Third, while time commitments were kept to a minimum, requesting only that students' complete reflective pieces and questionnaires, students were made aware of the option to withdraw from the study at any time.

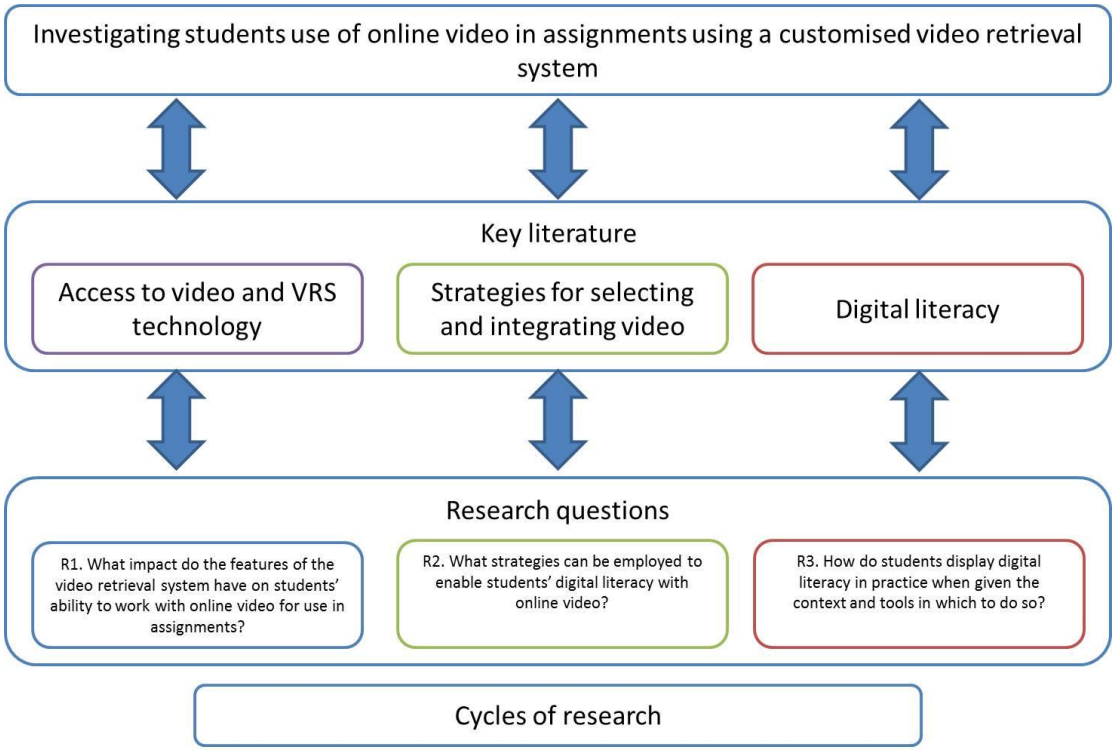
3.9 Conclusion

Choosing a methodological approach and the appropriate research methods are key to the success of any study. This chapter has outlined for the reader the research approaches which best suited the practically focused, researcher driven, cyclical design and implementation of online video for assignments using a VRS. I began by providing the reader with an overview of the main research paradigms, demonstrating how the pragmatic paradigm, which focuses on facilitating educational change and improvement by linking theory to practice, was the most appropriate for this study. The emergent design stance and qualitative focus also best facilitated the examination of the impact of online video and the VRS features on the student experience, allowing key areas of interest to emerge from the data, elucidating the how and why, rather than focusing on a hypothesis driven examination of these areas. Within the pragmatic paradigm sits the

action research approach. This chapter also introduced and explained Elliott's (1991) action research for educational model to the reader, outlining how this study adopted a cyclical approach to research, facilitating the investigation of my overall thesis, while facilitating the evolution of the idea throughout the cycles of research. This approach also encouraged practitioner reflection and engagement with qualitative experiences of participants. Finally, I justified the use of various research methods and how they were employed in the research, followed by how data was analysed and brought together using the constant comparative approach.

Preface to cycles of research

The preface to the cycles of study which follows provides the reader with an overview of the research design, outlining how the overarching objective of investigating students' use of online video in assignments using a customised VRS, to understand digital literacy in practice was achieved. The figure below demonstrates how the research questions were developed based on the objective of the research and supporting literature, and how these were addressed across the cycles of the study to arrive at overall conclusions and recommendations.



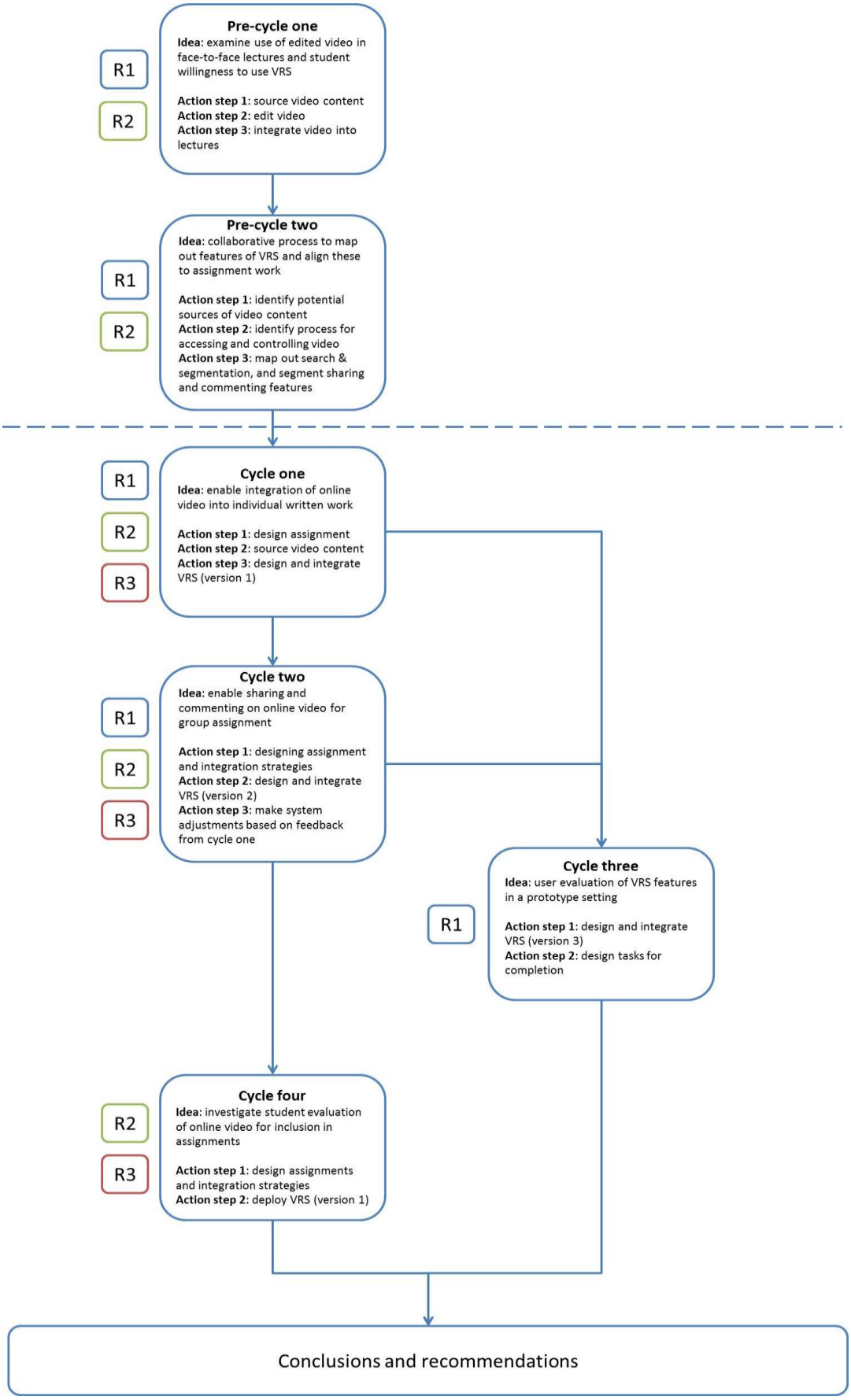


Figure P.1 - Research questions and process

Overview of research cycles

In this section, the reader is provided with a short overview of the pre-cycles to this study including their purpose, action steps and key findings. While not included in the main body of this thesis, these cycles (appendix V and W) informed and gave context to the remaining chapters.

Pre-cycle 1

Idea and reconnaissance

Pre-cycle 1, which has been published as a standalone piece of research (Tiernan, 2013), was designed to examine the use of edited video in face-to-face lectures to inform research questions R1 and R2. The cycle examined students' experiences and opinions of video as a source of information to support lectures with integration strategies which encouraged students to engage with video in class. This cycle was also a fact finding operation, targeting university students with whom the VRS would be used, and gather their views as to whether or not they would find such a system useful for coursework.

Action steps

Pre-cycle 1 involved a number of actions steps to integrate edited videos into face-to-face lectures.

Action step 1: A minimum of one video was sourced per lecture that related to the topic and provided students with alternative perspectives or viewpoints on the subject.

Action step 2: Using an open source video editing programme, videos were edited so that only important sections of the video were used to emphasise points or encourage discussion.

Action step 3: Following editing of videos, these were sequenced with existing lecture notes and integrated into the introduction, development or conclusion of a topic or

section. Questions were developed to help students focus on specific aspects of the content either before, during or after play through.

Impact of action

Main findings from this cycle were: 1) when linked to lecture topic and integrated alongside questions and discussion points, edited video had a positive impact on students' learning experience. Students felt that edited videos were interesting, held their attention and provided multiple viewpoints and perspectives; 2) edited videos explained concepts in an easy to understand, concise manner; 3) students were positive about the potential of using a VRS to view, share and comment on online video for coursework.

Pre-cycle 2

Idea and reconnaissance

Pre-cycle 2 built on my previous work identifying potential system features (Tiernan & Gurrin, 2012) and helped to address the research questions R1 and R2 by mapping out the features of the VRS and aligning these to assignments which would be completed in later cycles of the study. This cycle was a collaborative process with my colleagues in the School of Computing.

Action steps

Pre-cycle 2 involved a number of action steps which engaged with literature and technical information to map out the features of the VRS and make decisions on access to content and sources of online video.

Action step 1: By engaging with literature and reviewing previous work conducted in the School of Computing a number of sources of video content were discussed with potential advantages and disadvantages teased out.

Action step 2: Reviewing literature and discussing the current technical capabilities of VRSs, a number of different options were considered on how students would access content and what control would be afforded to them.

Action step 3: The technical features of search and segmentation, and video segment sharing and commenting were discussed with reference to previous work and the technical development required to implement such features.

Impact of action

The main conclusion drawn from this cycle were: 1) relevant video content would be sourced by the researcher to ensure maximum relevance to lecture and assignment topics; 2) content would be made available off campus and offer students full control over video playback; 3) a straightforward search interface would be provided for students to locate video content; 4) video segment sharing and commenting features were chosen to facilitate communication around online video; 5) assignments were aligned to two versions of the system to investigate the integration of online video in different contexts.

Remaining cycles

The remaining cycles of research presented in chapters 4 – 7 build on the work carried out in these pre-cycles, following the action research approach to facilitate the thorough investigation of the overall objective and research questions, as outlined in Figure P.1 above.

Chapter 4 – Cycle 1: enabling the integration of online video in individual work

4.1 Introduction

The purpose of this chapter is to describe cycle 1 of this research which involved students integrating online video- into individual written assignments, with the support of the first version of the VRS. This cycle aims to address the research questions:

R1. What impact do the features of the video retrieval system have on students' ability to work with online video for use in assignments?

- What is the impact of the search and segmentation features on students' ability to source online video for a written assignment?

R2. What strategies can be employed to enable students' digital literacy with online video?

- What strategies support students' use of online video in assignment work?
- How can assignments be designed which enable the use of online video?
- What impact does video have on students' learning experience?

R3. How do students display digital literacy in practice when given the context and tools in which to do so?

- How do students integrate online video into written work?

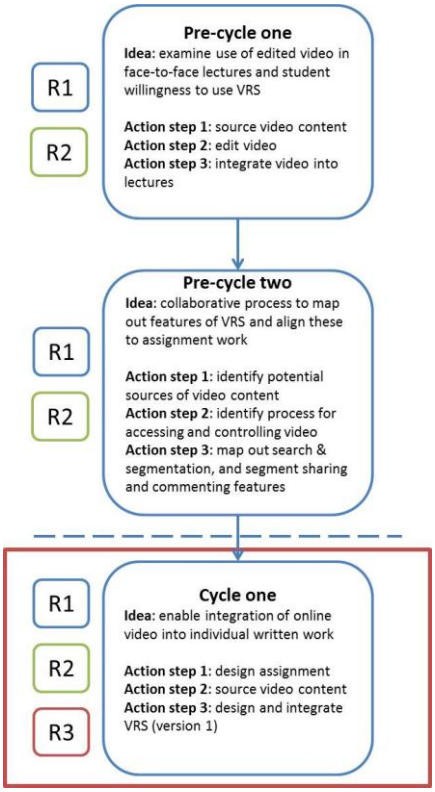


Figure 4.1 - context of cycle one

This chapter follows Elliot's (1991) step-by-step sequence of activities to guide the reader through the key stages involved. As outlined in section 3.4.3.1 these stages are: 1) general idea and reconnaissance, 2) general plan, 3) action steps and implementation, and 4) impact of action.

4.2 Context of cycle 1 – idea and reconnaissance

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 with online video, 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 research, 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; cycle 1 now describes this process in detail.

4.3 General plan

Cycle 1 of the research was carried out with the 2013-2014 cohort of ET1 students who were completing the module 'Social and Personal Development with Communication Skills' (see appendix E). The cycle was carried out over a six week period and while the content of the module remained unchanged from the previous year, the focus of the assignment shifted. Students were asked to complete an individually written assignment half-way through the semester on the topic of communication skills which was one of the main topics for the module. In order to complete this assignment, students were required to draw on lecture notes on the topic, relevant readings and a minimum of five video references from the VRS. To clearly explain the planning process, the implementation plan is now divided into three distinct action steps. Action step one focuses on the assignment for the group, action step two focuses on the gathering and organising of video content and action step three focuses on the implementation of version 1 of the VRS.

4.3.1 Action step 1: designing the assignment

Moskovich & Sharf (2012) and Berk (2009) suggest that active engagement with video content is best facilitated by designing follow-on activities which link video content to the overall learning objectives, where students can build on existing knowledge and contexts (Mitra *et al.,* 2010; Jonassen, 2000). To do this, a written assignment was

designed that would supplement lecture content provided, requiring students to engage with relevant video content on the VRS in their own time. One of the main focuses of the module under study was communication skills, as it not only forms an important part of everyday life, but also plays a critical role in the students' future careers as educators. For this reason, three whole lectures were devoted to the subject, covering a diverse range of topics such as: communication models; the importance of verbal and non-verbal communication; the importance of listening; barriers to communication. In addition to lectures, students were required to complete a written assignment on the subject. Sherer & Shea (2011) identified written assignments as key tools in using online video to support students' learning and engagement. The assignment was a 1,500 word paper reflecting on a number of different aspects of communication skills (appendix G). Students were asked that the paper would include an introduction defining communication and an outline of which topics would be tackled. Ellis & Childs (1999) and Mitra *et al.* (2010) found that providing guiding questions, categories and other cues encouraged students to pay more attention when using video, looking for specific information, reference points or examples, which could be linked back to the overall objectives. For this reason, students were tasked with developing the aspects of communication skills from a list of ten provided. The list was:

- *Trace the development of communication and interpersonal skills*
- *Discuss the different models of communication*
- *The importance of visual communication e.g. body language*
- *The importance of the voice e.g. pace & word emphasis*
- *The importance of content e.g. words & language*
- *Barrier to effective communication*
- *The use of humour in communication*
- *Listening and listening skills*
- *Dealing with interpersonal conflict*

- *Good presentation skills.*

Finally, students were asked to conclude the assignment by outlining the key learning points for them and why these were important for them in everyday life and as educators of the future. What set this assignment apart from traditional written assignments were the sources of information that students were asked to use. 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.

The purpose of this assignment was two-fold. First, it aimed to increase students' understanding of the various aspects of communication skills that affect their daily lives and impact on interactions in the classroom. Second, it aimed to gain a better understanding of how students use online video for coursework. 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. To make the process achievable and worthwhile for students, two further stages of preparation and planning were required: sourcing appropriate content relevant to the above headings, and providing students with a VRS that could facilitate the sourcing, integration and referencing of relevant content for their assignments. These further stages of preparation are now dealt with in detail.

4.3.2 Action step 2: sourcing and preparing the content

In order to assess students' ability to source, integrate and reference online video and the features of the system to support this, content was sourced and prepared for use. To source relevant content, a number of weeks were spent carrying out searches on the video hosting sites YouTube and TED; the decision was made to focus on these sites as the vast majority of videos that were found on other sites, could also be found here. Video content was found by searching under the relevant headings such as 'communication skills', 'models of communication', 'listening skills', 'body language' and

'presentation skills', while simultaneously using synonyms of these terms such as 'communicating', 'theories of communication' etc. to gather the widest possible variety of video content.

As videos were located, they were watched in full and criteria for selection (outline in section 2.4.2) were used to ensure content was suitable both for the students and for the topic of the assignment. Through this process, a minimum of ten relevant videos were sourced for each assignment topic heading. In most cases closer to twelve videos were found for each topic 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. The crossover evident between videos was also seen as an opportunity to consolidate learning by displaying a number of interlinking ideas in one place, demonstrating to students how related concepts work in practice (Mardis, 2009). 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.

The second stage of the process involved preparing the video content for use on the VRS. This involved a number of steps which were completed under the guidance of my colleagues in the School of Computing. Each video file was saved, given a corresponding file number, short description and full video transcript. These documents were then sent to the development team for processing and uploading to the system.

4.3.3 Action step 3: integrating the VRS

A key aspect of this cycle was the implementation of version 1 of the VRS and investigating the impact of video search and segmentation features on students' ability to complete the assignment as outlined above. To achieve this, the VRS was developed using content based video analysis, shot boundary detection and search functionality as

described in section 2.6. In addition to this, emphasis was placed on the user experience to ensure students could easily source, integrate and reference content for their work.

The student user experience

While the technical abilities of the system enabled the search of video segments, students themselves were likely not to be concerned with this but more likely to be concerned with the look, feel and ease of use of the system. Drawing on students' use of publicly available video sites such as YouTube, and case studies on the systems designed for educational use as outlined in the literature review, it is suggested that a video system should be easy to use and to allow the location of content within (YouTube; Zhang *et al.,* 2006; MacKinnon & Vibert, 2012), run on existing hardware (YouTube; Gurrin *et al.*, 2004), be available off campus (Gurrin *et al.,* 2004; Mustillo *et al.,* 1997) and give students full control over video content (Mustillo *et al.,* 1997; Merkt *et al.,* 2011).

With this in mind, the system was designed using a simple interface. Students could log on to the system from anywhere on or off campus by typing the address (www.videoforlearning.dcu.ie) into their web browser. The only restriction was that students needed to use the Google Chrome web browser which was available for download on all Windows and Apple computers. Once students logged on to the system, 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 (Fig. 4.2).

Figure 4.2 - System search box

Once search terms were entered (the interface was again kept clear and simple), videos were ranked and displayed by title and segment, so that when students searched for a word or term, the most relevant video appeared at the top of the list, segmented according to the most relevant segment first (Fig. 4.3). The ranking of the videos was enabled according to the frequency and uniqueness of the search terms within the videos as detailed in section 2.6.3.

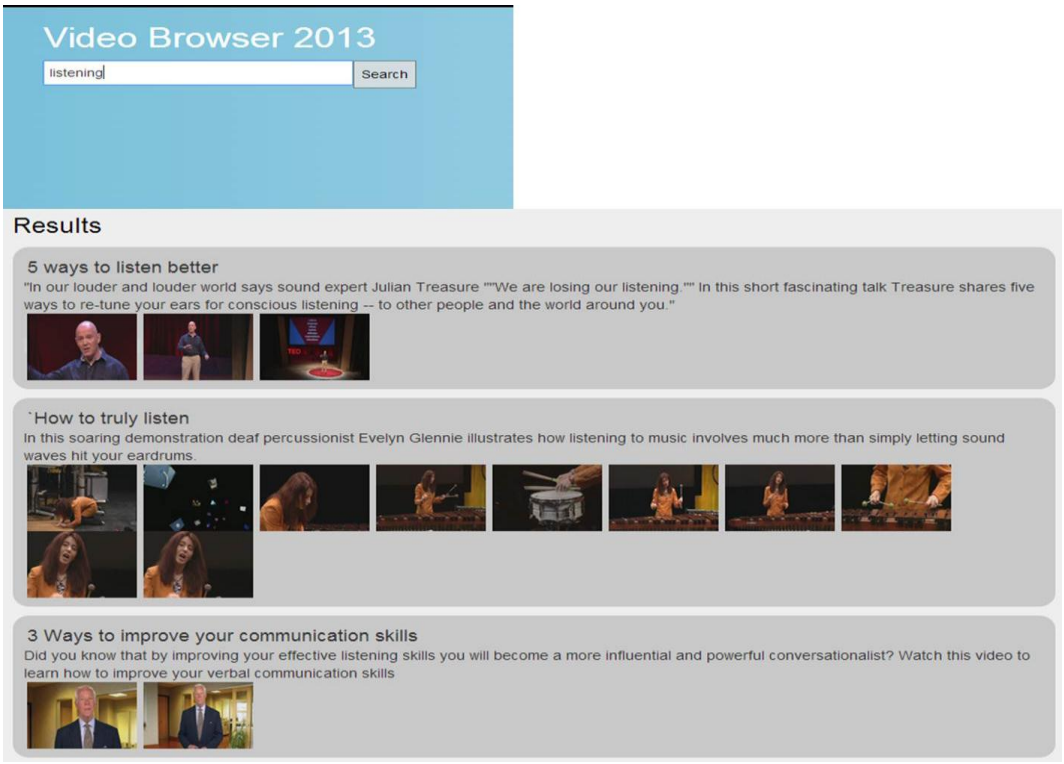


Figure 4.3 - Search interface

The next video in the list was the second most relevant, again segmented with the most relevant segment first. 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 4.4 - 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. 4.4).

4.4 Implementation

During the implementation phase, students began working on their assignment using the VRS as a major source of content. The first version of the VRS went live in September 2013 and during the lecture students were provided with a guided demonstration of how the system worked and how to search for content. As part of this demonstration students were advised that as searches were based on video transcripts, searches should include a selection of words and terms related to their topic which may be spoken during videos. For example under listening skills I instructed students to search for listen, listening, hearing, voice etc. In addition to the guided demonstration of the VRS, a narrated video was created and posted to the class Moodle (LMS) page which

outlined how to use the system and again gave examples of search terms that related to the assignment topics (Fig. 4.5).

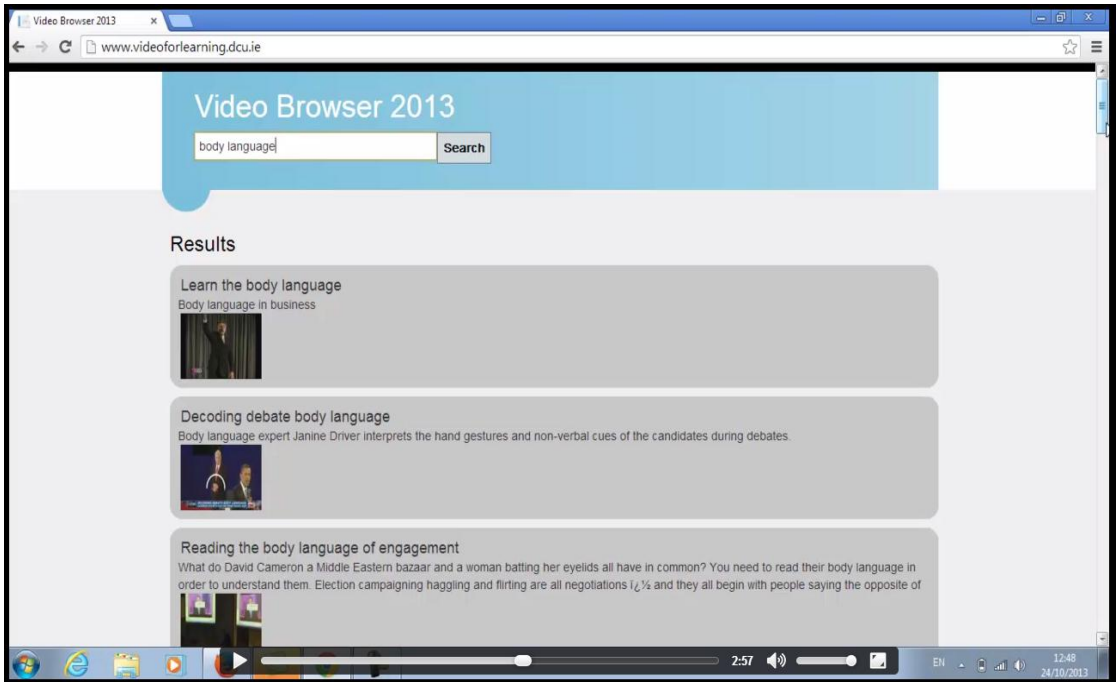


Figure 4.5 - Instructional video

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. During these lectures, students were provided with ample information on the different aspects of communication including: lecture notes, journal and book references, examples and in-class activities. Much attention was paid to supporting students in evaluating how video content would be relevant to their assignment and so, using techniques similar to those employed during pre-cycle 1 (appendix V), 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 Moodle page.

4.5 Impact of action

In this section, the impact of action is analysed and discussed for the reader. Themes and findings are drawn out to fully address the research questions:

R1. What impact do the features of the video retrieval system have on students' ability to work with online video for use in assignments?

- What is the impact of the search and segmentation features on students' ability to source online video for a written assignment?

R2. What strategies can be employed to enable students' digital literacy with online video?

- What strategies support students' use of online video in assignment work?
- How can assignments be designed which enable the use of online video?
- What impact does video have on students' learning experience?

R3. How do students display digital literacy in practice when given the context and tools in which to do so?

- How do students integrate online video into written work?

These findings not only built on our understanding of students' use of online video, but also helped in the development of future cycles of my research. In order to achieve this, data was gathered from students in a number of ways. First, students' assignments were analysed for trends in how online video was integrated and referenced within their work. Second, students were asked to write a 200 word reflective document outlining their experiences and perceptions of using online video and the VRS to complete their assignment, using examples of video content if applicable. These reflective documents were handed in along with their written assignments. Finally, a questionnaire was distributed to students in class following completion of assignments to ascertain the

benefits, drawbacks and suggestions for improvement in using the VRS to source, integrate and reference content for their work. Students were also asked how they would like to see the system developed for use in a group context with data to be used to inform the next cycle of study. 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.

4.6 Findings and discussions

Key themes and findings are now presented using qualitative and quantitative data from questionnaires, student reflections and written assignments. Data was analysed using the constant comparative method and as such is now presented using propositional statements in an effort to portray the overall meaning of the data categories. This is followed by overall conclusions and recommendations that can be drawn from this cycle of research, and used to inform future cycles. Student comments and references were first aligned to initial salient data categories before coming together as propositional statements under two key themes which helped to tell the story from the student data. The two key themes and corresponding propositional statements form the basis for the discussion of findings which follows.

4.6.1 Sourcing, integrating and referencing online video using a VRS

The first theme that emerged from student data centred on students' impressions of using the VRS to source video content, and their ability to integrate what they had located into their work. Key to this theme is understanding, in the students' own words, how the search and segmentation features of the VRS helped students to "locate and use information" (Eshet, 2004:5), crucially information which is structured in a non-traditional way (Eshet-Alkali & Chajut, 2009), to understand how the VRS impacted on the "skill of finding things" but also "using these things in your life" (Gilster: 1997:2).

4.6.1.1 Video search and segmentation had a predominantly positive impact on students' ability to source online video for their work

Student reflections contained a range of comments indicating that using the VRS to source online video, when provided with categories and themes to search for, had a positive impact on their ability to source online video for their assignments. Comments (n=57) spread across the key factors of video search and segmentation.

At its most basic level, digital literacy focuses on students' ability to locate and access information for later use. In the case study outlined in the literature review, MacKinnon & Vibert (2012) commented that using keyword filters for video content, students "found the volume of videos to be onerous and that they were not inclined to do the work necessary to carefully analyse or categorise all of them" (p. 95), suggesting a more accurate or flexible search mechanism would be more successful in facilitating students' access to video data. The content based analyses search in operation in the VRS in this study, which examines the video content itself, rather than its associated metadata alone (Lew *et al.,* 2006), seems to have improved students' ability to locate relevant content. 24 students' comments were evident in this area, stating that 'P01 – It has an easier search than other video websites because it searches for the key word you are looking for in the search box', 'P31 – I did not have to trawl through endless footage of unnecessary video to find what I wanted' and 'P68 – I found a selection of video that I would never have found on YouTube'. Student comments in this area also suggest that the provision of guiding categories and themes (Eillis & Childs, 1999; Mitra *et al.,* 2010) aided in this search process with comments such as: the system helped me to find 'P20 – footage of exactly what I was looking for' and 'P22 – videos that applied to the aspects I chose to discuss'. This data suggests that providing categories and themes to guide students is effective at helping them to access online video, and that the sophisticated content based analysis enables them to locate relevant content without the need to watch unnecessary volumes of video.

Authors such as Denning (1992), Kaufman & Mohan (2009), Mitra *et al.* (2010) and Halls (2012) and student feedback from pre-cycle 1 suggested that instead of providing lengthy videos for students to view, videos should be edited so that they are concise and to the point. While this research was predominately based on in-class viewing of video, it provides a useful lens through which to view students' impressions of the automatic video segmentation provided by the VRS which is the process of "automatically detecting the boundaries between shots in a video" (Smeaton *et al.,* 2010), returning video in standalone segments, and its impact on students' use of online video in this context. Student comments (n=16) indicate that the automatic segmentation of content 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'. The process of being brought 'P09 – to the exact point in the video which your topic or search word was mentioned' and the use of 'P10 – concise and short clips with relevant information to the topics being researched' led some students to comment that using the VRS was 'P64 – easier to get information and learn more quickly'. This data suggests that in a similar way to using video in face-to-face scenarios, the provision of concise segments of video, again with the guiding categories and themes, helped students to stay focused on the topic at hand. The positive impact that video search and segmentation had on students' ability to use video content for their assignments can be summed up by two students' reflections who said:

> P45 - The idea that one can simply type in a topic and have multiple videos about that topic, divided into short segments, makes research and finding useful and informative references extremely effortless. The use of this system also cuts back on the amount of time spent on searching for references, which would in turn create more time spent focusing on the content and critical analysis of the essay.

And

> P47 - Overall I found the video system very good. It saved a lot of time. Usually on a website such as YouTube.com when you search a word it only searches for videos with that word in the title. This can make looking up videos very long and can be a painful process. But on this website (http://videoforlearning.dcu.ie/) when you searched a word(s) it would give you videos with not only the title but also videos with these word(s) which was extremely helpful. Also when you clicked onto the video it would automatically fast forward you to the clip of the video which had the words you had searched. This saved a lot of time as most of the videos were quite long and this shortened the amount of time I had to spend on watching videos, because I didn't have to watch the whole video I also found that my concentration was better.

While much of the feedback received 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 a specific topic (n=6). For examples 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 that it was 'P42 – quite difficult to find specific information on the topic'. While others commented that it was an issue locating content for certain topics: 'P07 – it was sometimes very hard to find a video with any reference to what I was searching, for example, the use of humour' and 'P66 – on certain topics I found it difficult to locate videos that would help my understanding'. These students' comments contrast with the aim of content based analysis of "systems which would be user friendly and would bring the vast multimedia knowledge from libraries, databases, and collections to the world" (Lew *et al.,* 2006:3).

These conflicting views on the VRS suggest that while the video search and segmentation features did represent a step forward in providing access to online video content for the majority of students, some improvements are still possible. Students' comments on suggestions for improvements to the VRS provided some clues as to potential enhancements which might aid in the search process. Of most relevance, with six comments, was the inclusion of text summaries for video segments, which would

provide students with information on what was contained in each video segment. Students' reflections contained comments such as 'P03 – if it showed the first sentence of the beginning of that segments so we know exactly what that part is talking about' and 'P29 – descriptions for each video segment saying what this segment is about'. The most prominent suggestion for improvement, with 12 comments, was requests for more content on the system. While some of these echo challenges outlined by Kaufman & Mohan (2009) in providing sufficient volumes of content to keep up with student demand, with comments such as 'P26 – there was rarely more than two or three on my particular keywords', others were less critical and point to an increased appetite for video content, with comments such as 'P48 – more videos for each topic' and 'P33 – a wider range of videos'.

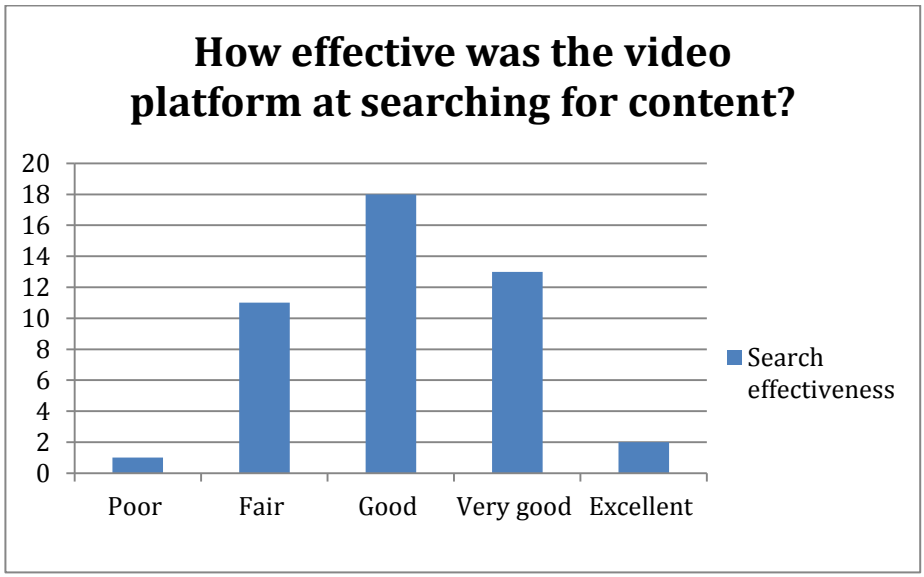


Figure 4.6 - Search effectiveness

Qualitative 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 (Fig. 4.6), 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 video search and segmentation 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.

4.6.1.2 Students 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 study 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 student reflection and examination of 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. In their reflections, many comments (n=14) confirmed the assertions that videos should be engaging and designed to interest learners (Mitra *et al.,* 2010) and contain unique or alternative perspectives (Denning, 1992; Moskovich & Sharf, 2012). Students said that 'P12 – you are spoilt for choice when it comes to videos. There are more than enough videos to cover aspects of communication' and that the system contained 'P21 – a variety of sources which I found useful to use in this assignment'. In terms of quality, students said that 'P16 – the quality of each video was superb' and 'P25 – each one held so much information'. This is summed up well by one student who said:

> P66 - I was able to research a lot of information such as humour in communication. I found the video that I used was very helpful in harbouring my knowledge of that topic. If it weren't for the video system I would have not come to such a conclusion on humour and comedy in communication.

The benefits in providing content that is contextually relevant (Berk, 2009) and extends or builds on students' previous knowledge (PEI Dept. of Education, 2008) was also evident in the manner in which students selected content from a variety of sources (Academic, Business/Training, TED Talks, TV) depending on the topic being tackled (See table 4.1). For example the most commonly referenced video for the models of communication came from an academic source which expanded on this topic, while the most commonly referenced video for barriers to communication came from a business/training source which elaborated on this area (see also appendix F). This data indicated that similarly to face-to-face learning scenarios the quality and relevance of

video, and their ability to build on existing knowledge and provide alternative perspectives are important in this context also.

Topic	Top Video	Source	Number of students that referenced
Introduction	What is communication	Academic	25
The development of communication skills	Transmission communication	Academic	1
Models of communication	Transmission communication	Academic	4
The importance of visual communication	Allan Pease – Body Language	TV production	11
The importance of the voice	5 aspects of a powerful speaking voice	Business/Training	5
The importance of content	What our language habits reveal	Presentation/Talk	3
Barriers to effective communication	How the communication process works	Business/Training	8
The use of humour in communication	Comedy is translation	Presentation/Talk	8
Listening and listening skills	5 ways to listen better	Presentation/Talk	18
Dealing with interpersonal conflict	A short overview of PCM	Business/Training	3
Good presentation skills	Improve your public speaking and communication skills	Business/Training	15
Conclusion	What is communication	Academic	2

Table 4.1 - Video references by topic

Perhaps most interesting in terms of how students integrated online video into their work, was examining – through the lens of digital literacy – the ways in which students used video references to support their work and understanding what this means in relation to digital literacy in practice. Analysing student assignments (see appendix U) revealed a total of 334 individual video segment reference and citations, broken down into segment summaries, direct quotations or statements, and supporting examples (Fig. 4.7). 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 number of segment summaries 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)

> P01 - During the Middle Ages communication science was very little. This was due to the decline of the Roman Empire which caused the decline of communication. Mass communication also declined the oral and figuratively was used for mass communication. The church had a role to play for mass communication as during the middle ages religion and the church were very powerful and this was a common way for mass communication. The printing age/ revolution had a dominant turning point in communication development. The printing age was also a catalyst or the renaissance. The audience made printing revolution popular because they are the costumers. The renaissance brought upon a new level of communication this is due to the art work and printing of books and it also had an important influence to the media. (The Dark Ages of Communication Science- University of Amsterdam 0.40 start time 4.24 end time)

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

> 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)

Analysing these extracts reveals 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)

Likewise, P48 used a number of quotations taken directly from the speakers in the video segments, to support the development of their topic on body language:

> P48 - Visual communication is body language; it has an impact of 55% of our total communication. "Body language is a hugely powerful communicator". (Learn the body language 6:08- 6:12)

And

> P48 - "Body language is also known as 'non-verbal's' it could significantly change the way your life unfolds. When we think of 'non-verbal's' is how we judge others and how they judge us and what the outcomes are." (Your body language shapes who you are 3.15- 3:30)

When talking generally about the topic of communication skills, we see below how students took a variety of different quotations and statements from the video segments to support their assertions or develop their point, for example P25 used a quotation to illustrate the importance of good communication:

> P25 - When good visual and verbal communications are finally reached, one is able to achieve good presentation skills. "We desperately need good communication to run the world." (Talk Nerdy to Me, 1:53-2:00)

Similarly P17 used a direct statement from a video to illustrate the importance of communication:

> P17 - People are constantly communicating ideas, sharing thoughts, absorbing new information and being entertained or persuaded through communication. Communication allows us to function as social and political animals. (what is communication 1.04 – 1.13)

Analysing these excerpts from students' work, we can again see clear 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.

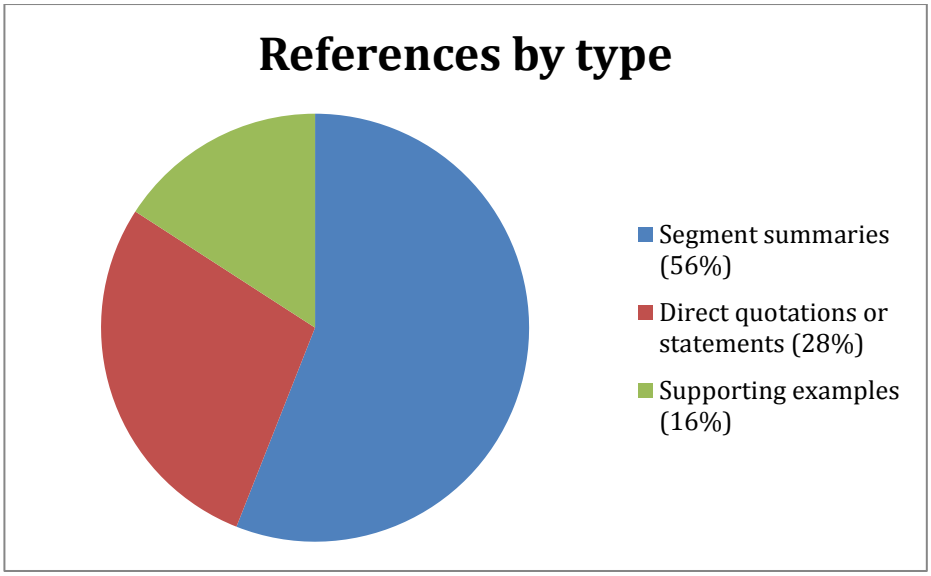


Figure 4.7 - References by type

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. As a means of illustrating how these were incorporated into assignments, examples are now displayed on a thematic basis.

Body language

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)

> P04 - The video 'Understanding body language' outlines just how important visual communication is. It is important to remember the famous line "Actions speak louder than words" (Understanding body language, 01:40-01:45) and after watching this video this line is truer to me than ever before. Something as simple as crossing your arms can portray that you are closed off from the conversation rather than being involved or even your handshake can say that you want to have the last word in the conversation! What I found most

interesting about this clip is the different gestures people make that can signify them being dishonest. For example they fidget with their nose in order to hide their mouth meaning they don't actually want you to believe everything that they are saying but it is all subconscious to them, and also the obvious ones like not making eye contact with you when telling a story shows they're being dishonest. (08:40-10:56)

Humour

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:

> P63 - Humour is used in communication to make a serious and dark topic easier to deal with and is often used when talking. Using humour also keeps the listener interested and ensures their mind does not wander when they are being spoken to. In the video (Chris Bliss: Comedy in Translation)(2:28-2:40) Chris is giving a quite intense lecture and decides to use humour to lighten the mood, using a touchy subject such as mental health as humour could be taken the wrong way as some people in the crowd may not find the humour in what has been said. By using this joke Chris got the approval of the crowd to continue using humour in his presentation. At (3:43-4:23) Chris talks about how important comedy and humour is to communication, Chris states that "It takes the base metal of our conventional wisdom and transforms it through ridicule into a different way of seeing and ultimately being in the world". This states that by using humour in communication it makes people understand from a different perspective, it can take a very serious topic, and make a person laugh which makes said serious topic feel less of a burden. When using humour as a form of communication you must ensure you make a point, you can then use humour, but you must repeat your point to reinforce it, the point of using humour is to break the silence between you and the audience but you must ensure that the point you are making is being taken on board by the audience, that although you made a joke the point is very valid and useful.

> 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.

Speaking and content

Finally, for illustration purposes students also used examples from the video segments on how to effectively publicly speak and the appropriate language to use when doing so:

> P22 - Other areas that are important when using the voice to communicate are pace, articulation, energy and emphasis. In the video "5 aspects of a powerful speaking voice", Conor demonstrates the importance of silence (1.00 - 1.14). The pace at which the person is speaking and their use of silence between topics may help to emphasise particular areas of importance to the audience.

> P51 - The last aspect of communication importance is your words, and the actual content of your speech. Steven Pinker in his TED talk "What Our Language Habits Reveal" discussed how our language expresses what goes on in our minds and that the words we choose communicate much more than we realize (0:10-0:30). The words we use, how complex we speak, what verbs we use, if we speak grammatically correct, etc., are categories that others judge us on. Our unconscious use of language reflects us as people, which is why it is so important to be aware of this (2:20-2:34). Pinker discussed the difference a few words can make in conveying a message. For example, there is a difference in tone describing the same situation yet using different words, such as an army "invading a country" or "liberating a country", or a government "redistributing wealth" or "confiscating earnings". There is a vast difference in interpretation between saying "Excuse me, could you please pass the salt?" and "Hey you—give me the salt". Pinker says as day-to-day translators and interpreters in this world we need to be keenly aware of how we communicate not just the facts but the tone or "flavour" behind those facts. (5:26-7:00). In trying to describe the same event, any two people will describe it in completely different ways by the words they choose. It is so important to be conscious of how our words effect how others interpret our words, just as we interpret and make inferences on the mood, personality, trustworthiness of others by the words others choose to use.

Analysing 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 P04 and P22, 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). This is especially evident in the extract from P63, whereby multiple sections of the video were weaved together to explain their point. 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, and P51's discussion on the use of language to convey different meanings in different contexts.

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. 4.8), 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.

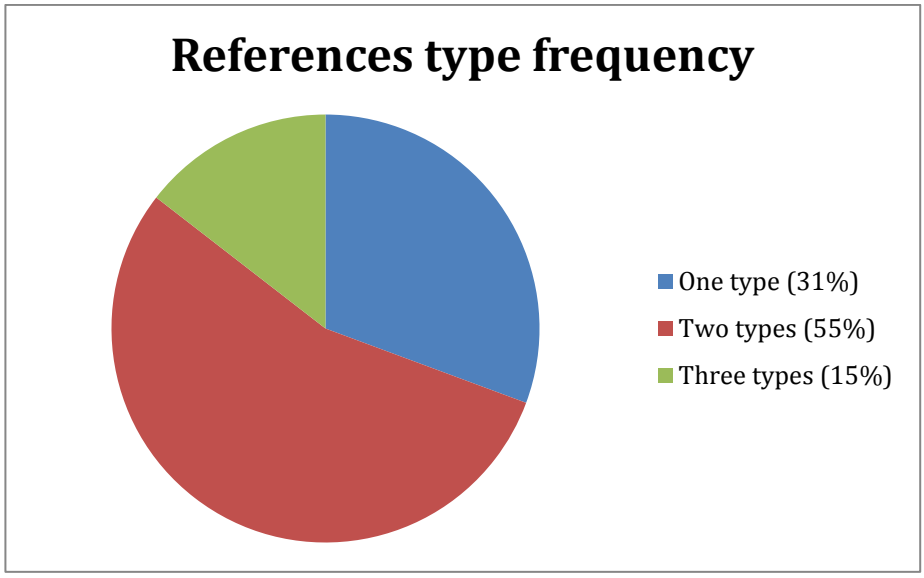


Figure 4.8 - Referencing frequency

4.6.2 Students' opinions on the learning value of video

Data above demonstrates students' ability to integrate and reference online video in their assignments. However, an important factor of this thesis was understanding students' perceptions of the value of online video as part of assignment work. Existing literature (for example Koumi, 2013) points to the motivational, cognitive and experiential learning value of video. However much of this research focused on the use of video as a support tool. This section analyses student experiences using online video as part of a meaningful task (Margaryan *et al.,* 2011; Buckingham, 2007) to investigate its value in this context.

4.6.2.1 Impact of online video on students' experiences was overwhelmingly positive

Students' experiences indicated that the learning value of online video when used in assignments was overwhelmingly positive, with a total of 68 individual comments about

the positive impact this had. These comments will now be discussed by analysing students' comments under four related themes that emerged from the data: a) how video supported understanding of topics, b) the provision of multi-modal information, c) engagement with topics, and d) providing a unique approach to assessment.

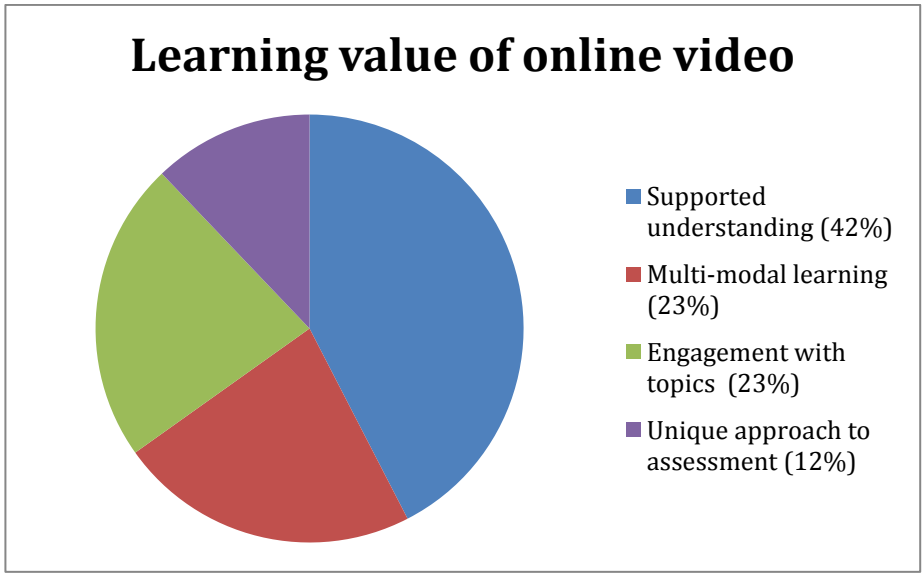


Figure 4.9 - learning value of video

Authors such as Koumi (2013) have suggested that part of the learning value of video is "through explaining complex processes" (p. 3) in an easy to understand and easily digestible manner (Denning, 1992). Prominent in this data, with 28 individual comments, were students' assertions that online video supported their understanding and comprehension of topics. Students commented that online video provided made 'P01 – it easier to understand the assignment and topic being discussed' and 'P18 – the videos were clear and concise which made the information easier to understand'. Comments also support assertions by Hakkarainen *et al.* (2007) that video can help students to "understand the different perspectives related to the topics under study" (p. 106), with comments such as: 'P48 – I thought that the videos were interesting and helped me to understand a broader scope of a particular topic that I was researching' and that they 'P50 – broaden your knowledge for that particular topic immensely as each video goes into great detail'. Comments also suggest that using online video can

"convey concepts in ways that the book or lecture simply cannot" (Mardis, 2009:250). Students commented that in using online video for their work they found watching 'P10 – information while taking notes much easier than copying notes from the book' and that the videos contained 'p30 – simpler language but still have the same information', also highlighting the importance of selecting content that is contextually relevant both in terms of theme and language (Berk, 2009; Mitra *et al.,* 2010).

A range of student comments (n=17) also pointed to the value in providing multi-modal information through online video. Comments such as 'P59 – I enjoyed using the video system as I personally prefer to listen to a person talking rather than reading a book' and that watching content 'P51 – helped me to learn the content that I was researching much easier than from a book or online journal' and 'P41 – my visual sensors started to ignite. I really enjoyed the break of not constantly having to look at text, whether that be a book or laptop'. These comments enhance our understanding of the value of video to "pique students' interest in subjects and result in more enjoyable learning experiences" (White *et al.,* 2000), demonstrating similar effects when online video is used as a source of information for assignment work. Other comments in this area, while still related to the multi-modal nature of video, link more specifically to the richer learning about communication skills outlined by Berkhof *et al.* (2011), Kamin *et al.* (2002) and Mueller *et al.* (2005). Students commented that 'P07 – It was beneficial to visually have someone explain to me what I needed to find out or watch someone giving a presentation', 'P11- it was particularly useful because I could visually see actual presentations taking place and I could clearly see how they involved their audiences and kept their focus' and 'P29 – not only could I hear that the person in the video was saying but I could read and interpret their body language'.

Student comments (n=15) also indicate that the motivational and engagement value of video outlined by Koumi (2013) and Boster *et al.* (2006) translates across to the use of

online video for assignment work, indicating the assertion by Boster *et al.* (2006) that video as the potential to increase students' motivation and level of engagement in all manner of educational contexts, held true in this case. Students said that 'P31 – I found using the video system an engaging and interesting way of supporting my academic work', 'P01 – it made the assignment more interesting to me', 'P24 – it was actually fun to use' and 'P48 – I found it an easier more approachable way of learning'.

In a related theme, some comments (n=8) indicated a generally supportive disposition for using online video for authentic tasks (Margaryan *et al.,* 2011; Buckingham, 2007), with comments such as 'P30 – it was interesting being able to use videos instead of just reading books', that the 'P42 – benefits of using the video system in academic work are to expand our experiences as it allows you to engage significantly with the video' and 'P57 – the learning system is very new and up to date for student information. In my opinion searching online seems to be the way going forward'. These sentiments indicate an appreciation for a different approach, enabling students to go beyond text based sources such as books and journals to complete their work.

While students' impressions of the value of online video in this context were overwhelmingly positive, some minor issues were noted which could be addressed. Four students noted that the absence of text based information cause difficulties for their understanding, especially when it came to referencing video content. They commented that 'P25 – I think it would be beneficial for all learning types to add in some text along with the video. That way you don't need to rewind the video multiple times' and that the videos had picture and sound but not script making it 'P43 – hard to listen and take notes there for having to re-watch the sections I missed'.

Data obtained from student questionnaires supports the themes outlined above with 29 comments outlining that the engaging and multi-modal nature of the videos was a major

benefit, five comments indicating videos broadened students' perspectives, and seven students recommending the inclusion of text based information.

Data in this section develops our understanding of the value of online video as a source of information for assignment work. Student experiences and comments indicate that when incorporating video into their work, many of the positive aspects of video witnessed in face-to-face scenarios hold true. Video explained concepts and ideas for students in a way that facilitated video content integration, while providing interesting and engaging material upon which to draw. The multi-modal nature of video not only held students' attention but allowed them to witness communication skills in practice which aided understanding and links to existing knowledge. The use of online video for assignments provided students with an alternative and unique source of information which students were comfortable using and engaging with, with some students acknowledging the increased relevance of video. From this section, the main area of concern noted was the lack of text based information, which may have hindered some students' understanding and ability to reference specific portions of video.

4.6.2.2 The VRS enabled seamless integration of online video into assignments

Many comments contained in students' reflections related to the ease of use of the system, linking to some of the design choices made throughout the implementation process. Based on reviews of case studies by Zhang *et al.* (2006) and MacKinnon & Vibert (2012), the decision was made to focus on a simple interface and straightforward search process. Student comments (n=22) indicated satisfaction with these choices. Students found searching 'P02 – a simple and quick process' and that a 'P12 – benefit of the video system is most definitely the easy access'. They said that the system was 'P47 – very straightforward and easy to use' and 'P52 – very user friendly'. The ease of use was summed up by one student who said:

> P53 - I would recommend using this system or one similar in the future as, with the ever expanding world of technology, using this system can only play a positive role in educating students in the research stage of any assignment.

Students also valued the simple layout of the system with comments (n=7) suggesting that the basic design helped them to focus on the task at hand and not get bogged down or distracted with unnecessary information. Students commented that the 'P39 - home page is not overcrowded' making it 'P14 - easy for people that are not great with technology' and 'P27 - straight forward to work'. Perhaps more significantly was the suggestion by some students that they 'P05 - liked the basic layout of the video system as there was no confusion when searching for a video, or a video segment'. This clarity and lack of 'P14 – complicated language' helped to improve the standard of research, allowing students to 'P39 - put their full attention into the subject required and not get distracted on other videos'. The subject of distraction was also mentioned by students in a different context, who appreciated the lack of interference from advertising. Students commented (n=5) that 'P11 - the video browser contained no advertisements; it got straight to the point and focused exactly what I had asked for in the search engine'. This appears to have been relevant in two contexts. First at the beginning of videos where one student commented 'P18 - the video system consisted of no advertisements before the video began. Therefore it was a quicker process which I preferred'. Second, a student commented on the lack of promoted videos which are listed in search results as a form of advertising, stating the system's approach was better 'P15 - as it brought up specific videos whereas YouTube often gives advertised videos preference over the videos you have typed'. These comments are supported by responses to the questionnaires where a number of positive comments related to the ease of use, such as: ease of referencing (n=7) and the quick process (n=10) of finding content.

While students seemed pleased with the overall ease of use of the system, some issues emerged from the data which were mainly technical in nature. The most prominent of

these (n=10) was that at times the video segmentation was not working, resulting in students having to watch the entire video. Students commented that 'P16 - when I attempted to use the video system it was not working i.e. The video clips significant to the searched topic did not load so I would have to watch the entire video' and at times there were 'P23 - two videos beside each other, both are different segments of the main video, it allowed me to click into the first video but not the second one' so that segmentation was inconsistent. Additionally, some students commented that the load times were quite slow which made using the system frustrating. They said that 'P67 - the videos were taking a long time to load which wasted some valuable time on progressing with my assignment' and 'P02 - It can take several minutes for your video to load and can slow down your work'. Again these comments were supported by data from questionnaires with four comments indicating that the segmentation of videos wasn't working.

Of particular interest to the next cycle of research was that when students were asked how the system could be developed to facilitate working in a group context, they suggested the following: the ability to comment on video segments (n=11), have a group viewing history (n=7) and be able to recommend video segments to their group (n=7).

The above data suggests that the vast majority of students found the system easy to use and appreciated the uncluttered, straight forward nature of the interface. However, the system did experience technical difficulties that impacted on its use. At times video segmentation was not working and segments were slow to load which contributed to some negative feeling. For future cycles it was evident that students envisaged a range of sharing functions as useful in completing work in a group context using the system.

4.6.3 Conclusions from cycle 2

The purpose of this cycle was to address the questions:

R1. What impact do the features of the video retrieval system have on students' ability to work with online video for use in assignments?

- What is the impact of the search and segmentation features on students' ability to source online video for a written assignment?

R2. What strategies can be employed to enable students' digital literacy with online video?

- What strategies support students' use of online video in assignment work?
- How can assignments be designed which enable the use of online video?
- What impact does video have on students learning experience?

R3. How do students display digital literacy in practice when given the context and tools in which to do so?

- How do students integrate online video into written work?

Findings from this cycle can be broken down into two broad themes: sourcing, integrating and referencing online for assignments; and students' experiences using online video for their work. In the first theme, findings indicate that when provided with categories and themes to focus their search (Ellis & Childs, 1999; Mitra *et al.,* 2010), the search and segmentation features of 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 (Lew *et al.,* 2006). The precise nature of the search enabled students to locate specific pieces of content, while the shot boundary techniques returned standalone segments (Smeaton *et al.,* 2010) to students which were concise (Kaufman & Mohan, 2009; Halls, 2012) 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. In contrast to earlier findings by Mitra *et al.* (2010), 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 revealed clear evidence of digital literacy in practice with students demonstrating the ability to assemble digital information (Gilster, 1997; Bawden, 2001), contextualise and synthesise information (Martin, 2007; Fieldhouse & Nichols, 2008) and integrate this content in a manner which demonstrates new understandings (Martin, 2005; Sinclair, 2010; Ng, 21012a; Bawden, 2001). 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.

In the second theme, findings demonstrate that the learning value of video transfers well when using online video as a source of information for assignments. Student comments indicate that online video explained ideas and concepts in an easy to understand manner (Koumi, 2013), conveyed information in ways that are not possible through text books and other written material (Mardis, 2009), provided an engaging and enjoyable source of information (White *et al.,* 2000) that held students' attention due to its multi-modal nature, which was especially useful in witnessing visual information for communication skills (Berkhof *et al.,* 2011). However some students suggested of text based information to support different modes of learning and make the process of referencing and integrating video into assignments more manageable. The ease of use of the system was a contributing factor in enabling students' use of content. Students commented that the simple, clean interface allowed them to search for content without distractions and the ease of access allowed them to do this at any time.

However some stability issues were experienced by students where segmentation was not working and videos were taking a long time to load. In order to ensure valuable use of the system in a group context, students' recommendations of group history, video sharing and commenting were also taken on board.

4.7 Conclusion

This cycle focused on examining the key areas of digital literacy of sourcing, integrating and referencing online video in students' assignment work, while also examining the impact of a VRS to support these tasks. Data outlined has shown that when given the tools and supports to do so, students can engage with online video in a meaningful way, displaying the digital skills necessary to synthesise online video into their work. Importantly, online video has a positive impact on students' learning experience, with students readily able to understand the content and use it to support the development of their arguments and link it with existing knowledge. These findings are a key step forward in our understanding of digital literacy in practice. The VRS played a key role in supporting this process, allowing students to access content in an efficient and effective manner, demonstrated by the range of referencing strategies used by students. While students' experiences were predominantly positive, improvements can be made in the search process. In the next cycle of study, I focus on the areas of commenting on and sharing online video, again drawing out the impact of this on students' learning experience and the effectiveness of the second version of the VRS to support this.

Chapter 5 – Cycle 2: enabling sharing and commenting on online video for a group assignment

5.1 Introduction

The purpose of this chapter is to describe cycle 2 of this research which involved students sharing and commenting on online video for a group assignment, with the support of the second version of the VRS. This cycle aims to address the research questions:

R1. What impact do the features of the video retrieval system have on students' ability to work with online video for use in assignments?

- What is the impact of the video segment sharing and commenting features on students' ability to share and comment around online video for a group assignment?

R2. What strategies can be employed to enable students' digital literacy with online video?

- What strategies support students' use of online video in assignment work?
- How can assignments be designed which enable the use of online video?
- What impact does video have on students' learning experience?

R3. How do students display digital literacy in practice when given the context and tools in which to do so?

- How do students use online video to inform the development of a group presentation?

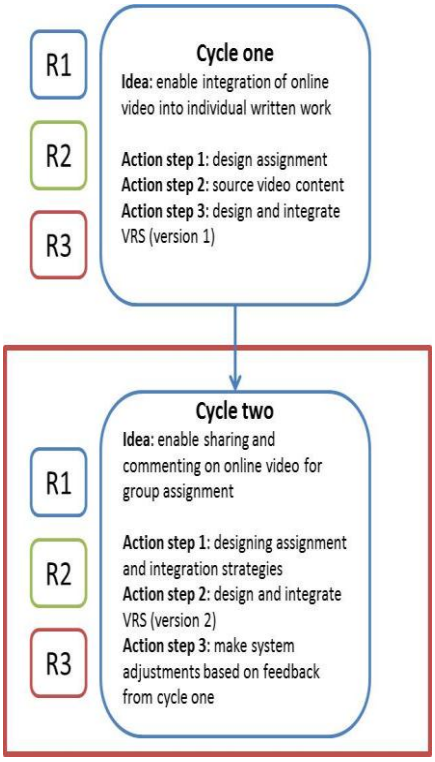


Figure 5.1 - Context of cycle two

This chapter follows Elliot's (1991) step-by-step sequence of activities to guide the reader through the key stages involved. As outlined in section 3.4.3.1 these stages are: 1) general idea and reconnaissance, 2) general plan, 3) action steps and implementation, and 4) impact of action.

5.2 Context of cycle 2 – idea and reconnaissance

Having investigated students' ability to source, integrate and reference online video in an individual written assignment, the focus of this research now shifts to examine how students share and comment on online video for a group assignment using the second version of the VRS to facilitate and support this. As Elliott (1991) states:

> The general idea may need to be constantly revised during the process of action research. This is why I have allowed for this possibility in every cycle of the spiral, rather than 'fixing' the focus for the research at its beginning. (p. 73)

With the advent of online systems, authors such as Cogill (1999) and Pearson (2005) outline that opportunities exist for students to collaborate and share views with each other around digital content. While much work has been completed which highlights the value of sharing opinions and ideas on video in face-to-face scenarios (Moskovich & Sharf, 2012; Berk, 2009), little research has investigated its value when completing tasks using online video. Research using similar video retrieval technology carried out by Gurrin *et al.* (2004) indicated that including the facility to add notes and comments to online video so that users can share opinions, would add value to the learning experience. Digital literacy in this context involves students' ability to communicate with each other using digital tools (Eshet-Alkalai & Amaichai-Hamburger, 2004; Martin, 2005; Hague & Payton, 2011), share information and ideas with others (Sinclair, 2010; Hague & Payton, 2011; Eshet-Alkalai & Chajut, 2009) around authentic tasks.

To achieve this, a group assignment was designed requiring students to select and share online video as one source of information for its development. Using the second version of the VRS students worked together to source, integrate and reference online video for their work. Cycle 2 now describes this process in detail, providing a deeper understanding of how students worked together to complete this task.

5.3 General Plan

Cycle 2 of the research was carried out over a ten week period with the 2013-2014 cohort of ET1 students who were completing the module 'Social and Personal Development with Communication Skills' (see appendix E). This cycle required students to design and deliver a group presentation on one of the following module topics: personal learning & goal setting; learning strengths & learning styles; time management; creativity; stress management (see appendix E). In order to complete this task, students were asked to source material for their topic from books, journals and lecture notes;

however in order to inform the design and delivery of their presentation, they were asked to draw exclusively on online video content and related lecture notes. To fully explain the planning process, it is necessary to divide it into two parts: action step one focuses on the development of the group assignment; action step two focuses on the design and integration of the second version of the VRS.

5.3.1 Action step 1: designing the assignment

The assignment for this cycle of research was again designed based on research by Moskovich & Sharf (2012) and Berk (2009) which indicated that engagement with video content is best facilitated by designing follow-on activities which link video to the overall learning objectives. Particularly relevant in this cycle was that students would use video to build on knowledge gained during the completion of their written assignment in cycle 1 (Mitra *et al.,* 2010; Jonassen, 2000). In order to investigate the communication and sharing aspects of digital literacy in practice, and their impact on students' learning experience, the assignment was also designed so that students were encouraged to share and comment on online video, for the application to the creation of a group presentation. Sherer & Shea (2011) identified presentations as key tools in using online video to support students' learning and engagement. As mentioned previously, this Social and Personal Development module contained a range of topics which are designed to help students engage fully with college life, with communication skills (Specific topic for cycle 1) being a major part of the module. Students were again provided with categories and themes (Ellis & Childs, 1999; Mitra *et al.,* 2010) within communication skills to assist them in applying these skills to aspects within other module topics. Students were asked to complete the following group assignment (appendix H):

Your goal is to produce an educational presentation (recorded PowerPoint) on one of the following topics:

- Personal learning & goal setting
- Learning strengths & learning styles
- Time management
- Creativity
- Stress management

Your goal is to produce a presentation that informs potential learners about your topic. The presentation must have an introduction, development of the topic, conclusion and references as per normal written assignments. Evidence that additional reading and research has been conducted for your topic is also required.

Your presentation should include:

- Quality information about your assigned topic
- Graphics and visuals to support text information
- Voice narration for entire presentation
- 2 minutes of recorded video explaining an aspect of the topic (to demonstrate aspects of communication skills). This can be a link to something you upload to YouTube or embedded in the PowerPoint.
- You must clearly demonstrate communication skills that you have learned or improved upon from the videos on the online system, and include references (title and time stamp) to these on the last slide of the presentation, along with a comment outlining what skills you learned, and how these link to specific segments (for example use of graphics, tone and speed of voice, body language, structure of argument). 4 of these references are needed.

To complete this presentation, you will be assigned to groups of six; marks will be awarded equally to each member of the group.

The purpose of this assignment was therefore two-fold. First, the purpose was to encourage students to dig deeper into the communication skills video content and

facilitate links between theory and practice i.e. put information learned about communication skills to use. Second was to explore how students would use the VRS to share and comment on video segments, to design and develop their presentations. To facilitate this, a system needed to be put in place that allowed groups to share in this manner.

As a means of supporting students, a number of PowerPoint workshops were run introducing them to the process of creating and publishing presentations. Workshops were run on a small group basis, facilitating demonstration, hands-on time and one-to-one support if necessary.

5.3.2 Action step 2: designing and integrating the VRS

The primary focus of this cycle of the research was understanding how students share and comment on video segments in order to apply what they have learned in a group presentation. To achieve this, the second version on the system was designed from two perspectives, the front end and the back end. The front end design was concerned with how the system would look and feel for the students and how interactions would take place. The back end was concerned with the internal mechanics of the system and how functionality could be designed and supported from a technical perspective. In order to clearly explain the unique features of the system, it is best to start with the back end, the technical features of the system and how these were incorporated.

The purpose of this version of the VRS, from a technical perspective, was facilitating students to share and comment on video segments which would later be used as a source of information for their presentations. From this perspective, the system had four distinct technical challenges that required tackling: facilitation of student groups; content sharing; commenting on individual video segments; group history.

The technical process behind segment sharing and commenting

The first task was ensuring that students could share content with their group on the system. To achieve this, a number of options were discussed such as linking students' log in details to their Facebook or Google accounts. However, the most practical approach was to use the existing class list and pre-assigned groups. Each student was allocated a unique individual ID and group ID and once they logged on to the system, all activity was recorded against these.

The next area for discussion was how students could share content with their fellow group members. A number of options were discussed such as the sharing of video timestamps across email or sharing of hyperlinks across a chat box style interface. However, the most efficient approach was the incorporation of a process whereby when a student wanted to share a video segment with the group, they simply had to click on a button after which this would be highlighted for other members of the group. This was perhaps the most technically challenging aspect as students individual ID and group ID needed to link directly to the exact video segment, which was then extracted out to be shared with the group (Fig. 5.2).

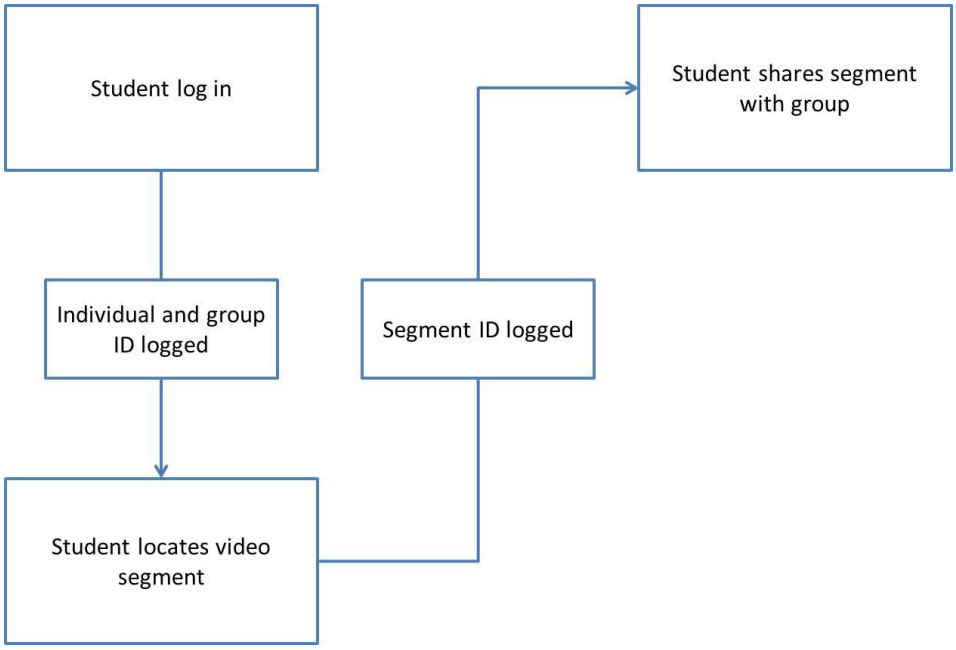


Figure 5.2 - Sharing process

In order to facilitate students in commenting on video segments, a similar process was applied. To comment on a video segment, students' individual and group ID were selected upon log in and then linked to a selected video segment. Student comments were then linked alongside their ID to the chosen segment to be shared with the group (Fig. 5.3).

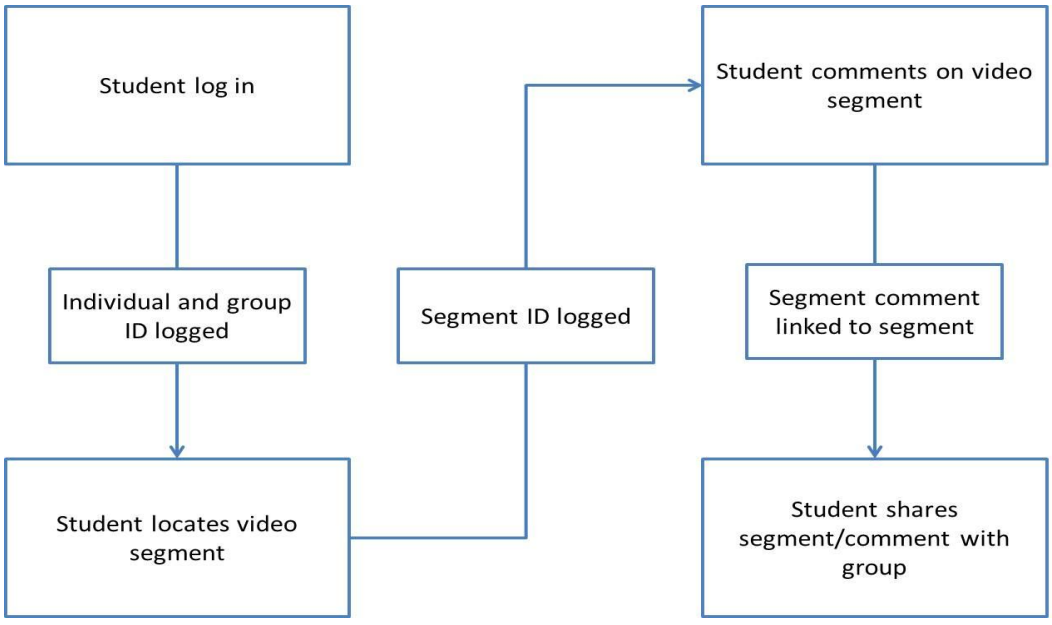


Figure 5.3 - Commenting process

The final technical area was designing how group members could view and respond to shared video segments and comments made by other members of the group. Again, many options were considered such as email notifications and incorporating a separate discussion area on the screen. However, in order to keep all activity located on one system, it was decided to create a group section where students could easily keep track of what was happening on the system. To facilitate this from a technical perspective, all student shares and comments were tagged with their individual and group ID. Once a student logged into the system, they could view all shares and comments made by any other students with the same group ID (Fig. 5.4).

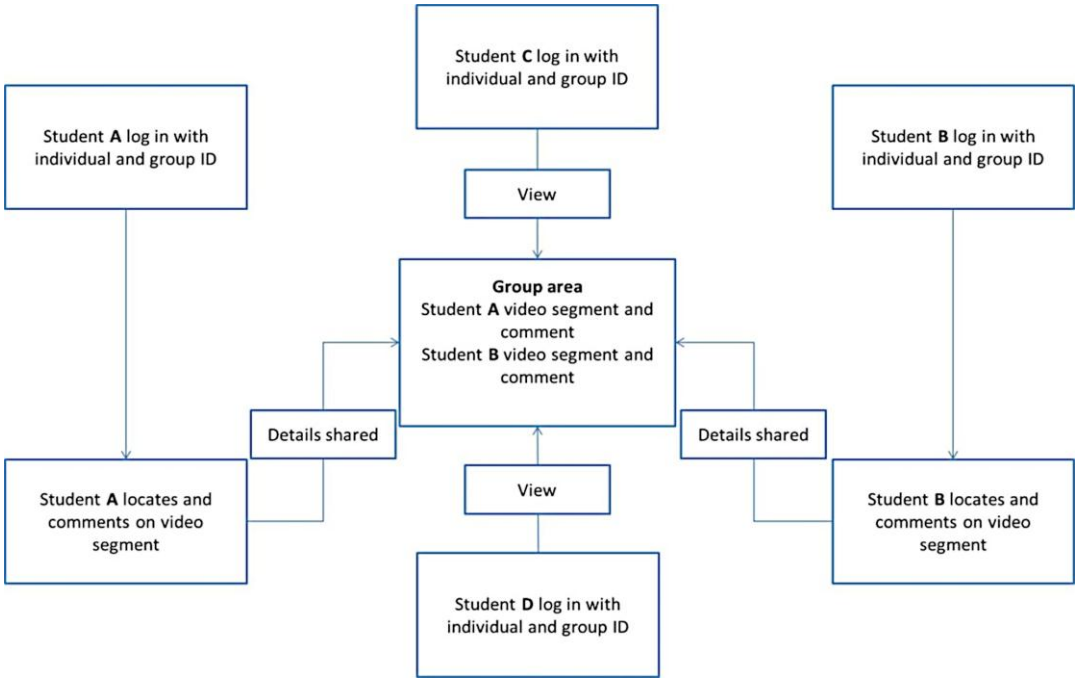


Figure 5.4 - Group process

The result of these technical features and linkages to individual and group IDs was that the group recommendations' area would act as a history and repository of group activity where any member of the group could view, and perhaps most importantly, respond to comments made by other group members. Also it is important to note that comments and shares were linked directly to video segments, so group members could share these short segments of video rather than entire videos. Finally, in response to feedback from

cycle 1, some technical implementation issues were addressed to improve the system's stability and load times of videos.

The student user experience

The next area for consideration was the front end of the system, dealing with its look and feel. Some major changes were made to the system over cycle 1, many of which were made out of necessity to accommodate the new sharing and commenting features as outlined above. Much thought went into seamlessly integrating new features into the system so that students could easily use the features, while retaining their understanding of how to use the search functionality in the same way as they had done during cycle 1. Gefen & Straub (2000) emphasise the importance of retaining ease of use throughout the development of web based systems, especially when the "required information is embedded in the system and thus quality is directly related to ease of use" (p. 2). The first major change was the introduction of groups, and while this did pose a technical (outlined above) challenge, the impact on the user experience for students was kept to a minimum. Accessing their group simply required students to select their name from a drop-down menu, after which the system would automatically link the student to their corresponding assignment group.

The addition of the sharing and commenting features also took much preparation and discussion, both from a technical perspective as outlined above, and a user perspective. The objective of this was to seamlessly allow students to build on the work carried out during cycle 1, meaning that they could search for content and then share segments and comments with other group members. To do this, the sharing and commenting features were integrated within the same window. When a student found a relevant video segment for viewing, they could then share this with the group by clicking 'submit' or comment by typing text in the comments box and then clicking 'submit'. Once

completed, the segment and relevant comment were logged in the group area for later viewing by the group (Fig. 5.5).

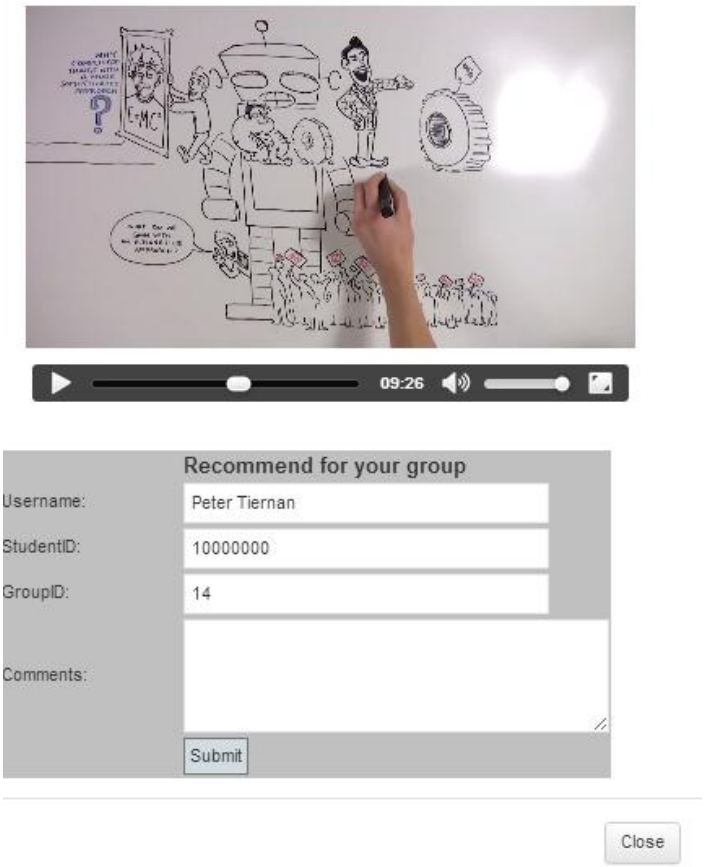


Figure 5.5 - Commenting and sharing window

The final feature involved deciding on how each member of the group could access and view comments and shared video segments recommended by other members of the group. After much thought, the decision was made to make the process as easy as possible for students by having a 'group recommendations' section available directly after logging in to the VRS. Once a student logged in, they could view this section which contained a log of all group members' shared segments and comments on video segments (Fig. 5.6).

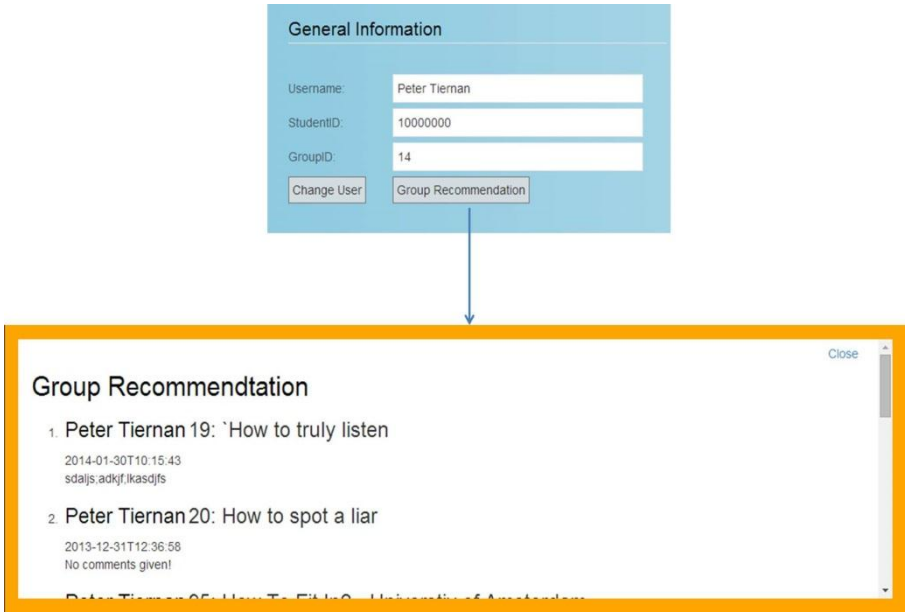


Figure 5.6 - Group recommendation section

One of the most important features of this section was that students could go directly to the video segments in question, removing the need to search again (Fig. 5.7).

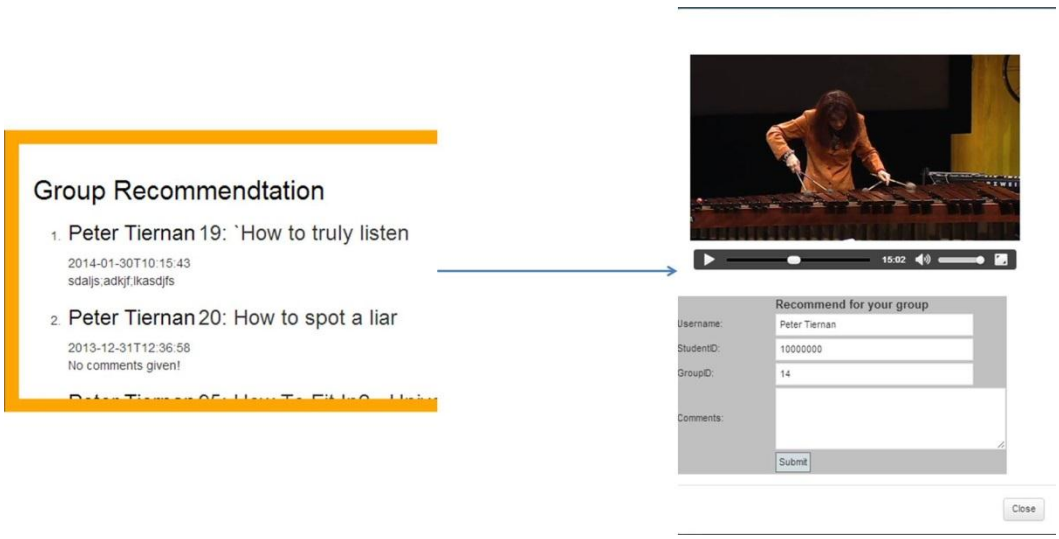


Figure 5.7 - Group recommendation link

The final area for consideration was the implementation of the system, dealing with how the system was administered and maintained. Given that there were some issues during the previous cycle, a number of small changes were made. First, contact was made with the systems' department and changes were made to the configuration of the server so

that no more down time would be experienced. Second, the video collection was re-indexed to stabilise the retrieval process and improve video load times.

5.4 Implementation

During the implementation phase, the plans outlined above were put into action and students began working on their group presentations as a part of their overall assessment for the module. Cycle 2 went live in early November 2013 during lecture time. During this time students were given a demonstration of the new version of the VRS and the features that had been added, specifically the group log in, video segment sharing and commenting features. Students were also informed of the stability and other improvements that had been made as a result of their feedback. In addition to the guided demonstration of this version of the system, a narrated video was created and posted to the class Moodle (LMS) page which outlined how to use the video sharing and commenting features and to access comments and segments shared by other members of the group (Fig. 5.8).

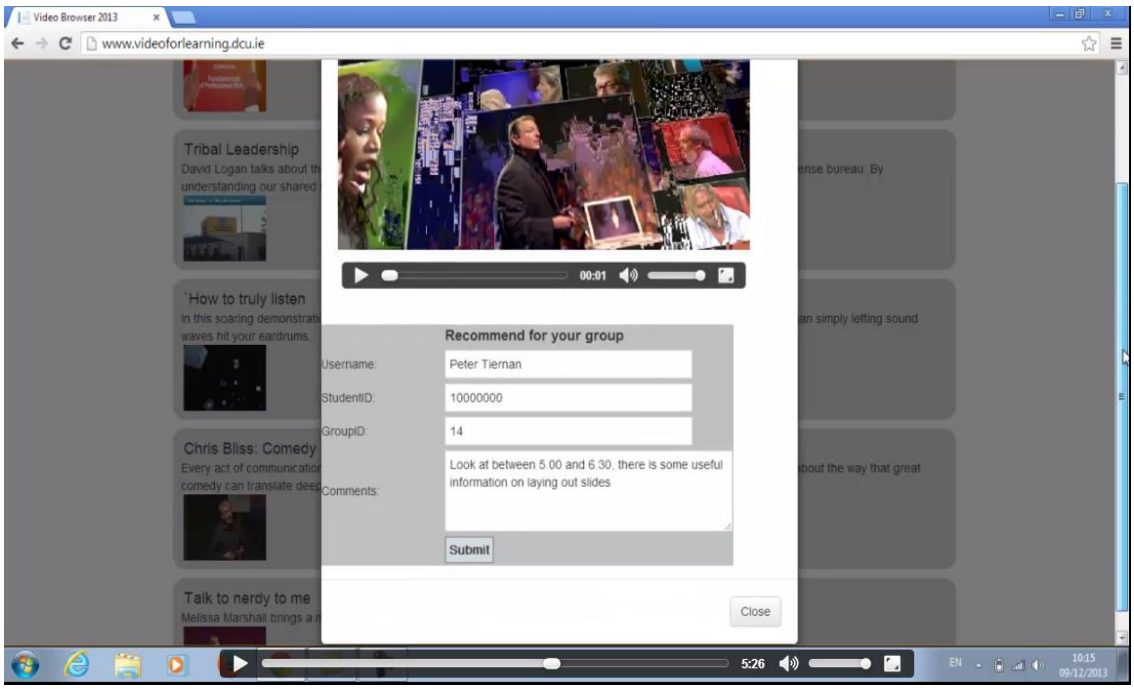


Figure 5.8 - Instructional video

Students were given a total of ten weeks to complete the assignment. During this time, the remainder of module topics were covered with the class, along with additional workshops on using PowerPoint to design and create presentations. Similar to support carried out during cycle 1, video was used during lectures to demonstrate anchoring key themes of video and referencing content. A portion of these ten weeks included students' Christmas break, when they were not required to be on campus. This was an ideal time to examine the use of the system features to support sharing and commenting on video segments online.

5.5 Impact of action

In this section, the impact of action is analysed and discussed for the reader. Themes and findings are drawn out to fully address the research questions:

R1. What impact do the features of the video retrieval system have on students' ability to work with online video for use in assignments?

- What is the impact of the video segment sharing and commenting features on students' ability to share and comment around online video for a group assignment?

R2. What strategies can be employed to enable students' digital literacy with online video?

- What strategies support students' use of online video in assignment work?
- How can assignments be designed which enable the use of online video?
- What impact does video have on students learning experience?

R3. How do students display digital literacy in practice when given the context and tools in which to do so?

- How do students use online video to inform the development of a group presentation?

In order to achieve the research questions, data was gathered from students in a number of ways. First, students were asked to submit an individual 500 word reflective document, outlining the benefits, drawbacks and potential improvements in using the features of the system in a group context, and how the information drawn from the video content contributed to the design, development and delivery of their presentations. Second, an online survey was distributed to students following completion of the assignment task. This survey gathered qualitative and quantitative data on students' opinions of the various features of the system and their thoughts on how this version of the VRS compared to that in cycle 1. Student submissions were also analysed for the video references used and how these were linked to the development of the presentation. Out of the 70 students, a total of 56 reflective documents and 25 questionnaires were returned, giving a response rate of 80% and 36% respectively. Finally, group interactions that occurred on the system were analysed to ascertain the kinds of communication that took place.

5.6 Findings and discussions

Key themes and findings are now presented using data from questionnaires, reflective documents, assignment analysis and system interactions. As stated in the methodology section, data was analysed using the constant comparative method and as such will now be presented using propositional statements in an effort to portray the overall meaning of the data categories. This is followed by overall conclusions and recommendations that can be drawn from the data and used to inform future cycles. Student comments and references were first aligned to initial salient data categories before coming together as propositional statements under two key themes which helped to tell the story from the

student data. The two key themes and corresponding propositional statements form the basis for the discussion of findings which follows.

5.6.1 Student impressions of the VRS as a tool to enable video sharing and commenting for a group assignment

While authors such as Cogill (1999) and Pearson (2005) have commented on the potential of online systems to facilitate students in sharing content and views, and others such as Martin (2005), Sinclair (2010), Bossewitch & Preston (2011) and Ng (2012b) have commented on the importance of sharing and commenting around digital content for the development of digital literacy, little evidence exists of students displaying these skills in practice or of their impression of using these skills to complete assignment work. Findings in this section go some way to addressing this gap in understanding by outlining students' impressions of using the video segment sharing and commenting features of the VRS to complete a group assignment.

5.6.1.1 Video segment sharing and commenting had a positive impact on students' ability to use online video for a group assignment

Students' reflective documents contained a range of comments which indicated that the video segment sharing and commenting features had a positive impact on their ability to use online video in a group context. Comments (n=86) were spread across a number of related areas.

The most prominent theme evident in students' reflections, with 39 individual comments, expands our understanding of what sharing information (Sinclair, 2010; Eshet-Alkalai & Chajut, 2009) and commenting around digital content (Martin, 2005; Bawden, 2001; Hague & Payton, 2011) mean in practice. Comments (n=18) indicate that in this context, students felt that the main benefit in sharing online video was the gathering together of content that may not have been found if students were working

alone. Students commented that 'P69 – the features helped us to work as an effective team in order to put together a successful presentation' because 'P02 – each member could recommend videos they felt were effective' and that 'P43 – sharing was a bonus as I was able to view videos that other group members suggested that I might not have found myself. Everyone was working together to find a variety of videos that suited'. The ability to 'P38 – show each other what we found and tag videos' for the group 'P06 – meant that we saw a wider variety of video, and in quicker time'. These comments expand our understanding of digital literacy in practice, highlighting the benefits of sharing content around a specific task. Student comments around communication (n=17) focus on how the features of the VRS enabled them to communicate with each other in a straightforward and worthwhile manner. Students said that 'P67 – the way in which the video system was set up made it so much easier to communicate with other members in my group. Usually for any other group assignment we would set up a Facebook chat between all the members in our group and through that communicate and try to copy and paste the video that we thought had useful information into the chat so other people could watch it and see what they think' and that 'P39 – instead of trying to remember what video one looked at when at home it was now directly in front of us' allowing the group to 'P19 – make a more informed decision' on what to view and 'P13 – remember which ones we watched'. The features of the system also appeared to facilitate communication from every member of the group with students commenting that 'P27 – after using the video system it helped me to get involved with the group. This helped my group collaborate better and enjoy working together' and 'P32 – the collaborative features of the video system helped us as a group to communicate with each other'. These comments indicate that not only do the students display the ability to communicate with each other around digital media but that the tools provided were more effective than traditional methods in enabling students to share content and encouraged participation from a wide variety of group members.

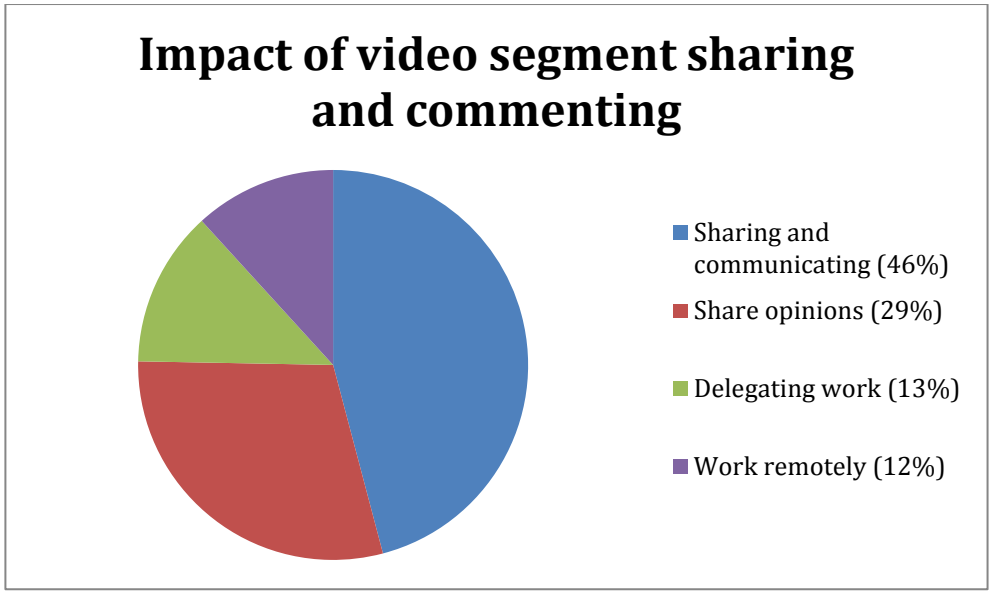


Figure 5.9 - Impact of video segment sharing and commenting

Authors such as Cogill (1999), Pearson (2005), Gurrin *et al.* (2004) and Eshet-Chajut (2009) have suggested the potential benefits in enabling students to comment on video and share their opinions related to content. Comments contained in students' reflections (n=26) indicate that this was not only feasible in practice, but that by enabling this process, students' comments allowed them to express opinions and ideas on video segments and how they related to the task at hand. Students commented that the features allowed 'P19 – a user to elaborate, in their own words, on the reason or reasons that they chose and tagged the video they did' and explain why they 'P29 – found that specific video useful'. The theme of sharing ideas and opinions can be viewed from two perspectives. Students appreciated being able to view others' thoughts saying that comments helped them to understand what other members were 'P22 - intending to communicate' and to gather 'P27 – different opinions and ideas' on video segments, a sentiment summed up well by one student who commented that it was 'P41 – a great facility to have in order to get different individual views and opinions on the video segment'. However, the benefits of commenting in order to share opinions and ideas can also be viewed from the perspective of students' satisfaction in being able to express their own views on content to the group. Students commented that it was helpful being

able to ‘P18 – tell my group why I found videos necessary to be recommended and what I found most interesting about each video’ and to explain to the group ‘P13 – what we thought about the video and what bits we thought would be helpful in our presentation’. Students also commented that ‘P31 – being able to narrow down the video times and be able to use the comment box provided to pass on any information we wanted to share with the group’ and leaving a ‘P47 – message to our group explaining why the link was relevant’ was useful. These comments develop our understanding of digital literacy in practice by demonstrating the value of sharing ideas and opinions on online video to accomplish a task not only because students value the opinions of others in the group but because they value the ability to offer their own views on content. Interestingly in the context of this study, students also began using the comments feature to help refine the search process by providing other members of the group with specific times when relevant information was covered in a video segment.

While the above themes provide valuable understanding of digital literacy in practice as it relates to ideas already suggested by authors in the area, the following data reveals areas of sharing and communication that are undocumented in the literature and shed some light on developments in students’ behaviour when working together on a group task around digital video. The first of these themes, with 11 comments was students’ use of sharing and commenting features to delegate work throughout the group. Students’ commented that they used the features to break up the task among group members saying ‘P06 – we could divide up search terms’ and ‘P02 – work as a team to complete the presentation’. By dividing up the topics, members of the group were able to ‘P36 – work on our given topic in our own time’ where each member of the group was ‘P43 – working together to find a variety of videos that suited’. This ability to use the system to delegate portions of the work enabled members of the group to focus more deeply on the areas that were assigned to them. One student commented that separating out the task amongst members ‘P12 – allowed each person in the group to do in-depth research

into their topics and understand them better' with another adding that this 'P60 – divided the workload and still came out with a number of useful videos'.

The second emerging theme evident in the students' reflections, with 10 comments was the ability to work together remotely to complete the task. Comments here support findings by Gurrin *et al.* (2004), Kaufman & Mohan (2009) and Mitra *et al.* (2010) that suggest content should be available to students at all times. Students noted that they could share video segments and make comments 'P01 – without having to be with each other in person' and P06 – without having to try and co-ordinate any kind of meeting'. They said that the commenting system 'P12 – made life a lot easier for us as everyone could contribute to the work online without having to find a time when everyone was free to go into college and meet up while we were on our break' and 'P26 – it allowed us to have conversations about video links without having to meet up in person'. These sentiments are summed up well by one student's comment who said:

> P53 - The option to make group recommendations was extremely useful as it allowed each group member to be able to share ideas and communicate with one another efficiently over the Christmas break. This meant that although we were unable to meet as a group for a period of time, we were however able to conduct valuable research into our presentation and prepare ourselves for completing the assignment.

These overwhelmingly positive comments from students were also clearly evident from the survey data collected directly after version 2 of the system was used by the students. This data suggested that students preferred using the system in a group context with 100% of them saying that they felt version 2 was an improvement over version 1, both due to the fixes and added features (Fig. 5.10).

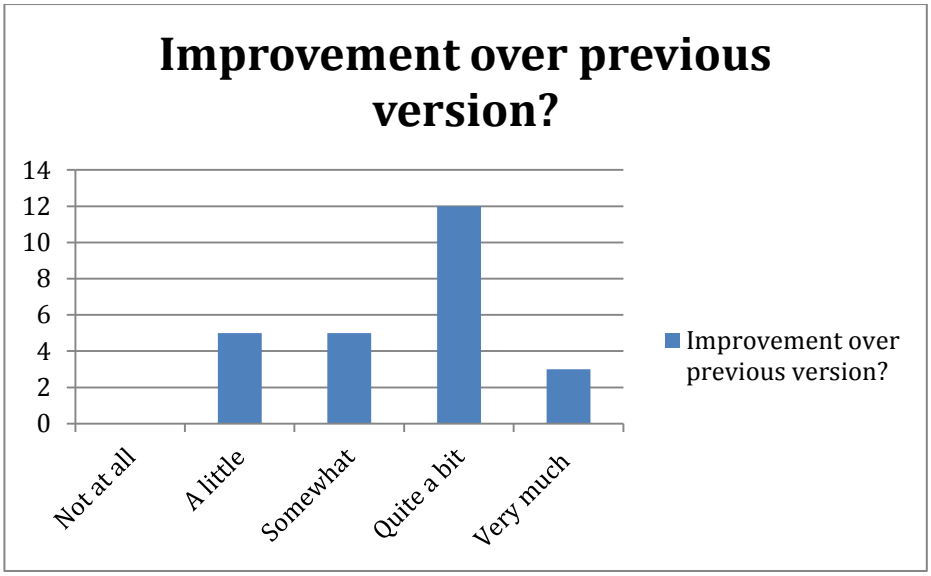


Figure 5.10 – Improvement over version 1

Moreover, the survey data supports students' positive feelings regarding the ability to share and comment on video segments. 100% of respondents believed the video segment sharing feature was a useful addition due to its ease of use and value in recommending content to the group. Similarly, 96% of respondents to the survey said they found the commenting feature useful as it enabled them to share thoughts and information related to video segments and exchange opinions about video segments for use in their presentations (Fig. 5.11).

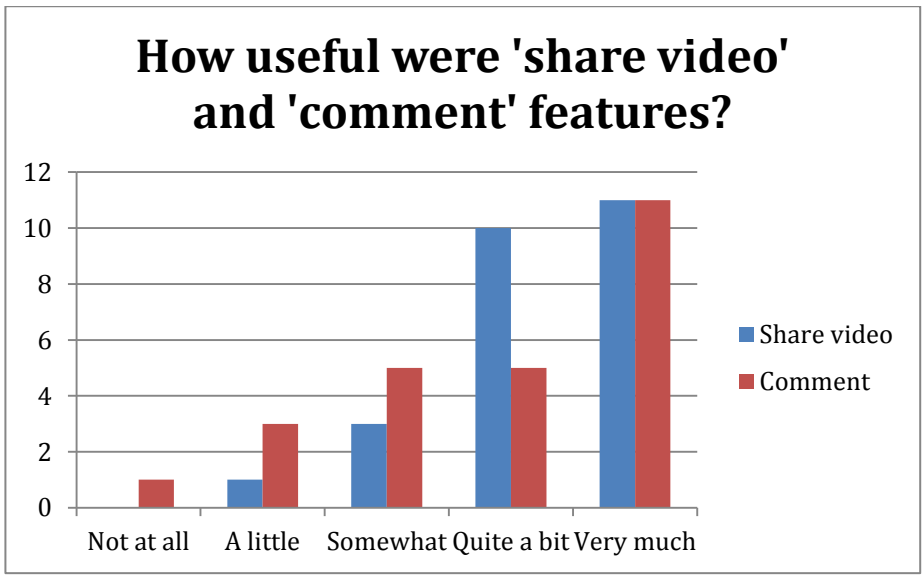


Figure 5.11 - Usefulness of sharing and commenting features

Data in this section indicates that students' perceptions of using the video sharing and segmentation and commenting features of the VRS to complete their assignments largely concurs with existing literature in the area. Their feedback indicates that sharing digital video (Sinclair, 2010; Eshet-Chajut, 2009) allowed them to work effectively as a group by recommending content, allowing them to view a range of content which otherwise may have been missed if working alone. The commenting features allowed students to work effectively when compared to existing approaches, allowing them to communicate around digital content (Martin, 2005; Hague & Payton, 2011), facilitating engagement from members of the group. Also evident was students' appreciation for the ability to not only view opinions and ideas from other members of the group, but also to offer their own ideas on why specific pieces of video were relevant to their assignment (Gurrin, 2004; Eshet-Alkalai & Chajut, 2009). Data in this section also contained details of emerging benefits of these tools for group work not present in existing literature whereby students valued the ability to delegate work and communicate remotely for the completion of their task.

5.6.1.2 Video segment sharing and commenting features enabled a variety of interactions between group members

Having analysed student comments and impressions on the use of the VRS's video segment sharing and commenting features to complete their task, the next section examines the interactions which took place online. The purpose of this is to understand more fully, how students actually interacted with each other using the features of the VRS. A total of 70 interactions took place on the system over the course of the group assignment. Analysis of these interactions reveals that they were similar in breakdown to the themes outlined above, with one notable exception. Interactions fell into two main categories: 1) Sharing video segments with the group, 2) Sharing of opinions and deeper views on the segments; with a third presenting as an emerging theme - 3) Social interactions.

1) Sharing video segments to the group

The majority of interactions (n=46) which took place on the VRS correspond with comments from students' reflections outlined in the previous section, falling into the category of sharing and communicating around online video. The interactions which centred on suggesting content to the group and communicating what videos had been found, took place on a number of levels. For example, some students simply clicked the share button so that a segment was shared with the group, while others provided varying levels of information along with their share.

The most common, with 28 individual interactions (see Figure 5.12) clearly demonstrates students' ability to share information in new ways (Sinclair, 2010) and to communicate with others (Martin, 2005) around digital content. Examples such as P01 sharing a segment from 'Improve your public speaking and communication skills' along with the comment 'This is very good to help with the narration and presentation' and P61 sharing a segment from '4steps to great speaking' along with the comment 'This video showed me ways of giving a good speech for a presentation' demonstrate students' use of the communication tools available to them (The international ICT literacy panel, 2002) to share information and interact with each other in a meaningful way (Eshet-Alkalai & Chajut, 2009). Additionally, interactions such as P36 sharing the video 'Improve your public speaking and communication skills' along with the comment 'This is some good advice to look at 6.00 – 6.43', highlighting students' ability to collaborate effectively around the task and understand how the tools provided can be used to support this (Hague & Payton, 2011).

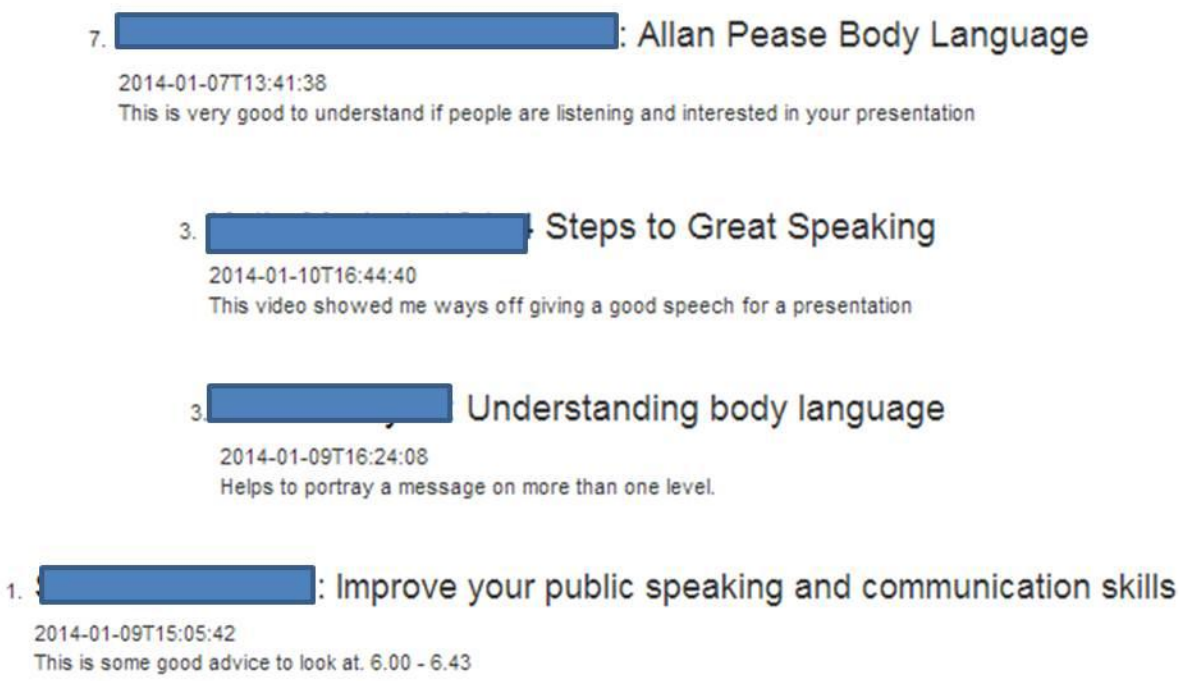


Figure 5.12 - Group shares: with reasoning

The next most common category involved students sharing video segments along with a short personal message (see Figure 5.13) and was focused more on sharing information, while communicating with others in the group (Martin, 2005). A total of 14 shares of this kind were noted in students' interactions, for example P20 share a video segment from '4 steps to great speaking' with the comment 'I recommend watching', while P27 shared a segment from 'Effective listening skills' along with the comment 'I think this video could help us a lot'. Other comments indicated that students developed a comfort in communicating around digital video (Bawden, 2001), inserting emotion into their shares to aid communication. P31 for example shared a segment from 'Speaking tips – stop worrying and start presenting' with the message 'Hey think this would be good for us ☺'.

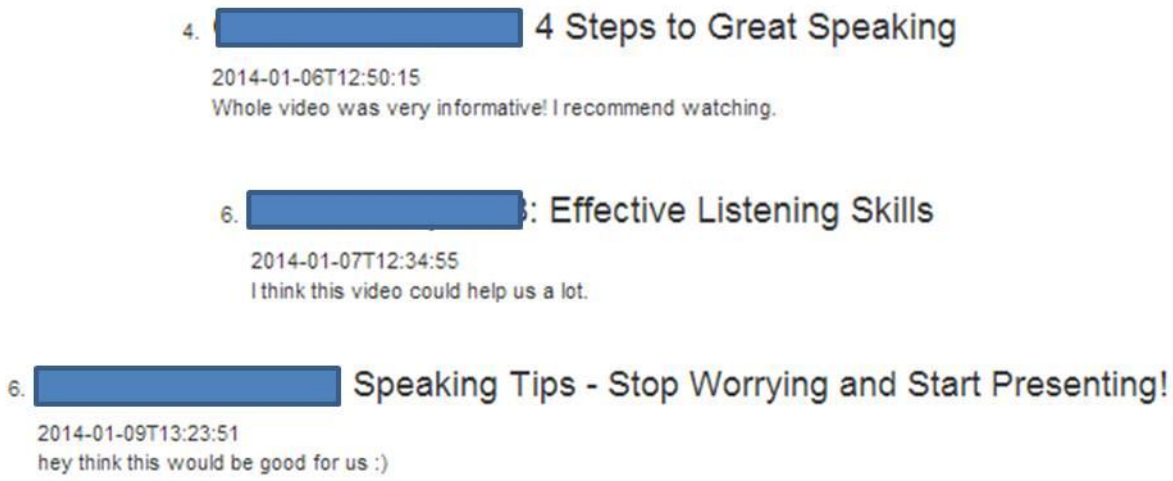


Figure 5.13 - Group shares: with personal message

The least common of these, with only four interactions was the basic task of sharing video segments (Sinclair, 2010) with no additional information (see Figure 5.14). For example P22 share a segment from 'Understanding body language' with no additional information. Similarly P40 share a number of segments from '3 ways to communicate better'.

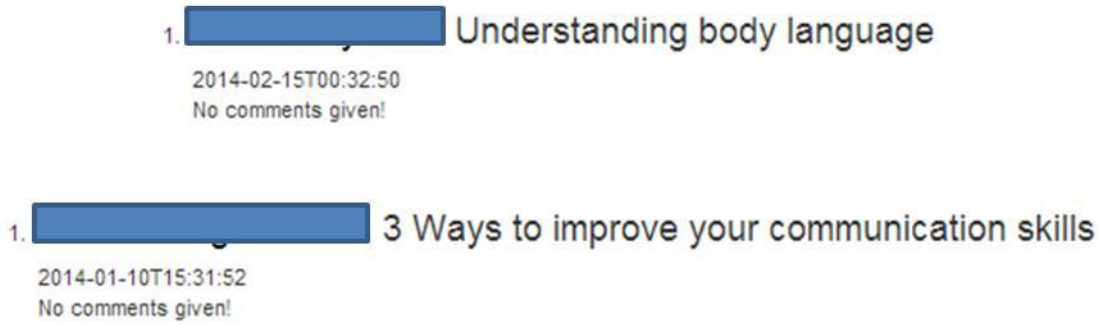


Figure 5.14 - Group shares: no message

The data presented here demonstrates students' ability to use the tools provided by the VRS to communicate on a number of different levels for the completion of their assignment. Evidence shows student awareness of how these tools can be used to share relevant content and communicate additional information which supports the use of online video for their work and aids group communication.

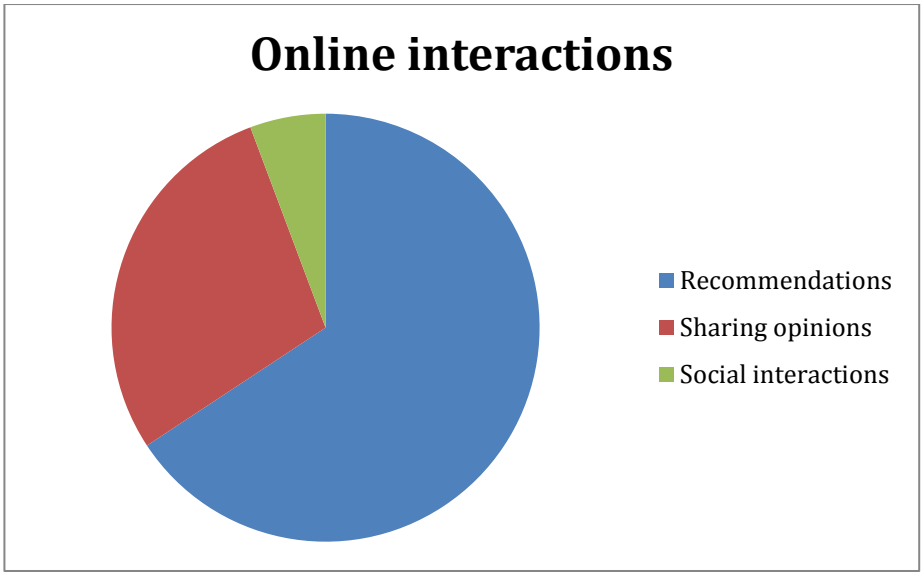


Figure 5.15 - Breakdown of online interactions

2) Sharing of opinions and deeper views on the video segments

Snelson *et al.* (2012) argue that community features such as video comments on sites such as YouTube have been critical to their success with students, arguing that investigating the impact of such features in teaching and learning should be one of educators' top priorities. Evidence from the interactions on the VRS suggests that in practice, students do take advantage of the opportunity to share their views with others (Pearson, 2005). A total of 20 interactions of this kind took place, containing deeper, more opinion based information (see Figure 5.16).

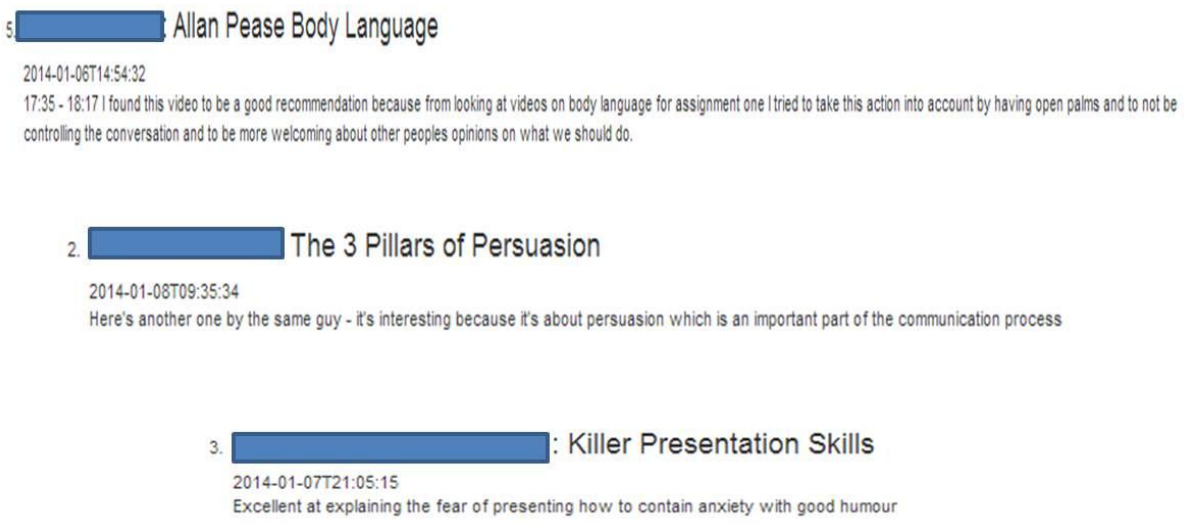


Figure 5.16 - Group shares: sharing opinions

Examples such as P30 sharing a segment from 'Allan Pease body language' along with the comment 'I found this video to be a good recommendation because from looking at the videos on body language for assignment one I tried to take this action into account by having open palms and to not be controlling the conversation and to be more welcoming about other people's opinions on what we should do' and P21 sharing a segment from 'The 3 pillars of persuasion' along with the comment 'Here's another one by the same guy – it's interesting because it's about persuasion which is an important part of the communication process'. These comments not only demonstrate the sharing of opinions and ideas around digital video, but also again suggest the value in linking video to the overall context of study (Moskovich & Sharf, 2012; Berk, 2009) whereby students can witness communication skills in practice (Berkhof *et al.,* 2011).

These interactions clearly demonstrate digital literacy in practice, whereby students used the features of the VRS to communicate around digital video in a worthwhile manner, using the space provided to share their thoughts, ideas and opinions on the video segments. The VRS enabled students to comment on the value of specific video segments for the group assignment, displaying a considered approach to using digital video in this context.

3) Social interactions

Eshet-Alkali & Amichai-Hamburger (2004) and Eshet-Alkali & Chajut (2009) identified social-emotional literacy – that is understanding the emotional and social aspect of working together – as a key element of digital literacy, with Dabbagh & Kitsantas (2012) suggesting that social technologies allow students to facilitate "their own learning activities and connections with peers" (p. 3). While not as prominent as other areas of interaction which appeared on the system, most likely because they were not required to complete the assignment, there was evidence of social interaction beginning to emerge (see Figure 5.17). A total of four interactions of this nature were noted which ranged from simple replies to attempts at organising the group for the next meeting. For example P05 replied to a video suggestion with the comment 'Really interesting video J (name removed)! ☺', while P35 replied to a suggestion saying 'I agree A (name removed) this will be very helpful'.

Figure 5.17 - Group shares: social

One student even used the system to attempt to spur the group on to watch content that might be discussed at their next face-to-face meeting (see Figure 5.18). P18 from group four suggested a segment from the video 'Speaking tips – stop worrying and start presenting' with the comment 'Hey guys I found this video very useful for speaking tips for practicing our voice overs, maybe have a watch before our meeting tomorrow ☺'.

Figure 5.18 - Group shares: social two

The data above outlines that while not required, students began to communicate with each other on a more social level, demonstrating a level of comfort communicating around online video, allowing them to use the VRS outside of the set boundaries of sharing and commenting on video segments, specifically focused on the completion of their group assignment.

While it is clear from the above that there was an overwhelmingly positive response to the video segment sharing and commenting features of the system, a small number of improvements were also suggested by students (Fig. 5.19). Similar to during cycle 1, students again suggested that increasing the amount of content available would improve the user experience and the value of the system for completing their assignments. Seven individual comments mentioned this in their reflections. However little new data could be yielded from these comments that was not already presented during cycle 1. Students (n=18) also suggested a variety of collaborative improvements that they would like to see implemented which may improve the functionality of the system for use in group tasks.

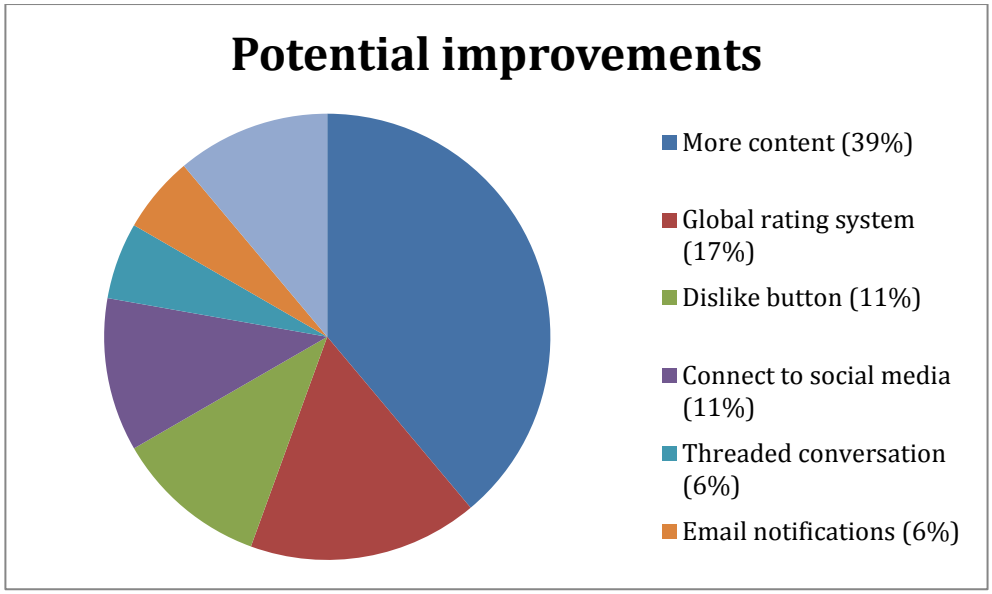


Figure 5.19 – Potential improvements

While there was no improvement that stood out amongst students' suggestions as the most prominent, there were a number of recommendations that could be taken on board. For example, three students recommended an overall rating system where the entire class could rate content for each other 'P09 - This way you can see what people are finding interesting and helpful within the topic of choice'. Two students recommended a 'dislike' button, where content that was not relevant or not useful for the group could be removed from the search, they felt this 'P26 - would show quickly whether a video was worthwhile watching or not, without having to read all the comments'. Five students suggested other ways of facilitating conversations around the video segments, such as connecting to the system with social media (n=2), threaded conversation (n=1), in-built chat system (n=2) and email notification (n=1) when another student gives replies to their comment.

The above data confirms that the video segment sharing and commenting features of the system enabled students to successfully complete their assignment in a group context. Students were particularly taken with the impact on their ability to communicate with one another, especially in terms of sharing views and opinions on video segments. The

system enabled students to divide up the task and delegate work to each other, fostering an effective approach to tackling the assignment, while removing the need to meet up on campus. While overall satisfaction was high, students did have a number of suggestions for improving the features, such as better integration of chat features with social media networks, more whole class rating and a notification system to make students aware of new interactions.

5.6.2 Student integration of online video

Having examined students' impressions of the sharing and commenting features on their ability to work together to complete a group assignment, and the specific interactions which took place online, the following section now examines in a different context to cycle 1, how students used the information contained in the online video to inform the development of their presentations (Prensky, 2009) and demonstrated an understanding of how this information linked to their task (Sinclair, 2010; Ng, 2012a).

5.6.2.1 Students used specific information from online video and applied it the creation of their presentations

Students were asked to reflect on how online videos were used to inform the design, development and delivery of the group presentations. Responses in this area spanned a number of themes, with some interesting and surprising insights (see Figure 5.20). Responses covered a range of areas including information on: designing and delivering presentations; the importance of preparation; understanding delivery techniques; and awareness of teamwork.

The most prominent of these areas, with 40 comments was the area of design. Comments (n=19) indicated that students learned about the importance of the visual nature of presentations. Students said they learned 'P02 – about the importance of images in our presentation', 'P10 – the colour scheme we should use' and 'P34 – how to lay out the presentation'. Students also commented (n=16) on learning about the

importance of structure saying they 'P20 – learned how to plan and structure our presentation' and provide 'P22 – clear and concise information'. Students also commented (n=5) on the importance of taking the perspective of the audience into consideration saying 'P26 – the best way to design a presentation is to look at it from the point of view of the viewer' and that they wanted 'P10 – to appeal to the audience in every way' in order to 'P52 – keep the audience interested'. Comments here demonstrate students' ability to understand muti-modal information (Ng, 2012a), synthesise key points (Fieldhouse & Nichols, 2008) and importantly in the context of this study, adapt and re-use this information for the design of their work (Sinclair, 2010). Similarly, students' comments (n=27) on learning about the importance of the voice, demonstrate that when focused on a given task (Margaryan *et al.,* 2007) and provided with relevant content, students were able to identify key video and use it to inform the delivery of their presentation. Students commented that video showed them 'P47 – how to use your voice while presenting', expanding their understanding of how to project confidence by 'P02 – eliminating any filler words such as "uh" or "um"', using 'P18 – the power pause' and using the voice to 'P21 – deliver with intensity' in order to 'P55 – maintain interest and attention'. These comments also highlight the value in witnessing the subtleties of communication in practice (White *et al.,* 2000), rather than simply reading about them in text.

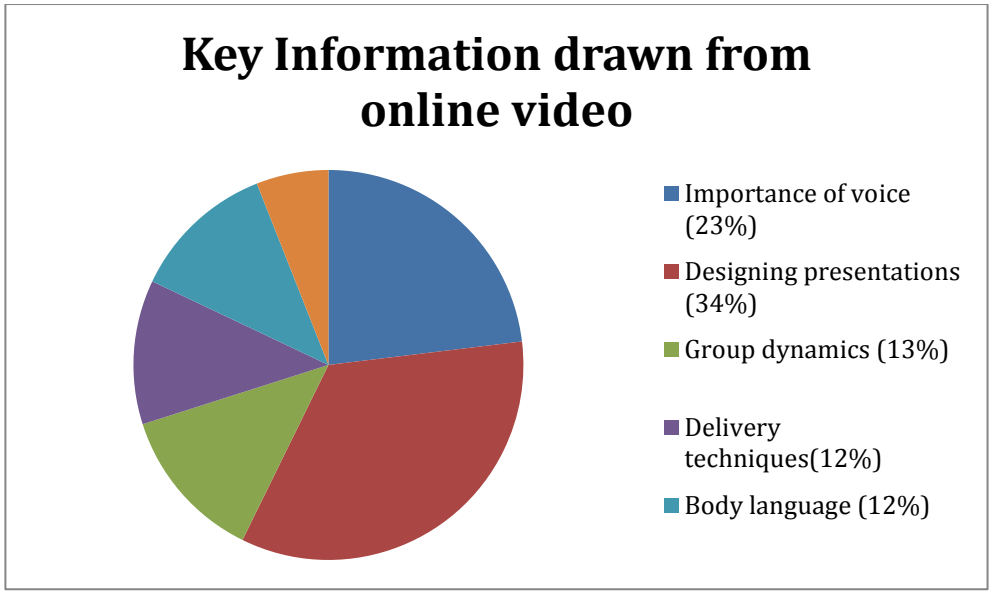


Figure 5.20 - Key information from online video

The next most prominent theme in the data, and perhaps most surprising, indicates that students began to use the information contained within the video content and apply it to their own group context. Comments (n=18) in this area spread across a range of areas which influenced students' ability to work together. Some comments (n=9) focused on the importance of listening skills with students saying 'P21 – listening skills are of huge importance when working in a group and we must take in every member's views and opinion even if we do not agree with them'. Other comments (n=6) indicated an increased awareness of body language and its impact on their group. Students commented on the importance of 'P05 – keeping eye contact with each member of the group' and avoiding finger pointing as 'P15 - pointing at someone can be perceived as an aggressive, domineering gesture'. They also commented that 'P28 – when I was presenting my ideas to the group, I noticed them smiling, this made me feel good showing me that my opinions were understood'. This data shows that while not directly related to the task at hand, students related to the content on a more social-emotional level, were able to reflect on this learning (Martin, 2005) and apply it in different contexts. Discussed in chapter 2 was the experiential value of learning from video (Koumi, 2013) and Karppinen's (2005) link between emotion and learning, and the

power of video to deepen the learning experience. From the data provided by the students above, we see how the content in the video enabled them to draw on the vocal, visual and event driven cues to recall information (Shams & Seitz, 2008) and in turn integrate this into their work together.

Similarly, the next area which students acquired from the video segments was the area of delivering the presentation and techniques which helped to make this delivery more effective. This area contained 14 comments which focused on a variety of techniques which students extracted from video segments, ranging from general to very specific. Some general information that students learned for example was the importance of timing**,** rehearsal and appealing to a wide range of learning styles, with students commenting 'P05 - When preparing the presentation it was important to consider how long the presentation had to be and how many slides were needed' and 'P14 - I made sure for the presentation to reach out to all learning styles of those who may potentially view it' and 'P31 - video tape yourself to practice'. In addition to these general tips, some more specific learning was drawn out by students who commented for example on the importance of stage presence, 'P16 - the act of walking around and "owning the stage" demonstrates to the selected audience confidence coming from the speaker' and the use of humour to defuse situations 'P18 - it is important not to take myself too seriously. People enjoy light heartedness and like to laugh so telling an interesting anecdote or a joke can benefit my communication with people' or the use of 'P26 - fun facts, can keep the attention of the group to whom you are presenting'. Other students began to view their presentations as stories which could be told to draw listeners in 'P41 - simply take them in, through story' and that eye contact is important in forming a connection with the audience 'P52 - The use of eye contact with the audience is important because it creates a connection and keeps their attention'.

Students also learned about the use of body language and the importance of this in terms of sending a consistent and positive message when delivering presentations. Fourteen individual comments related to this area with students mentioning eye contact, posture and the use of hand gestures. Students commented how they learned that the 'P10 - presence of the speaker on the stage' was important and 'P52 - the use of eye contact with the audience is important because it creates a connection'. In particular they mentioned the use of hand gestures as a form of communication saying 'P60 - we can use our hands while talking to engage the audience' and that they were now 'P30 - more aware of the way my arms and hands were behaving'.

The final area students extracted from the video segments was the use of language. Six students mentioned how the video segments demonstrated the importance of preparing before presenting, saying the videos showed them 'P43 - it is important to practice recording yourself before you go and do so' and that 'P41 - prior preparation now, for me is an important task that has to happen no matter how important the presentation may be'. In terms of language they commented on how the videos demonstrated the need to be clear in the language they use throughout the presentation, avoiding the 'P16 - misuse of slang words and jargon', 'P24 - separate facts from opinions' and how 'P23 - clear, simple language' is important when presenting to a large audience.

The data in this section further develops our understanding of digital literacy in practice with online video. Not only does the data build on findings from cycle 1, demonstrating students ability to source (Gilster, 1997), synthesise (Martin, 2005), adapt and re-use (Sinclair, 2010) information gained from online video to develop their presentations, but it also demonstrates students' ability to understand the relevance of the information gained to other contexts such as their own group interactions. When provided with the tools and context in which to do so, students successfully extracted information about key knowledge and skills from video segments, some of which was directly applicable to

their presentations. This data was also supported by data gathered from analysing student presentations (appendix I) whereby a range of references (n=41) were used to support a range of areas such as: the importance of voice (n=8); implications of body language (n=7); developing a convincing argument (n=4); and designing and delivering a strong presentation (n=12). However interestingly, students also identified a lot of skills that were more generally important for communication and presentation skills. The video segments enabled students to view information about the design of presentations, such as how they are structured and how to ensure they are visually appealing. Students also gained information about the power of their own speaking voice, and the importance of using techniques such as pausing, tone and pacing to appear confident and assured in their delivery. Students also drew out knowledge about the basic skills of rehearsal and appropriate use of language. Perhaps most surprising was how the video segments supported student understanding of how to work together to complete a task. Students commented on how they became more aware of their own body language and gestures and the effect this may have on others, while also becoming increasingly aware of the body language of other members of the group. This breadth of information indicates that students were not only able to locate and understand video segments but that they could apply them to the prescribed task and to future scenarios.

5.6.2.2 Feature set of the system enabled a rewarding user experience for students

The decision to focus on keeping the user experience as streamlined as possible, making few major changes from version 1 of the VRS to ensure consistency, appears to have facilitated a smooth transition to version 2 for the students. Many student reflections commented on the ease of use of the video segment sharing and commenting features, while also offering opportunities for improvement.

The vast majority (n=36) of students' comments focused on the ease of use of the system and the ease with which features could be used to their advantage. 21 comments

specifically mentioned the ease with which video segment sharing and commenting features could be used and how this improved the quality and efficiency of their interaction with the group. Students commented on how it was 'P03 - good to be able to share the video with everyone at the same time' and how this 'P10 - was quick and easy and very efficient on gathering and collecting information'. One student commented how the 'P42 - the video system was brilliant for interacting with the members in my group and sharing interesting videos we discovered online'. A specific benefit drawn out by some of the students was the advantage of the system over more tedious processes such as copying and pasting video links into email or other communication methods. Students commented 'P15 - when a group member found a useful video… they simply told us the title of the video in a group chat… instead of linking the video to an email and sending it out to each member in the group. I personally found this very helpful and thought it saved me a lot of time' and 'P30 - the group recommendations and comments were a good idea so that we did not have to email them to each member of the group'. In addition to the positive comments specifically related to the sharing and commenting features, many students (n=15) commented on the general usability of the system and how this contributed to the completion of their assignments. Students commented that the system was 'P27 - easy to use and understand' and that 'P59 - the video system was much quicker this time round'. One student commented that 'P69 - I found the video system very easy to use and once you got going and searching different links it was easy to find helpful videos on your topic. The video system was displayed very simply which made it easy to use and understand'. One student in particular again mentioned how the 'P47 - browser would automatically bring you to the relevant piece in the video, this saved a lot of time which would usually be wasted on watching pointless videos'.

However, while the vast majority of comments were positive, one negative theme emerged from the responses with a small number (n=3) of responses. This concerned the way in which the groups were set up for the assignment, indicating that the lack of

password access meant that other groups could look in on their conversations and see what comments they were making on videos. Students said that 'P01 - It was easy to get into other groups work and look at their recommendations and this could cause a problem with groups' and that being able to sign in as another person 'P20 - allowed for other people to be able to see the videos we were recommending for our own group, enabling them to just copy us instead of researching themselves'. However, given the variety of references used in the groups' presentations (see appendix I), this issue did not materialise in this cycle of study.

A small number of students also had some suggestions for improvement for the system: it was the only theme that was represented in the data with three comments to improve the layout and appearance of the system design. Students commented that they 'P02 - would like to see more time spent on developing the video system to make it more appealing' and that 'P69 - would like to see a more colourful system implemented'.

The data above illustrated that the ease of use of the system enabled students to use the video segment sharing and commenting features to work as a group to integrate video content into their assignment. They found using the system quick and easy, and the use of the video segment sharing and commenting features straight forward and effective for the task at hand, especially when compared to copy and paste features offered by other approaches. The nature of the system brought with it natural drawbacks in terms of presentation and understandably some students picked up on this and would like to see some energy put in to the aesthetics of the system. Finally, the most pressing concern from the students and the most significant area for improvement was the process of accessing groups. Students highlighted the need for more secure access to the 'group recommendations' section to ensure groups can comment on video content without fear of other groups accessing their work.

5.6.3 Conclusions from cycle 2

The purpose of this cycle was to address the questions:

R1. What impact do the features of the video retrieval system have on students' ability to work with online video for use in assignments?

- What is the impact of the video segment sharing and commenting features on students' ability to share and comment around online video for a group assignment?

R2. What strategies can be employed to enable students' digital literacy with online video?

- What strategies support students' use of online video in assignment work?
- How can assignments be designed which enable the use of online video?
- What impact does video have on students learning experience?

R3. How do students display digital literacy in practice when given the context and tools in which to do so?

- How do students use online video to inform the development of a group presentation?

Findings from this cycle were broken down into two broad themes: 1) Student impression of the VRS as a tool to enable video sharing and commenting for a group assignment; and 2) student use of online video to inform the development of a group presentation. In the first theme, findings indicate that when provided with categories and themes to focus their work (Ellis & Childs, 1999; Mitra *et al.,* 2010), the video segment sharing and commenting features had an overwhelmingly positive impact on group communication around online video. Students displayed the ability to share a range of content related to their work, allowing the group to view a wider range of

content (Sinclair, 2010; Eshet-Alkalai & Chajut, 2009). Students also communicated effectively around digital video (Martin, 2005; Hague & Payton, 2011) not only sharing their reasons for video choice and delegating work, but also offering and receiving opinions and ideas on video segments (Pearson, 2005). Evidence of this was not only displayed in students' own reflections but in the range of interactions which took place, with students even beginning to use the system to interact socially. Students also provided some options for the future, with a multitude of suggestions on how features could be improved such as integration with social media, whole class sharing and rating of content, and email notifications.

In the second theme, students' use of online video to support the development of their presentations, findings again demonstrate the learning value of online video in an online context (Koumi, 2013). Students were readily able to understand content as it related to their presentations, with comments suggesting that videos were especially useful in witnessing communication skills in practice (Berkhof *et al.,* 2011). When supported in their use and referencing of content, student comments and referencing data showed an ability to source (Gilster, 1997) and synthesise (Martin, 2005) key information about designing, developing and delivering presentations and the ability to re-use this information (Sinclair, 2010) to support the development of their work. Significantly, students also commented more generally on skills learned from videos, displaying the ability to reflect on the meaning of this (Martin, 2005) and apply it to contexts outside the given task. For example, they identified key skills concerning group work and body language, showing an understanding of the impact these areas play on the relationship between groups. From a practical perspective, the ease of use of the features of the VRS was a key factor in enabling this use of video for students. Students commented on the seamless nature with which they were able to interact and share with fellow group members. Future development in this area for consideration include: revamping the look and feel of the system; an improved, more secure group log in area; examining

possible integration with social media; and trialling alternative communication methods.

5.7 Conclusion

This cycle focused on examining they key areas of digital literacy of communicating and sharing digital content for use in assignment work, while examining the use of a VRS to support these tasks. Data has shown that not only do the tools provided enable student to interact with each other around online video and integrate this into their work, but that these have a positive impact on their learning experience. The VRS provided students with the tools to share and comment on video in a variety of ways, demonstrating students' ability to display these aspects of digital literacy when given the opportunity to do so. The significance of this cycle is that it furthers our understanding of students' ability to communicate and share online video in an academic context, while again confirming the learning value of video in developing students' understanding of the topics under investigation. Aside from experimenting with alternative communication methods, the most pressing development from a student perspective was improving the look and feel of the system and improving the security of group access.

Following the investigation of the key areas of digital literacy over the last two cycles and the evaluation of the VRS to support these, the next cycle of research moves to investigate some of the potential improvements to the VRS namely: improvements to search clarity; and provision of text based information.

Chapter 6 – Cycle 3: User evaluation of VRS features in a prototype setting

6.1 Introduction

The purpose of this chapter is to describe cycle 3 of this research which involved integrating potential features to the VRS which could be used by students when integrating online video into assignment work, and to evaluate students' perceptions of these. This cycle aims to address the research question:

R1. What impact do the features of the video retrieval system have on students' ability to work with online video for use in assignments?

- What is the impact of the search and segmentation features on students' ability to source online video for a written assignment?

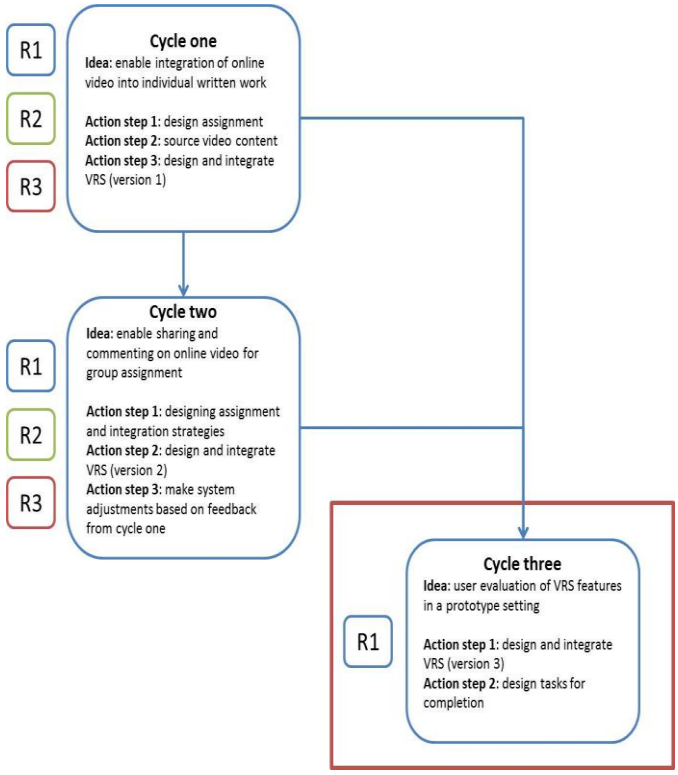


Figure 6.1 - Context of cycle three

This chapter follows Elliot's (1991) step-by-step sequence of activities to guide the reader through the key stages involved. As outlined in section 3.4.3.1 these stages are: 1) general idea and reconnaissance, 2) general plan, 3) action steps and implementation, and 4) impact of action.

6.2 Context of cycle 3 – idea and reconnaissance

During the previous two cycles of research, the VRS was integrated with two key questions in mind: 1) What is the impact of the search and segmentation features on students' ability to source online video for a written assignment? and 2) What is the impact of the video segment sharing and commenting features on students' ability to share and comment around online video for a group assignment? While the video segment sharing features in cycle 2 yielded little opportunities for development, the search and segmentation features in cycle 1 presented some opportunities for development in this context. Feedback from students on the use of the search and segmentation features was predominantly positive, however a number of comments indicated that when using online video for assignment work the vision of bringing "vast multimedia knowledge from libraries, databases, and collections to the world" (Lew *et al.,* 2006:3) had the potential to be improved. First, a portion of students' comments indicated that the search was vague at times and it was difficult to see the relationship between the search term entered and the resultant list of video segments, suggesting the issue had more to do more with clarity of relationship, rather than the search process itself. Second, ten student comments indicated that the lack of text information made it difficult to see the relevance of some search results and had a negative impact on their ability to directly quote and reference video segments. Students also commented that the inclusion of video transcripts would improve the potential for understanding, allowing students to read along with information being described on screen. As such, the following opportunities were identified:

1) Improving the visible link between students' search term and video segments displayed
2) Providing video segment transcripts to improve viewing experience and referencing of video content.

6.3 General plan

Cycle 3 of the research was again carried out with the ET1 2013-2014 cohort of students, however in this instance students were invited to a standalone session to engage with the third version of the VRS and evaluate the features developed in a prototype setting. Of those invited (n=70), at total of 29 students were present, giving an attendance of 41%. While previous versions of the system focused on its use for an assignment over a number of weeks, this cycle focused on the use of the system to complete a series of short tasks to evaluate the features and their potential impact on students' use of the system for assignment work. In order to explain the planning process, it is necessary to divide it into two parts. Action step one focuses on the design and implementation of the third version of the VRS. Action step two focuses on the design of the tasks to be completed by students.

6.3.1 Action step 1: designing and implementing the VRS

The primary focus of this cycle of research was incorporating features to the VRS and evaluating their potential in improving the student experience in using online video for assignment work. To achieve this, the third version of the system was again designed from two perspectives: the front end and the back end. The front end design was concerned with how the system would look and feel for students. The back end was concerned with the internal mechanics of the system and how functionality could be designed and supported from a technical perspective. In order to explain the features

incorporated, it is best to start with the technical features of the system and how they were incorporated.

From a technical perspective, this version of the VRS had two opportunities to be addressed: improving the visible link between students' search term and video segments displayed; and the provision of transcripts to better enable the integration of video segments. To achieve this, a review meeting was again held with my colleagues in the School of Computing. A number of options were considered on how to support students in the search process. Based on student feedback from cycle 1 which suggested for example, 'P03 – if it showed the first sentence of the beginning of that segment', it was decided that text would be incorporated so that students could see a snapshot of the text contained within a specific video segment, as a means of improving the link between the search and resulting segment list. To facilitate this, a hover-over pop-up window function was agreed upon, where users could hover their mouse over a video segment which would result in a pop-up window appearing, displaying a portion of the text from that segment (Figure 6.2).

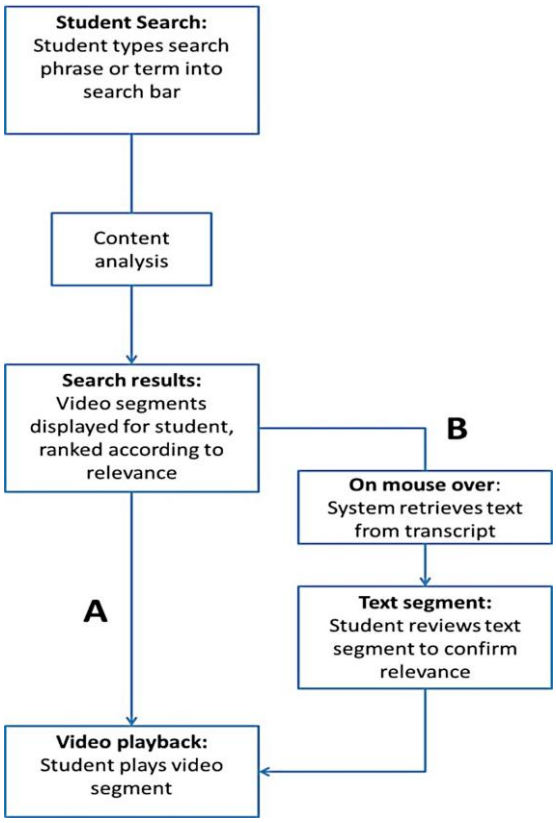


Figure 6.2 – Pop-up text segment process

The final item for discussion was the incorporation of video transcripts. This process involved changing the design of the content window so that the transcript of the video segment appeared below the video as it was playing.

The next area for consideration was the front end of the system i.e. how the changes would look and feel to the students. Some of the changes to this version of the system were more technical in nature and involved only minor cosmetic changes, while others had an equally large impact on the interface as they did on the technology in the background. The pop-up text segments were designed to provide information to the students without interfering with the streamline nature of the system. An instant pop-up and retreat design was incorporated so that text segments appeared when students hovered their mouse over a video segment, then retreated again as soon as students moved their mouse away again (Figure 6.3).

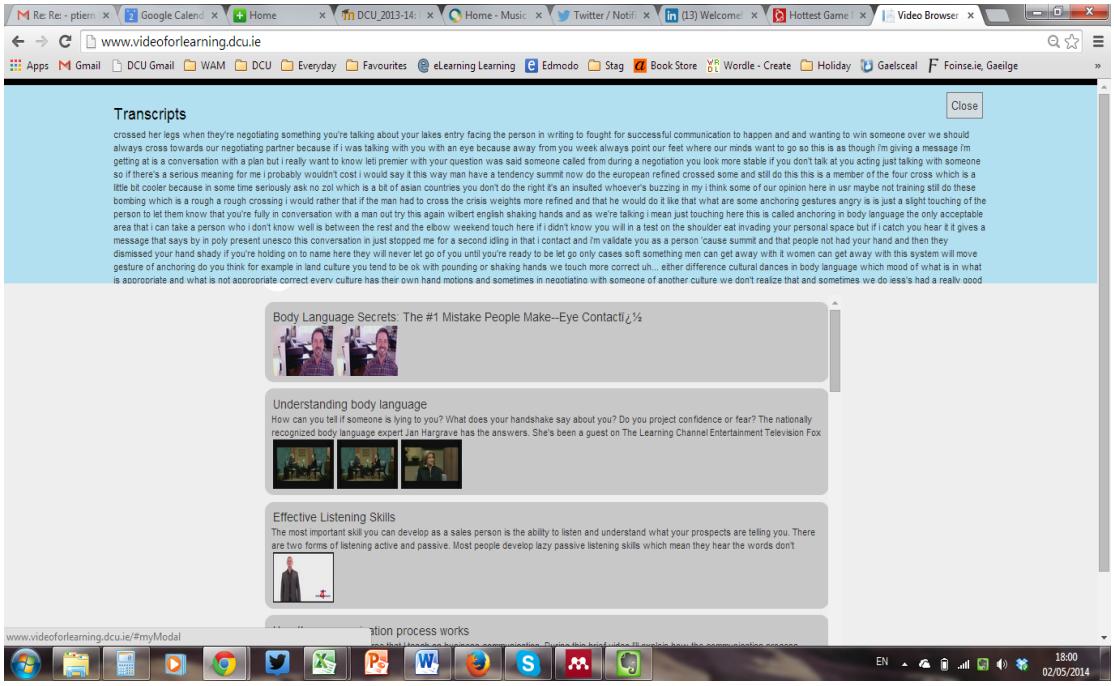


Figure 6.3 – Pop-up text segment in action

Finally, the incorporation of video transcripts into the content window was designed. Once again, the main priority was providing students with information, while keeping other functionality intact and avoiding an overly cluttered playback window. Scott (2013) highlighted the importance of ensuring a system was functional while "paying attention to interfacing by taking care to keep user interfaces simple and easy for a novice user to understand" (p. 53). This was achieved by positioning the transcript just below the video playback window so that students could view the text without interfering with video playback (Figure 6.4)

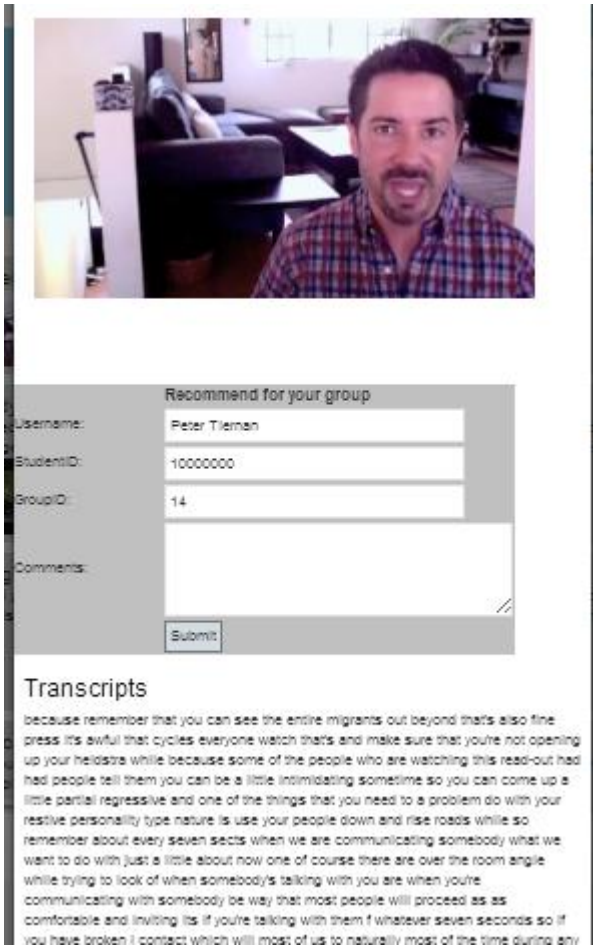


Figure 6.4 - Video transcript

6.3.2 Action step 2: designing the tasks

In order to investigate the potential impact of these features on students' use of online video for assignments, a focused session was designed that would encourage students to try the new features and give their impressions on their usefulness. This focused session asked students to: 1) Conduct searches for content and evaluate the potential of pop-up segments to ascertain the relevance of video segments, 2) View video segments along with transcripts and evaluate their potential to improve understanding and referencing of content for assignment work, and 3) Offer opinions and suggestions for additional features and improvements in this context.

1. Conduct video searches of the following terms:

- Eye contact
- Listening

Once searches have been conducted, use the pop-up text segments to evaluate the relevance of the video segments to your search term and discuss with the group.

2. Following this you should select and watch pieces from a number of these video segments and corresponding video transcripts and comment on:

- The impact of video transcripts on viewing and understanding
- The impact of video transcripts on citing and referencing

3. Finally, when these short tasks are complete, students are asked to spend some time using the latest version of the system and offer your thoughts on its overall usefulness, along with any opportunities for improvement or development which you can see.

6.4 Implementation

During the implementation phase, the plans outlined above were put into action with students who were brought in to use and evaluate the final version of the system by completing a number of specific tasks. The session took place in a computer lab in May 2014 and was scheduled during a gap in the students' existing lecture timetable. During this session, students were first introduced to the changes that were made to the system and given a demonstration of how the new features worked. This session lasted a total of one hour, during which time students were given ample time to complete the assigned tasks.

First, students were asked to conduct two searches on the VRS: 1) eye contact, and 2) listening. They were then asked to use the pop-up text segments to assist in evaluating the relevance of the search results. Once these searches were complete, students were asked to conduct a number of searches on the topic of communication skills to get a 'feel'

for the new features. The second section of the session asked students to select one of the video segments found and watch a short piece to evaluate the video transcripts and their potential to aid understanding and referencing of video content. Following this, students were given time to use the system for themselves before final evaluations took place.

6.5 Impact of action

In this section, the impact of action is analysed and discussed for the reader. Themes and findings are drawn out to fully address the research question:

R1. What impact do the features of the video retrieval system have on students' ability to work with online video for use in assignments?

- What is the impact of the search and segmentation features on students' ability to source online video for a written assignment?

In order to achieve this, data was gathered from student questionnaires completed at the end of the session, where questions were posed about the VRS. Questions were structured to gather feedback on the current version of the system and to draw out ideas for future developments. Questions firstly focused on the potential of the new features for using video in assignments, asking for students' thoughts and suggestions for improvement. Second, students were asked for their thoughts on the overall design and feature set provided, again attempting to draw out current and future possibilities. Out of the 29 students who took part in the session, all completed and handed back the questionnaire, giving a response rate of 100%.

6.6 Findings and discussions

Key themes and findings are now presented using quantitative and qualitative data from the completed questionnaires. Data was analysed using the constant comparative

method and as such is now presented using propositional statements in an effort to portray the overall meaning of the data categories. This is followed by overall conclusions and recommendations that can be drawn from this cycle of research and used to inform future iterations of the VRS in this context. Student comments were first aligned to salient data categories before coming together as propositional statements under two key themes which helped to tell the story from the student data. The two key themes and propositional statements form the bases for the discussion of findings which follows.

6.6.1 Text information would have a positive impact on selecting and integrating relevant video segments

In this section, students' impression of the potential of the VRS's features to select and integrate video segments are analysed and discussed. Specific attention is paid to how these features would enable students to select relevant video segments to view, and impact on their ability to reference content contained within them.

6.6.1.1 Pop-up text segments would have a positive impact on students' ability to choose video segments

A key aspect of digital literacy is the ability to work with databases (Eshet-Alkalai & Amichai-Hamburger, 2004) to identify (Martin, 2005; Ng, 2012b) and access (McCabe, 2001) a variety of digital content. Data gathered from student questionnaires indicated that the provision of pop-up text segments would have a positive impact on their ability to complete these tasks when using online video for assignment work. 90% (n=26) of students said that these text segments would help them to identify if video segments were relevant to their search. Students (n=14) commented that the pop-up text segments helped to give them an overview of what was contained in the video segment before watching. For example, 'P24 – it works well because it is always handy to scan through what is going to be said in the video – rather than watching the entire video and

then deciding if it is relevant to the search'. This ability to scan through a segment of text 'P35 – makes it easier to read what the video is about' so that 'P18 – you get a brief idea of what is going on in the video' making it easier to see 'P52 – if it is relevant to your search'. Other students (n=4) mentioned being able to see if specific words or terms were present, saying that 'P22 – scanning the document to search for specific items' would help them 'P16 – pinpoint the exact point in the video that we are looking for' making 'P16 – the process easier'. Through a combination of these strategies students felt that pop-up text segments would make the process of identifying and locating video for their work more effective. They (n=7) commented that they could 'P55 – find the information quicker and easier' which 'P38 – avoided watching a lot of content that is unnecessary'. A small number of students (n=3) disagreed with these sentiments, saying there was 'P13 – a lot to be read', text segments were 'P04 – very wordy' which 'P41 – defeated the purpose of video referencing', indicating that having to read substantial amounts of text information took away from the experience of using online video as a source of information.

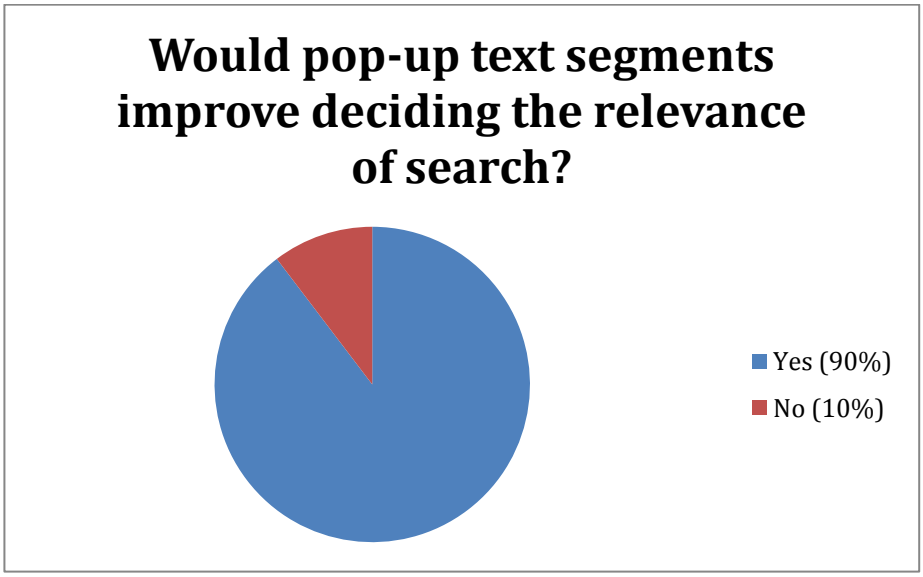


Figure 6.5 – Would pop-up text segments improve relevance of search?

While the vast majority of students spoke favourably of the potential of the pop-up text segments in identifying the relevance of video segments, students also outlined possibilities for the future which may improve the ability to filter through (Bawden, 2001) online video. Many comments related to how the pop-up segments were organised and laid out. Some of these (n=22) indicated that a mechanism for highlighting the search word or term within the text would increase their usefulness. Students commented that the system could 'P68 – bold the relevant information' or 'P35 – highlight certain words' making it easier to see relevance:

> P13 - When searching, search for a particular word/phrase when you search the words you searched for should be highlighted in the transcript.

Other significant themes included comments (n=17) on the format of the text segments. Some (n=5) recommended improved formatting where the use of paragraphs, colours and fonts would improve the aesthetics and readability. Other comments relate to work being conducted by researchers such as Nenkova (2006) and Ding *et al.* (2012) on the process of automatically summarising transcripts and other data. While work in this area is in its infancy in terms of its application in practical contexts, students' comments indicate that integration of these techniques in the future could yield positive results. Students recommended (n=12) adapting text segments to a more summative role, whereby rather than showing the transcript, pop-up segments could provide an overview of what was contained within them. Students said that it would be helpful if 'P04 – the text was made shorter' and wondered if the 'P24 – text could be made into bullet points' or summarised as a 'P48 – brief overview in words'.

The final area that arose from the data was the possibility that pop-up text segments could play a more active role in locating content. Student comments (n=18) suggested that the text segments could include an active timeline where they had 'P30 – the time

beside them' and students could 'P41 – hover [over the text] with mouse to give exact time' or 'P26 – click on a word to see that part of the video'.

This data suggests that the provision of pop-up text segments has the potential to improve students' ability to work with databases of online video (Eshet-Alkalai & Amichai-Hamburger, 2004) to identify (Martin, 2005; Ng, 2012b) and access (McCabe, 2001) online video for their assignments. These text segments have the potential to enable students to quickly scan through the text to get an overview of what is covered and look for specific terms which might be mentioned throughout. However it appears that a number of processes could be put in place to fully realise this potential. First, work could be done to highlight relevant terms so that they stand out for students. Second, as technology progresses a number of automated processes could be put in place. Text segments could be automatically formatted into paragraphs and easy to digest snippets. Alternatively, students suggested that a form of automatic bullet points or automatic text summarisation could be incorporated so that students are presented with succinct summaries of what is contained within video segments.

6.6.1.2 Video transcripts would help confirm understanding of video segments

Ng (2012a) argues that key to digital literacy is the ability to understand multi-modal information, especially audio and visual information. While data in previous cycles indicated that students were capable of understanding and synthesising (Fieldhouse & Nichols, 2008) this kind of information, data presented here indicates that the provision of video transcripts may help to allay student fears of misunderstanding or not comprehending information presented in videos (Cennamo, 1993). Comments (n=21) concentrated on the ability to read and re-read transcripts saying 'P24 – it helps to understand what you're watching by reading the transcripts as the video is playing, pausing and restarting' and 'P30 – if you are unsure of what they said in the video you can check the transcript'. Students also commented that they 'P02 – could read the

transcript while watching and listening to video' which is especially useful if they 'P70 – missed what had been said' or did not 'P47 – understand something said in the video' especially 'P26 – if speakers have accents'. Overall, 97% (n=28) of students indicated that transcripts would help confirm their understanding of online video content.

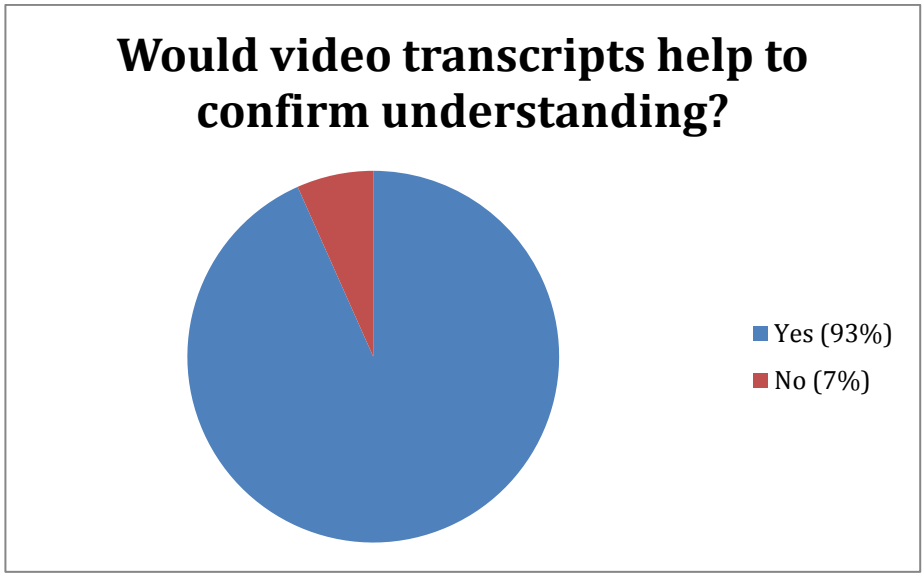


Figure 6.6 – Would video transcripts help to confirm understanding?

Once again, while there was overwhelming support for the use of transcripts and their positive impact, students suggested a vast array of improvements and opportunities for development which might be considered going forward. These suggestions were broken down into three areas: location, layout and features. First, in terms of location, while students found the transcripts useful, many (n=25) suggested alternative locations for the transcripts which might make them easier to follow and use. Thirteen of these suggested that transcripts should be moved from their current location, to beside the current video screen so that the transcript is 'P67 – in line and [they] can follow easier'. This would make for easier viewing and remove the need for 'P48 – scrolling down all the time'. Some students (n=8) also spoke about the possibility of including subtitles to each segment rather than accompanying transcripts, with one student saying 'P01 – subtitles would make it easier to keep looking through the video'. The final suggestion

for the location of the transcripts was in a new, resizable window where students could move the transcript to a location of their choice. Students (n=4) said the transcripts should 'P18 – open in a new window' making them 'P67 – easier to follow'. Second, students highlighted the layout of the text within the transcripts and offered many similar suggestions to those outlined in the pop-out text segments above. They (n=5) commented that the transcripts could be better 'P06 – punctuated' and that the system could 'P02 - divide transcript into different parts'; also that 'P43 – more colour' could be introduced where the system might be 'P72 - able to colour code' or 'P02 - highlight important' words or sections. Finally, through the responses, students (n=6) again suggested functionality improvements that could improve the transcripts saying that including features such as 'P06 – timestamps and a 'P26 – copy and paste feature' might improve the processing of using segments for assignments.

This data suggested that provision of video transcripts has the potential to improve students' use of video segments, allowing them to re-read segments if needed, read along with video to confirm understanding and take notes more easily if necessary. Alongside these benefits many opportunities for development were present. The manner in which transcripts are displayed to students may be worth experimenting with in terms of the layout of the text and the different location and window styles, while also considering the provision of subtitles in their stead. These changes, along with practical functions such as copy and paste, may enable students to better integrate video segments into their assignments.

6.6.1.3 Video transcripts would improve ability to integrate and reference video segments

In previous cycles, students demonstrated the ability to synthesise information contained in online video (Fieldhouse & Nichols, 2008), and use and integrate (Prensky, 2009; Buckingham, 2006; Ng, 2012a) this unstructured data (Eshet-Alkalai & Chajut, 2009) in a variety of assignment tasks. Data obtained from student questionnaires

suggests that the incorporation of video transcripts has the potential to improve students' integration of online video, especially in relation to referencing content. 100% (n=28) of students indicated that this was the case for two interrelated reasons. First, transcripts appeared to make the whole process clearer and easier to complete for students. They (n=13) commented that the 'P24 - words are there in black and white' making it far easier to 'P41 – find [the] exact reference' which makes the whole process 'P35 - more accessible' ensuring that 'P52 - you don't cite the wrong thing'. Second, the presence of the transcripts removes the need for students (n=6) to have to keep rewinding segments and replaying them to take down what was said during the segment. Students commented that they 'P02 - don't have to keep rewinding the video' or 'P68 - watch it over and over again' to get a reference. Instead they could pause 'P30 - the video to write down the information'.

Students' recommendations for improvements in this area mirrored those outlined in the previous section around the location, layout and interactivity of video transcripts. Students mentioned video transcripts could be 'P24 - located closer to the video, making it easier to read as you watch it' and be divided 'P02 - into different parts' so that it was easier to follow and find information. In terms of layout, students again spoke about providing 'P71 - colour codes' and 'P55 – sections of text' so that referencing was easier. Finally, students again mentioned having 'P14 – time sections' in the transcripts so that they more easily quote the exact time at which certain statements were made.

This data suggested that the video transcripts would make the referencing process easier for students as the text is there for them to see and there was no need to keep rewinding a segment to take note of exactly what was said. However possible areas for improvement were also identified such as a better layout for video transcripts, using paragraphs, timestamps and colour coding to break up the text.

6.6.2 Students offered a range of design and feature improvements

As this cycle represented the final version of the VRS, the opportunity was taken to engage with students about changes that could be made to the design of the system and additional features they would like to see added to future iterations. Pitman (2008) illustrated that "involving users in the design process was not only possible, but preferable" (p. 40).

Student comments in this area were relatively consistent in terms of changes they would like to see made to the overall design. While students indicated that the design made the system easy to use, a large number of students (n=17) indicated that future iterations of the system could have a more interesting and elaborate interface. Students commented that the design could be more 'P22 – visually appealing', 'P47 – brighter' and 'P18 – more colourful'. Additionally, in terms of basic design, students (n=6) recommended that search results open in a new window so that they would be free to continue searching in the background. They commented that there should be a 'P22 – new window for [the] video selected' and 'P35 – when you click on the video it opens in a new search bar' also having the option for a 'P26 – new window for video transcript'. Finally, some students (n=3) suggested a change to the way comments are linked to video segments, saying that comments could be attached to the video's timeline so that others would know which sections of the video were most talked about. They said 'P24 - comments could be attached to a 'time -line' i.e. people can comment on a certain point of a video - rather than the whole video - maybe to point out a certain quote' and 'P35 - attach comments to a certain part of the video that appears during the video for people to read up on and gather information'. Students appear to have developed this idea from a service called 'soundcloud' (soundcloud.com) which is an audio broadcasting service, 'P41 - soundcloud type comment bar'.

In relation to additional features, students had a range of suggestions for the development of the system that would impact on individual use as well as use in a group context. While Figure 6.7 outlines all of the suggestions, the more prominent of these are dealt with below.

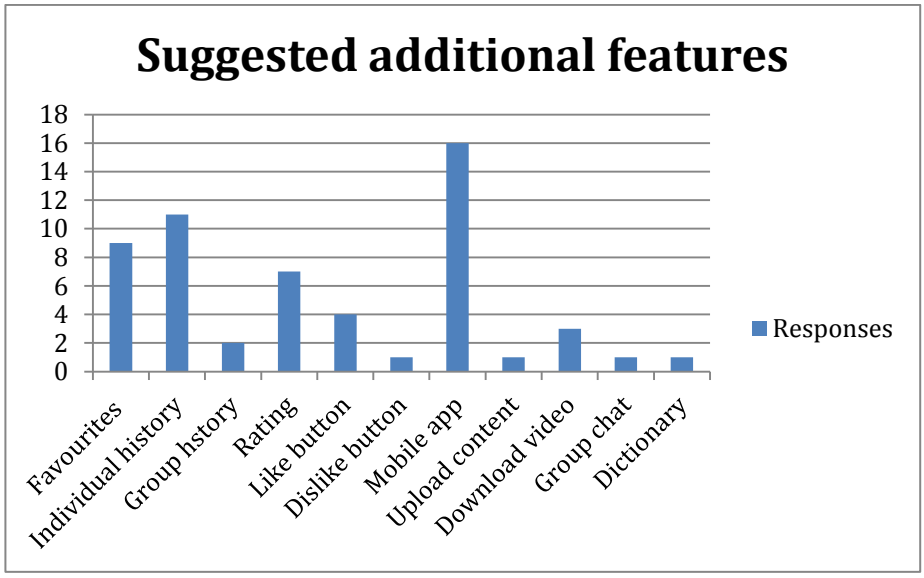


Figure 6.7 - Suggested additional features

The most prominently requested additional features were history (n=11), favourites (n=9) and video ratings (n=7). Students seemed to feel that a history or recently viewed section, where they could 'P67 – review and watch other videos you thought were useful' would make keeping track of videos watched a smoother process and would 'P14 – make it easier' to relocate content already viewed so that students would know not to re-watch videos. Similarly, students would like to have the ability to collect their 'P68 – own favourites' so that they could store videos that they found interesting to re-watch later without the need for searching again. Finally, in addition to the ability to share segments with their group, students would like to see the incorporation of a rating feature where they could grade the quality of videos so that other members of their group or the class could see at a glance how worthwhile the video segments are. They commented that they would like to rate videos to 'P68 – recommend it for the rest of the class' and that a 'P02 – star rating' would make it easier to see what the class consensus

was on certain kinds of video. Outside of these additional features to the system, there also appears to have been an extremely strong interest (n=16) in the development of a mobile app for smartphones and tablets so that students could access the content on the go and through the devices they are using every day. Students felt that this would make the system far more accessible, negating the need to be at a computer to use it.

We see in this data that students would like to see the system evolve into a more vibrant, personalised and connected system where the experience is tailored to their own viewing history and needs. They envisage a system where they can play a part in curating video content for each other by rating the video segments and indeed even adding to the collection with their own suggested content. This would suggest that students have an interest in developing their ability to collectively determine the value of video content in relation to their coursework.

6.6.3 Conclusions from cycle 3

The purpose of this cycle was to address the question:

R1. What impact do the features of the video retrieval system have on students' ability to work with online video for use in assignments?

- What is the impact of the search and segmentation features on students' ability to source online video for a written assignment?

Findings from this cycle were broken down into three broad themes: The impact of pop-up text segments on students' ability to choose relevant video segments; impact of transcripts on confirming understanding and integration of video segments; and students' suggestions for the future development of a VRS for using online video with assignments. Findings in the first theme indicate that pop-up text segments have the potential to improve students' ability to work with databases (Eshet-Alkalai & Amichai-Hamburger, 2004) of online video to identify (Martin, 2005; Ng, 2012b) and access

(McCabe, 2001) content relevant to their assignments. Pop-up text segments could provide students with an overview of what is contained within video segments, allowing them to scan through the text to get a sense of its relevance and look for specific words or phrases, making the process of locating and selecting content more efficient. Students indicated that these pop-up text segments could be improved by highlighting the search word or phrase in the text, improving layout through the use of colours, paragraphs and other formatting functions. Perhaps most interesting was the link to nascent research by Nenkova (2006) and Ding *et al.* (2012), suggesting the potential for automatic text summarisation or bullet points.

In the second theme, student comments suggest that the inclusion of video transcripts have the potential to improve their ability to understand multi-modal information (Ng, 2012a), synthesise this information (Fieldhouse & Nichols, 2008) and integrate this information (Prensky, 2009; Buckingham, 2006; Ng, 2012a) with reduced fear of misunderstanding (Cennamo, 1993). Data suggests that the transcripts would allow students to read and re-read sections without having to rewind video, allowing them to check the detail in the text. Comments also indicated that transcripts would make the referencing process easier, enabling students to better cite what was said in videos. Improvements in this area included the ability to move the transcript window to their preferred location and improve the layout of transcripts with paragraphs and text formatting.

In the third theme, opportunities for the development of the system, student data from the session indicated changes should be made to the look and feel of the system and time should be spent improving the aesthetics, providing a more colourful experience. Students also highlight the possibility for developing the system into a more personalised and customisable experience which keeps track of their activities and

allows them to add content and contribute to the curation of this content according to their specific tastes.

6.7 Conclusion

This cycle focused on integrating features to the VRS and evaluating their potential to support students in locating, integrating and referencing online video for use in their assignments. Data gathered in this cycle indicates the potential value in providing pop-up text segments to enable students to locate and select content relevant to their work by scanning for relevant words and phrases. Potential developments in the area such as highlighting key words and automatic text summarisation should be considered to realise their full potential. The integration of video transcripts has the potential to improve students' use of online video for their assignments by helping confirm understanding and improving the process of extracting references from online video. Aside from natural experimentation with additional features, the key focus of future research on VRS in this context could be on refining these pop-up text segments and video transcripts to improve their layout and functionality, while at a broader level improving the look and feel of the system and feature set to provide a more personalised experience for students.

Chapter 7 – Cycle 4: Student evaluation of online video for inclusion in assignments

7.1 Introduction

The purpose of this chapter is to describe cycle 4 of this research which involved examining student evaluation of online video for inclusion in their assignments. This cycle aims to address the research questions:

R2. What strategies can be employed to enable students' digital literacy with online video?

- What strategies support students' use of online video in assignment work?
- How can assignments be designed which enable the use of online video?
- What impact does video have on students' learning experience?

R3. How do students display digital literacy in practice when given the context and tools in which to do so?

- How do students evaluate online video for inclusion in their work?

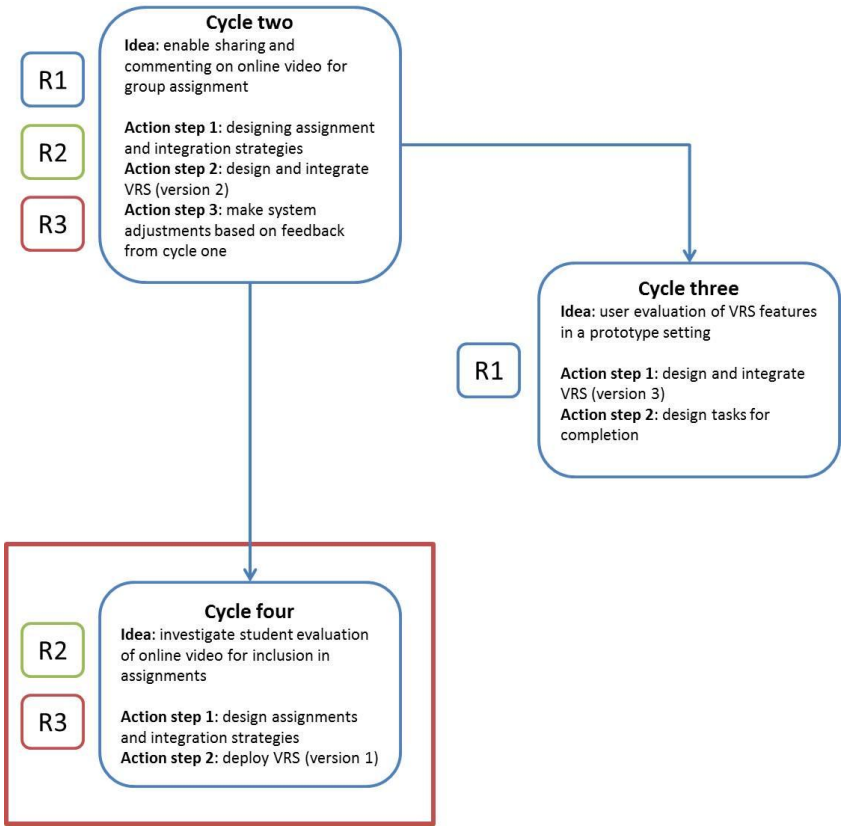


Figure 7.1 - Context of cycle four

This chapter follows Elliot's (1991) step-by-step sequence of activities to guide the reader through the key stages involved. As outlined in section 3.4.3.1 these stages are: 1) general idea and reconnaissance, 2) general plan, 3) action steps and implementation, and 4) impact of action.

7.2 Context of cycle 4 – idea and reconnaissance

Over the preceding cycles of research, it has been established that through integration strategies and with the support of the VRS, students were able to source, integrate, reference, comment on and share online video for use in their assignments. However, as outlined in chapter 2, a key aspect of digital literacy is the ability to evaluate content (Gilster, 1997), use filters to manage information (Bawden, 2001), make judgements about the relevance and usefulness of information (The international ICT literacy panel, 2002), and assess information effectively for its usefulness in completing tasks (Ng, 2012a). Also,

students' comments on 'recommending' content to other group members in cycle 2, indicated the opportunity to further investigate this area. In line with the principles of action research, which encourages the researcher to "take account of what has been learned in previous cycles" and allow "understanding about the local situation to increase over time" (Lienert, 2002:18), this cycle now sought to directly examine the strategies employed by students in selecting online video, when encouraged to reflect on their choices (Martin, 2005).

7.3 General plan

Cycle 4 of the research was carried out with the 2014-2015 cohort of ET1 students who were again completing the module 'Social and Personal Development with Communication Skills' (see appendix E). The cycle was carried out over a 16 week period and the content of the module remained unchanged from the previous year. Students were again asked to complete an individual written assignment at the end of semester on the topic of communication skills which was one of the main topics for the module. In order to complete this assignment, students were required to draw on lecture notes on the topic, relevant readings and a minimum of four video references from the VRS.

7.3.1 Action step 1: designing the assignment

The assignment process (outlined below) used was identical to that outlined in cycle 1, with the exception that students were required to submit 50 word reflections outlining why they felt each video was a worthwhile choice for inclusion in their assignments. The purpose of these reflections was to allow students to explain in their own words, their reasons for choosing certain videos, and so gain a better understanding of why students select online video for coursework.

You are asked to write a paper of 1500 words, which reflects on the aspects of communication skills outlined below. Your paper should include:

1. Introduction: What is communication? What will you discuss in the body of your assignment?

2. Development of topic: Choose 3 of the following 10 aspects of communication to discuss.

    - Trace the development of communication and interpersonal skills
    - Discuss the different models of communication
    - The importance of visual communication e.g. body language
    - The importance of the voice e.g. words and language
    - Barriers to effective communication
    - The use of humour in communication
    - Listening and listening skills
    - Dealing with interpersonal conflict
    - Presentation skills

3. Conclusion: Close off your argument. What have you learned? Why is this important to you?
4. Reflection on using videos: an additional 50 words outlining why you felt each video was a worthwhile source of information for your assignment
5. References: Essay must contain a minimum of 8 references, 4 directly from the video system (video title, plus start & end time), 4 from other sources such as books and journal articles.

7.4 Implementation

During the implementation phase, students began working on their assignments, using the VRS as a major source of content. Students were introduced to their assignment brief, along with the VRS in September 2014. This lecture also included a guided demonstration of how the system worked and how to search for content. As part of this demonstration, students

were again informed that the VRS searched for words within video transcripts and so were advised to enter a selection of words and terms related to their topic which may be said during videos. For example under listening skills I instructed students to search for listen, listening, hearing, voice etc. In addition to the guided demonstration of the VRS, a narrated video (Fig. 7.2) was created and posted to the class Moodle (LMS) page which outlined how to use the system and again gave examples of search terms related to the assignment topics.

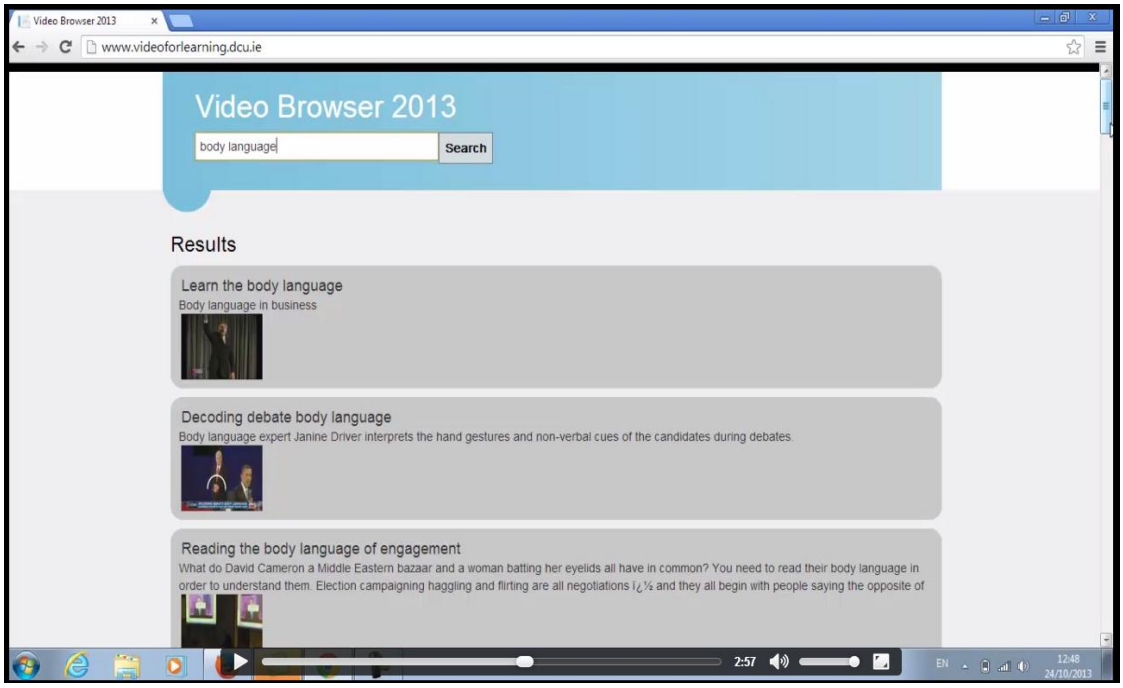


Figure 7.2 – Instructional video

Students were given a total of 16 weeks to complete the assignment, during which time three lectures on communication skills covered all topics relevant to the task. During these lectures, students were provided with ample information on the different aspects of communication including: lecture notes, journal and book references, examples and in-class activities. Much attention was paid to supporting students in evaluating how video content would be relevant to their assignment and so, using techniques similar to those employed during pre-cycle 1 (appendix V), 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 again instructed how to reference videos through summarising and direct quotations, with futher details and examples posted to the class Moodle (LMS) page.

7.5 Impact of action

In this section, the impact of action is analysed and discussed for the reader. Themes and findings are drawn out to fully address the research questions:

R2. What strategies can be employed to enable students' digital literacy with online video?

- What strategies support students' use of online video in assignment work?
- How can assignments be designed which enable the use of online video?
- What impact does video have on students' learning experience?

R3. How do students display digital literacy in practice when given the context and tools in which to do so?

- How do students evaluate online video for inclusion in their work?

These findings build on our understanding of students' decision-making process in terms of evaluating and selecting online video content. In order to achieve this, data was gathered from students in a number of ways. First, students were asked to complete a 50 word reflective piece for each video outlining their reasons for choosing that video, using examples of video content if applicable. These reflective documents were handed in along with their written assignments. Second, an online questionnaire was distributed to students following completion of assignments to gather information around: 1) the benefits,

weaknesses and areas of improvement in using video content, 2) the benefits, weaknesses and areas of improvement in using the VRS, 3) the number of videos watched before selection was made, and 4) the quality of the videos. Out of the 66 students, a total of 61 reflective pieces and 31 questionnaires were returned, giving a response rate of 92% and 47% respectively.

7.6 Findings and discussions

Key themes and findings are now presented using qualitative and quantitative data from questionnaires and student reflections. Data was analysed using the constant comparative method and as such is now presented using propositional statements in an effort to portray the overall meaning of the data categories. This is followed by overall conclusions and recommendations that can be drawn from this cycle of research. Student comments and reflections were first aligned to initial salient data categories before coming together as propositional statements under two key themes which helped to tell the story from the student data. The two key themes and corresponding propositional statements form the basis for the discussion of findings which follows.

7.6.1 Why students chose videos

Data obtained through questionnaires revealed that students' learning experience in using online video as part of their assignments remained positive. 94% of questionnaire respondents said that their overall experience was 'good' or higher. Data outlined that students found using video content positive as it helped them to understand topics (41%), offered a multi-modal approach to the assignment (33%), and provided them with engaging content (24%). Drawbacks mirrored those presented in previous cycles, with the most prominent being student requests for more content (26%). Questionnaire data also revealed that the VRS enabled students to locate and engage with a variety of video content. 90% of

respondents said that their experience in using the video system to locate and view content was 'good' or higher. Also 91% of students watched five or more videos before selecting the videos to integrate into their assignment with 19% watching 8-10 videos and 22% watching 10-12 videos, indicating that students watched a variety of content before making their choice (Fig. 7.3). However, as outlined in the literature review chapter, one of the key components of digital literacy is assessing digital information in terms of its relevance and quality. For example the International ICT literacy panel (2002) spoke about evaluation in terms of judging the quality, relevance and usefulness of information, while Bawden (2001) encouraged filtering through information to ascertain what is relevant to a given context. In this section, data is drawn together on the reasons students selected videos for use in their assignment, to gain a better understanding of the factors that influence this decision making process in terms of integrating online video (For further analysis of the most selected videos, see appendix Y).

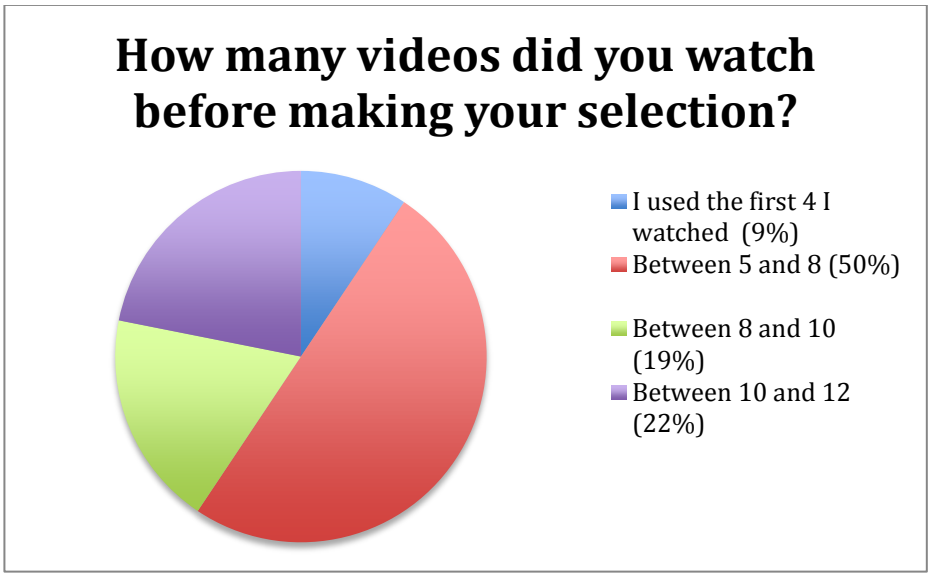


Figure 7.3 – Number of videos viewed

7.6.1.1 Video was used to support content from lectures and other sources

Student reflections contained a range of comments indicating that a significant reason for selecting videos stemmed from the fact that they supported the development of their topics

by confirming, expanding upon and linking to information they had gained from lectures, reading and other sources (Fig. 7.4). Comments (n=259) spread across a number of key areas.

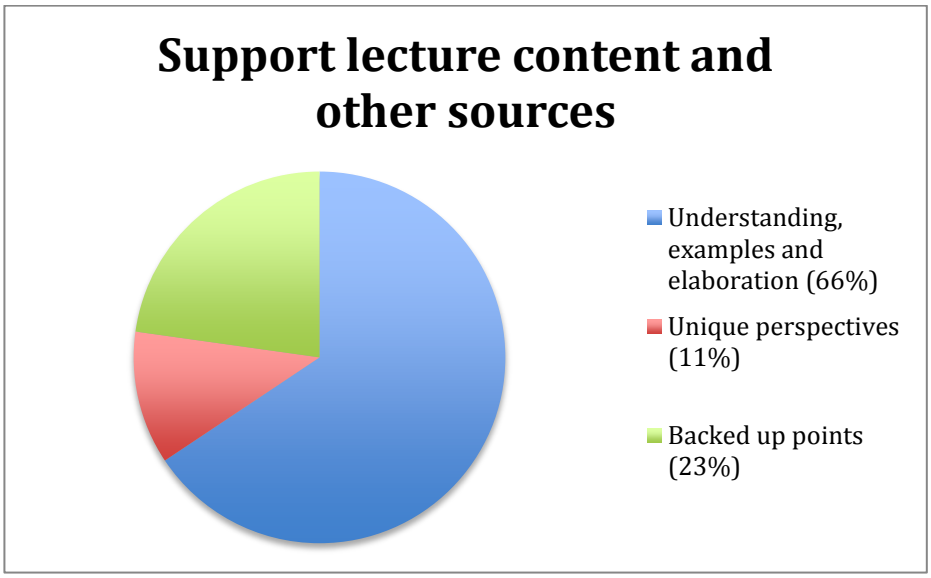


Figure 7.4 – Criteria for selection A

The most prominent of these with 170 comments was that students chose videos for inclusion that confirmed understanding, elaborated on topics and provided examples to draw upon. In this section, students' comments suggest that the key elements of the learning value of video, outlined in the literature review, also have a significant impact on students' selection of content for use in their assignments. In terms of confirming understanding, P1 said the video 'How the communication process works' was helpful as it 'gave me a clear idea of the term encoding that was being used frequently in communications', while P11 selected the video 'Comedy in translation' as it 'explained how and why people are able to learn more from the use of humour in communication'. These comments indicate the potential of video in "adding value through explaining complex processes" (Koumi, 2013) and was a key factor in the choices made. Authors such as Mueller *et al.* (2005), Berkhof *et al.* (2011) and Liu (2011) have suggested that the use of video can enable students to "witness rather than calculate" the meaning (Choi & Johnson, 2010:223-

225) of concepts by providing examples to reinforce learning. This also emerged as a key reason for student selection of video for inclusion in their work. For example P14 said that the video 'In the mix – conflict resolution' was helpful in 'seeing how people react to conflict differently', while P22 chose the video 'What is communication' because 'it showed the different ways we use interpersonal skills in our everyday lives by doing simple gestures, non-verbal gestures and using signs and symbols which help us communicate better with people'. Students also selected videos which allowed them to "build on existing knowledge" (Mitra *et al.,* 2010:223) and branch off in related directions (PEI Dept. of Education, 2008). For example P17 used the video 'Greek and Roman Rhetorica' as it 'gave me an insight into how current communication theory is linked to Greek and Roman times', while P15 commented that the video 'Effective listening skills' gave her 'a new and different insight into listening' as it explained that 'listening isn't all about hearing what the person is saying but it's about engaging with them and responding to what they say'.

In a related area, students' reflections also revealed that videos were chosen as they offered unique perspectives (Moskovich & Sharf, 2012) on the topics being discussed. These comments (n=30) concentrated on the fact that videos provided students with alternative opinions and contexts from which to draw upon. 17 comments related to the provision of alternative opinions which helped them to "understand the different perspective related to the topics under study" (Hakkarainen *et al.,* 2007:106). P6 in his discussion on the process of communication said that he chose the video 'Effective communication skills – monologue vs dialogue' because 'the woman makes her point on how communication should be carried out, it's good to have different opinions heard before getting to make your own call on it and I felt this was useful'. P37, in her discussion on listening skills, said that the video '5 ways to listen better' encouraged her to 'look at listening in a different way than I previously thought and made the reality of it seem more like a task'. Students also made a number of comments (n=13) on the benefit of "showing or documenting phenomena that would

otherwise be inaccessible" (Koumi, 2013:32) by viewing the different contexts in which communication skills apply. For example, these related contexts (Jonassen, 2000:8-9) prompted P28 to say that in relation to technology in communication he chose the video 'Connected but alone' as it gave an 'interesting insight into where the world is going with technology and how it can affect our communication skills'. Similarly, P44, in her discussion on intercultural communication used the video 'Intercultural communication' as it 'shows how in different countries their culture influenced their tone of voice and body movement'.

The second most prominent theme with 59 comments, highlighted the importance of linking strategies when incorporating online video into assessment work. Students commented (n=35) that they chose video content which linked to their existing knowledge (Mitra *et al.,* 2010; Jonassen, 2000:8-9), using it to back up points being made. For example, P5, when speaking about his topic on the barriers to communication, used the video 'How the communication process works' as 'in this video segment they talk about how you should effectively communicate and what you should take into account and consider when communicating. Similar to when I mention the example about primary school and know their capacity for language'. P9, when speaking about body language used the video 'Learn the body language' as 'I was backing up my point about how visual communication is very important by use of body language, how we convey a message more by use of gestures and movement'. MacKinnon & Vibert (2012) found that the benefit of including video as part of the content offering was especially apparent when linked to existing lecture topics and other sources. Students' selection of online video for their assignments was also linked to these areas, with students choosing videos that linked to other sources of information they had found, corroborating information and providing additional depth to their topics. For example, P19, when discussing barriers to communication, chose the video 'How the communication process works' because 'it aligned with the knowledge I had previously gained about what the communication process entailed. It also had some cross-over

information to information we had been presented in lectures'. Similarly, P55 chose the video 'Talk nerdy to me' because 'her opinions on why jargon was a barrier also matched well with other studies I had researched, so her statements were not uncommon'. P35 said that she chose the video 'The communication process' because the 'points are very similar to the academic books I've read'.

This data suggests that when online video is linked to the overall learning objectives and students are encouraged to integrate content into their work (Moskovich & Shart, 2012; Berk, 2009), the filtering strategies adopted are heavily influenced by the relevance and usefulness of information (The international ICT literacy panel, 2002; Ng, 2012b). The value of content in this sense, has its roots in traditional academic information, where these foundations are built upon by contextually relevant content (Berk, 2009; Mitra *et al.,* 2010) which builds upon students' existing knowledge (PEI Dept. of Education, 2008), related sources (MacKinnon & Vibert, 2012) and is relevant to the instructional goal (Mitra *et al.,* 2010). Students' use of online video in this manner is significant as it displays 'reproductive literacy' (Eshet-Alkali & Amichai-Hamburger, 2004; Eshet-Alkali & Chajut, 2009) where online video is combined with existing knowledge to create new interpretations and meanings. Also evident in the selection process is a demonstration of the cognitive and experiential value of video (Koumi, 2013) where online video clarified concepts and ideas for students, while also providing them with related contexts (Jonassen, 2000) and examples to draw upon (Liu, 2011).

7.6.1.2 Source and quality of videos

Student reflections also contained a range of comments indicating that a significant reason for selecting videos stemmed from the quality of the videos and the source from which they came (Fig. 7.5). Comments (n=129) spread across a number of key areas.

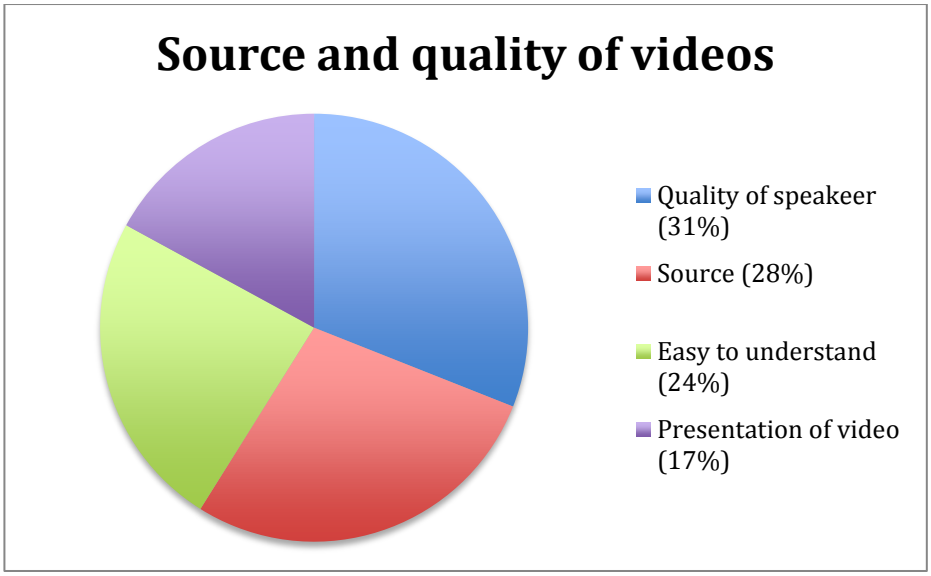


Figure 7.5 – Criteria for selection B

The most prominent of these with 40 comments, was the quality of the speaker or presenter. Many of the students' comments (n=21) indicated that having access to experts in the field (Mitra *et al.,* 2010; Jonassen, 2000:8-9) was the reason content was included in their work. Comments in this section indicated that they paid attention to the credentials of the presenters, conducting their own research to gather information. For example, P1 chose the video '4 steps to great speaking' to support his assignment topic on vocal skills because 'The speaker in this video, Conor Neill, has been teaching Persuasive Communication on MBA courses for ten years at the IESE Business School, giving this video much credibility in my mind'. Similarly, P24 chose the video 'Understanding body language' for her topic body language because 'I felt the video on Understanding Body Language was a credible source because the woman speaking about body language is a nationally recognized body language expert, and has also written many books about the importance of body language'. Students also commented (n=19) that the engaging delivery (Mitra *et al.,* 2010; Koumi, 2013) formed part of the decision making process. For example, P3 chose the video 'The communication process' for her topic on models of communication because 'The speaker conveyed the lesson in a manner that was interesting to listen to'. P8 said that she chose the video 'Killer

presentation skills' for her conclusion because 'The speaker is very humorous which makes the idea of public speaking more appealing to me'. Finally P55 chose the video 'Effective listening skills' for her topic on listening skills because 'the person in this video is confident in what he is saying and his delivery is excellent and engaging'.

The second most prominent area which appeared in students' reflections (n=36) was the source of content, with students paying attention to the affiliations associated with the videos (Buckingham, 2008). For example using the video 'Talk Nerdy to Me' to support the development of the barriers to communication, P4 said that it was a 'credible resource as it is a TED talk which are talks delivered by professionals who are qualified in their areas'. P10 used the video 'Effective listening skills' for her topic on listening as 'I thought this video was a credible source because at the start of the video it showed that it was sponsored by the Royal Bank of Scotland, which is a very recognised bank, and LinkedIn which is a recognised company'. P18 said that she used the video 'Learn the body language' in her topic body language because the video was a 'reliable source of information as it was made by Perception Business Skills'. P24 chose the video 'Understanding body language; because she felt that it was a 'credible video source because it was a video from Anderson Coopers show on CNN, which is a credible source for news'.

The final two areas that appeared in students' reflections (n=53), related to findings from previous cycles of this study, where students selected content as it was easy to understand (Mardis, 2009; Koumi, 2013) and presented information in an engaging way (Mitra *et al.,* 2010). In the first category, students commented (n=31) that the easy to understand nature of the content made it more feasible to incorporate into their work. For example P8 said that she chose the video 'What is communication' to introduce her essay as 'it explains what communication is in a very simplistic and comprehendible way. It gives us examples of communication e.g. media, gestures and provides us with general information on

communication. In my opinion this video is suitable for all ages and everyone would understand it'. P25 selected the video ‘Organisational communication’ for her topic on the importance of visual communication as 'I felt the video was very informative, factual, easy to follow, interesting and expresses the importance of communication'. In her discussion on models of communication, P60 chose the video ‘What is communication’ as it ‘clearly and simply explains the various forms and channels of communication'. In the second category comments (n=22) indicated that the visual nature and structure of content were important criteria for selection. For example P3 commented that she chose the video ‘What is communication’ as the 'use of drawings and animations caught my eye and helped me understand the concept of communication in terms of academic study'. P21 said the video ‘What is organisational communication’ she selected was ‘very appealing to me as the content consisted of pictures rather than someone orating information into the camera with no facial expressions or body language'. P57 said that she selected the video ‘How the communication process works’ for her topic on the models of communication because it helped her to 'understand the models of communication by using simplistic diagrams'. P10 said that her selection was based on the fact that the video ‘Effective listening skills’ was 'very well put together', with P2 saying that he selected the video ‘What is communication’ because 'the content wasn't too heavy'.

Data in this category suggests that when online video is linked to the overall learning objectives and students are encouraged to integrate content into their work (Moskovich & Sharf, 2012; Berk, 2009), the filtering strategies adopted are also influenced by the quality of the content, both in terms of the credentials of the speakers (Mitra *et al.,* 2010; Jonassen, 2000:8-9) and their ability to deliver content in an engaging manner. In this sense, the process of integrating online video enabled students to display information literacy in analysing online video (Ng, 2012b), while also confirming the importance of providing students with engaging content that sparked interest and increased motivation to learn

(Koumi, 2013; Mitra *et al.,* 2010). The data also reveals that while not top of students' lists of criteria, the source of the content also had an impact on the students' decision making process. The idea is that content comes from a recognisable source, gives credence to the information and suggests to students that content is reliable and worthwhile. Here we can see elements of media literacy at play (Buckingham, 2008), where students have an awareness of the sources of information and are cognisant of the importance of understanding where information comes from. However questions remain as to whether students automatically trust information simply because it has come from a recognised source. Given the subject matter and that content was selected for students in this research, the impact of this area of data is reduced and would require a different approach to further draw out these findings. Finally, this data confirms that the presentation of the video content (Denning, 1992; Mitra *et al.,* 2010) and its ability to explain concepts in an easy to understand way (Mardis, 2009) have an impact on students' decisions to incorporate online video into their assignments.

7.6.2 Conclusion from cycle 4

The purpose of this cycle was to address the questions:

R2. What strategies can be employed to enable students' digital literacy with online video?

- What strategies support students' use of online video in assignment work?
- How can assignments be designed which enable the use of online video?
- What impact does video have on students' learning experience?

R3. How do students display digital literacy in practice when given the context and tools in which to do so?

- How do students evaluate online video for inclusion in their work?

Findings from this cycle can be broken down into two broad themes: students' selection of online video based on how it supports content from lectures and other sources; and selection of video based on its quality and source. In the first theme, findings indicated that students selected video based on its ability to support and develop themes which stemmed from content covered in lectures and from others sources. Students chose content that linked to existing topics and other sources (MacKinnon & Vibert, 2012), confirmed their understanding of topics (Koumi, 2013), built on existing knowledge (Mitra *et al.,* 2010), provided examples (Liu, 2011) and alternative perspectives to develop points (Moskovich & Sharf, 2012; Hakkarainen *et al.,* 2007). This suggests that when encouraged to reflect on the process of incorporating online video (Martin, 2005), students use content to display 'reproductive literacy' (Eshet-Alkalai & Amichai-Hamburger, 2004; Eshet-Alkali & Chajut, 2009) by weaving online video together with existing knowledge to create new meanings and understandings.

In the second theme, findings indicated that the quality of content, and its source, were also important factors in the selection process. Students chose content based on the quality of the presenter, in terms of their expertise in the field (Mitra *et al.,* 2010; Jonassen, 2000), the quality of the delivery (Koumi, 2013) and their affiliations with credible organisations (Buckingham, 2008). Also evident was students' choice of video based on the ease of understanding and the visual nature of the content (Denning, 1992; Mitra *et al.,* 2010).

7.7 Conclusion

This cycle focused on examining the criteria adopted by students in evaluating online video for inclusion in their assignments. Data outlined has shown that when asked to integrate online video into their work, and encouraged to reflect on their choices, students are most concerned with how content can be used to develop and support their arguments. Students

evaluate content in terms of its usefulness for the task at hand, selecting online video based on its ability to build on current knowledge and add to the work being completed. This signifies the importance of curation of content on the part of lecturers, finding and making available content that clearly links to the topics at hand, and is rooted in the key themes of the work. However it also suggests that the value in providing video content from a variety of sources lies in its ability not only to confirm what students already know, but allows them to incorporate different opinions, perspectives and points of view which may otherwise be unavailable to them. The quality of online video was also significant, again providing guidance for educators working in this area. In order to encourage students to integrate online video into their work, video should be engaging, explain concepts clearly and hold students' attention. Finding large libraries of video of this kind may still be a challenge into the future, however, a focus on quality over quantity may the best approach. Students seem clearly aware of the importance of the source of information, both in terms of the credibility of speakers and affiliations associated with online video. This is encouraging in that it demonstrates a clear distinction between recreational use of online video and its application to assignment work.

Chapter 8 – Conclusions and recommendations

In this chapter I summarise the work presented in this thesis which investigated digital literacy and online video - enabling students' use of online video for assignments using a customised VRS, paying particular attention to the research questions which were addressed throughout the thesis. Next, I outline the contributions to knowledge achieved by this work, followed by its limitations. Finally, I look at possible future directions of research in the area, suggesting work which could further advance the use of online video for assignment work.

8.1 Summary of work

Students' use of online video has increased in recent years, due in part to increased access through video sharing sites such as YouTube. This increased use has led to students beginning to source online video to support their coursework and an increased demand from university students for video content as a tool to support this.

In the first chapter I outlined how in a world that is increasingly mediated by digital technology there is growing recognition of the importance of digital literacy where students source, evaluate and integrate digital content into academic work. In addition to its popularity with students, video content has been recognised by educators as a valuable learning resource due to its ability to aid understanding, present alternative viewpoints and opinions, as well as through its engagement and motivational value. Given the vast quantities of video now available online, educators envisage a move towards online repositories where students have consistent access to content. However, educators are concerned with their ability to provide concise, relevant and up-to-date material for students to view. The availability of VRS technology which enables search and segmentation capabilities and options for video sharing, provided opportunities to examine how students integrate online video into assignment work by sourcing, sharing,

commenting on, evaluating and integrating online video, thus facilitating the investigation of digital literacy in practice with online video. For this work, I hypothesised that when provided with VRS technology and the strategies to integrate online video into assignments, students would display key digital literacy skills in practice. Through the investigation of three research questions over a number of cycles, this hypothesis held true:

What impact do the features of the video retrieval system have on students' ability to work with online video for use in assignments?

- What is the impact of the search and segmentation features on students' ability to source online video for a written assignment?
- What is the impact of the video segment sharing and commenting features on students' ability to share and comment around online video for a group assignment?

This study found that the features of the video retrieval system had a positive impact on students' ability to work with online video for use in assignments. The search and segmentation features enabled students to locate specific and concise pieces of content, meaning students could spend more time focussing on assignments rather than trawling through vast amounts of video content. The search and segmentation features enabled students to communicate effectively around digital video, not only sharing their reasons for video choices and delegating work, but also offering and receiving opinions and ideas on video segments.

R2. What strategies can be employed to enable students' digital literacy with online video?

- What strategies support students' use of online video in assignment work?

- How can assignments be designed which enable the use of online video?
- What impact does video have on students' learning experience?

This study found they key strategies required to enable students digital literacy with online video were: using video in lectures to develop students' understanding of how to anchor their analysis in key themes; requiring the use of online video as part of their assignments; requiring students to directly reference online video in their work, demonstrating how to do this; providing guiding questions and themes to aid students' search; providing quality content that expanded on topics covered in lectures, and encouraging them to reflect on their use of online video for assignments. When provided with these strategies, online video had a positive impact on students' learning experience.

R3. How do students display digital literacy in practice when given the context and tools in which to do so?
    - How do students integrate online video into written work?
    - How do students use online video to inform the development of a group presentation?
    - How do students evaluate online video for inclusion in their work?

This study found that when given the tools and context in which to do so, students displayed key digital literacy skills in practice. Students successfully integrating online video into their work by summarising content, drawing on examples and re-using content to demonstrate new understandings. Students shared and communicated around online video, sharing opinions and views and delegating work, while also evaluating online video for its usefulness and relevance to their work.

In chapter 2, I reviewed literature from educational and technical standpoints, focusing on areas that directly related to the work in this thesis. As a grounding for this work, I

analysed literature on digital literacy, synthesising seminal and current work in the area to draw out key aspects of digital literacy for investigation. Next I examined the learning value of video to establish its worth in my context. In order to understand the most appropriate ways to use online video, I then reviewed the key strategies for its integration. Next I examined case studies using online video systems in education in order to draw out key learning and opportunities for integration from a technical and learning perspective. Finally in chapter 2, I discussed the core components of a video retrieval system and how these could be used to improve access to and integration of online video in assignment work.

In chapter 3, I outlined how through an action research approach, this thesis would investigate the use of online video for assignments over a number of linked cycles, which allowed research questions to be addressed and learning from cycles to be brought forward.

The first cycle of research outlined in chapter 4, focused on students' use of online video in an individual assignment. Students used the first version of the VRS to source relevant segments of video from the catalogue provided and integrate these into their work. Students integrated video content using a variety of referencing strategies such as summaries and direct quotations to support their own arguments. In addressing research questions R1, R2 and R3, findings from this cycle demonstrated that students' digital literacy was enabled by: using video in lectures to develop students' understanding of how to anchor their analysis in key themes; requiring the use of online video as part of their assignment; requiring students to directly reference online video in their work, demonstrating how to do this; providing guiding questions and themes to aid students' search; providing quality content that expanded on topics covered in lectures; and providing them with the tools to source this content. Based on these enabling factors students displayed the ability to source, synthesise, integrate and

reference online video in their work, with feedback indicating that using online video in this way had a positive impact on their learning experience. Findings also demonstrated that the search and segmentation features of the VRS effectively supported students in completing this task.

The second cycle of research outlined in chapter 5, focused on students' use of online video for a group assignment. Students used the second version of the VRS to locate, share, comment on and use relevant segments of video to inform the development of a group presentation. In addressing research questions R1, R2 and R3, findings from this cycle demonstrated that students' digital literacy was enabled by: using video in lectures to develop student understanding of how to anchor their analysis in key themes; requiring the use of online video as part of their assignment; requiring students to directly reference online video in their work and demonstrating how to do this; providing guiding questions and themes to aid students search; providing quality content that expanded on topics covered in lectures; and providing them with the tools to share and comment on online video. Based on these enabling factors students displayed the ability to share and communicate around online video, and extract relevant information related to their assignment, with feedback indicating that using online video in this way had a positive impact on their learning experience. Findings also demonstrated that the video segment sharing and commenting features of the VRS effectively supported students in completing this task.

The third cycle of research, detailed in chapter 6, outlined the implementation of the final version of the VRS and its evaluation. This version incorporated changes based on student feedback during previous cycles: the incorporation of pop-up text segments to improve contextualisation of search results and video transcripts to facilitate better understanding and easier referencing of video segments. In addressing R1, findings from this cycle demonstrated the potential of these features to improve students' ability

to locate and integrate video segments, as well as offering suggestions for improvement for future iterations of the system in this context.

The fourth cycle of research, outlined in chapter 7, focused on examining the choices made by students when evaluating online video for inclusion in their assignments. Students again used the VRS to source video from the catalogue provided and integrate this into their work. In addressing R2 and R3, findings demonstrated that in addition to strategies employed in cycles 1 and 2, students' digital literacy was enabled by encouraging them to reflect on their use of online video for assignments. Based on these enabling factors, students displayed the ability to evaluate content for its relevance to their work, focusing on how content linked to existing knowledge, its usefulness for completing the task at hand, the quality of content, and its source.

8.2 Contributions to knowledge

Many studies, upon which this thesis has drawn, have examined the use of video as a means to: a) Increase student engagement in lectures, b) Provide an alternative source of information for students, c) Encourage student use of video through write-ups and case studies. 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 is the first study to examine digital literacy with online video in practice, whereby students used a VRS to integrate online video into assignments alongside traditional sources such as books, journal articles and lectures notes. Also unique to this study was the investigation of sharing and commenting on online video around assignment work, while also examining students' criteria for evaluating online video for inclusion. The study showed that by combining technical features which enable sophisticated engagement with online video with carefully constructed assignments which encourage its integration, that students can interact

intelligently with online video. The study also showed that integrating online video in this way had a positive impact on students' learning experience. A list of the key enabling factors and their impact on students' digital literacy in practice can be seen in table 8.1.

Key enabling factors and their impact on students' digital literacy		
Key enabling factors		
Video retrieval technology	1) Content based analysis search 2) Shot boundary detection – short video segments 3) Individual segment text summaries to identify relevance 4) Video segment sharing functionality 5) Video commenting functionality 6) Interactive video transcripts	
Integration strategies	Supportive	1) Use of edited video in class to guide use 2) Link to lecture content, promote engagement and discussion 3) Demonstrate technology 4) Demonstrate referencing strategies
	Assignments	1) Link video to assignment objectives 2) Require use of online video in assignment 3) Require integration and referencing 4) Provide guiding themes or questions to guide integration 5) Require group use of video and interaction around content 6) Encourage reflection on video choices
	Video	1) Provide quality content 2) Access to unique contexts and perspectives 3) Link video to lecture content

		4) Ensure video is engaging, relevant and easy to understand 5) Provide ample choice of video for student selection
Digital literacy displayed		
Integration		1) Assemble digital information 2) Contextualise and synthesise information 3) Summarise content 4) Demonstrate new understandings 5) Draw on examples 6) Adapt and re-use content
Share and communicate		1) Share digital content 2) Communicate around digital content 3) Share opinions and views 4) Delegate work 5) Work remotely
Evaluation		1) Evaluate content 2) Filter through and select digital information 3) Judge relevance and usefulness of information 4) Evaluate credentials of speakers 5) Evaluate source of content

Table 8.1 - Key enabling factors and impact on students' digital literacy

This study demonstrated that when encouraged to integrate online video into assignments, and provided with the necessary tools to do so through a VRS, students display key digital skills of sourcing, integrating and referencing online video for their work. The search and segmentation features of the VRS enabled students to locate relevant content, while the focus on referencing online video enabled students to weave together online video with information also garnered from lectures, academic sources and their own reflections. This has important implications for our understanding of digital literacy and online video, suggesting that online video can be used as more than

an entertainment medium and when content is carefully selected it can support students' understanding of topics and act as a viable source for developing topics throughout assignment tasks.

The study demonstrated that when asked to interact around online video for the completion of a group assignment, and provided with the necessary tools to do so through a VRS, students also display the skills of sharing and commenting on online video to accomplish this. The sharing and commenting features of the VRS enabled students to share relevant content with each other, make comments as to its relevance and offer opinions on content. This suggests that when harnessed in the correct way, these tools can facilitate the sharing of content and ideas in a learning setting, again implying that students display digital skills when provided with the context in which to do so.

Digital literacy is also concerned with evaluating content for its relevance, applicability and quality. This study has shown that when encouraged to reflect on their choices of online video, students' primary concerns are its relation to lecture notes and other sources, and the quality and source of content. Students' major concern when assessing content for use in their assignments appears to be focused on how it can be used for the task at hand, how it links to information already garnered and how it can support the development of their topics. Also of concern are the quality of the delivery of content, the credentials of the speakers and the source from which the content came. This suggests a number of things. First it stresses the importance of linking online video content to the objectives of the module or task at hand, to ensure students can see its relevance or links. Second, it emphasises the importance of selecting content from quality sources that provide students with engaging content and from presenters with experience in the field. Finally, while not paramount to this study as content was provided by the lecturer, it suggests that students do have an understanding of the

importance of the sources of content, but raises questions as to their understanding of bias if online video were not to be provided for them.

The cycles of study provided an evaluation of the different features employed through the VRS in an educational context. This provides a number of important contributions to the field in terms of technical specifications and their usefulness in providing students with access to online video for assignments. The study demonstrated that the search and segmentation features enabled students to source and integrate online video into their assignments. By rendering video more searchable when compared to traditional video sharing sites, students could locate digestible portions of video which could be directly related to topics under discussion without the need to watch lengthy clips. The examination of these features in education presented opportunities for improvements to the technology in this context. While the pop-up text segments tested in cycle 3 presented a potential step forward in improving the search capabilities by allowing students to easily evaluate search results, the search functionality could be further improved by adopting highlighting and automatic text summarisation, features which are beginning to emerge in this field. Findings also suggested that while the VRS did support the integration of online video into assignments and enabled students to reference content for their work, the provision of interactive transcripts which are linked to the timeline of videos would improve the ability to reference content. The video sharing and commenting features employed in cycle 2, demonstrated the technical feasibility of interaction around specific segments of online video, a first in educational contexts. Natural experimentation with additional features was suggested by students, this suggests that while the focus of research in this area of VRS technology has been predominately on improving video search technology, there is value in perusing the more collaborative features for future iterations in educational contexts.

Finally, and most importantly from a methodological perspective, this study demonstrated that adopting an action research approach enabled cross-disciplinary research to be conducted between the School of Computing and the School of Education Studies. This practice based approach facilitated learning from each cycle of the study from a technical perspective and the students' perspectives, enhancing the value of the study. The action research approach framed the study so that it was more than a technical exercise; it also offered evidence of how technical features can be designed and developed for use in an educational context.

The culmination of what was learned through the implementation of this study, including recommendations for the future, contributes to the future use of online video in assignment work. This contribution provides educators and technical staff with a foundation of work and guidance for the successful future integration of online video in educational contexts, and a base system and assignment procedure through which educators of all kinds can begin to integrate online video into their assignments.

8.3 Limitations

In this study, each of the cycles was conducted with a cohort of university students taking part in the BSc in Education and Training, with a maximum potential sample size of 80 students in any of the cycles. The intention of this study 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.

Given the prototype nature of the system and the focus on understanding digital literacy in practice, certain features commonly associated with technical development of video systems were missing from this study. For example, the study may have benefited from tracking students' use of the system in terms of their navigation, selection and viewing

of video content. This data could have strengthened findings in relation to students' use of the search and segmentation features in particular and are recommended for inclusion in future work.

Due to the action research approach adopted for this study, the researcher's own discipline and teaching area were chosen so that cycles could be implemented, evaluated and changes could be made in practice. The result of this is that the study has focused on Education Studies 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 researcher 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 thesis.

However, while the above limitations have been noted, the purpose of this study was to carry out an action research inquiry to enable the use of online video in assignments using a VRS in a natural context, based within the researcher's own teaching environment.

8.4 Recommendations for future work

Throughout the cycles of this research thesis, many questions were raised and answered. However as is the nature of any research, these results posed many new questions which could lead this research in a number of different directions.

8.4.1 Digital literacy

Sourcing and evaluating online video: Content provided for students in this study was provided by the researcher in a central location. Future studies could focus on examining how students source content from a range of online video repositories, locating content based on set criteria. Such studies could further investigate students' ability to identify relevant content and evaluate this in terms of its suitability for inclusion in their work, biases and credibility.

Social interaction: This study focused on investigating students sharing content and sharing opinions and views on content around a specific group task. Future studies could investigate further the social interactions of students around online video, examining behaviours in online scenarios through discussion fora, examining their ability to interact appropriately with each other in online communities and draw upon peer knowledge as 'people networks' where groups could work together to solve problems or complete tasks in an online environment.

Creating using new media: While the work presented in this study was an important step forward in understanding how students integrate online video into the traditional style assignments of a written essay and online presentation, there is value in examining how students use online video to inform the creation of assignment tasks involving new media. Studies could focus specifically how students create video content using knowledge and skills gained from online video, investigating for example how students mimic and absorb certain aspects of communication skills and display these to their own audiences.

Alternative contexts: This study took place with the module 'social and personal development and communication skills', with a particular focus placed on communication skills. However the outcomes of this study, and indeed feedback from the students themselves (see appendix X), indicated its feasibility in other subject areas.

Outside students' own suggestions, the presence of abundant video content for subjects such as History, Politics and Media Studies, for example, indicate there is potential in these areas also. It is reasonable to suggest that using similar approaches, educators in these fields could yield positive results by setting their students assignments around online video. Similarly, while this study focused on using the system's features to support student use of video content from academic, training, TV and other sources, the system also has the potential to support teacher (and other professions) professional development. Teachers who participate in skills practice and skills demonstrations could upload their videos to the system and critique them together in groups, using the search functionality to find areas of interest and the sharing features to make comments for improvement to each other.

8.4.2 VRS

Content analysis: The content analysis based search used in this study represented a new approach to finding and integrating video content in assignments. While this approach had a number of advantages over traditional searches, it poses areas for further research. Rather than searching purely for searched words and phrases, it may be beneficial if these words and phrases were found 'in-context' i.e. their relation to the overall content of a segment could be established to ascertain the overall contextual relevance of a segment. For example, searches for 'listening skills' could automatically search for related terms e.g. 'communication', 'paraphrasing' etc. and segments with the most 'primary' and 'secondary' terms could be presented first. Future research could also attempt to link work being carried out by Ding *et al.* (2012) on text summarisation and link this to content analysis so that searches not only look through the content but through automated summaries which give the 'gist' of segments. These summaries could be presented using a version of the pop-up text summaries used in this study to aid students in identifying relevant content for their work.

Segmentation: The shot boundary detection techniques employed during this study were again a first for the use of online video in education and worked well in providing students with concise, focused content. However future research could focus on refining and improving the process, based on technical progress and user requests. In this study segments were presented to the user based on start time as it related to their search term, from which time segments continued until the end of the video. Future developments could offer users the ability to choose segment length – short/medium/long, and source – academic/TV/etc. - and create a segment playlist based on the user's search, where related segments would be lined up for the user to watch next.

Sharing: Sharing video segments with other users is new, especially within educational settings. This process worked well in this study but has opened up many other avenues for research. Future work in this area might investigate the use of group tiers to facilitate sharing among different user groups. Users could share with individuals within their own group only, or chose to share with their own group and the wider class community. This opens up many other opportunities for investigating not only how students use a system for small group activity, but how a larger class group find, share and recommend content to one another. Expansion of the group features may also allow investigation of managing group log in, as was mentioned in this study, and the possible need for a notification system that informs students when content has been added or shared and by whom.

Comments: Commenting features represented a new way for students to provide additional information and share their views and opinions on video segments; this work has presented a number of possibilities that may warrant further research. Implementation of threaded conversations as a form of comment sharing, where replies are linked to the original message, may improve the communication process especially

for longer, more in-depth conversations. The development of a 'chat box' feature could facilitate instant, live chat between group members. Finally, integration with social media sites such as Facebook could allow students to share comments over existing networks.

Video transcripts: Video transcripts provided in this study would help students with confirming understanding of video segments and with the practical task of referencing content. Further developments to the formatting of transcripts and the flexibility of their use may lead to better results for students. Techniques such as automatic time stamps and actively linking words to points in the video, may improve their usefulness.

Adding content: Finding video content and passing this on to the technical team for processing before being added to the system was time consuming. Future research may focus on improvements in this area. A possible development is an automated process whereby educators can continually add content to the system by simply 'dropping' new video files into a given folder. Once there, videos could be processed using auto-transcribe and auto-segmentation software, then made available on the system within a given timeframe. This solution would be beneficial in two ways. First it would ensure that control of what content appears on the system remains firmly in the hands of educators who can make informed decisions about what content is and is not on their system. Second, it would allow educators to add relevant content in a gradual manner, without the need for technical know-how. Other alternatives might be direct links to sites such as YouTube so that videos of interest would be automatically added to the system. Whatever the mechanism, it is my view that a more user friendly, streamlined process for adding video content is needed for the mainstream use of video retrieval systems in education.

Group viewing: This study demonstrated the value of students sharing and commenting on video segments, further development on how this occurs may be

possible. Students valued being able to share thoughts and opinions on video content, so it may be worth investigating 'live chat' over group viewing of video. Future research could investigate the development and implementation of a group viewing feature where students could watch the content together online and jot down their thoughts using live chat and live mind-mapping features.

8.5 Final thoughts

Advances in technology in recent years have led to an explosion in the use of video content. This increase has led to some changes in how students and educators view the use of video content in educational contexts, with many viewing the advent of digital video as an opportunity to use video to enhance teaching and learning. Future trends suggest that both students and educators see video content playing an increasingly prominent role in education (Martin *et al.,* 2011; Johnson *et al.,* 2014), with both parties indicating an increased appetite for video as part of course content. Research indicated that facilitating the use of online video into assignment work would encourage engagement with video content and allow the investigation of digital literacy in practice. It is in this area that I have focused my research. I have shown that when provided with relevant content, the tools to access and integrate this content, and assignment tasks which require its use, student digital literacy is possible in practice with online video.

Under the right conditions, online video can play a role in supporting students understanding and development of topics, where students can draw out information and examples which can be used to support their work. This represents a move away from the text focused sources which are still dominant today, suggesting that online video can be more than an entertainment medium or a 'nice to have' extra offered by lecturers but can be integrated in a meaningful way into the learning process. This work also suggests that sharing features are not simply the reserve of sites such as YouTube

but can also have a positive impact in educational contexts, helping students to communicate and share opinions with each other to complete group work. However, there is still much work to be done and room for development in the area. Digital literacy requires further investigation in practice to examine students' ability to source and evaluate content from a range of disparate sources, taking into account bias and media influences. From a technical perspective search functionality could be further developed to better contextualise searches for students so that the real relevance of video segments can be identified more easily. Segmentation could be further improved and implemented so that it adds to the usability of a system by offering playlists and differing segment lengths. Better socialisation and group features could be implemented so that the system becomes a true group learning platform. From an educator's perspective, processes could be improved so that adding video content and creating users and groups becomes a seamless process that would encourage the use of video content as an effective source of educational references and student collaboration in the future.

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