Development and validation of a taxonomy to guide practitioners in the use of video feedback

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Abstract

This research was motivated by observing the lack of student engagement with assessment feedback on a first year undergraduate computer programming unit. The thesis includes background information regarding current trends and issues in Higher Education assessment and feedback, a review of current literature on video feedback, and the method selection process which resulted in an overarching design science structure, encompassing case studies, implemented in an action research context.

A related pair of taxonomies were developed from the literature, and validated both in practice and by experts. These were designed to aid both best practice for academic staff involved in setting up systems to produce and distribute video feedback, and researchers, when choosing which details to include in studies and papers on video feedback. By including recommended information, the connection between practice context, and perceptions, can be observed, thus maximising the contribution to best practice for the global research community, as media formats and technologies evolve.

To my family

Behind all my efforts is my wonderful family.
This work is dedicated, with love, to you.

To my parents, Viv and Bob
whose endless love, and appreciation for education, has driven me my whole life.

To my husband Lennie,
and my girls,
Ellie and Summer
Thank you for your love, patience and the everlasting supply of cups of tea.

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Author’s Declaration

The following work has, in part, been previously presented in the following publications: -

> Atfield-Cutts, S., Ollis, G., Coles, M. and Mayes, H., 2016. Blended Feedback II: Video feedback for individual students is the norm, on an undergraduate computer programming unit. In: 27th Annual Workshop of the Psychology of Programming Interest Group - PPIG 2016, 7-10 September 2016, St. Catherine’s College, University of Cambridge, UK.

The contribution of the other authors to this paper, and to the thesis, was as education practitioners, who willingly accepted video feedback into their practice, without which this work would not have been possible.

> Atfield-Cutts, S. and Jeary, S., 2013. Blended Feedback: Delivery of feedback as digital audio on a computer programming unit. In: BCS Quality Specialist Group’s Annual INSPIRE (International conference for Process Improvement, Research and Education)., 4–5 September 2013, London, UK.

The contribution of the second author to this paper was invaluable editorial advice.

Glossary of Abbreviations

ADA	The **Americans with Disabilities Act** (1990) is a civil rights law of the USA which prohibits discrimination against individuals with disabilities in all areas of public life
CEQ	The **Course Experience Questionnaire** (CEQ) collects opinions from recent graduates on the quality of education provided by Australian institutions
HE	**Higher education** (HE) leads to the award of an academic degree and is an optional final stage of formal learning that occurs after the completion of secondary education
HEI	A **Higher Education Institute** (HEI) is a provider of higher education
HTML	**Hyper Text Markup Language** (HTML) is the standard markup language used to implement documents designed to be displayed in a web browser
NSS	The **National Student Survey** (NSS) is an annual survey of final year undergraduate students across the UK. The survey gathers opinions from students about what it has been like to study on their course at their university/college
NSSE	**National Student Survey of Engagement** (NSSE) is used to measure the level of student participation with learning at universities and colleges in Canada and the United States.

NUS	The **National Union of Students** of the United Kingdom (NUS) is a confederation of students' unions in the United Kingdom.
NVC	**Non verbal communication** (NVC) is the non linguistic transmission of information through visual, auditory, tactile, and kinaesthetic channels
NVivo	**Nvivo** is the name of software used for qualitative analysis, by QSR International (1999). The name is a play on the words 'in vivo' and refers to inductive coding of data (rather than deductive)
PCA	**Principle component analysis** (PCA) is a data analysis technique for reducing a set of potentially correlating variables down to a single principle component (Pearson 1901)
QAA	The **Quality Assurance Agency** for Higher Education, UK (QAA 2006) is an independent body that assesses standards and quality in UK higher education
SPSS	**SPSS** is the name of Software by IBM 1999 used for quantitative data analysis. The acronym stands for 'Statistical Package for Social Sciences' but the software is commonly known as SPSS
TEF	The **Teaching Excellence (and Student Outcomes) Framework** (TEF) is a framework introduced by the UK government, for the assessment of the quality of undergraduate teaching in England.
VLE	A **virtual learning environment** (VLE) is a term used to describe any web based application used to deliver teaching materials and facilitate student-teacher communication. VLE's are used by educational institutions to augment attended courses, or to deliver online courses

Chapter 1

Introduction

This chapter will explain the motivation and rationale behind the development of the taxonomy of video feedback. It will position the research in context and explain the key terms and concepts as they are used in this work. The research questions, which motivate this work, and the key contributions towards moving knowledge forward, are also explained here. How those questions will be answered, and how the contribution will be achieved, is discussed in an overview of the structure of this thesis.

1.1 Problem Overview

The motivation for this research was to solve the problem of the lack of student engagement on a first year undergraduate computer programming unit. Student engagement was improved by setting a few small assignments throughout the academic year, rather than a single large one. Student attitudes towards this assessment style were positive, as they realised the benefits of regular practice over time. However, once submissions were only two weeks apart, staff became aware that they were writing the same feedback comments, on work for the same students, time after time. It became clear that although students were now participating and interacting with assessments many students were still not engaging with feedback.

Traditionally in Higher Education (HE), students are taught in a classroom, lecture theatre, or laboratory, by staff. They are encouraged to question, discuss, and participate in learning activities maximising learning potential, and to engage in a dialogue as a means of monitoring understanding. Increasingly staff use a variety of technological aids to assist in the learning process offering a diverse student body greater opportunity to engage.

However, feedback on assessments is still largely delivered as the written word and students are thus treated as distance learners with no requirement to acknowledge receipt or validate understanding. They are given comments, which they are expected to interpret and action independently. This is particularly difficult for first year students, for whom expectations of independent learning are relatively new.

1.2 Research Aims and Objectives

Audio and video feedback have been used to replace the written word, but there has been little academic research into best practice for the use of this new format when used to produce feedback in practice. The primary aim of this research is to analyse the student and staff perceptions of video feedback and use the results to inform best practice. Examination of the systems used to produce and distribute video feedback, and the style of the production, will be explored to understand its impact on the perceptions of students and staff. Documenting the rationale for system selection and its use, along with the impact of those choices on student experience, will enable practitioners to implement best practice. It will enable informed decisions about their own video feedback systems, and how they use them, in their own practice context. To that end, the following discrete research questions were identified:

- Q1) To what extent is it feasible to use video feedback in normal practice to provide individual feedback to normally large cohorts of students as a response to assessment?
- Q2) What evidence is there of how the attributes of the system used to produce and distribute video feedback, and the style of the production, impact the perceptions of students and staff?
- Q3) Based on evidence, can a taxonomy be developed with a view to enabling informed decisions by staff about their own video feedback production and distribution systems?
- Q4) To what extent can the taxonomy developed be validated by application to video feedback in practice?
- Q5) To what extent are the reported positive perceptions of video feedback enabled by the video as a media, rather than attributes that can be found in other media formats?

1.3 Key Concepts

This section discusses the key concepts and contemporary ideas, from literature, surrounding assessment feedback. Any study relating to feedback needs to ensure an understanding of how feedback is a response to assessment, an awareness of how the message is conveyed, the different formats of feedback commonly available, the attributes of good quality feedback, the problems with feedback and the potential of technology to improve feedback.

1.3.1 Assessment

The purpose of assessment is to enable a student to provide evidence to external parties e.g., potential employers, of their level of performance. Therefore, the business of Higher Education institutions (HEI's) is to use assessment to indicate student performance to external parties at the discretion of the student. In turn, the Quality Assurance Agency for Higher Education (QAA), and other interested parties, make judgements about HEI's based, in part, on the collective student performance at the time of assessment, which may be used by HEI's to uphold a good reputation.

Assessment can be regarded as 'any processes that appraises an individual's knowledge, understanding, abilities or skills' (QAA 2006) and is often considered from a student perspective, as a process used for two broad student focused functions: performance level indication and learning. It influences the focus of student effort that will progress learning towards a goal. The degree to which the goal outcome is achieved is indicated by marks or grades. Assessment is commonly categorised into one of two categories: formative or summative.

Formative assessment

Formative assessment is usually more frequent and sometimes informal, and therefore the feedback is also frequent and sometimes informal. The informality is why formative feedback sometimes lacks recognition as feedback.

Summative assessment

Summative assessment is normally compulsory, used as a performance level indicator, and consequently used by the institution as criteria for student progression (Marriott and Lim Keong 2012). Although summative assessment awards formal credit, formative elements may still be intentionally built into the assessment and designed to guide student learning towards the next stage. For example, feedback on an assignment mid-way through a unit may be compulsory and graded, whilst also providing feedback intended to move learning towards the next assessment. Whereas an exam at the end of a unit of learning may return only a summative grade.

1.3.2 Feedback

Marking student work is one of the most significant events in the lives of both students and academics (Fleming 1999), and is therefore, one of the most important tasks that staff do (Cryer and Kaikumba 1987; Irons 2007). The feedback created as part of the process is central to pedagogy (Kahu 2008; Gould 2011; Jones et al. 2012), at the heart of the learning experience (Race 2001; Carless et al. 2011; Cryer and Kaikumba 1987; Gould 2011; Crook et al. 2012; Henderson and Phillips 2015; Cranny 2016) and one of the most powerful influences on student achievement ((Bloxham and Boyd 2007); Turner and West 2013; McCarthy 2015; Cranny 2016). Ramsden (2003) says it is 'impossible to overstate the role of effective comments on students work' which is upheld in both the research, and the reactions from students to their feedback observed every day. Feedback is important throughout our lives but never more important than during periods of formal education (Handley et al. 2007).

Comments regarding the importance of feedback are usually qualified by a reference to 'effective' (Hatzipanagos and Warburton 2009; Gould and Day 2013) or 'high quality' (Henderson and Phillips 2015) feedback, and may go on to mention timeliness, its role in developing student-staff relationships (Crook et al. 2012), encouraging learner autonomy, deep learning, and a framework for high achievement (Gould and Day 2013). Feedback only enables progress if students perceive the value of engaging with it, therefore, good quality feedback is vital to the student experience (Henderson and Phillips 2015; Mayhew 2016). The primary motivation for research into provision of quality feedback is the consensus among staff and students that feedback of good quality is a vast potential source of learning (Sommers 2006).

HEI's benefit if quality feedback improves student results, and so staff are encouraged to spend large quantities of time on assessment feedback. In the UK, feedback is one of the student satisfaction factors in the UK National Student Survey (NSS), the results of which directly influence the ranking of HEI's in the Teaching Excellence and Student Outcomes Framework (TEF), and it is a teaching quality indicator for the Quality

Assurance Agency (QAA).

The creation of assessment feedback is a ritual of academic life that is carried out with varying degrees of consideration by staff, yet can be a significant resource for teaching improvement. During the process of creating feedback on student work, staff may observe where learning has taken place and modify teaching based on student performance (Angelo and Cross 1993). These observations refocus staff attention to improve areas of miscommunication, or reduced understanding, and can direct effort to address unsuccessful elements of teaching, thus increasing the potential for learning. This kind of guidance is especially useful to new staff (Gibbs 2010).

Students can use grades to monitor their own progress (Marriott and Lim Keong 2012) and manage their effort accordingly. However, Smith (2007) discovered that students only perceive a response to work as feedback if it is written down, highlighting a significant discrepancy between the staff and student perceptions of what constitutes feedback. Evans (2013) states that there is no general agreement on a definition of feedback. For instance, it has been described as a 'set of instructional activities and functions'(Clark 1994). Price et al. (2010) says 'feedback' may have many purposes, and will only be useful if all parties share an understanding of those purposes. Although the term feedback covers a broad range of activities in a HE setting, the majority are part of a formal process known as assessment feedback, which can be distinguished from other feedback on learning (Jones et al.2012; Henderson and Phillips2015)

The feedback artefact itself is usually intended to be multipurpose. Its function could merely be to deliver judgement and justify marks, or offer advice for improvement, for this or future works. In the process it portrays the marker's level of expertise, diligence, impartiality and concern for the student, in both an academic and pastoral sense. Students and even the staff who created it, may not be fully aware of which functions, or combinations thereof, are involved (Carless 2006).

Regardless of the other functions and purposes it may have, the literature agrees that for feedback to be effective in learning, it needs to provide qualitative information about student performance, as well as a grade (Hattie and Timperley 2007; Jones et al. 2012; Henderson and Phillips 2015). Although staff observations sometimes suggest otherwise, Higgins et al. (2002) found that students are not necessarily driven solely by grades and they desire feedback that can enable further learning.

The contemporary term for the portions of feedback designed to guide the student towards further learning is 'feed forward' (Race 2014). Feed forward offers support and guidance for improvement in the next piece of work. It takes the emphasis off judgement and grade justification, and focusses on learning.

Conveying the learning message - Transmission V Dialogue

Traditionally feedback was perceived as the transmission of knowledge which occurred at the end of a topic of learning, usually with the responsibility for the process with the teacher role (Cranny 2016). Research is challenging this perspective and moving ideas of feedback towards a dialogue (Nicol and Macfarlane-Dick 2006; Crook et al. 2010; Cranny 2016). Sommers (2006) suggests that learning from feedback can only take place when 'students and instructors create a partnership' by encouraging students to engage in a dialogue, which also generates motivation (Hatzipanagos and Warburton 2009), and skills to sustain continuous learning (Boud and Falchikov 2007). However, in modern HEI's, workloads often restrict the iterations of communication to just a few exchanges per student per subject. Somehow staff are expected to manage that issue with varying degrees of support. Consequently the search for the most useful means of delivering feedback for learning goes on.

1.3.3 Formats of feedback

Before computers the only useful methods to provide feedback were by handwritten annotations on work, or as a meeting face to face. Now technology facilitates multimedia options and combinations, each with their own strengths and weaknesses. The following briefly discusses the main formats available today.

Hand written feedback is annotations on submitted work on paper. The famous red pen was used to be able to differentiate between student work, generally done in blue or black ink, and marker comments. This format regularly meant that markers came under criticism for poor handwriting, which often rendered some, or all of the feedback, useless to students.

Face to face feedback is often regarded as an individual experience where the student is in a one-to-one meeting with the marker. The student needs to make notes to record the feedback, and sometimes students feel intimidated, especially when they are aware that the work assessed was poor. This has traditionally been a popular format for feedback on art subjects, such as fine art, textiles or photography. However, face-to-face feedback also sometimes occurs when staff take a group for a class and offers feedback on the work whilst it is in progress, on an individual or group basis. Sometimes shortly after the submission of an assignment a marker may discuss with a class of students, the common problems that may have been observed, either having marked a sample of submissions, or based on previous experience. The informal and unrecorded nature of these kinds of discussions often mean that this type of feedback is not acknowledged as such by students.

When submissions became digital various formats became possible, but the technology needed time to grow in capacity to handle the quantity and speeds required for everyday use. The only feasible option available initially was digital text in a separate document to the work.

Digital text feedback became commonplace with the adoption of Virtual Learning Environments (VLE). It might mean typing from scratch, or the use of the copy-and-paste paradigm to reuse frequently used comments, thus speeding up the process for the marker. However, students recognised these new tricks of the trade and are disheartened by the lack of individual attention given to the work.

Digital audio feedback became a viable option as electronic storage capacities grew. Having provided a mechanism for delivering an electronic file as feedback, the VLE also meant that other formats, including audio, were also practical to distribute. The proliferation of digital devices makes it easily accessible to students. Therefore, some staff have begun to provide feedback as audio, and many students have found it to be an improvement over text. Some VLE's now provide an interface for recording audio feedback.

Digital video feedback also became possible with the introduction of the VLE. However, it took longer for storage capacities that could sustain a constant sizeable demand to become commonplace. This is required because of the larger file sizes required for video. This has predominantly been provided by investment in cloud services. VLE's sometimes provide an interface for recording, although it is more common to provide access to the camera and rare to have the option to screen cast. The advantages and disadvantages of the video format will, of course, be discussed in further detail throughout this thesis, and in particular, in the literature review (Chapter 3).

Despite all the new media options open to educators, in the main, staff have not explored beyond the easy progression from hand written text to digital text.

1.3.4 Attributes of good feedback

There are two broad attributes essential to good quality feedback for learning:

1. **Comprehensible message**
   For the learning message to be effective it must be understood. It is vital that the student receives a feedback pitched at a level to suit their ability so that they comprehend the message as intended (Marriott and Lim Keong 2012). Students must be able, and be prepared, to engage with their feedback. While the quality of the message is important, the quality of the student interaction with it (such as discussion, asking questions, or analysis), is possibly even more important (Nicol 2010). Therefore, the content must be both accessible and at a suitable level for comprehension by the recipient.

2. **Delivered in a Timely manner**
   For students to value feedback it needs to be delivered prior to commencing work on the next relevant assessment submission, with enough time for reflection and additional learning to take place (Rowe and Wood 2008; Marriott and Lim Keong 2012). This vital element can become eroded due to workload pressures on staff, which is often cited as caused by high student numbers. This key factor is the motivation behind studies implementing 'generic' feedback i.e.: one artefact returned to whole classes or cohorts highlighting commonly shared points of learning only. (Stannard 2008; Crook et al. 2010; Gomez 2010; Crook et al. 2012).

Feedback is effective as a learning tool because 'we learn faster, and much more effectively, when we have a clear sense of how well we are doing and what we might need to do in order to improve' (Hounsell 1987). Therefore, according to Hennessy and Forrester (2014), it should explain to the student :-

- **What progress has been made**, in terms of what was and was not evidenced in the work, in relation to the learning objectives (Stern and Solomon 2006; Cocea and Magoulas 2009).

- **The level achieved** as a summative grade, which provides information about the size of the gap between the actual performance and the goal performance.

(Hounsell 1987; Cocea and Magoulas 2009;Getzlaf et al. 2009; Boud and Molloy 2012; Hennessy and Forrester 2014; Cranny 2016).

- **How to move learning forward** by including strategies for reducing the gap between the actual and goal performance and therefore facilitate progress (Cocea and Magoulas 2009; Getzlaf et al. 2009; Boud and Molloy 2012; Hennessy and Forrester 2014; Cranny 2016). It may explicitly describe corrections in process as well as content (Stern and Solomon 2006; Cocea and Magoulas 2009). Therefore, directing learning effort to accelerate future learning (Hounsell 1987; Inglis 1998; Nicol and Macfarlane-Dick 2006; Marriott and Lim Keong 2012).

Without feedback students would largely be unable to identify their own weaknesses and strengths and have no basis on which to make decisions about how to move work forward (Marriott and Lim Keong 2012). Students may not have sufficient understanding, or confidence in their ability to apply new knowledge (Garrison 2009; Borup et al. 2015) and at that stage of development the role of the teacher in providing direction is ‘irreplaceable’(Garrison 2009).

1.3.5 Problems with feedback

Literature suggests that students do, in fact, value feedback. However, it is often not considered as useful as it has the potential to be (Weaver 2006). Where feedback has traditionally been provided in text, there are several commonly reported reasons for this, including firstly, the tone of the feedback; secondly, feedback is often regarded as too general or too brief; thirdly, it is often returned to students too late to inform the next piece of work; and finally, the type of submission can also make it difficult to form useful feedback using traditional methods such as text. Investigations into the use of audio as feedback have had some success, but it also has many downfalls. These problems are explored in this section.

The source of the unpleasant tone of feedback which is sometimes conveyed to students, is often attributed to the pressure on staff. Staff workloads have come under increased pressure due to an increase in student numbers in recent years. The consequential need to be concise may be responsible for the terse tone students sometimes comment on (Mutch 2003). Some studies suggest that staff are insensitive to the emotional reaction a student has when reading feedback as text, especially when the news is not good. Staff rarely see the effect they have as, whether electronic or physical in format, delivery is often at a location away from them. The investment of time and effort by students means an emotional reaction is inevitable. Dowden et al. (2013) found that the academic benefit of the feedback could be extinguished by a harsh tone and highlights the plight of the mature student trying to fit back into education, and others who have built up a resilience to cope with it.

Feedback that is too vague, or too general, is also a common complaint from students (Weaver 2006). A study by Price et al. (2010) across business courses at three universities and found that feedback lacked 'specificity', possibly due to the brevity of comments, can also be a consequence of high staff workload (Wolsey 2008). Even when using electronic text as feedback, it is common practice to use banks of commonly made comments, which get pasted in to the feedback area to save time, depersonalising feedback in the process.

There is a tendency for staff to be brief when producing feedback, to reduce the time taken. The reduction from a full explanation to a concise one can reduce the meaning in the message, as explanations are curtailed down to the bare minimum, sometimes without enough elaboration to enable understanding (Moore and Filling 2012).

The length of time between student submission and feedback return can be several weeks. Timeliness, as an issue, is not just about a long wait on the student's part to receive their feedback. It affects its usefulness as a learning tool to feed into the next piece of work. Slow return could be to the detriment of subsequent submissions until the student has the opportunity to review, and learn from, their feedback. The QAA found that timely response was considered a weak point for over 40% of institutions teaching business as a subject, but only a minor issue on art courses, where face to face feedback is more common due to the visual nature of the work (Weaver 2006).

The traditional mode of feedback delivery in the arts has been face to face feedback. However, in modern times large numbers of students make this impractical. Cruikshank (1998) reconsidered delivery modes when feedback for 440 students had taken 5 weeks to complete, and so change had become essential. Face to face meetings have the overhead of organisation as well as the meetings themselves. In addition, once the student leaves the room the conversation is forgotten. Detailed notes may be possible but still not always as useful as a recording. There is additional stress caused for some students as they come face to face with the person making judgements (Henderson and Phillips 2015), especially where the standard of work is known to be poor.

Other types of submission particularly present difficulties when attempting to respond to students with text feedback. These often lack a linear flow, such as diagrams or computer programming code (Gould 2011); or that require problem solving steps explained, or demonstrated, as model answers e.g., numerical problems (Klappa 2015). It is difficult to write meaningful comments in the nooks of space around a diagram, or to link up comments about areas that are spatially separated across pages.

There have been many studies into audio as feedback with positive reactions from students. However, the novelty of the new format has been highlighted in comments from students (Durkacz and Mowat 2012), and it is possible that frequent use can cause students to stop listening (Ekinsmyth 2010). Criticisms of audio feedback vary according to the previous format used. For instance, where students are used to face to face feedback reviews, there are concerns about being unable to seek clarification (Cryer and Kaikumba 1987), whereas, for students comparing audio to text feedback this aspect is unchanged, and in fact, clarity is often vastly improved with audio and improves satisfaction. On the other hand, students used to handwritten text pointed out the physical separation of feedback from the script where they were used to their work previously being annotated directly (Ekinsmyth 2010). In one study it occurred to some students that they were receiving comments on the work in the order in which staff reviewed it, ie: there was no sense of the important things being first (Cryer and Kaikumba 1987), and therefore, it becomes up to the student to prioritise the learning.

The time taken to review audio feedback is extended when compared to text feedback as it takes longer for students to listen to feedback than to read it but in one study masters level students were academically mature enough to determine that the additional time was worth it. (Cryer and Kaikumba 1987). However, text does facilitate an overall perspective allowing students to scan for particular sections or points made, which is not available with audio (Cryer and Kaikumba 1987) It is often suggested that this disadvantage is more than compensated for by the quality of audio feedback (Evans and Palacios 2010).

A solution to this problem is for students to make notes, however, students have complained about the extra work required to make the audio useful (Cryer and Kaikumba 1987). However, the time spent reflecting on performance may be of benefit to the student. They have now transformed an already enhanced message (compared to text) into notes which they understand, and they have spent time engaging with the feedback.

When using audio, staff concerned with their 'performance' are often concerned about not being able to erase errors (Cryer and Kaikumba 1987) as editing is deemed too onerous, and often not available in the software used to record. Historically. when audio was recorded on physical media staff were concerned about not being able to keep a copy but that issue is resolved by the use of electronic media, especially when the media is stored in a VLE where both parties have access (Cryer and Kaikumba 1987).

Staff consistently report the high burden of work and lack of student engagement with feedback (Cranny 2016). Staff may not always feel the effort of creating feedback is worth it since students don't always review it (Gould 2011). This may explain why, when under workload pressures, some staff are willing to accept compromises that ease their load.

In general, both parties can see how the process could work to form a useful learning opportunity, yet the disparity between student satisfaction, and what staff are able to produce, continues. The question remains, how do staff a) produce feedback that students value and b) are prepared to engage with, within the constraints of available resources? For certain types of assessment, a sound pedagogical decision would be to explore other media, or media combinations, for creating feedback, other than text.

When students are used to a particular format of feedback e.g., written feedback, like many of us, they are reluctant to change. Before they experience feedback in a different media, when asked, they often express a preference for text as feedback over other media (Fawcett and Oldfield 2016). The problems and benefits with various types of feedback media, largely stem from either student perceptions, or the available functionality. Table 1.1 summarises the consensus of opinion from literature regarding attributes of various media when used to provide feedback.

1.3.6 Solving problems with technology

Universities around the world have made a substantial investment in technology to enhance learning and the consensus on engagement with feedback is that it could be improved by the appropriate use of technology (Cann 2014). With the investment comes the pressure to use the technology, and some staff suggest that the technology can feel like a wedge widening the communication gap between student and their teacher

	Attributes			Functionality available			
	Likely perceived tone	Non-verbal communications	Clarity depth and detail	Usually feasible with large numbers of students	Words comprehensible	Permanently available	Direct reference to work
Face to face	positive	✓	✓	X	✓	X	✓
Hand written text	negative	X	X	Must carry/store physical item	Depends on handwriting	Must carry/store physical item	✓
Digital text	negative	X	X	✓	✓	✓	Text maybe in separate document or annotations on work
Digital audio	positive	✓	✓	✓	Depends on clarity of speech	✓	X
Video	positive	✓	✓	✓	Depends on clarity of speech. Visual clues may aid comprehension	✓	✓

Table 1.1: Attributes of media formats for feedback

(Ekinsmyth 2010; Cann 2014). Often authors will point out that pedagogy, and not technology, should guide staff choices about where, and which, technology is used (Chew 2014). The technology will not make poor feedback better but may improve the chances of communicating a message more accurately and completely. Therefore, it is important that staff reflect on their motives before employing technology in education to ensure they see benefits for the students, and have the skills to implement it (Dagen et al. 2008). Being mindful of best practice when delivering feedback is crucial, by whatever method (Dagen et al. 2008).

With changes in practice at an institutional level, generational changes in the way the students perceive their world and their expectations of feedback, one response could be to radically change either, what is delivered as feedback, or how we deliver it (Mayhew 2016). Students were asking for feedback electronically in 2007 (Hepplestone et al. 2007) just as the move to VLE's was becoming commonplace in HE in the UK. Although the HE sector has embraced digital text as feedback, with the digital age comes a plethora of multimedia options, and therefore, questions are being asked about the impact of creating feedback as audio and video, rather than as a text-based artefact. Video may be able to deliver deeper, clearer and more useful messages without a negative impact on staff time (Mayhew 2016). It may be possible on a large scale without losing the personal touch. It has the potential to be more accessible to a greater variety of learning styles (Stannard 2008) developed by the next generation of students, who are using to electronic tools for learning. If that is the case, it could improve accessibility for a greater diversity of students now entering HE.

On the whole staff want to see students succeed, and will adapt as best they can if they believe change will help their students. Crook et al. (2012) found staff using a variety of methods for feedback provision, which had been adopted because of two main causes: student expectations or workload pressures. The expectations of students are likely to continue to inform pedagogy within the constraints placed on staff.

1.4 Background and Context

This section discusses the modern trends commonly found in HE institutions which impact on the provision of quality feedback delivered within acceptable timeframes. It examines increases in student numbers since the turn of the millennium, and the perceptions of modern students collected by surveys from around the world.

1.4.1 Student numbers in the new millennium

Much of the literature on feedback discusses how the workload of marking student work exceeds the time available to staff, with such phrases as 'increased staff work load due to increased student numbers' (Higgins et al. 2002; Lunt and Curran 2010; Haxton and McGarvey 2011; Crook et al. 2012; Jones et al. 2012; Evans 2013; Orsmond et al. 2013; McCarthy 2015; Mayhew 2016). In the UK this is no longer a new phenomenon. Numbers of students entering HE were significantly and continuously increasing from at least 2000 to 2012 (see Figure 1.1, or for more detail, see Appendix A.1 and Appendix A.2 for the original figures and graph respectively). However, since the introduction of students paying £9,000 fees in 2012 numbers have declined, although there is still a net gain between academic years 2000-2001 and 2016-2017 of 225,060 students on undergraduate courses (14.6%) and 369,745 on all courses (18.98%), but these figures had peaked at 2,503,010 students in total, an increase of 554,875 or 28.48% since the start of the millennium (HESA 2018).

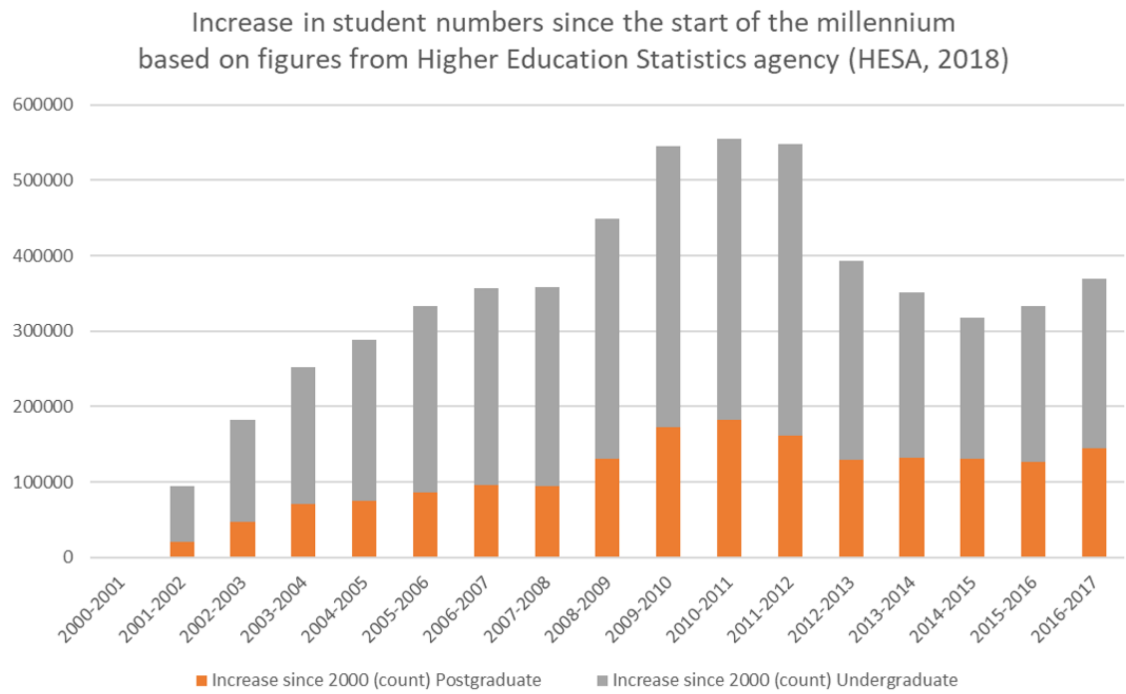

Figure 1.1: Increase in Student numbers entering Higher Education since the start of the millennium in the UK.

Whilst teaching allows for increases in economies of scale, such as extra chairs in rooms, this is not so easily achieved in assessment and feedback. Most assessment costs increase in proportion with student numbers and staff find themselves spending a lot of their time marking (Gibbs and Simpson 2005). Deadlines are further squeezed when academic units are scheduled into more intensive but shorter blocks, such as semesters.

The modern shift towards semesterisation, or modularisation, exacerbates the problems of timely feedback delivery to students. Short course durations can mean teaching and assessment has to occur within a 10 to 12 week block (Gibbs and Simpson 2005) Feedback may not be returned to students until after the end of the course (Heywood 2000; Lunt and Curran 2010), at which point opportunities to feed forward new learning may be severely limited (Boud and Falchikov 2007; Marriott and Lim Keong 2012), as students move on to new subjects (Bailey and Garner 2010). Therefore returning feedback as soon as possible after assignment submission is vital (Higgins et al. 2002). Otherwise, for many, but not all students, that is an opportunity to learn that is lost (Hounsell et al. 2008). Fitting in more than one assessment, or formative feedback on a draft prior to assessment, can seem impossible with high student numbers on short time frames.

1.4.2 Student perceptions of assessment and feedback

Large scale student surveys are a source of student perceptions regarding assessment and feedback. In the UK the National Student Survey is taken by final year undergraduate students as a collective judgment on their course experience. It is the current benchmark by which prospective students measure the quality of courses at HEI's and being high up in the table is a positive selling point. Therefore, improving results are the focus of much effort by staff. Similarly, in Australia there is the Course Experience Questionnaire (CEQ), and similarly, the National Student Survey of Engagement in the USA.

As might be expected, the NSS score regarding the 'teaching on my course' follows that of 'overall satisfaction' very closely (see Figure 1.2) , however, it is often pointed out that the score for 'assessment and feedback' sits well below both of these questions every year (Handley et al. 2007; Crook et al. 2012; Marriott and Lim Keong 2012; Carruthers et al. 2014a; Chew 2014; Mayhew 2016). Note that there was a change of format to the published data. From 2005 values were published for individual questions. From 2009 an additional summary value was published for the scales of questions. From 2014 onward, the values for individual questions were dropped and only the summary per scale values are available. In Figure 1.2 satisfaction overall and satisfaction with teaching are shown by broken lines, and questions and scales related to assessment and feedback are shown in solid lines.

The National Union of Students (NUS) said the fact that 'assessment and feedback stuck out like a sore thumb among the good results is a cause for concern' (Williams et al. 2008). The fact that HE institutions were looking in to it, and had been for some time (Crook et al. 2012), was evidence that the problem was not easily solved (Williams et al. 2008). What is less frequently mentioned, is that with the efforts of concerned staff, the gap is gradually closing. This can be seen when comparing the NSS scores for 'overall satisfaction' and 'teaching on my course' to 'assessment and feedback' (see Figure 1.2). Indeed, Figure 1.2 demonstrates a trend towards improved feedback as perceived by students, when compared to earlier years, showing improvement on every question within the assessment and feedback scale.

For comparison, in Australia, the Course Experience Questionnaire (CEQ) was designed with similar wording in some questions to the UK NSS for bench marking purposes, including the overall satisfaction question. The results show Australian students are more likely to rate the quality of their experience as lower than their counterparts in the UK and USA. Unlike the NSS which has a separate scale for assessment and feedback, the CEQ includes two questions in the 'Quality of Teaching' scale, indicating the inextricable relationship between quality of teaching and assessment and feedback. The results for the 'Quality of Teaching' has remained in a 4% range (79-82%) in the first 5 years since the survey began, and the during the same time period 'Overall Satisfaction' has varied by only 1% (79-80%), both elements indicating no significant change (QILT 2016).

The National Student Survey of Engagement in the USA similarly places the two questions about feedback under the theme 'Effective Teaching Practices', which contains only 5 questions in total. The focus of this survey is to ask students to reflect on their own engagement, as opposed to asking for their opinion on quality, making results on assessment and feedback incomparable. (NSSE 2017).

Given that the average undergraduate student has now grown up with connected technology in all aspects of their life, the sizeable gap in perspective between many staff and the majority of students must be acknowledged. Known commonly as 'Digital Natives' (Prensky 2001), 'Generation z' or the 'iGeneration', the 'post-millennial' preferences for learning can often be accommodated by technology in education, as it is

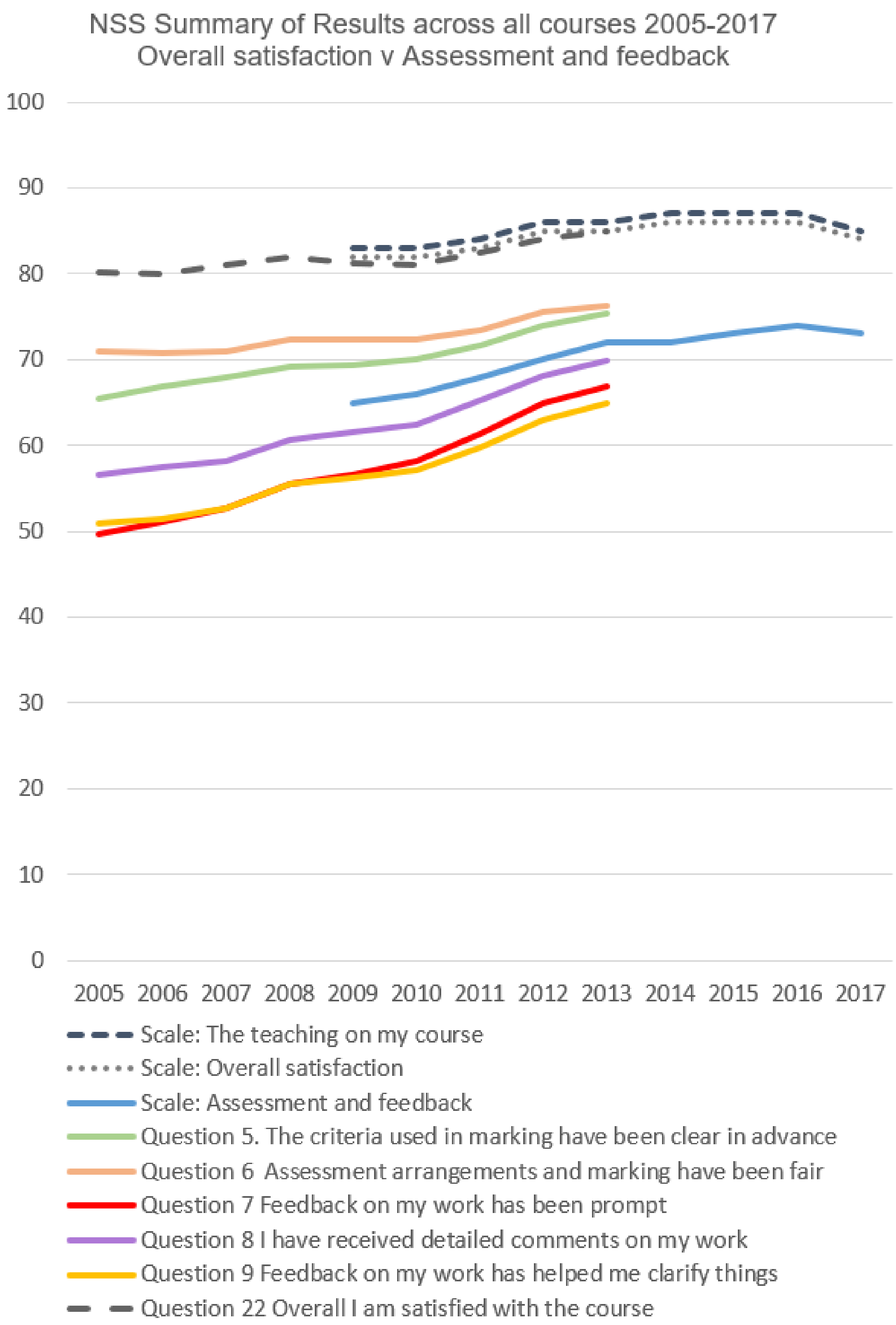

Figure 1.2: NSS results, shown by scales and questions, for the whole of the UK - overall course satisfaction compared to assessment and feedback (Higher Education Funding Council for England 2017)

a comfortable and familiar means of communication in their commonly technology enriched lives (Jones et al. 2012). Therefore the use of technology for interaction with students on all levels, should be under consideration by academics (Carruthers et al. 2014b), and should be under constant review to keep up to date. With VLE's now common place in HE the student expectation for all communication to be digital is high.

Previously technology in a work environment has been all about efficiency and achieving objectives. Now the majority of students are also comfortable with projecting a sense of themselves through social media, creating a social presence in a virtual place, and communicating with other virtual profiles (White and Cornu 2011). Prensky (2001) describes "Digital Natives" as those who have grown up in the digital age, while the older generation attempt to adapt to a digital world with varying degrees of success as "Digital Immigrants". The main issue in education is the differing perceptions between these two groups.

> *"Our Digital Immigrant instructors, who speak an outdated language (that of the pre-digital age), are struggling to teach a population that speaks an entirely new language."* (Prensky, 2001)

Having updated Prensky's 2001 "Digital Native" methodology, White and Cornu (2011) describe the level to which people are comfortable with technology embedded into their life as somewhere on a continuum between 'residents' and 'visitors'. While most students now sit in, or very close to, the 'residents' end, the staff that teach them may be anything in the range all the way to a 'visitor' furthest from the students. A 'visitor', far from someone who is computer illiterate, is described as someone who happily uses computers as tools to do a job but does not accept that there is requirement for a social media profile. The problem is, students expect their seniors to be just as comfortable and effective in a virtual world as they are.

1.5 Key contributions to knowledge

The use of multimedia as feedback is a growing area of application for new technology. The fact that for this research, colleagues have been persuaded and had the foresight to switch from the media of text as feedback, with which they were wholly comfortable and familiar, and to take on the challenge of using video as feedback, has facilitated the completion of this research. In this context, a taxonomy of video feedback has been developed to enable others to make decisions about how best to implement a system for the production and distribution of video as feedback.

- **C1) Literature review**
  There are many regarding the use of videos in teaching. There are many regarding the use of video feedback when used for skills or performance self-review. A literature review regarding the use of video feedback on academic submissions (see Chapter 3) is rare at this time.

- **C2) Improved feedback locally**
  Not least of the contributions is that the teaching team, through their open minded and willing acceptance of the work required to change, have provided an improved quality of feedback for students for a number of years now (see Chapters 5, 6 and 7), and understand how to produce effective video feedback.

- **C3) Evidence of the feasibility of Video Feedback** The feasibility of video feedback in normal practice as a response to assessment to normally large cohorts of students, is evidenced by the case studies in Chapters 5, 6 and 7.

- **C4) Provision of evidence of how the system used, and the style of the production, impacts the stakeholder perceptions**
  The evidence comes from reviewing the literature (see chapter 3), and the studies in chapters 5, 6 and 7. Each provides evidence of the impact of the context on the stakeholder perceptions, and the learning from each study is fed forward to the next.

- **C5) Taxonomy of Video Feedback** The most significant contribution is through the development of a taxonomy for video feedback. A taxonomy development method was adapted from literature (see Section 2.5.4 in Chapter 2). The taxonomy was developed simultaneously during the thematic analysis phase of the literature review (see Chapter 3), by an iterative process of refinement (see Chapter 4). It was then validated through a series of applications in practice, each informing the next version (see Chapters 5, 6 and 7) and finally during reviews by practitioners (see Chapter 8).

1.6 Thesis Structure

This thesis is organised into a set of chapters as described below.

- **Chapter 1: Introduction**
  This chapter has described the problem which motivated this research, and the resulting aims and objectives. To ensure shared meaning of the domain, it also

defines and discusses the key concepts related to assessment and feedback. The background and context in which the following studies took place is also discussed. Finally, the key contributions to knowledge have explicitly been identified.

- **Chapter 2: Methodology**
  The decisions for the selection of the methods of the studies comprising this work are explained.

- **Chapter 3: Literature Review**
  Publications regarding the use of video feedback in practice were reviewed, thematically analysed and the results synthesised.

- **Chapter 4: Taxonomy Development**
  A taxonomy of video feedback is developed which is later validated by application in the studies of video feedback in practice and expert panel (see 8).

- **Chapter 5: Pilot Study: Audio Feedback on Trial**
  A pilot study was run to determine if the benefits being reported by providers of video feedback could be achieved using audio feedback, and therefore, determine if it is possible to achieve the same positive results using fewer resources. Finally, a trial iteration of validation of the Taxonomy of Video Feedback is completed in this study applying only the facets relevant to audio feedback.

- **Chapter 6: Video Feedback on Trial**
  This study investigates the development of a system for the production of video feedback according to the considerations identified in the taxonomy. It then puts video feedback into practice for a sample of computing students. Finally, the first full iteration of validation of the Taxonomy of Video Feedback is completed in this study.

- **Chapter 7: Video Feedback in Practice**
  This study examines the perceptions of several cohorts of students in receipt of video feedback for all assessment submissions for an undergraduate unit. Finally, the second iteration of validation of the Taxonomy of Video Feedback is completed in this study.

- **Chapter 8: Taxonomy Validation**
  This chapter describes the validation of the Taxonomy of Video Feedback by utilisation in practice and by expert panel.

- **Chapter 9: Final Discussion and Future Work**
  This final chapter explores the extent to which the contributions to knowledge address the original research questions, critically evaluates this work, and makes recommendations for future work.
- **Appendices**
  Material supporting other chapters.

1.7 Summary

This introductory chapter describes the motivation and objectives for this research. To ensure shared meaning key concepts related to assessment and feedback have been explained as relevant to the domain. It has laid out the background and context in which the following studies took place, and how the key contributions to knowledge were achieved. Finally, there is a description of the structure of this thesis. The next step is to select the methods to be used to achieve the research aims and objectives.

Chapter 2

Methodology

2.1 Introduction

The aim of this chapter is to explain the research plan. It begins by describing the context of the work, followed by the approach to research in terms of the perspective of the researcher, and how that is identified as a paradigm. Next is an exploration of potential methodologies in terms of their features, strengths, weaknesses, and which are the most appropriate fit to achieve the research objectives. Each study is then explained in terms of the potential methods, the rationale behind the method selection process and the selected method.

2.2 Research Context

It is intended that this research takes place in practice to ensure both its relevance and validity for the intended audience. With that context comes constraints and requirements necessary to prevent any detrimental impact to the students learning experience.

2.2.1 Audience

The audience for this work are the academics who have not yet tried to use video feedback but would like to do so, and would like the benefit of experience to guide their decisions before they attempt to go live in practice. Locally this includes colleagues who are taking on this practice for the purposes of the study. They may be open to modifying their instinctive practice based on evidence provided here. Globally it could be any teaching academic and/or assisting technologist, setting up a system to create and distribute video feedback for the first time, and seeking advice to ensure an easy transition. There are also the researchers publishing papers on the use of video feedback, many of whom may be inclined to omit apparently insignificant figures or points which, if they can be encouraged to include them, may contribute to the global picture.

The most important audience of all according to Zuber-Skerritt (1996) is ourselves. Any researcher must be open to the findings and willing to explore ideas and interpretations that do not fit with their own ideas and intuition.

2.2.2 Requirements

The first requirement is that the proposed solution includes implementing a workable system for the creation and distribution of video feedback. This must be technology based, as is current practice for feedback creation and distribution. Analogue alternatives have historically proven less efficient, and such a retrograde step would be unwelcome. Having established feasibility, the system needs be tested under load for the production of video feedback for large numbers of students (see Research Question 1 in section 1.2). Feedback must still delivered in a timely manner to a normally large cohort with the resources available. If adjustments are required to cope with the requirements of practice these must then be recorded, and the extent of their impact evaluated.

Tools need to be generated to guide staff in their endeavour to improve the feedback they create (see Research Question 4 in section 1.2) and these tools need to be validated in practice to prevent differences in simulated conditions influencing advice given, and to hold credibility with academic staff. (There may be some merit in conducting small discrete studies out of context, perhaps to enable the isolation of individual variables, but to ensure the guidance offered to staff is practical the study should largely be completed in a real-world situation.)

The study methodology requirements are: -

- Those concerning the impact on research context
  - The research must be completed in practice
  - The research must not be detrimental to the student experience
  - The research must not increase the burden of staff marking student work
  - The intervention must be compatible with current institutional policies on assessment feedback

  - Any intervention must be technology based and compatible with current IT systems eg the virtual learning environment.

- Therefore, the methodology must have the following qualities:

  - It must be appropriate for study of a contemporary phenomenon
  - It must accept that data may be gathered from literature and/or any available relevant source in practice
  - The knowledge may be need to be constructed from several data sources of different types
  - It must allow the contribution to emerge from the knowledge in the form of artefacts such as models and documentation.
  - It must allow for validation of artefacts in practice
  - It must permit numerous iterations to allow for validation producing amendments and/or new knowledge, which may be applied and evaluated in subsequent iterations

2.2.3 Constraints

Conducting the research in practice constrains the resources available. The constraints are those imposed by the context.

Current student experience The most important constraint of this research is that nothing must be implemented that causes disruption to the student experience, or that results in feedback that is of less value to the students than is currently being received. Should anything be found to cause such an effect it must be removed from practice at the earliest opportunity.

Staff Workload Timely return of feedback to students is essential to maximising its learning potential. Creating feedback for normally large cohorts is a significant burden and may take several days for several staff, especially when completed in tandem with other normal duties, such as teaching, research and management. This research must not add to the burden of the marking team.

Data Sources The sources available in normal practice conditions are the opinions of the students and staff involved, and whatever information is already recorded by the information systems used.

Literature A number of studies examine the use of video feedback. Although conducted in practice they normally consider only small numbers of students over a short time span and are usually published following a first attempt. Their findings can be compared to the findings in this study, particularly for validation purposes, however, the context must be considered carefully in each case.

Stakeholder opinion It is important that, as well as gaining answers to targeted questions, this research offers students space to express their ideas on how they perceive, and use, video feedback. The newness of the use of video in this way means that an instrument which only offers selection from a fixed set of responses may prevent emergence of new and useful ideas, which in turn may improve the usefulness of the feedback to students. Students may have determined how to use the video feedback in new and exciting ways that staff have not even considered yet. They may even perceive their ideas as natural, instinctive and insignificant and yet, knowledge of those ideas may facilitate the improvement of the quality of the feedback. Therefore, it is important that the instrument used for data gathering stakeholder opinions allows for a free expression and emergence of ideas.

Video production and distribution system logs It is possible that the system used for video production, distribution, or both, may have system logs which record the level of user engagement. (It is already known that the current VLE does not record student activity in the feedback area.) For example, the number of times a student views a video. These systems may provide useful data available for quantitative analysis.

2.2.4 Role of the researcher

To complete the research in practice, the researcher is best positioned as part of the marking team creating feedback for students. This is the best position to gain understanding of both the system used, and the feelings and views of the feedback creators. The rapport with students built as a member of the teaching team may increase the chances of revelations about its use, or may just as easily hinder criticism. Therefore, the position of the researcher must be reflected on with consideration of its impact on objectivity.

2.2.5 Ethical considerations

Clearly ethical considerations also place constraints on the work done here but they also maintain its credibility and relevance to practice. The intent of this research is to improve the student experience when in receipt of feedback on assessed work. It must in no way be detrimental to that experience, nor have any influence over marks awarded.

All modes of data gathering and all related documentation, must receive ethical approval from Bournemouth University Ethics Committee. All participation must be voluntary. Due to the role of the researcher as a participant in the marking process, the relationship between the researcher and the participants, must be considered throughout. Any potential negative impact, on students or staff, must be mitigated against and openly discussed as part of the findings of this research. Records of data must be carefully stored with restricted access, and deleted on completion of the research, according to institution guidelines.

2.3 Identifying an appropriate research methodology

Research is a systematic investigation to find answers to a problem (Burns 2000), therefore, there must be a system, or methodology. A research methodology, also commonly described as a research approach, is the overall strategic plan which lays out how specific methods will be employed to answer the research questions of a specific study. They cover everything from the broad philosophical assumptions held by the researcher, down to the selected method detailing each step of the procedure. Planning should cover all aspects of data gathering, analysis and interpretation (Creswell 2014).

Decisions regarding a research approach are influenced by the researchers own view of the world. Since every researcher has their own perspective there is no truly objective means of evaluating approaches, since examination of a particular paradigm can only be made when positioned within one (Pring 2000, p.251-252). Therefore, the researcher perspective must be documented to facilitate informed decisions.

There are normally several methodologies that have potential in any study, and even more potential methods. By focusing on a methodology, which supports the selected paradigm, the list of methods should be limited to a group that will focus progress towards answering the research questions. Potential research methodologies are examined here and the discussion regarding the selection of methodologies and methods for this work follows. This chapter follows a step by step approach to research planning adapted from Mackenzie and Knipe (2006) (see Figure 2.1).

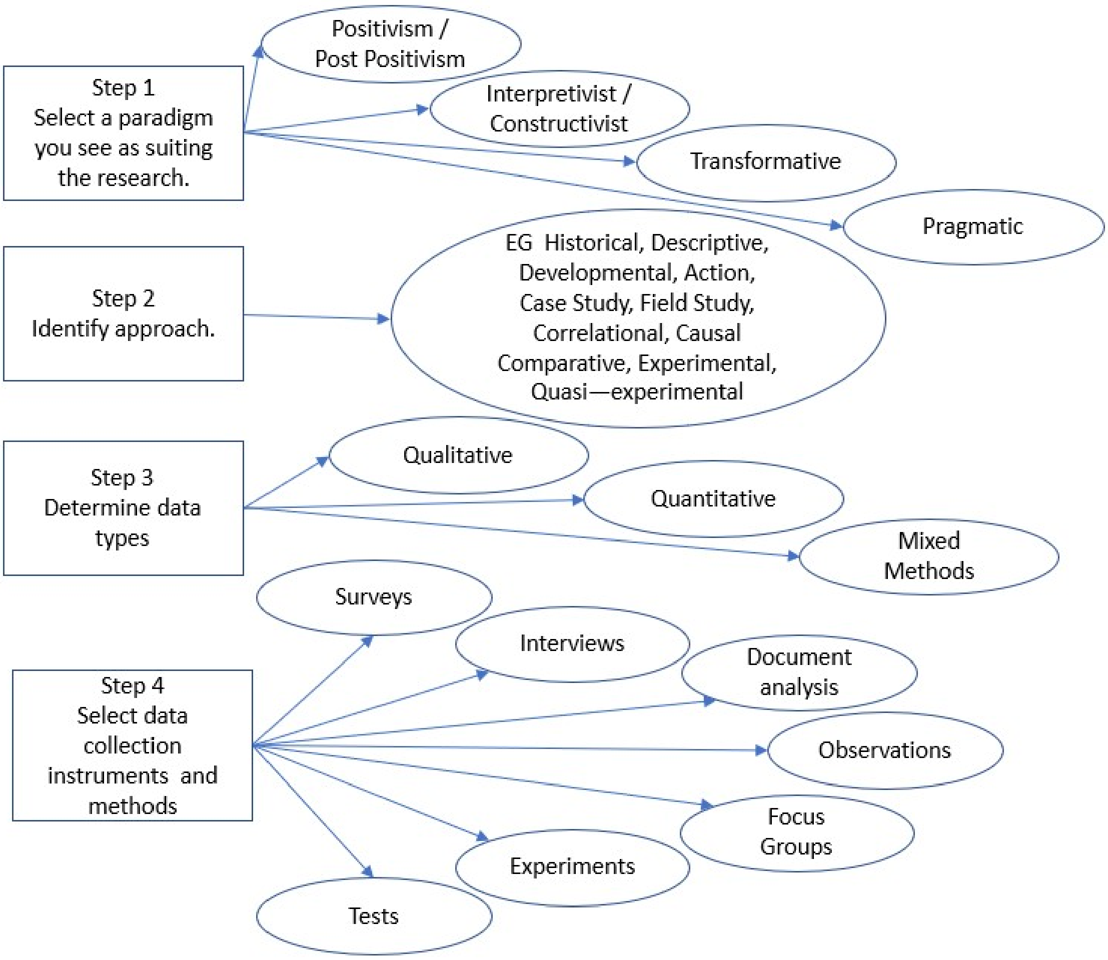

Figure 2.1: Steps taken for research method selection adapted from Mackenzie and Knipe (2006).

The first step should be the consideration of the paradigm (Mackenzie and Knipe 2006; Creswell 2014), which is a *"collection of related assumptions or concepts that orient thinking or research"* (Bogdan and Biklen 1998). The choice of paradigm informs the intent, motivation and expectations for the research (Mackenzie and Knipe 2006). Next, the researcher identifies their methodology, which determines the thought process and design of the research. The third step is to identify the potential sources of data and the type of data available from those sources. This information then informs the fourth step, when identifying the instruments appropriate for gathering the type of data required and methods for its analysis.

2.3.1 Step 1 – Selection of a paradigm

Research is based on a set of philosophical assumptions about what constitutes valid research, and which method is appropriate for which study (Antwi and Hamza 2015). Since the influence of the philosophical view of the researcher is widely accepted it is also often suggested that it should be explicitly declared (Creswell 2014; Pring 2000). Creswell (2018) defines five world views, paradigms, or categories of beliefs, which are used as guidance (Guba 1990). They are post-positivism, interpretivism, constructivism, transformative and pragmatism. They are discussed here, followed by a rationale for selecting a paradigm and the selected paradigm for this work is identified.

Post Positivism The post positivist world view is the closest to the traditional scientific perspective. However, far from being black and white (like its predecessor - positivism), it recognises that we cannot claim absolute knowledge when studying human beings and their behaviour. It represents a deterministic philosophy where causes are identified and their influence on the outcomes is evaluated (Creswell 2014), As in a scientific experiment, the phenomena may be removed from context in the interest of variable isolation. Because reality is considered independent of us from this perspective, it is assumed the act of investigation has no influence on the outcome (Collis and Hussey 2013). Measurable results which support or refute a theory, and objectivity, are essential. Post positivism is closely aligned with quantitative data collection and analysis methods (Mackenzie and Knipe 2006).

Interpretivism Interpretivism was developed as a paradigm to address the short comings of positivism. From this perspective reality is constructed from the human perception and is highly subjective. Therefore, there is held a broad belief that findings come from qualitative data and where the researcher's interpretation may influence conclusions. The objective is to generate theories (Collis and Hussey 2013).

Constructivism Constructivism is usually the chosen perspective of a qualitative researcher. Theories are developed during the research process, rather than stated before it starts. They often examine social situations and develop subjective meanings from experiences. The meaning of concepts can be different depending on individual perspective as reality is considered a social construct (Mertens 2014, p.17). They may generate many specific meanings rather than narrow it down to a few ideas. i.e. they are not looking for a generalisation. Questions are broad to allow room for the participant to generate their own meaning, which may be negotiated through interactions with others (social constructivism), and researchers acknowledge their own influence on the research (Creswell 2014).

Transformative Transformative research is looking towards change in society, particularly advocating the views of minority groups, where issues such as injustice, inequality or oppression reside. Therefore, there is an inbuilt bias on the part of the researcher towards the group in question as they are often participants of the group themselves. Other participants from the group may also be involved in the design of questions, and gather and analyse data (Creswell 2014).

Pragmatism Creswell (2018) and Mackenzie and Knipe (2006) agree that pragmatists focus on the problem and potential solutions, rather than the method, which is why it often results in a mixed methods approach. Rather than adhering to the guidance of a particular philosophy or methodology, the actions are determined by what needs to be done to solve the problem in real world situations (Mackenzie and Knipe 2006; Creswell 2014). Whilst suggesting that few researchers rigidly follow a single paradigm, Collis and Hussey (2013) warn against declaring oneself a pragmatist and then selecting a mix of methods from a single paradigm, which could lead to loss of rigour.

Rationale for the Paradigm Selection

If it were possible to fulfil the research aims by means of a scientific style experiment positivism, or post positivism, would play a strong role. It gives the impression it can deliver objective, clear cut answers from straightforward studies often by excluding context. However, in this case it would be inappropriate to consider removing the study from context even though the act of investigation may have an influence on the outcome. Although interpretivism has tried to address issues with a positivist approach by allowing for high levels of subjectivity, an understanding of the impact of the context and researchers position could still be used to temper subjectivity in this case.

Certainly, constructivism will play a part in this research since its aim is to generate meaning and allow room for the generation of ideas. This research is also looking for generalisations that can be applied in the majority of cases where video feedback is used, rather than the specialisms of individual cases sought by constructivism.

This research is not considered transformative as no effort is being made to transform society here, only to see if a part of educational practice can be improved by technological progress. Although the needs of minority groups are deliberately being considered, it is intended that student participation is as respondents rather than in any way as researchers, not least since additional roles may impact their studies.

Of the paradigms suggested by Creswell (2018), this work is taking a pragmatic view and plans to complete actions, led by the aims of the research, in a real-world context by whatever means are deemed feasible, ethical and necessary.

Selected Paradigm

This work takes a pragmatic perspective and focus on the problems rather than the method (Creswell 2018).

2.3.2 Step 2 – Identify methodology (approach)

There is often more than one approach which could work for any given piece of research. Wolcott (2001) models them as 19 branches of a tree, but despite the high numbers included, he still omits case study as an approach preferring to regard it as a form of reporting. Creswell's (2014, p.42 2018, p.67) five strategies of inquiry (methodologies) are highly regarded and simpler to follow. They are narrative, phenomenological, grounded theory, ethnographical and case study.

The five methodologies, as described by Creswell (2018), are the basis for the pragmatic selection process which follows. The selection of the methodology would be pragmatically determined by the aims of this research.

Narrative The aim of a narrative strategy is to produce the story of, normally one or two individuals, in a biographical sense, using strategies such as plots, activities, and settings.

Ethnography Ethnography studies a cultural group from the perspective of participants, and is typically holistic, including not only study of behaviour but also the impact of habitat and geographic context on the group.

Phenomenological Inquiry This research tends to be about significant life experiences of a number of individuals who have gone through similar circumstances. The aim is to capture the shared essence of the experience (Creswell 2018, p.75).

Grounded Theory Grounded Theory contains aspects of potential use to this research, such as several stages of data collection and refinement, and it examines the relationships between categories of data.

Case Study A case study is a study of a contemporary phenomena in a real world setting in depth (Creswell 2018; Yin 2008). Creswell (2018) stresses the importance of considering the intent of conducting a case study. It may be to explore a specific case in detail, also known as an 'intrinsic' case (Stake 1995), or to understand a specific issue or problem. According to Cohen et al. (2013), Creswell's (2014) and Yin's (2008) ideas of a case study are conflicting. Creswell (2014) sees a case study as a 'tightly bounded' unit, where Yin (2008) sees the overlap between phenomena and context, but both could be true. Even a unit where the participants are easily identifiable, such as a class or group, live in the context of the real world, and the participants have lives beyond the unit of study. The cases are then specifically chosen for their relevance to understanding the problem. Stake (1995) identifies this as an 'instrumental' case. The depth of analysis is achieved by realising the potential in multiple data sources (Yin 2008).

Rationale for selecting a methodology

This research is not about the biographies of students or staff and is therefore not best served by a narrative methodology. An ethnographical perspective is also inappropriate, since the students whose opinion will be sort regarding video feedback, will normally come from a wide variety of cultural backgrounds, and the 'student culture' is not the focus of the research. In a similar way, a phenomenological inquiry is for investigating something of significant impact in a persons life, and would be too broad, as the only life experience being examined here is that of being in receipt of video feedback. This is something which our participants are likely to regard as a novel, but ’normal’, part of their learning whilst at university. Grounded theory holds some merit for this research since there is the facility to refine theories over iterations and in context. However, it seems predisposed to the analysis of an existing procedure.

The requirements of this research

This study is dealing with the new phenomenon of video feedback, and may need to resort to a variety of data sources as some aspects are people related and others are technology related. The plan is to conduct it in a real world context (Stake 1995; Cohen et al. 2013; Yin 2017) where the boundaries between the phenomena and the context may not be clear (Yin 2017) which highlights the potential for a case study. According to Yin (2017), a case study can deal with the technical distinctiveness where there are many variables of interest, which is described by Stake (1995) as complexity. It may be necessary to triangulate data from multiple sources available. Therefore, there may be a sizeable volume of data collected from each ‘case’.

Gomm et al. (2000) also suggests that where a case study is under consideration an experiment might also work. In this research, although there are multiple variables as in an experiment, it is important that the context remains as it is in practice, and therefore phenomena is not to be separated from context, which is a normal characteristic of an experiment.

This work is looking at a series of video feedback interventions in practice. It is an empirical inquiry that investigates contemporary phenomena in depth (Yin 2017). A case study can be layered to allow multiple levels and methods within the same study. It is a well-used approach with clear instruction on conduct and reporting, making it a robust and replicable option.

Selected methodology

Case study (Yin 2017)

2.3.3 Step 3 – Determine data sources

The pragmatic paradigm and the exploratory nature of a case study means the data may come from everywhere useful data can be found. Although the aim is to find generalisations that can be applied to future practice, which may be possible statistically, the nature of a case study means that it can 'penetrate situations in ways that are not always susceptible to numerical analysis' (Cohen et al. 2013). Therefore, a mixture of data sources are to be analysed.

- **Literature** - The first step in this research is a thorough literature review of studies of the use of video feedback conducted in practice. This is to inform not only how best to set up a system to implement video feedback, but also how best to provide guidance to others.
- **System information** - Data may be available from system logs to enable examination of how students engage with their feedback.
- **Students and Staff** - Gathering data regarding perceptions and rationales behind perceptions would enable both triangulation of data and a richness of data (Cohen et al. 2013). An in depth analysis of stakeholder perceptions and opinions may provide rationale for good practice, which can make a valuable contribution when synthesised into guidelines for practitioners. Therefore, this type of qualitative data is expected to be the most significant type collected.

Therefore, quantitative and qualitative data is expected to be collected with qualitative data being the most significant in terms of both quantity and impact. This strategy aligns with the pragmatic perspective and is consistent with the eclectic collection of methods which will be applied to contribute to the depth of the case study.

The literature on video feedback studies in practice is to inform an initial implementation that is likely to be feasible in practice. The perceptions of staff and students regarding its use are to inform implementations of future iterations of the studies.

Selected data sources

- Literature on video feedback studies in practice.
- Perceptions of staff and students.
- Data from systems used to produce and distribute video feedback.

2.3.4 Step 4a – Select methods

At first glance there are two methods which are likely to significantly contribute this research. Action Research allows for the researcher to be positioned within the context of the study of an intervention, whilst Design Science encourages cycles of exploration and validation as a process towards emergent artefacts. All these aspects are applicable to this work. To explore the likely contribution of each method towards this research both were thoroughly explored.

Action Research

A common approach for research into education is action research. There are many variations on action research which are diverse (Hult and Lennung 1980; Tripp 2003, p.2). Kemmis and McTaggart (2005, p.273) identified many different 'families' of action research including one which emphasises the practical element, and is the most appropriate to this study: 'classroom action'.

When to use Action Research Corey Corey (1952) believes that action research is conducted where a hypothesis says that the research approach results in better decisions and actions than if decisions are based on intuitive and subjective opinion. Action research problems never emanate from theory alone but emerge from a desire to solve a practical problem (Hult and Lennung 1980). It requires a rational and systematic examination of a phenomenon with a view to problem solving, competence enhancement and theory expansion (Hult and Lennung 1980; Zuber-Skerritt 1996)

Action research can be viewed as an iterative structure of 'self-reflective cycles' including several stages such as planning, action and observation, and reflection (Lewin 1946, Tripp 2003, p.14, Kemmis and McTaggart 2005, p.278). The research is completed within the system under scrutiny creating an immediate impact, without the need to wait for findings to be published prior to action (Hult and Lennung 1980). Of course, making the findings public is what makes researchers accountable (Zuber-Skerritt 1996) and is therefore, still an essential part of action research.

Criticisms of Action Research It is the variety of Action Research which also causes the most problems for researchers. It is frequently misunderstood (Tripp 2003, pp.1-2) and regarded as confusing (Hult and Lennung 1980;Tripp 2003, p.2). Kemmis and McTaggart (2005, p.273) warn of the philosophical and practical perils of proposals based in abstraction and idealism, rather than in practice.

Most researchers agree that the phenomenon is studied within the context that gives it meaning (Hult and Lennung 1980, p.5). However, controversially some state that participation and collaboration is not essential to action research (Hult and Lennung 1980, p.7, Tripp 2003, p.6) and the degree of the presence of these elements should be determined by method and strategy (Hult and Lennung 1980, p.7), where other advocates insist that its participatory nature is a key feature of action research (Zuber-Skerritt 1996).

Kemmis and McTaggart (2005, p.273), define ‘classroom action’, specifically as the collection of data by teachers, but explicitly limits this to qualitative modes of inquiry with a view to teachers making judgements regarding their own practice. Hult and Lennung (1980, p.2) say action research simultaneously assists practical problem solving and expands scientific knowledge, however they immediately point out that this is not a universally upheld idea.

Hult and Lennung (1980) suggest the method of gathering and analysing data must be pragmatically chosen to suit the problem by any valid and reliable method. Therefore, they suggest action research is not a method in its own right, but a way of employing methods. Tripp (2003, p.3) holds the opposing view, identifying action research explicitly as a method, and says it is ’a mistake’ to define it as a ‘category of processes’ and even suggests that the confusion could threaten research funding by undermining the stakeholder’s confidence in researchers.

Relevance to this study This research is to be conducted by a researcher within the context of a teaching role, but intends to go beyond the micro reflection by teachers implied here. The goal is to expand the relevance of findings to the global community of interested teaching practitioners.

Design Science

Design science is concerned with devising artefacts which serve a human purpose (Formosa in Dresch et al. 2014, p.v). It concerns itself with innovative development defining ideas, practices, technical capabilities, and products through which IT systems can be developed, managed and used (Hevner et al. 2004). Cole et al. (2005) outlines the pragmatic nature of design science and the inextricable link between truth and utility

(Dresch et al. 2014, p.70). Hevner et al. (2004, p.80 and 89) differentiates between the objectives of design science and behavioural science research by saying that behavioural science research seeks the truth, whilst design science research seeks what is effective.

Criteria for the use of Design Science Research From an inductive perspective, design science builds on a foundation of experience to produce knowledge (Dresch et al. 2014, p.18). Dresch et al. (2014) interpreted the guidelines for design science by Hevner et al. (2004) as a criteria for its use, and a similar exercise has been carried out here to determine its suitability. Each of the guidelines by Hevner et al. (2004) are described here, and the relevance of each one to this study is explained.

Guideline 1: Design as an artefact

- **Guideline**
  Design-science research must produce a viable artefact in the form of a construct, a model, a method, or an instantiation
- **Relevance to this study**
  The aim of this study is to produce artefacts of guidance for teaching practitioners in the production and distribution of video feedback. A taxonomy has the potential to form the foundation of many such artefacts of guidance.

Guideline 2: Problem relevance

- **Guideline**
  The objective of design-science research is to develop technology-based solutions to important and relevant business problems.
- **Relevance to this study**
  Modern cohort sizes and expectations of modern students mean technology offers the best chance of making video feedback feasible to produce and valuable to students.

Guideline 3: Design evaluation

- **Guideline**
  The utility, quality, and efficacy of a design artefact must be rigorously demonstrated via well-executed evaluation methods.

- **Relevance to this study**

  This study will test the validity and usefulness of all artefacts produced in practice.

Guideline 4: Research contributions

- **Guideline**

  Effective design-science research must provide clear and verifiable contributions in the areas of the design artefact, design foundations, and/or design methodologies.

- **Relevance to this study**

  This research aims to produce clear and verifiable contributions in the form of design artefacts.

Guideline 5: Research rigour

- **Guideline**

  Design-science research relies upon the application of rigorous methods in both the construction and evaluation of the design artefact.

- **Relevance to this study**

  Methods selected must befrom those which are already well established, well documented and well used. However, the unique context may require a combination of methods designed to fit the circumstances of the work. Methods will be carefully applied during both the construction and evaluation phases.

Guideline 6: Design as a search process

- **Guideline**

  The search for an effective artefact requires utilising available means to reach desired ends while satisfying laws in the problem environment.

- **Relevance to this study**

  The selected pragmatic paradigm allows the researcher to use any available resources, whilst the case study approach encourages the use of multiple sources of data, to create artefacts of theoretical and practical contribution.

Guideline7: Communication of research

- **Guideline**

  Design-science research must be presented effectively both to technology-oriented as well as management-oriented audiences.

- **Relevance to this study**
  The language and style of presentation must be tested by trial presentation to an audience who are expert in practice.

In their framework for conducting design science Hevner et al. (2004, p.78) acknowledge how emerging technologies play a significant role in determining the strategies of an organisation and their capability to engage with new ways to do business, or in our case, education. The underlying design theories are articulated by Walls et al. (1992) as both product and process, noun and verb. These inextricably linked aspects must both be considered in the development of the artefact. The researcher shifts perspective many times between the product and the process evolving both aspects towards a product (Hevner et al. 2004, p.3). Many iterations of build and evaluation cycles may occur before a finished artefact is created.

Identification of the problem Many of the proposed methods of design science research suggest the first step is to identify the problem, (like Cole et al. (2005) and Peffers et al. (2007)), while others begin at the point of understanding the problem, (like Eekels and Roozenburg (1991) and van Aken and Romme (2009)). Vaishnavi and Kuechler ((2009) in Dresch et al. 2014) merge the two steps into one step known as 'awareness of the problem'.

Contributions The contributions themselves could be the artefact itself; other models, constructs, or ontologies developed during the process; innovative systems; or developments in the method or methodology used (Hevner et al. 2004).

Development of artefacts According to Hevner et al. (2004, p.77) the products of design science may be :-

- Constructs of meaning consisting of words and symbols which determine the language used to share understanding and ideas.
- Models of abstraction or representations of the real world.
- Methods explaining algorithms or practices provide guidance towards the solution.
- Implementations of complete or prototype systems which validate the work as concrete evidence of feasibility.

Evaluation of artefacts Measures of design science contributions found in product or production fall into one of three categories: novelty, generality and significance. The designer may also bring an element of style, which while difficult to quantify and measure, should also be assessed during the evaluation phase (Hevner et al. 2004, p.86). Of the evaluation methodologies and corresponding methods for design science suggested by (Hevner et al. 2004, p.86) three are applicable to this work.

- **Methodology: Descriptive**
  An 'informed argument' can be developed using information from the knowledge base (e.g., relevant research) to build a compelling case for the artefact's utility.
  Relevance to this research: In this case the informed argument is to be provided by the relevant research reviewed.

- **Methodology: Analytical**
  A 'static analysis' method can be used to examine structure of artefact for static qualities e.g., complexity. Alternatively an 'architecture analysis' method can be used to study the fit of artefact into the technical architecture.
  Relevance to this research: This can be employed as a strategy to test implementation of any artefacts developed. This type of analysis can be conducted with each iteration of development.

- **Methodology: Observational**
  Employing a 'case study' method to study the artefact in depth in a business environment.
  Relevance to this research: This would be useful to ensure the effectiveness of artefacts in a real-world context.

Criticisms of Design Science There are currently insufficient constructs models and other tools available for modelling the real world and rigorously adhered to methods can result in high abstraction levels, which reduces relevance. This inadequate knowledge base results in the researcher becoming reliant on intuition and experience. At that point the researcher is experimenting, and iterations of prototyping and evaluation are of high importance. Rigorous evaluation methods are notoriously difficult to apply in design science research. Finally, as in any field of technology, the results may have been superseded before reaching a state of useful implementation (Hevner et al. 2004, p.99).

The case for a combination of methods

Cole et al. (2005) suggest a method which combines design science research with action research. The ‘in context’ position of the researcher in this study (see section 2.2.4) fits with this pragmatic suggestion. Cole et al. (2005, p.332) examines similarities between design research and action research. For instance, regarding ontology, both approaches depend on the phenomenon being studied evolving during study. The epistemology assumes that knowing involves intervention which is required to effect change. In action research the intervention occurs in practice, and design science specifies an artefact that enables change. The shared axiology is evident as both methodologies value the research problem, and theoretical knowledge as well as change in practical application. Cole et al. (2005) concludes that the mapping between the two approaches is not perfect but that they are paradigmatically compatible.

Structural similarities also make Action Research and Design Science compatible. Action research models are often cyclic in nature (Ferrance 2000; Coughlan and Coghlan 2002; Cohen et al. 2013), as are the 16 tenets of participatory action research by McTaggart (2018). Although Cole et al. (2005, p.329) does not specify a cyclic model in the synthesised research approach it is discussed as a criterion. Therefore, there is a strong case for a combined approach of design science and action research in this case.

A combined method, as suggested by Cole et al. (2005), is the best fit for this research. In this case it would be an action research study within each iteration of a design science structure. The qualities of action research position the researcher within the real world context. An overarching design science approach pulls together the separate studies as evolutionary stages enabling change in practice, and progression towards an improved artefact, for validation.

Selected methods

- A combined method (Cole et al. 2005)
- An overarching design science structure.
- Action research studies within each iteration, positioning the researcher in the real world context.

2.3.5 Step 4b – Data collection instrument selection

Taking the pragmatic perspective on the instrument selection means collecting from any sources available, in whatever way they can contribute to the knowledge. All instruments require ethics consideration and require approval before use (Stake 1995; Cohen et al. 2013).

Literature is a useful starting point, but it also has the disadvantage of being beyond the researchers control. Therefore, primary data must be developed to work out to what extent the conclusions are applicable in other practice contexts. Having discounted a survey as a single approach, as a source of information among many it still has significant value as a tool for data gathering. In addition, there is the data held as part of the video storage system regarding individual interaction with the media. Finally, students can be interviewed on an individual basis about their experience with video feedback. Therefore, the potential types of data sources are: -

- Literature
- Questionnaires
- Interviews
- Documentation

Literature

When implementing a new element of practice, and starting from scratch, the literature offers the opportunity to avoid repetition of the pitfalls already found. The variety of studies available is anticipated to provide insight into the advantages and disadvantages of implementation details and the impact of context.

Questionnaire

The questionnaire is a widely used and useful instrument for collecting data. The contributions from a large number of participants can be collected in far less time than individual interviews would take. Like any other instrument it has limitations, in that the preparation time must be considered. The questions must be constructed with care and should be analysed regarding ambiguity (Cohen et al. 2013; Collis and Hussey 2013), and their ability to obtain information pertinent to the research question.

There are limits regarding the types of data that can be collected, particularly regarding the lack of flexibility available for the participant in their response. However, this feature is also considered an advantage in that it makes analysis easier in some respects. In addition there must be the consideration of ‘non-response bias’ (Collis and Hussey 2013), in that there may be a reason why a particular set of participants do not respond, and therefore the participant set is not necessarily representative of the general population. In the particular case of students on the first year of an undergraduate degree, may suffer from what Collis and Hussey (2013) calls questionnaire fatigue. It is known that many organisations, commercial, governmental and academic, ask new students to answer many online questionnaires at this point of their academic career.

Interview

In an interview, the interaction between two humans emphasises the social nature of the knowledge since it is constructed through conversation (Cohen et al. 2013). Although the researcher can control some elements, such as ensuring topics covered, there is the opportunity to be flexible in responses. The structured or unstructured style questions can result in answers of ‘yes’ or ’no’, or in depth answers (Cohen et al. 2013; Collis and Hussey 2013), taking directions the interviewer was not expecting. It allows for the flexibility of adding in questions mid way through the interview, and changing the questions for future participants, in a way not always possible with e.g., a questionnaire (Collis and Hussey 2013).

The multi-sensory communication informs by the additional non-verbal communication in ways a questionnaire cannot (Cohen et al. 2013). However, questions still need careful preparation to get to the detail that is useful to knowledge construction without becoming invasive in ways intolerable to the participant (Cohen et al. 2013). Its results can be compromised by the attitude or tone of the interviewer, causing the interviewee to respond in superficial ways, or even shut down the interview. It is a resource hungry mode of elicitation where anonymity is usually not possible (Cohen et al. 2013). c

Documentation

There are two main sources of other documentation that would provide useful data. There is data from students enrolment on the course, and once produced, the data from the videos made and returned to students as feedback.

Feedback videos The feedback videos themselves contain evidence to determine if feedforward of learning is taking place as anticipated. The system on which the videos are stored contains evidence of student interaction with the videos. Whilst each of these sets of data has the potential to make a valuable contribution to the research, each of these systems is also limited to their design and original purpose. After closer examination the data collected may be flawed or not fit for the purpose of this research.

Student information system Summary information regarding the cohort is available through the student information system. The results of student surveys and interviews are often examined in the context of the total number of students on the course at the time, for example, response rates. The number of students will vary at different points in the year. Therefore, depending on when a particular analysis is done, or a survey is released, the total number of students in the cohort may vary. In general, the number of students is at its highest approximately two weeks after the start of term when all enrolments are complete. Beyond that point the main cause of change is students changing course within the university or withdrawing to pursue an external option.

Students occasionally wish to transfer to a course from another subject after the first two weeks of teaching have passed. However, unless the student has relevant prior knowledge of the subject these applicants are not normally accepted on to computing due the volume of work that would need to be caught up on to succeed. Consequently,increases in numbers after the first fortnight are rare and made only in exceptional circumstances. As a result, changes in student numbers normally follow a shallow decline from that point onward through the year. This is a normal general trend within the yearly cycle of first year undergraduate students.

The variation across the year in the total numbers of students on the course may appear inaccurate at first glance when e.g.: two different values are given for the cohort size when referring to the same year group. However, the numbers reported are accurate at the time and to report any other figure would be give an inaccurate reflection. To give the reader a point of comparison values should be additionally shown as percentages of the cohort wherever possible.

Summary of data collection instrument selection

The data gathering techniques planned for use in the studies for this work have been selected based on resource availability and purpose. The pragmatic perspective is gained by evaluating all the potential resources of information available. The depth and complexity of each case in its context can be drawn on in this way.

The questionnaire, and documentation are sources of quantitative data, whilst the interviews, and parts of the questionnaire, supply qualitative data. Mitigation against bias and the limitations of a single data source may be reduced by examination and comparison of different data sources, although investigator triangulation is not possible due to the single researcher involved (Collis and Hussey 2013). Therefore, the combination of instruments is employed to form a well-informed and rich picture of the student perspective of video feedback used in practice.

Selected data collection instruments

Questionnaire, documentation and interviews.

2.4 Literature Review: the research plan

The purpose of the literature review is to gain familiarity with the content of the body of work completed to date in the area of video feedback. By doing so commonality and differences in findings between studies can be reported with regard to the impact of 1) system implementation, 2) system use, and 3) context, on relevant perceptions. There is then the potential to capture any emergent theories regarding the phenomena of video feedback.

The scope of the raw data for this study is the publicly available peer reviewed literature regarding the use of video feedback in practice where applicable to academic work assessed by staff. Studies regarding assessment of physical skills, performance, or behaviour or where the purpose is peer or self-review, are to be excluded.

2.4.1 Potential methods for literature review

Literature reviews can be highly subjective and so the robust nature of a systematic literature review can be very appealing for those who value objectivity. However, it is a resource hungry process, and without a second willing participant, impossible. Therefore, alternative methods needed to be sought to complete the process of gathering and analysing data.

The target publications of the search is to be wide reaching so that nothing of potential significance gets omitted. There is the potential however, that a search could result in an overwhelming data corpus. Therefore, the process of reducing this down to a manageable and relevant data set requires consideration and documentation of a process. The search strategy for the literature review is to be well documented with identifiable stages and clear criteria for the inclusion or exclusion of publications at each stage.

2.4.2 Selecting a method for literature analysis

The data to be analysed is going to be of large quantity and qualitative in nature. Thematic analysis is a broad collection of techniques with several flavours to choose from, any of which can deliver a rich, complex and detailed account of data. Two such options are the consideration of thematic analysis as a method in its own right (Braun and Clarke 2006; Nowell et al. 2017, p.2) and template analysis (Brooks et al. 2015). These are methods for the identifying, analysing and reporting of patterns known as themes (Braun and Clarke 2006) which balances a relatively high degree of structure with the flexibility of application to a particular study (Braun and Clarke 2006; Brooks et al. 2015). Nor is either method tied to a theoretical framework however, this means that the theoretical position of the researcher should be made clear (Braun and Clarke 2006, p.9; Brooks et al. 2015).

2.4.3 Thematic Analysis (Braun and Clarke 2006)

Themes can be defined as something important related to the research question which is represented by a pattern of meaning across the data set (Braun and Clarke 2006, p.10). More instances of the theme do not necessarily imply greater significance. There are no hard and fast rules about what a theme is and how much weight should be given to a theme (Braun and Clarke 2006, p.11). These must be determined by researcher judgement, exposing the analysis to subjectivity. Therefore, clear reporting of the process improves the likelihood of the work being replicable.

An inductive approach to analysis keeps the themes tightly linked to the data (similar to grounded theory). This means identifying themes as they emerge from the data which may have little or no connection to questions asked of participants (Braun and Clarke 2006, p,14). In addition this can be done with no attempt to tailor it to any preconceived coding template (Braun and Clarke 2006, p,14) or towards a theoretical framework, (as in grounded theory) (Braun and Clarke 2006, p,10). Therefore, during the analysis process latent themes are likely to emerge through interpretation of the data set (Braun and Clarke 2006, pp,13-14).

Braun and Clarke (2006) emphasise that the phases of the analysis process they suggest are for guidance only, and that phases should be customised to suit the research question. The refinement of themes should be an organic activity throughout the process. Analysis begins when the researcher notices patterns of meaning in the data set. Writing should begin immediately with the making of notes, ideas and potential codes and should continue throughout the process.

The phases outlined by (Braun and Clarke 2006), with a description of the steps as they are applied in this research, are detailed in Chapter 3 section 3.3. In this work the process is designed to make use of software to create an annotated set of electronic notes and to complete the coding process.

Reporting on themes can also impact the outcome. A broad scope offers readers an understanding of the data set but may result in limited detail. Narrowing to reporting only a targeted subset of themes may provide detail but lack context (Braun and Clarke 2006, p.11). In this case a broad approach to encompass all considerations of a system and its use, and the perspectives of stakeholders, is necessary if the impact of the system setup or use is to be identified in the perceptions of the students and staff.

Criticisms of Thematic Analysis

There are several pitfalls to thematic analysis to be avoided, such as a lack of analysis, a set of themes that do not work, a mismatch between evidence and claim (Braun and Clarke 2006, pp.24-26). Another is a tendency to use the data collection questions as themes. This is less likely to occur in this case, since the work begins with an analysis of literature, rather than responses to questionnaires. Since the position of the literature review is at the start of the research process it is expected to identify a set of considerations for video feedback, which can be refined by the studies completed in practice, and therefore move the outcome to specifically address the research questions.

Mitigation strategy for Thematic Analysis

In addition to awareness of the pitfalls, employing strategies for ensuring 'trustworthiness' (Nowell et al. 2017) safeguards the credibility of the work. That is to say that when readers are confronted with a phenomena which is discussed or explained, they recognise it as such (Guba and Lincoln 1989). To ensure credibility it is recommended that the raw data be checked by other members, however, the raw data has already been peer reviewed and often cited by another and has therefore already been checked. Most other recommendations are targeting application to participant responses rather than publications.

Credibility, dependability and confirmability are qualities of trustworthiness (Nowell et al. 2017, p.3), and are all related to the clear explanation of the decisions made during the execution of a method, and the clear explanation of the rationale behind those decisions. In the case of this research it is also very important that transferability is maintained. Transferability refers to the generalisability of the work, a test for which is to ask if the findings can be transferred to other instances. This is more likely to be possible with 'thick' descriptions enabling accurate replication or clarity where there are differences (Guba and Lincoln 1989). Only then can judgements be made regarding differences and similarities present in each instance. The intention here is to develop guidance that is applicable in practice. By synthesising findings of different studies and by exploring the contexts in detail, advise can be made generalisable across other instances of practice, to enable informed choices by staff delivering video feedback. Nowell et al. (2017, p.4) provides means of establishing trustworthiness at each stage of thematic analysis (Braun and Clarke 2006).

Since the main difference between Template Analysis and Thematic Analysis is that Template Analysis begins with a template of codes as a starting point, and there is no such template for this work, thematic analysis is the method of choice. In addition Braun and Clarke (2006, p.7) explain that it does not require the detailed background knowledge of e.g., grounded theory, making it accessible by an early career researcher.

Selected Method for Literature Analysis

Thematic Analysis (Braun and Clarke 2006)

2.4.4 Summary of the research plan for the literature review

This section outlined the potential methods under consideration for carrying out a literature review of studies conducted into the use of video feedback in practice. It then explained the rationale for the selection of thematic analysis. Considerations, such as avoiding pitfalls and trustworthiness are discussed. A detailed description of the steps taken to complete the literature review is given in Chapter 3.

2.5 Development of a taxonomy: the research plan

2.5.1 Introduction

At its most basic level a taxonomy is a scheme for classification. It defines the terms used in a field of study and the relationships between them (Usman et al. 2017, p.43). The defined vocabulary assists communication in pedagogy and research for practitioners and researchers providing clarity and structure. It is expected to evolve to incorporate new knowledge over time.

In this work the two domains of education and computing overlap. The most famous taxonomy in education is Blooms taxonomy of 6 major categories of the cognitive domain (Bloom 1956), which has evolved into updated versions. The role of taxonomies in computing systems is also widely recognised (Nickerson et al. 2013, p.336).

2.5.2 Relevance of the taxonomy

This research aims to discover how the setup and use of a system for video feedback impacts the perceptions of it by students, and how staff feel about creating it whilst using such a system. Therefore, data about the system and the user perceptions must be collected from many studies in different contexts. Then the hope is that the impact of certain aspects of the system on the user perceptions can be identified. Guidance for staff can be determined by identifying the set up and use of the system that will provide most value to students, and how that may change with different resource availability in practice.

2.5.3 Rationale for selection of a taxonomy

The reason a taxonomy has been chosen, as opposed to for instance, a more complex ontology, is for its simplicity. It’s purpose is to provide a shared language to use in practice. It's scope must cover all considerations for setting up a system for video feedback, and the perceptions of stakeholders. There is no need for greater complexity than that. In fact greater complexity may make the artefact more difficult to apply by staff. Adding to the staff burden may dissuade staff from trying video feedback at all, particularly in unusual contexts or where resources are limited, therefore, simplicity is key. From this foundation it can form the basis of other artefacts, for instance, to ensure all aspects are considered when creating guidelines for practice, rather than to be final product in its own right.

Therefore, the aim is to create a useful taxonomy, which fits with a design science perspective of finding acceptable and good designs rather than seeking 'optimal solutions' (Hevner et al. 2004, p.88).

The data source for development would be the literature published regarding studies of the use of video feedback in practice. They must be applicable to academic work assessed by staff. This excludes studies regarding assessment of physical skills, performance, or behaviour, where the purpose of using video is normally peer or self-review. The data sources for validation are the studies conducted during the course of this work.

2.5.4 Potential Methods for developing a taxonomy

A single detailed step by step process for the development of a taxonomy that is applicable to this study has not been found. However, three authors provide useful guidance for different parts of the process. There is very little guidance available in literature for the development and evaluation of taxonomies. Of the literature reviewed by Nickerson et al. (2013, p.340) approximately half of the publications derived classifications by some statistical method, whilst the other half were more informal. However, Nickerson et al. (2013, p.341) set out criteria for the qualitative attributes which make a taxonomy useful which says that a useful taxonomy should be concise, robust, comprehensive, extendable and explanatory. It is also stated that these guidelines are not necessarily sufficient, and the only real evidence of usefulness is when the taxonomy is applied and is found to be useful. Hence the intent here is to apply the taxonomy to new studies to evaluate whether it is adequately useful.

The list of qualities considered necessary for a method of taxonomy development (Nickerson et al. 2013), are that it should: -

1. Take into consideration alternative methods, or combination of methods of development.
2. Reduce the possibility of ad hoc dimensions and characteristics being included.
3. Be completed within a reasonable time period.
4. Be straightforward to apply.
5. Result in a taxonomy that is concise, robust, comprehensive, extendable and explanatory and therefore, has the potential to be a proven a useful taxonomy.

Nickerson et al. (2013) offers a method for taxonomy development for use in information systems. Since the system for creation and distribution of video feedback is to be developed using technology it is likely to be relevant and effective. It is based on a design science paradigm which is appropriate to this work. The aim is to develop an artefact (taxonomy) which is a model developed through an iterative cycle of development and validation phases.

Some literature refers to a taxonomy as a classification structure that is derived empirically, where others include those derived conceptually. The empirical inductive approach applies in this case since it begins by classifying the findings from published empirical studies and intends to validate it by application to further studies conducted in practice (Nickerson et al. 2013, p.339).

Work by Usman et al. (2017) was also conducted in the relevant field of software engineering. They take a step by step approach. The first step is described as defining the units of classification, but then adds a prerequisite of thoroughly understanding the material to be categorised. Step two is to define descriptive terms, to describe and differentiate subject matter instances. These 'descriptive bases' are the attributes that can be used for the classification of instances. The third step is the classification process, which, it is vaguely suggested, could be qualitative or quantitative. It then discusses at some length, strategies for classification structure. The final step is validation by one or more of three suggested methods: orthogonality demonstration, benchmarking or utility demonstration.

Finally, Kwasnik (1999) guides the identification of a useful type of taxonomy structure. This is done by exploring the link between classification and knowledge, and how representing the same classifications in a different way can impact the knowledge gained from it.

A true ’hierarchy’ begins with a single class which subdivides into lower levels. Each object is classified into a single point of classification. For example, it is common for animals to be classified through a hierarchy of Kingdom > Phylum > Class > Order > Family > Genus > Species, so that an animal is classified into a single species dimension. It ensures mutual exclusivity preventing the placement of an object under more than one category, and is not suitable for inclusion of multiple or diverse criteria, making it unsuitable for this domain.

A ’tree’ structure is similar and additionally allows for a ’part-whole’ relationship, but still resulting in an object placed into a single dimension. For example, a ’town’ would be placed in a single named ’county’ dimension, which is positioned as part of a ’country’. Even though it can allow for description by two attributes at one time it still could not work in this case.

A ’paradigm’ may be viewed as a two dimensional matrix, but each of the studies in this case, requires information regarding more than two dimensions to explain the whole video feedback domain e.g., recording source, type of assignment, details of the class participants, stakeholder perceptions etc. (Kwasnik 1999).

In this case information may overlap categories simultaneously. Even if descriptions of perceptions of video feedback are split up into short sentences, implications of meaning may reach beyond a single category. The purpose of the taxonomy is to describe various, and therefore potentially several, aspects of the practice studied, making such restrictions inappropriate.

A ’faceted’ approach can be used to categorise complex entities across several perspectives (facets) at once (Kwasnik 1999, p.39). This facilitates the classification of a single item based on several different attributes simultaneously. Each entity can be characterised by a string formed from the descriptors of each facet. For example, a taxonomy of famous people may be described by their name, the year they were born, where they were born, their field, and what they were famous for e.g., Isaac Newton, 1643, UK, mathematician, developed three laws of motion. A single entity has values in all of the facets, rather than being categorised wholly under one (as they might be in a taxonomy structured as a hierarchy).

According to Kwasnik (1999), this type of structure offers many advantages. The most useful of which, is its flexibility and it can be used to take into account different perspectives simultaneously. That means it is possible to retrieve sets of data based on any one facet, or a combination of a set of assets e.g: list of car models built in Japan in 1995. This makes it extremely flexible and useful in discovering new associations by comparing the results of various combinations of facets and their characteristics e.g., most flowers with yellow petals flower earlier in the year than those with pink petals.

In addition, it does not require complete domain knowledge, making it ideal for a new field, such as video feedback. It is not necessary for the facets to be related, or to be structured in a similar way, making it possible to apply to multiple models or structures found in the knowledge simultaneously. It accommodates the emergence of classifications for new domains by being 'hospitable' meaning it accommodates new entries smoothly. It is also described as 'expressive', in that it pragmatically incorporates the structure and vocabulary which suits the knowledge.

There are limitations with something so flexible and all-encompassing as a faceted classification. It is difficult to come up with useful categories until knowledge of the domain and the users is established. With many unrelated attributes being recorded there may not be relationships between them. Finally, it is claimed that while hierarchy or tree structures have a natural visual structure, faceted classifications can often only be viewed along one or two facets at a time meaning visualisation may need to change depending on the perspective required.

A combination of methods by Kwasnik (1999), Nickerson et al. (2013) and Usman et al. (2017)

Kwasnik (1999) details the various data structures commonly used for taxonomies, and under which circumstances they are appropriate, enabling an informed decision to be made. Usman et al. (2017) offers a set of steps to take when developing a taxonomy, but omits the detail of the classification procedure. That gap is filled by Nickerson et al. (2013), who also provides a set of final objectives necessary to prevent development going on eternally. By combining the three works, which have all previously been evaluated by peer review and application, a method can be defined. These steps are described in Chapter 4 beginning at section 4.3.1, with reference to the original work in which they are suggested.

2.5.5 Preparation for Classification

Step 1: Taxonomy structure selection (Kwasnik 1999)

Kwasnik (1999) does a thorough job of exploring the options for structures and Usman et al. (2017) summarises them similarly. A true hierarchy begins with a single class which subdivides into lower levels. It ensures mutual exclusivity and is not suitable for inclusion of multiple or diverse criteria, making it unsuitable for this domain. A tree is similar but allows for a 'part-whole' relationship, which may be viewed as a two dimensional matrix. However, in this case each study, requires information regarding more than two dimensions to make the whole system e.g., recording source, type of assignment, details of the class participants etc. The final option is a faceted taxonomy which allows for multiple characteristics of the entity to describe the object simultaneously. A thorough discussion of the selection process can be found in chapter 4, at the point of implementation.

Step 2: Define terms (implied by Nickerson et al. 2013)

This step is implied by Nickerson et al. (2013) as crucial to the shared understanding of the work and they demonstrate the value by explaining the terms used for their own work. The terms used to describe the artefact, the data to be classified, the points of classification within the data structure, and process of classification, must be defined at this point in the process, and the rationale explained.

Nickerson et al. (2013) suggest that one of several terms would be appropriately used to describe the artefact they produce, e.g., taxonomy, typology, framework or classification. They chose the term 'taxonomy' since the evidence of their research suggests that this would improve the likelihood of recognition. According to Nickerson et al. (2013) the term 'classification' may refer to both the system or the process of organising objects. Similarly, Usman et al. (2017) found that significant studies described the purposes of taxonomies as used to 'classify' or 'categorise' objects. Likewise, the term 'taxonomy', in literature, is used for the system, or the process, or the result of applying the system.

The points of classification also have a variety of names. In the selected method the points of classification are called 'dimensions' (known as 'variables' in other studies) and values for those dimensions are called 'characteristics' (Nickerson et al. 2013, p.341). The method prescription uses the term 'dimension',

Step 3: Become familiar with domain (implied by Nickerson et al. (2013, p.346) and Usman et al. (2017, p.44))

Again, this step is not explicitly part of the original method, but is implied by both Nickerson et al. (2013, p.346) and Usman et al. (2017, p.44) as being crucial to the development process. It is suggested that the required familiarity might be achieved by conducting a literature review (Nickerson et al. 2013, p.340) which has been planned for completion (see Chapter 3).

Step 4: Define the users of the taxonomy (implied by Nickerson et al. 2013, p.343)

Another additional step is implied by Nickerson et al. (2013, p.343), suggesting that the precursor to defining meta characteristics should be to define the purpose of the taxonomy. They then also suggest a strategy of defining potential users, which may in turn, help define the purpose of the taxonomy. Therefore, the lack of experience in this new domain may be mitigated by completing this step, and the one which follows, explicitly.

Step 5: Define the purpose of the taxonomy (implied by Nickerson et al. 2013, p.343)

The next step is to then define the purpose of the taxonomy. This can be done by examining the needs of the users identified in step 4. Any requirements which are applicable to any taxonomy, rather than specific to this taxonomy can be eliminated, to leave a description of the purpose of the taxonomy of video feedback.

Step 6: Define meta characteristic (Nickerson et al. 2013, p.343)

Nickerson et al. (2013) suggests that the meta characteristic for a taxonomy should be determined at the start of the process, but accepts that the meta characteristic does not always become clear early enough that early on in the process. Once defined, the meta characteristic guides the development of the taxonomy. The main task in the development process is the determination of the characteristics of interest, and each one should be a ’logical consequence of the meta-characteristic’ (Nickerson et al. 2013, p.343). An additional step must be added to the iterated section of the process, enabling a delay in the decision regarding the meta characteristics (Nickerson et al. 2013) and to determine if they have been identified correctly (see Step 11).

Step 7: Define ending conditions (Nickerson et al. 2013)

The development of the taxonomy as part of this study ends when it has been utilised to classify the studies examined in the literature review (see Chapter 3) of this work. The validation is taken to a separate process.

The ending conditions are adapted from those defined by Nickerson et al. (2013). The two levels of objectivity result in two tables of ending conditions.The objective ending conditions will satisfy the definition of a taxonomy. The subjective conditions should be specific to the domain, and in this case are specific to a taxonomy of video feedback in practice. These are generalised by the terms concise, robust, comprehensive, extendable and explanatory, as the requirements which make a taxonomy useful (Nickerson et al. 2013).Whether these have been met is determined in Step 12 of each iteration.

2.5.6 Planning the iterative classification process

This section of the classification includes Steps 8-12, and may need to be repeated several times, until the taxonomy meets the ending conditions (Nickerson et al. 2013) as defined in Step 7: Define ending conditions.

Step 8: Determine classification approach (Nickerson et al. 2013 and Usman et al. 2017)

Each taxonomy has its own traits and the nature of those require consideration when selecting an approach to classification.Initially an inductive process must be employed (Nickerson et al. 2013, p.334), derived from the empirical and generalised to the conceptual, across all the studies to realise column headings for a matrix. As each paper is read, and details considered pertinent to setting up a system to produce video feedback are found,they are noted in the matrix. It is anticipated that some iterations need to follow the inductive approach, while others apply a deductive approach, moving from the conceptual to the empirical, to be validated later. This aligns with the recommendations of Nickerson et al. (2013, p.345) who suggests that different approaches are used with different iterations to ensure no new insights are missed. The approach taken would be re-evaluated with each iteration (Nickerson et al. 2013).

Step 9: Define units of classification (Usman et al. 2017)

The purpose of familiarisation (Step 3) is to be able to identify units of classification, or classes (Usman et al. 2017). By defining ‘descriptive bases’, or a set of attributes, instances of objects can be classified (Usman et al. 2017). These are referred to by Nickerson et al. (2013) as ‘dimensions’. The domain studied by Nickerson et al. (2013) were publications regarding taxonomies. Amongst that data set most taxonomies had four or fewer dimensions, but a few papers identified more than ten dimensions. Therefore there is clearly no agreement on an appropriate number of dimensions, although Nickerson et al. (2013) refers to Miller (1994) and the work completed on the amount of information a person is able to successfully process. Miller (1994) famously recommends a maximum for such quantities of seven plus or minus two. This concern for not overwhelming the user is mirrored in one of the ‘Ending Conditions’ suggested by Nickerson et al. (2013).

Step 10: Revise taxonomy (Nickerson et al. 2013, p.343)

At the end of each of the two branches for both inductive and deductive approaches a new version of the taxonomy is developed and may be re-diagrammed at this point.

Step 11: Revisit meta characteristic (implied by Nickerson et al. 2013, p.343)

Nickerson et al. (2013, p.343) implied this step by suggesting that the meta characteristic may not become clear until later in the classification process. To maintain a robust process, it follows that the original meta characteristic should be reconsidered at this point.

Step 12: Determine if ending conditions have been met (Nickerson et al. 2013)

The ending conditions have been selected in Step 7, and should be compared at his point, to determine if they have been met. If they are all met the development may cease and validation begin. If they have not all been met the classification process (see Steps 8-12) may be repeated until the ending conditions are met.

Summary of taxonomy development

This section outlined the potential methods for developing a taxonomy for video feedback. It then explained the rationale for the development method chosen and a description of the steps to be taken.

The proposed method for the development of the taxonomy is shown in Figure 2.2.

Selected method of taxonomy development

By combining all three works of Kwasnik (1999), Nickerson et al. (2013) and Usman et al. (2017), an complete process can be laid out in steps as shown in Sections 2.5.5 and 2.5.6.

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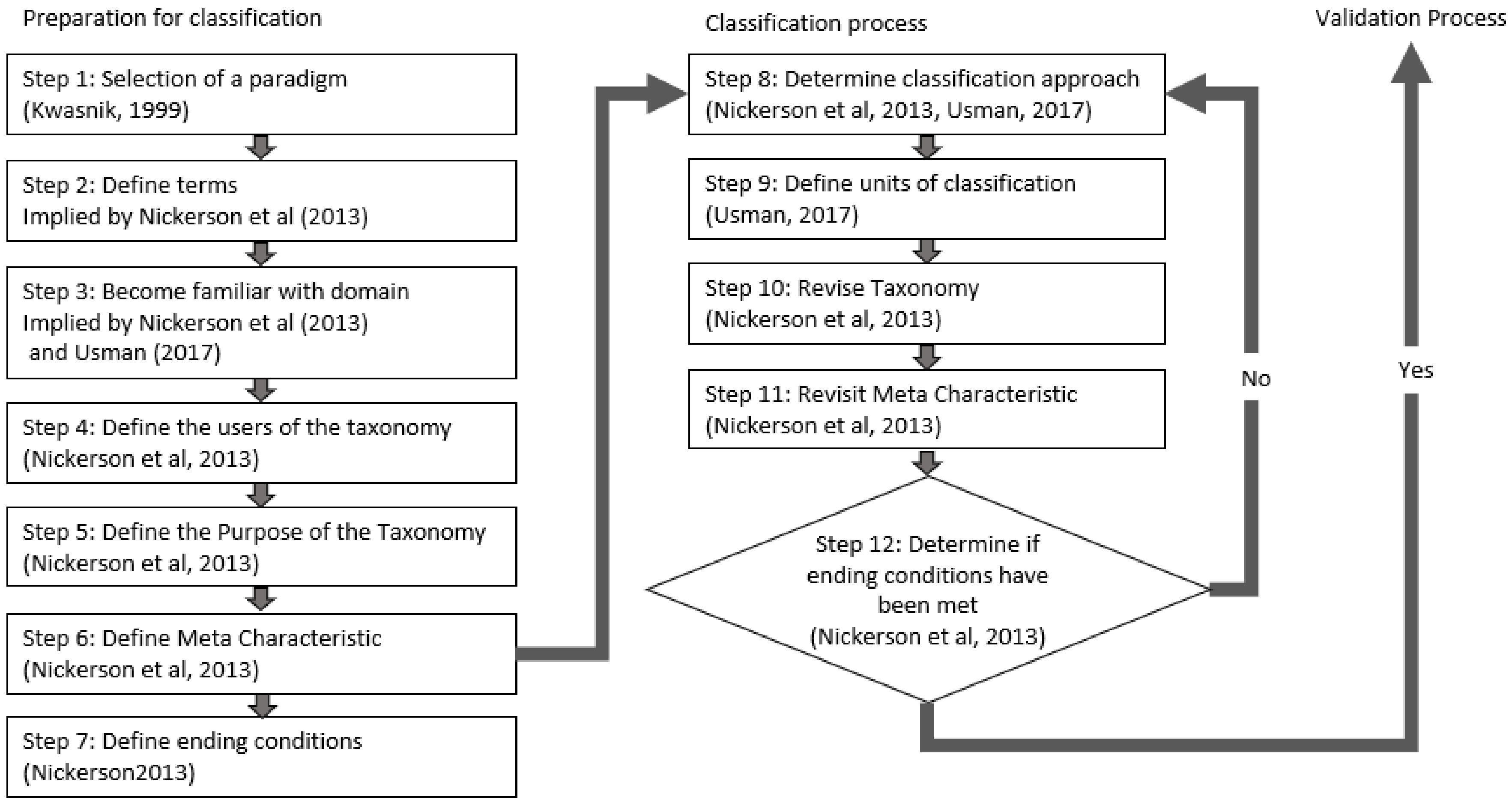

Figure 2.2: The Development method for the Taxonomy of Video Feedback

The next section explains the plan for four discrete studies. They form cycles of validation for the taxonomy.

2.6 Context of practice: the research plan

There are two strands to this section of the research and both involve the implementation of video feedback. The first strand is necessary for developing understanding of what it is like to put video feedback into practice, and the second is for the purpose of validating the taxonomy by utilisation.

2.6.1 Strand 1: The individual studies

The first is a set of individual studies and their findings. A set of studies are to be conducted examining the implementation of audio, or video, as feedback. The researcher's position is within the studies, action research style. Each were to be carried out from a pragmatic perspective and reported as a case study.

The studies are: -

- **Pilot Study: Audio Feedback**
  The aim of this study is to determine the feasibility of a media as feedback with lesser technological requirements than video feedback. This would provide a baseline of comparison to determine if the video element of video feedback is of benefit to students.

- **Video Feedback on Trial**
  This study creates a feasible system for the implementation of video feedback and employs it in practice for a sample of the student cohort. Participant numbers were limited to enable an assessment of whether producing video feedback for the whole cohort has a negative impact on the staff workload or the quality of feedback. The supply of text feedback continues in addition to the video feedback to mitigate any negative impact of the use of video feedback, and to facilitate consistency across the cohort.

- **Video Feedback in Practice**
  Having optimised the implementation of a video feedback creation and delivery system, it was to be implemented for a whole cohort of students in normal practice. Text feedback would be discontinued. This study may occur across more than one

cohort, depending on the level of confidence staff have that video feedback is adding value to feedback, or that it is preferred by students, and that the workload is acceptable.

To enable a robust and rigorous set of results, studies would be repeated and refined with each iteration of the academic year.

2.6.2 Strand 2: Taxonomy validation

The purpose of these studies is the validation of the taxonomy. The overarching design science structure makes each of these studies an iteration in the validation process. The findings of each study would be used to validate the taxonomy in a demonstration of utility exercise (Usman et al. 2017, p.45).

2.7 Planning the validation of the taxonomies

Validation strengthens reliability and usefulness of taxonomies, and yet in their study (Usman et al. 2017) found that over a third of the taxonomies they analysed employed no form of validation.

Through the design science paradigm of emergence an artefact would be developed in the form of a taxonomy to explain the domain of video feedback in practice. The proposed method was adapted from the combined works of Kwasnik (1999), Nickerson et al. (2013) and Usman et al. (2017). Usman et al. (2017) also provides guidance on methods for validation in three ways: -

1. **Orthogonality demonstration**
   The orthogonality of a taxonomy is demonstrated by ensuring that the dimensions, or in this case, facets, are unique. Verification takes place through the application of the development process. The Objective Ending Conditions recommended by Nickerson et al. (2013) (see Table 4.1) say that every dimension should be unique, and these conditions would be considered at the end of each iteration of the development cycle. By the end of the development cycle all of the Objective Ending Conditions (Nickerson et al. 2013) must be considered true, including the unique quality of the dimensions.

2. **Benchmarking**
   The taxonomy is compared to similar classification schemes. To the best of knowledge no other taxonomy exists for video feedback at this time.

3. **Utility demonstration**

   The utility of a taxonomy is demonstrated by classifying authentic subject matter examples. In this case, the taxonomy developed here would be applied to the case studies regarding video feedback. The following three chapters describe the studies used to validate the taxonomy set by utilisation. These are: -

   - Chapter 5 - Audio Feedback on Trial
   - Chapter 6 - Video Feedback on Trial
   - Chapter 7 - Video Feedback in Practice

   Usman et al. (2017) regards this as a more rigorous validation technique than, for example, classifying from literature.

The details of the studies were to be recorded under classification points of the taxonomy for all three case studies. These can then be examined to see if they work as a resource for comparison across studies, and as a potential means of examining the impact of the *Context* on the *Perceptions*. The details of the steps performed are be explained in detail in Chapter 8.

All three studies contributing to the utilisation exercise were to be performed in only one practice setting. To ensure comprehensiveness and robustness are still relevant across a variety of settings, the taxonomy would be reviewed by experts through a formal expert panel.

Details of the methods of validation carried out, and the findings, can be found in Chapter 8.

2.7.1 Data collection

In all three studies an implementation of the feedback delivery system would be built. In each study a number of students would receive feedback via that system. The students who have received feedback by the system were to be invited to participate in a survey, or interviews. This data would be obtained to inform the research of their perceptions of the system and the feedback they received from it.

Data would be collected in two ways. Initially, to get a broad idea of the feelings of the cohort, a questionnaire would be used. To add depth to the case study interviews would be conducted. With each iteration questionnaire and interview questions would be refined.

Mixing the instruments of data collection enriches the research. The questionnaires are expected to provide a high number of responses that can be synthesised into a meaningful picture. However, because of the pre determined questions and limited answers it may result in a broad overview. Questions would include free text boxes to ensure participants have room for expression, and some additional depth may be found here. Although interviews are more resource hungry and therefore are going to be limited in number, the interview findings are expected to augment the questionnaire findings and to add depth to the case study. Data collection by questionnaire and interview have already been discussed in greater depth in section 2.3.5.

Interview and questionnaire responses would be qualitative and analysed using template analysis. The method follows the same steps as the thematic analysis of the literature (Braun and Clarke 2006), as previously discussed in section 2.4.2, with the exception of beginning with a template based on the taxonomy.

Selected method for analysis of questionnaires and interviews

Interview and questionnaire responses would be analysed using template analysis.

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2.7.2 Summary of research plan for studies in practice

A pragmatic paradigm offers the freedom to select the right tools for the job. This work would be highly constrained by the resources available and the real-world context of the study, both ethically and in terms of productivity. Since studies would be conducted in practice, isolation of selected variables is not possible, or advantageous. Limiting access to valuable sources of information by method selection has the potential to constrain conclusions unnecessarily, and therefore, limit the contribution of the research. A combination of appropriately selected instruments of data collection and analysis would be applied in the context of a case study.

2.8 Conclusion of the research plan

This research includes a variety of studies and when applying the pragmatic paradigm, results in the selection of a variety of methodologies and methods, each appropriate to the objective of each particular study. A visualisation of the methods to be applied in this research can be seen in Figure 2.3.

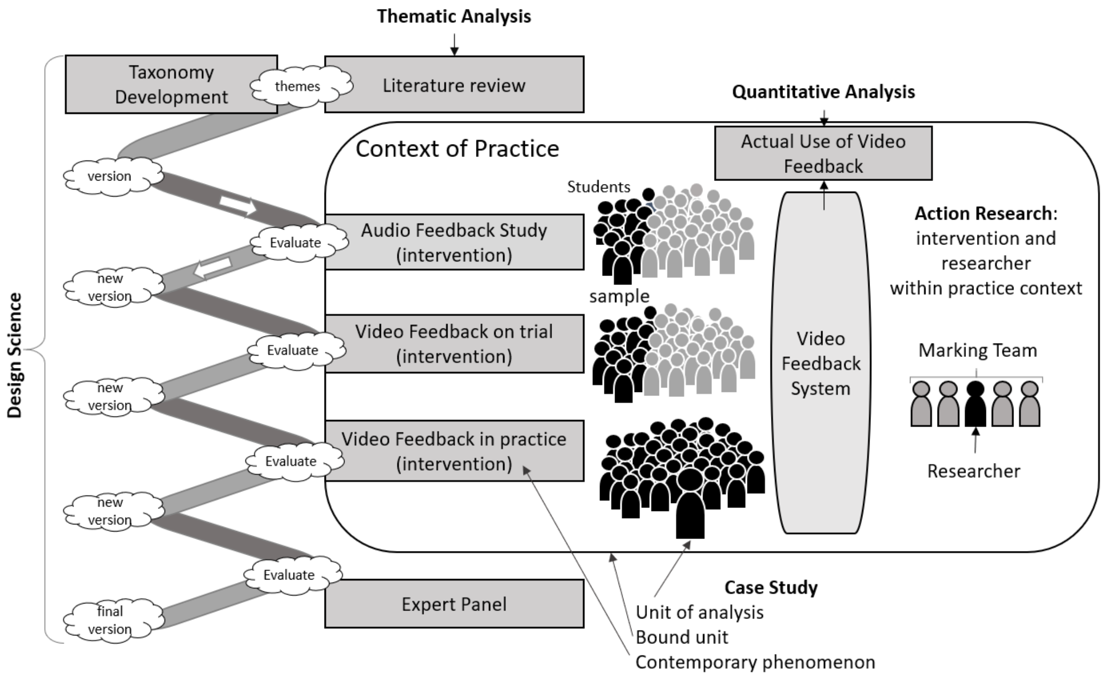


Figure 2.3: A visualisation of the methods to be employed in this research

This chapter has discussed potential paradigms, methodologies and methods and explained the rationale behind the selections for each study in this research. The next step is to carry out the studies, beginning with a review of the literature available regarding video feedback in practice.

Chapter 3

Literature Review of Video Feedback in Practice

3.1 Introduction

Feedback is a significant source of learning (see Section 1.3.2) but its potential is not always fully realised. Technological progress has reached a point where the use of video technology is now feasible in many aspects of learning. This review examines publications regarding the use of video feedback in practice. The literature review was methodically conducted and documented. The method used is described in detail here beginning with the search for relevant literature. A thematic analysis of the resulting data set followed, conducted as described by Braun and Clarke (2006), as discussed in Section 2.4.

3.2 The search method

The method used to search for relevant literature begins by identifying topic areas, which in turn, narrows the selection of relevant databases to be searched with a suitable search string. The process of excluding irrelevant material is repeated for several criteria. Finally the remaining publications are catalogued and sorted.

3.2.1 Step 1 - Identify topics

The first stage was to identify the topic areas of literature to search. Not only were publications on the use of video feedback likely to be listed under education, but because the implementation is likely to be electronic, they may also be listed under computing or information systems. Therefore databases covering these topics were to be included.

3.2.2 Step 2 - Identify databases and sites to search

A list of 8 research databases covering education, and 12 on computing or information systems was compiled. One of the computing/information systems databases was excluded as it applied exclusively to business and industry, leaving 19 sources to search (details of the research databases considered can be found in appendix B.1). In addition other sources of research considered were the websites of professional bodies. The websites examined were BCS (formerly British Computer Society), the Higher Education Academy (HEA), and the Staff and Educational Development Association (SEDA).

3.2.3 Step 3 - Develop a suitable search string

The search string was selected by starting with a wide scope and gradually reducing it so that the numbers of articles returned became manageable. However,it was also important not to make the search so narrow that relevant publications are omitted, so a balance was sort. Candidate strings were tested on EBSCO Industries, Inc. (2019) (see Appendix B.5 for details of search strings tested and the results). The string with the widest scope included any one of a set of keywords related to feedback, and any one of a set of keywords related to media, which returned an unmanageable 85,717 articles. Gradually 5 different search strings were developed as potential candidates. In addition filtering options were applied to only include peer reviewed articles, where the full text is both accessible and written in English. Twenty different combinations of search string and options were recorded. The selected string sort a term related to feedback and a term related to media in the title of the article, and reference to HE, university, or undergraduate. In combination with all three options for peer review, English and full text selected, the number returned was 671 but that still contained duplicates.

3.2.4 Step 4 - Removal of duplicates

EBSCO Industries, Inc. (2019) has the facility to automatically remove as many duplicates as it can find, but it is not perfect. Once the duplicates were removed automatically by EBSCO Industries, Inc. (2019) 439 articles were returned. Finally, duplicates missed by the automatic system were removed manually leaving 394 unique publications returned by EBSCO Industries, Inc. (2019).

3.2.5 Step 5 – Exclusion by abstract review

The abstract of each paper was reviewed to identify, and remove from the data set, papers which are not relevant. The publications to be included needed to be relevant to the use of video feedback used in practice for the purpose of marker feedback on academic subjects in higher education.

- **Exclusion by subject: Effect in a system**
  The term feedback is commonly used in electronic systems to describe when the route taken by the signal becomes a loop, and the effect that might create. Feedback from a system might also refer to a response to a user to confirm correct use e.g., haptic feedback on a hand held device. Both of these types of articles are excluded from the study.

- **Exclusion by subject: Feedback on products**
  Articles were excluded where feedback was referring to feedback from consumers on products and not as a response to student work. These scenarios could be in a completely different domain or they could be as closely related as e.g., an instructor getting feedback from students on a video they used in a lecture. However, the feedback is not being completed by the instructor in response to student work, and is therefore excluded.

- **Exclusion by subject: Not in teaching or instructional domain**
  Articles were excluded where the domain was not instruction of any kind e.g., to see how computer gamers perform.

- **Exclusion by subject: Assessment but not feedback**
  Some articles were concerned with the development of assessments, but not with feedback, and were therefore, excluded from the data set.

- **Exclusion by subject: Performance and behaviour**
  Video feedback is a term used frequently in contexts regarding skills, performance or behaviour. In these cases videos are used to reflect on action for the purposes of evaluating a performance. It comprises of evaluation post performance and often out of context, to allow the performer to be present at the review, or where the presence of the reviewer would interfere with the performance. The reflection activity is potentially completed by the performer or performers; with or without, the instructor and/or peers. These articles are excluded from the study. This study is looking at video as an asynchronous response to student work by teaching staff.

- **Exclusion by reviewer type: peer, self or automated**
  Articles referring to work on assessment feedback by student peers, by the student themselves, or by an automated system, are excluded here. This study is concerned only with feedback created by teaching staff.

Some of the articles fell into one or more of these categories and all of these were excluded from the data set. In some cases, the eligibility of papers was indiscernible from the abstract, or the abstract was not available, and those papers go through to the next step for further examination.

Steps 3 to 5 repeated per research database

Steps 3 to 5 were repeated for each database and website. However, some of the databases are included in the results by EBSCO Industries, Inc. (2019) searches and therefore did not to be repeated separately. Of the remaining 11 databases covering computing or information systems all but 1 was included in an EBSCO search. Of the 8 on the topic of education 3 were not included in an EBSCO search. That meant 5 separate searches needed to be completed in total. Table 3.1 summarises the numbers of publications resulting from searching each resource, and the number of publications remaining following the abstract review process.

Research database or website	No. search results	No. publications post exclusions by abstract
EBSCOHost	439	85
Higher Education Empirical Research (HEER)	157	19
Gartner	65	3
Research into Higher Education Abstracts (RHEA)	18	13
Google	146	52
Higher Education Academy (HEA)	62	22
BCS (formerly British Computer Society)	296	8
Staff and Educational Development Association (SEDA)	100	0
Total	1283	202

Table 3.1: Summary of results from research databases and websites

3.2.6 Step 6 - Catalogue publications for review

The remaining publications were downloaded to a single location. Now duplicates that had come from different sources could be identified and removed. Each publication was labelled and the references were recorded in reference management software.

3.2.7 Step 7 - Sorting publications

Of the studies remaining, 34 are about the use of audio only as feedback, and one is about automated feedback. These are to be filed away in case they happen to make interesting points of comparison, but are excluded from the main data set for review. That left 30 which are about the use of video as feedback and 19 that required a more detailed review to ascertain the media formats of the feedback in the study.

Publications were sorted into folders by the type of media they used in the study. These were text, audio or video or a mixture. Only the publications categorised into the 'video' folder, and those in the 'mixed' folder which include video in the study, were selected for inclusion in the core data set for this review. This folder structure was duplicated in the three ways: -

1. The file system containing the articles as files.
2. The node structure in the software to be used during the thematic analysis process which would contain the imported annotated files (Nvivo (QSR International 1999)).
3. The folder structure in the reference management software (EndNote (Clarivate Analytics 2001)).

The data set was sorted into the video feedback folder in all three structures. Articles were also kept on related topics e.g., audio feedback, since they may still provide useful insights. Publications excluded were recorded along with the reason for their exclusion.

3.3 Analysis method

The qualitative analysis of the data was carried out from an inductive approach with no consideration of potential themes prior to commencing analysis, to maintain a close connection to the data. The purpose of the analysis is to broadly examine the data set for themes to produce a rich overall picture (Braun and Clarke 2006, p.13) from the synthesis of findings, which may prove useful to other researchers and practitioners setting up, or reviewing, their own practice. The method of thematic analysis follows the six phases as defined by Braun and Clarke (2006).

3.3.1 Phase 1 - Familiarisation with the data

Braun and Clarke (2006) encourage the writing of notes and consideration of potential themes early on in the process. All publications in the data set were read in their entirety and annotated with hand written electronic notes. The annotated versions of the papers were then imported into Nvivo (QSR International 1999), the software used to support the thematic analysis process.

3.3.2 Phase 2 - Generating initial codes

Each paper was opened in Nvivo (QSR International 1999) and the annotated notes were reviewed. Relevant text was highlighted and coded to a named electronic node in the software.

3.3.3 Phase 3 - Searching for themes

Themes tended to form out of necessity. As the list of codes became too long, searching for a particular node took a long time and became difficult, as the list grew. Groups of related nodes were collected into folders to facilitate a simpler and faster coding process.

3.3.4 Phase 4 - Reviewing themes

Braun and Clarke (2006) split this phase into two levels: -

- **Level 1 Periodic Review** Check the themes work in relation to the coded extracts by periodic reviews of node content. If nodes were found to be related to a different interpretation of a node name they were separated out into their own node. Nodes may also be renamed if necessary.
- **Level 2 Diagramming** Mind maps and diagrams were experimented with from early on in the process, such as the example in Figure 3.1, which was drawn when the layout of the papers was still the naturally formed basis for grouping nodes. As the number of papers reviewed increased the themes became clearer, and the groupings and names evolved (see Figure 3.2).

3.3.5 Phase 5 - Defining and naming themes

Naming of themes occurred dynamically as the themes were coded and names were refined as the coding process progressed. Definitions were not completed until almost the end of the initial coding process when codes were less likely to change. The periodic reviews (see section 3.3.4 Level 1) assured the correct interpretation of the node name up to that point.

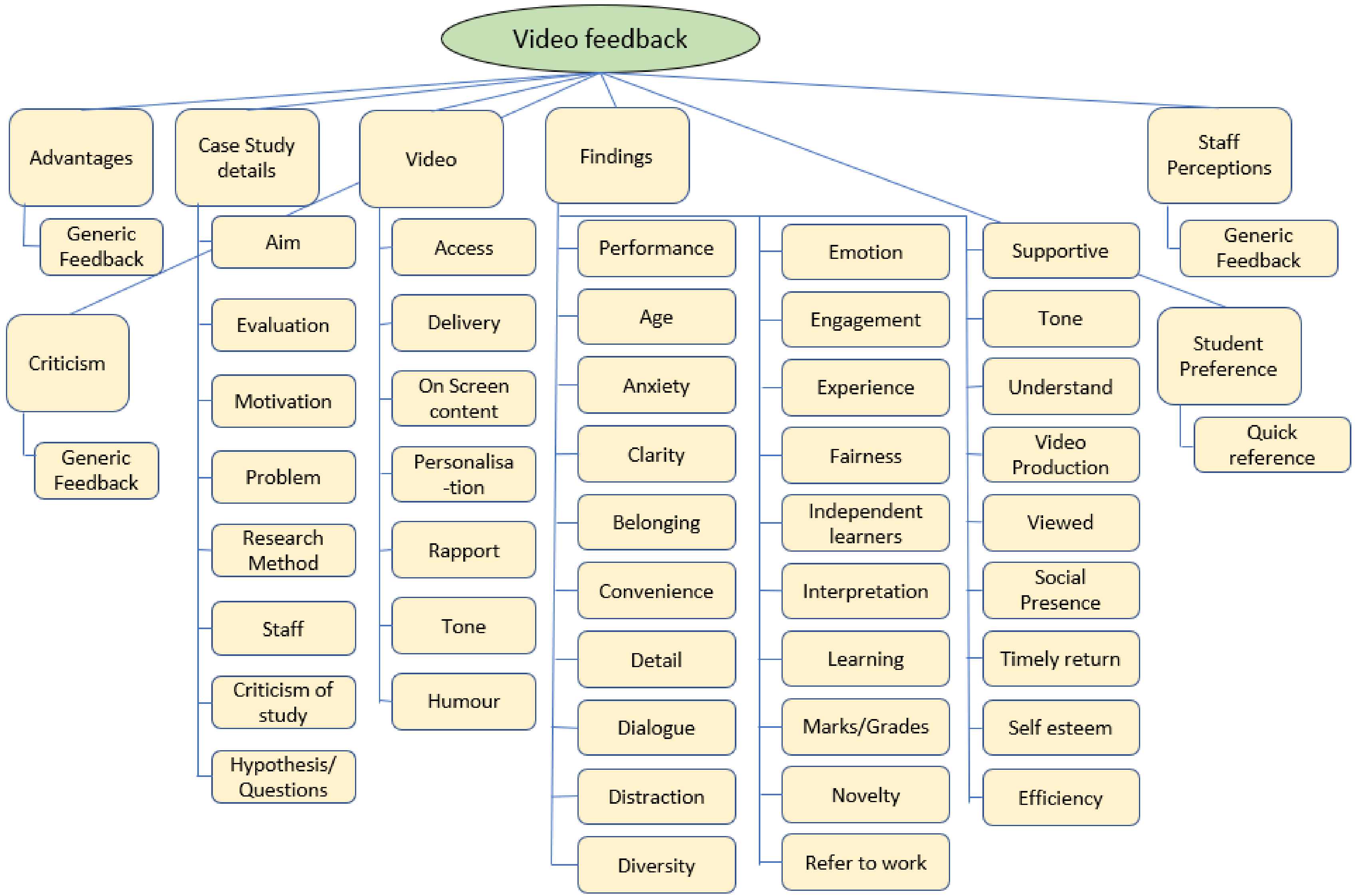


Figure 3.1: The initial mind map of potential themes

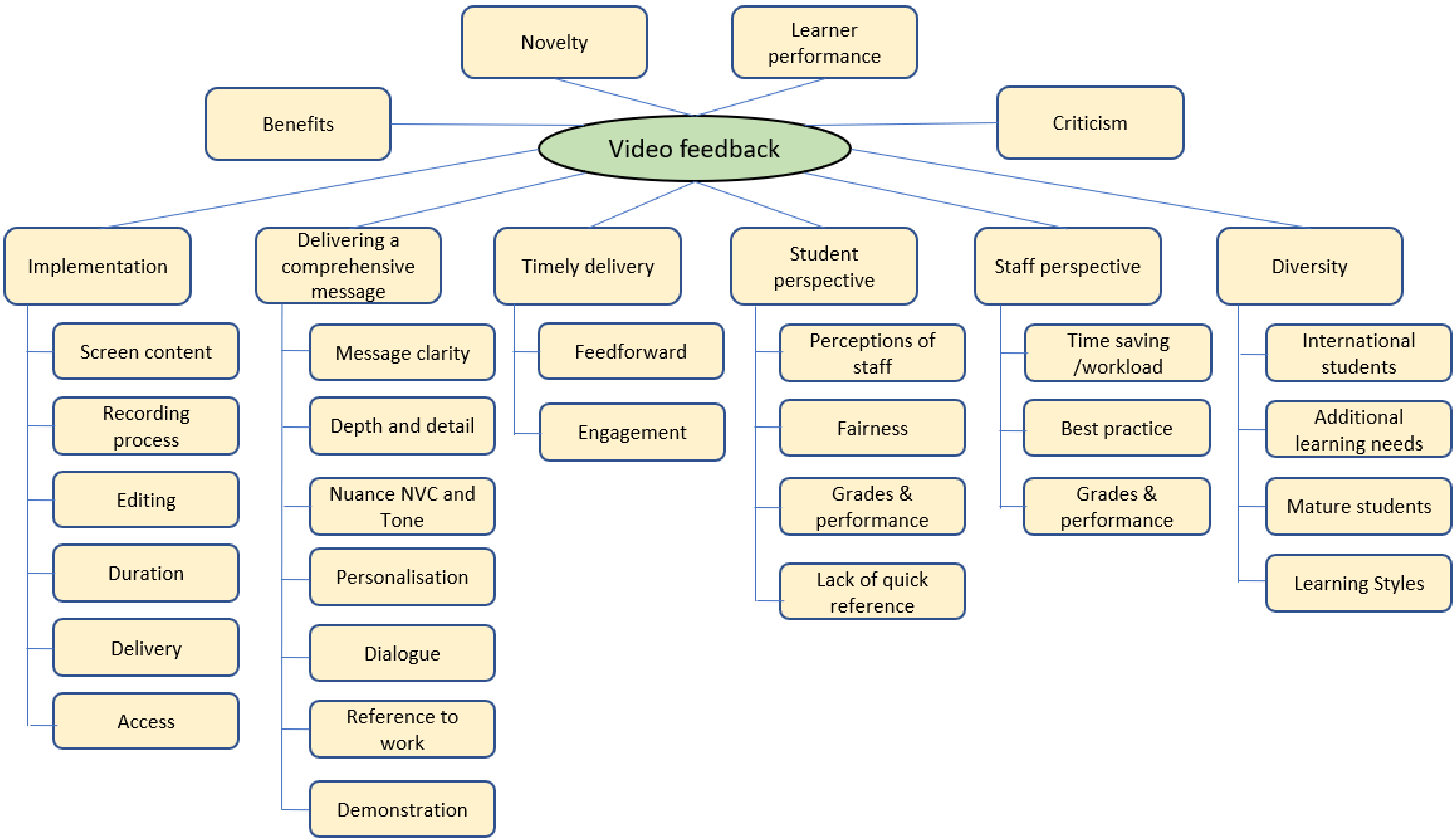


Figure 3.2: A revised mind map of potential themes

During the synthesis of the body of knowledge available, as the number of studies reviewed grows patterns emerge which may provide useful knowledge. Thereby, the themes are derived from terms used in practice, the findings observed provide authentic outcomes, and the context information provides researchers with a set of useful variables to consider when comparing the context to their own.

3.3.6 Phase 6 - Writing the report

Finally, a literature review is produced. The purpose of the review is to summarise the findings of the studies, into discussions of themes. In this way it facilitates decision making processes.

3.4 Literature Review - the report

The core of the publications reviewed here consist of 23 journal articles, 10 conference papers and proceedings, 3 reports and a book chapter, each invariably written by teaching staff out of concern for their students. The educational context of the studies means the research is through personal inquiry with the researcher situated within the research context. The desire to improve practice through applied creativity and reflection (McIntosh 2010) is consistently present. The rationale for improving practice is always to improve quality of life (McKernan 2007) for both students and staff.

Scope

Video feedback has long been used as a tool to facilitate students self-review of performance, behaviour or physical skills. Examples of this function can be found as far back as the 1960’s (Fukkink et al. 2011). In the 1970’s video feedback was used in a teacher training technique known as ‘micro teaching’ (Cameron and Cotrell 1970; Cotrell and Doty 1971) to enable trainees to reflect upon classroom performance. This review does not include the use of video feedback designed to fulfil a self-review purpose.

The publication dates of papers span from 1998 to 2017 with a significant gap between 1999 and 2007 with only one paper published during those 8 years (as shown in figure 3.3), proving that Inglis (1998) and Cruikshank (1998) were well ahead of their time when they published in 1998.

Online courses have differing levels of personal interaction between students and staff making it difficult to ascertain the extent to which the course design affects relationships and learning, however there are some pertinent lessons to be learned from studies completed in an online or blended setting, and so reference may be made to them in this review.

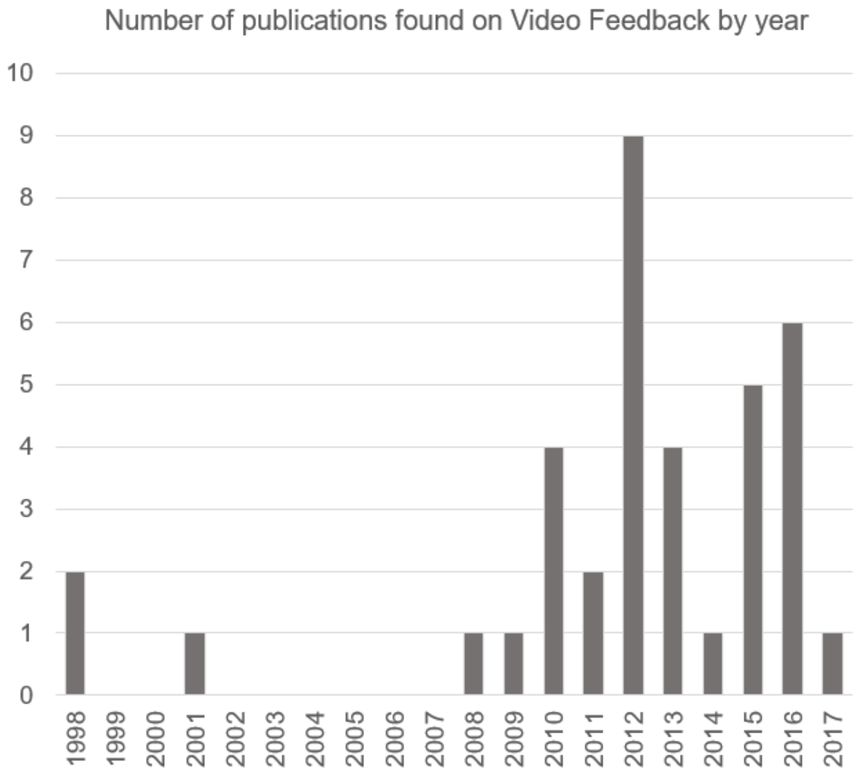


Figure 3.3: Number of studies published on video feedback in practice by year

Feedback can be intrinsically provided as the result of a learning activity. By reviewing the result of their effort, the student may be able to identify where changes are required, such as when a computer programming student executes a program they wrote and observes what it does (Inglis 1998). Intrinsic feedback is not normally acknowledged as feedback as it is not always possible by design, and is not normally part of a formal assessment process. Peer marking is frequently part of a formal assessment process, however, the issues of peer marking differ from those of marking by staff, and so scenarios involving peer marking are also excluded here. The original problem motivating this work was identified on a course with attendance, therefore, this work focuses on the use of video feedback on attended courses, where assessment feedback is extrinsically provided by staff performing the role of marker.

Researcher motivation

Using video as feedback on HE courses as normal practice is still a rare occurrence and the variety of studies available can leave more questions than answers (Thompson and Lee 2012). Currently researchers are setting out to solve today's problems, and they are making decisions based largely on experience, instinct and preference. Those who publish their findings discuss facets of their studies perceived as important to them, and miss out others which at first appear insignificant. Some results will appear to have little impact due to low numbers in almost every report. For instance, some groups of the student demographic e.g., mature, dyslexic or non native speakers, may have low numbers in a study, but when those numbers are examined across studies they may in fact, contribute to building a global picture. It may be possible to improve the learning potential of video feedback based on the wealth of experience of the research community. This work attempts to explain reasons for researchers to include details and what they might consider less significant findings, to facilitate comparison across studies. By comparing findings of published works and examining attributes of the study contexts, it is hoped that a perspective across many reports will result in a useful and robust contribution to best practice.

Structure of review

The themes derived from the thematic analysis of the literature are divided between the context of the practice in which video feedback is put into practice, and the perceptions of the two stakeholders; students and staff. First there will be an explanation of the system context, which is in turn split between the attributes of the system, and the attributes of the group of students. Second, there will be a discussion of how these attributes affect the perceptions of both staff and students.

3.4.1 System context

The system section discusses the practical details of the technologies and how they are implemented. How that can impact on ease of use, flexibility for staff, and the effects on the message delivered to students. Next there is a discussion regarding the demographics of students, since the findings of a study can be significantly altered by the demographic of the studied population.

3.4.2 Screen content

Video feedback has the potential to answer the main criticism of audio feedback, which is the lack of direct reference to work (Ekinsmyth 2010), by putting the student work on the screen. The role of screen content is to illustrate the learning message. There are publications from which it is difficult to determine what the content on screen is, as though it is obvious, a natural instinct embedded in tacit knowledge, or just unimportant. When setting up a system for video feedback recording by camera is very different to recording the content of the screen, or screen casting. Therefore, what is presented to students on screen is still a choice that must be made.

Academic work is usually visual by nature, in that we use our visual channel to process it. If it is text we read it, and if it is illustrated we look at it. Even music students submit compositions as music notation sometimes. Which means that to share with the student the experience of reviewing the work video is ideal. The use of screencast video as feedback brings together the student work and staff commentary in a way that audio and text feedback cannot (Ribchester et al. 2007, Cranny 2016, p.29116).

While most areas of study use their own terminology within the domain of work it is accepted that students need to learn these terms, and therefore need to look up terms they do not understand. However, if many terms are new for this piece of work, or the concepts are complex, using these terms in response to student work, is not going to necessarily improve understanding. For instance, when talking about a 'method' in computer programming the student , may not know which part of the code is being referenced, since a 'method' is not labelled as such. The facility to point out, or highlight areas of work with the cursor, as they are being explained, is very valuable (Marriott and Lim Keong 2012, p.593, Hyde 2013, Orlando 2016).

Annotations on work are useful for a single point of reference, but when taking a macro perspective to communicate structural issues eg: the class structure of object oriented programming traverses many files, or how conclusions match up to points made in the introduction of written work; only a screencast video can move between points of interest within the work at a similar speed to the explanation (Rodway-Dyer et al. 2011; Crook et al. 2012). This enables a focus on global issues without the need for students to piece together points or examples from various disparate sections of the work (Moore and Filling 2012; Ghosn-Chelala and Al-Chibani 2013). Being able to reference the work during feedback review in this way engages the student because of the clarity of the message communicated by it (Cranny 2016).

For some, building relationships with students takes priority and the screen content focuses on the marker to facilitate non-verbal communication (Henderson and Phillips 2015). The motivation for selecting this mode of delivery may be the limitations of the Virtual Learning Environment (VLE) platform (Borup et al. 2015) as some offer access to the camera to record video feedback, but not screencasting. That doesn't mean that uploading screencast video feedback to the VLE cant be done, it just requires further work to setup a system to achieve it. Therefore, using the camera to place the marker on screen is still a choice to be made.

Of course, screen content can contain a video of the marker on screen with the work, which at first may appear to be the best of both worlds. Mayhew (2016) made a deliberate decision to include her face on screen with the work in the interests of personalisation, and 72 percent of students responded positively. However, not all students are happy about seeing the face of staff. One commented on feeling 'awkward' during the review, and another asked for 'no face to face contact' (Mayhew 2016). Some students find coming face to face with the marker intimidating, especially when presented with a poor mark.

From a psychological perspective, using the screen to display the student work could reduce cognitive load compared to a 'talking head' of the marker alone. Without the work on screen the student must simultaneously follow their work to make sense of it. If audio and visual channels are both saying the same thing working memory does not have to hold on to concepts waiting for other information to be presented, improving the potential for learning (Mayer and Moreno 2003). It may also engage kinaesthetic ways of learning (Hynson 2012). Mayhew (2016) asked an open question to students about anything else they found particularly useful in video feedback, and almost half of the students remarked on the value of being able to see the work on screen. Henderson and Phillips (2015) chose to turn the camera on themselves as a means of making the most of non-verbal communication but then found that students missed the connection to the work. Being able to see the work takes priority for students, although there may be certain subjects where including a visual of the marker may augment the learning experience.

In the studies so far, the use of assessment documentation on screen, such as rubrics and marking schemes, have been used in synchronisation with the work (Thompson and Lee 2012; Turner and West 2013; Denton 2014; West and Turner 2016). It can illustrate the gap between what was expected and what has been delivered. Screencasting makes it easy to have both documents open (work and documentation) and to click between the two. It can also be used to reiterate the exact wording of the assignment question when students have glossed over, or missed out, important points.

Examples and demonstrations can similarly be pulled into view at appropriate times (Jones et al. 2012). They illustrate gaps between actual and desired performance, or demonstrate the effects of change by showing how the students own work can be altered, and the improved result. Video is a useful tool for conveying points of learning to feedforward into other work. Rather than simply identifying what is wrong, it can be made to provide guidance about how to improve the work and demonstrates the results of change. It might be to execute programming code before and after debugging code to demonstrate alternative solutions (Schilling 2013), or to hear staff reading original and amended versions of written work (Jones et al. 2012). Students appreciate being able to follow the markers thought process, to watch the corrections happening, and see the results of amendments. Learning takes place when, as a consequence, students comprehend the reason why a change is an improvement (Ghosn-Chelala and Al-Chibani 2013).

The source of the recording may be determined by the nature of the student work. Figure 3.4 shows the recording source used in studies by assignment submission type (a more detailed table is available in Appendix B.2). Those teaching subjects where the submission is a physical artefact need to opt for a camera to place the submission on screen. Anything that can be viewed electronically can more easily be reviewed with a screencast. The choice should be considered carefully as it also affects flexibility in terms of the variety of materials that can be presented. Screencasting offers greater flexibility regarding screen content because you can show e.g: the submission, documentation, simulations and model answers all in the same short video. The selection is made by staff and the decision process is rarely discussed in publications. Inglis (1998) found a camera was ideal for filming a gallery of photographic work. In computer programming where you want the student to move away from imagining the physical object, and to focus on the object as created in code, a screencast is a pedagogically sound choice. Currently the options are limited to the use of a camera, or screencasting, but this is likely to change over time as technology progress, for instance to include 3D imaging.

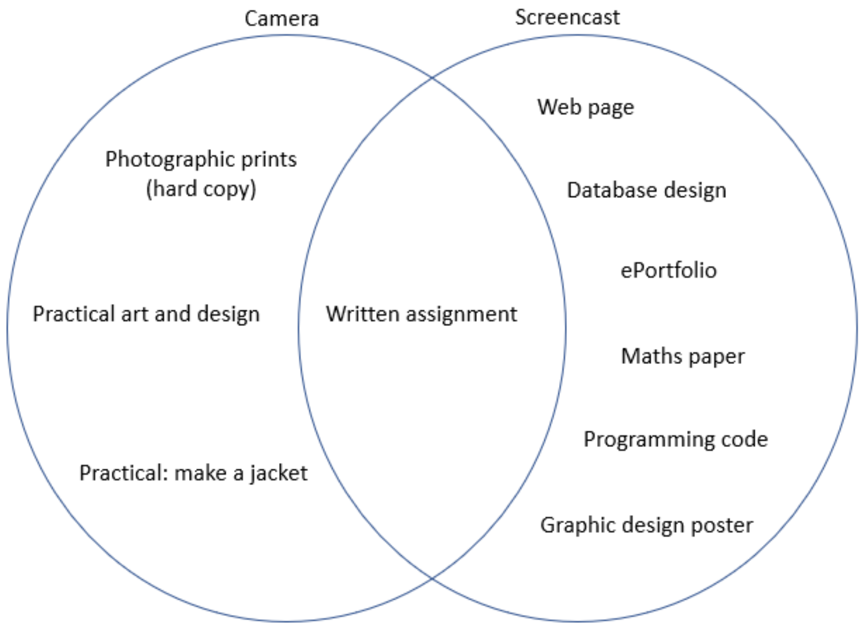


Figure 3.4: Venn diagram of assignment types sorted by recording sources used in studies

3.4.3 Recording and editing

The video production platform performs two significant functions – recording and editing. Most systems described in literature do not have the option for integration into the VLE, which is the most common method of receiving student work and distributing feedback. The varying degrees of integration means some systems are easier to use than others and can affect workload. However, what apparently has a larger impact on workload is the way staff choose to use the recording and editing system.

Some staff see the recording process as having a conversation with students (Ghosn-Chelala and Al-Chibani 2013, Borup et al. 2014, Henderson and Phillips 2015, Cranny 2016, Mayhew 2016), others become concerned about delivering a polished performance, and therefore, require software with facilities to help them achieve that. Some have become comfortable with a realistic conversational style and have given up trying to be perfect to maintain a manageable workload and ensure timely delivery (Borup et al. 2015, Henderson and Phillips 2015, Orlando 2016). Once the record button has been pressed there are normally options available for relief from the burden of continuous performance. One is to pause the recording and the other is to re-record it.

In software, so called ‘hot keys’ can control record, play, pause and stop functions of recordings without software being visible on screen, and can give staff a break for longer deliberations without the student even noticing (Mayhew 2016). The pause function is essential, to give staff time think, and to bring other materials on screen e.g., without making the student sit through the process of locating the file. Gould (2011) found the lack of a pause button on a budget camera to be a significant disadvantage.

Even so, staff are used to being able to edit text and can become concerned if they can’t take back what they say. Without easy to use editing facilities, they feel the need to make notes, or rehearse their ‘performance’. This adds significantly to workload, but so can video editing. Therefore, the production software used is an important consideration (McCarthy 2015). Some studies have edited videos as part of the normal routine (McDowell 2011), others have dismissed the possibility of editing as too time consuming to be feasible (Gould 2011; Henderson and Phillips 2015), and either just follow up mistakes with a correction (Orlando 2016) or opt for re-recording instead (Borup et al. 2015). This is a personal choice for staff. It is possible that a few practise runs is all it takes to give staff the confidence to accept that they can correct comments as part of the commentary, and to save the expense of a more comprehensive software package. With a little practice the need to re-record becomes rare.

When selecting software, there is a balance between functionality and cost to consider. For instance, TechSmith make Camtasia (Techsmith 2002), which is relatively costly, Snagit (Techsmith 1996), which is relatively cheap and Jing (Techsmith 2007) which is free. Camtasia (Techsmith 2002) has extensive editing facilities where as Snagit (Techsmith 1996) has limited editing facilities, and Jing (Techsmith 2007) has none. Screencast-o-matic (Gregory 2006) is free, unless you require editing facilities. Many cheap or free software for video recording don’t have editing options at all, meaning that if mistakes are made, re-recording the whole feedback is the only option (Séror 2012; Hyde 2013). Some have limited functionality, such as Panopto (2018) and Snagit (Techsmith 1996). Camtasia (Techsmith 2002) offers full editing functionality but may require an investment of time to become comfortable using in it practice (Hynson 2012). Editing was a vital requirement at Huddersfield for the VERiFy project (McDowell 2011), but considering the subject taught was computer games development the staff probably felt comfortable with the editing environment. Video production free software is currently lacking in editing functionality in a way audio software does not e.g., audio production software Audacity (Audacity Team 1999) has full editing functionality and is free.

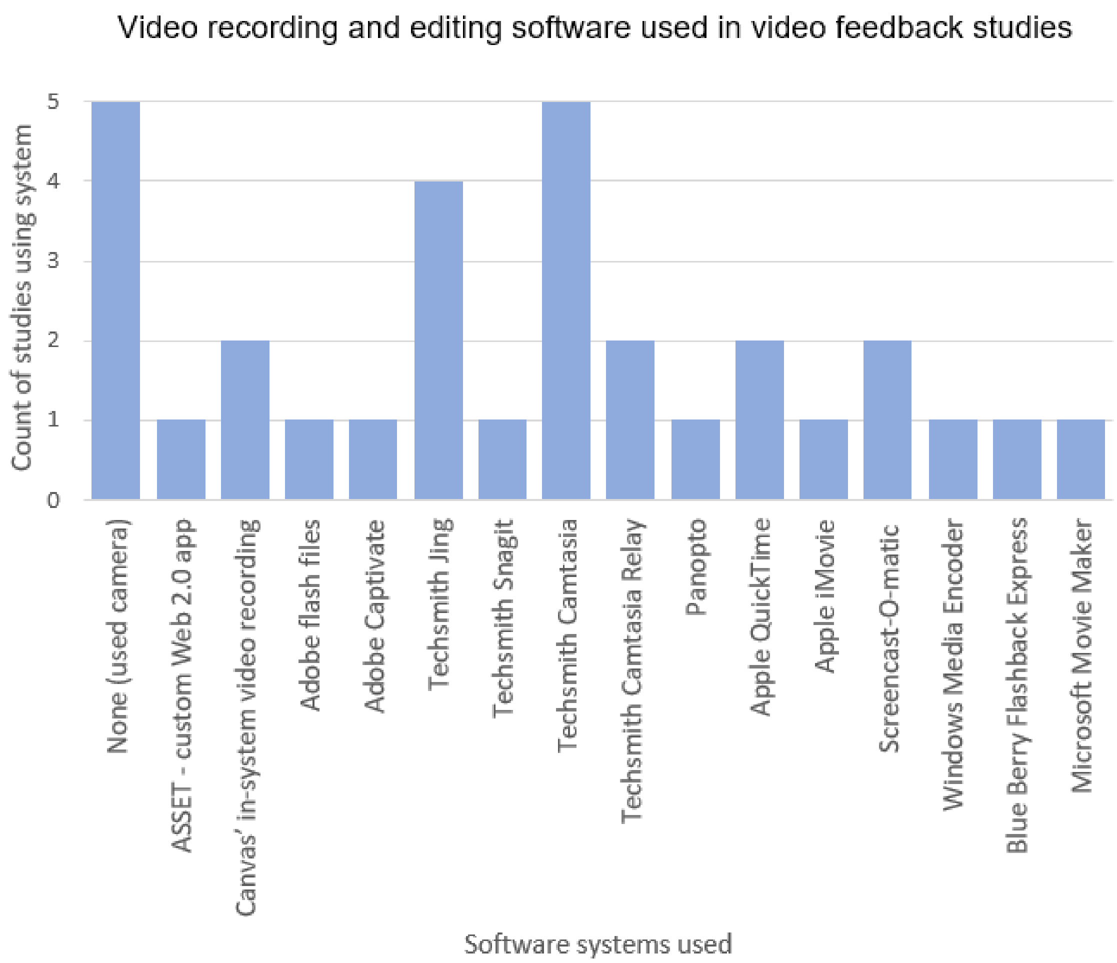


Figure 3.5: Video recording and editing software used in studies

3.4.4 Video duration and storage

The video has to cover all the points of learning considered appropriate by staff, whilst not being so long in duration that students disengage. Students comment on durations as ideally being no longer than 5 minutes (McDowell 2011; Moore and Filling 2012). In the study by Moore and Filling (2012) students said that 15 to 20 minute videos created by one instructor were too long. However, duration may also be restricted by the capabilities of the system. For instance, Jing (Techsmith 2007) limits users to 5 minutes putting pressure on staff, where Screencast-o-matic (Gregory 2006) allows for 15 minutes, which can be longer with payment. Therefore, when looking at the average duration of videos across studies, many may be affected by the limitations of systems they use. This means that there is a danger of technology driving pedagogy and staff need to ensure that good education is a priority.

Recording hundreds of videos (one per student) for each assessment is going to use a sizeable volume of storage. At this time, it is not wise to assume that just because you have a system that can store video files, that there is enough capacity to hold videos for the entire cohort, especially for a number of submissions. Institution IT policies may insist on student feedback being on an institution controlled system, whether that is a cloud service under contract, or hosted in house. Either way arrangements may be required in advance. It is common to use publicly available free cloud services to store feedback, such as Jing (Techsmith 2007) or Screencast-o-matic (Gregory 2006). Gomez (2010) was concerned that placing feedback on an external system such as YouTube (2005) might be distracting for students, although a hidden link prevents videos appearing in search results, and can be embedded in a VLE so that students would not normally click through to the site. Storage often gets ignored in the literature, probably because it is invisible to the user. The platform used may be difficult to identify since it is often, but not always, integral to either the recording system or the VLE.

Normally privacy is a concern for students regarding storage of data on computer systems. Although there is not always a contract in place if anything goes wrong with cloud systems there appears to be no concern, nor any case reported, of a hacked site where student videos have been stored. In the study by Cruikshank (1998) the video was a physical tape recording of staff walking through a gallery of student work. The content focus was on one piece of student work at a time, but viewing was a communal experience. Arrangements for private viewing were confounded by time constraints so that groups of students were forced to view together. Students were not comfortable having their work discussed in an environment where anyone could see the comments. Privacy is an important consideration for storage of feedback on an external server or cloud service (Marriott and Lim Keong 2012; Klappa 2015; West and Turner 2016). In which case, service level agreements regarding privacy must be examined carefully (Thompson and Lee 2012).

3.4.5 Distribution and accessibility

These days the ever-changing world of mobile devices gives students flexibility for access and re-access of their feedback in digital media formats, anytime anywhere, although in some situations the technology just isn't available. In the past reliable internet connections have been an issue (Hyde 2013), and in some parts of the world they still are. The need for speakers or headphones have also caused problems in studies (Hyde 2013). When considering access to video feedback the advantages reported include: -

1. Access from anywhere with an internet connection (Hyde 2013)
2. Repeated access any time (Crook et al. 2010, Jones et al. 2012, Cranny 2016, p.2911)

However, these 'advantages' are no different than for any other electronic media and not specific to video.

When considering improvements in accessibility, the previous form of feedback must be compared, to determine if video as a media offers an advantage over current modes of delivery. When compared to feedback on hard copy students are glad not to be required to keep stacks of paper (Ghosn-Chelala and Al-Chibani 2013) or to have to visit the university to collect work (Hyde 2013). However, since the introduction of the VLE students may be used to having their feedback as text delivered online (Hyde 2013), therefore, video is no more or less accessible when compared to text feedback on a VLE, or any other digital media. When comparing text, audio and video feedback access McCarthy (2015) found that students had no preference on the delivery aspect alone, despite slightly longer download times for video. Accessibility of a video may be considered an improvement over a face to face meeting with regard to the ability to revisit the content. Although highly regarded, face to face reviews, cannot be re-accessed later unless they are recorded (Henderson and Phillips 2015).

Some publications discuss how staff have come up with their own arrangements to place videos in the feedback area of VLE's (McDowell 2012b). ASSET is a custom-built platform produced to deliver videos, which was so successful that the University of Reading (UK) implementation was replicated at the University of Plymouth (UK) (Crook et al. 2010; Gomez 2010). The intention with the ASSET project was to integrate the video delivery system with the VLE, as the team could see the benefits of a single system for learning (Crook et al. 2010).

An alternative to the VLE is email. In large HE institutions every student has an email address set up by the institution. In the days before VLE's Inglis (1998)established the delivery of video feedback via email as feasible. Since then many of the size issues are greatly reduced, however, expectations of quality and duration have increased so compression may still be required (Stannard 2008; McDowell 2012a). In addition staff need to be aware that institutions normally limit the size of attachments, which may mean limiting the duration of recordings to make email a viable option. Some regard the direct emailing of the video file an improvement in accessibility over sending a link (Harper et al. 2012), however, students find that media files fill up their inbox (Hennessy and Forrester 2014; Klappa 2015) and so it is more practical to send a link to a video file stored elsewhere (Marriott and Lim Keong 2012). While practical issues can often be addressed, the changing way students use systems is rarely considered. Sweeney (2009) was sending audio feedback via email and felt students were becoming 'email adverse' and that student accounts are often full of junk and unused, therefore reducing the chances of engagement with feedback.

Ideally delivery of feedback by video would be through the feedback area of VLE. That is where students expect to find their feedback, and where they normally find feedback in other formats. It would be easy if all VLE's had the recording, production and distribution technology, for both on camera and screen casting, built in. It is coming, but meanwhile, it is always possible to link a video. In fact, it is usually possible to embed the link in the page so that the video appears on screen as part of the VLE page. Hyperlinks are usually easy to paste into the feedback area of a VLE (Cranny 2016, p.2919), but the location of stored videos has to be considered separately. Some recording applications are compatible to link through the VLE interface, which may come with their own storage space e.g., such as Panopto (2018), or Screencast-o-matic (Gregory 2006) (as used by Cranny (2016)). There is the potential for attaching, or uploading, video files directly to the feedback area as Mayhew (2016) did with a small sample size. However, you may need to investigate whether the infrastructure really can cope with larger numbers. Storage is a consideration that is easy to forget since it is hidden behind the user interface.

3.4.6 Timeliness of delivery

Timely delivery is crucial to the effectiveness of learning from feedback. For learning to feedforward there has be time between the delivery of the feedback artefact and commencement of the next piece of work for review and for learning to take place. Delivering feedback before the next piece of work is begun means leaning can influence grades immediately. Delays in feedback delivery is not necessarily detrimental to effectiveness, but it will slow down learning (Inglis 1998), and may frustrate students if they realise they could have improved marks sooner. Delivery was taking up to 5 weeks when video was trialled by Cruikshank (1998). A number of studies discuss the effect of modern day increased cohort sizes (Handley et al. 2007; Ackerman and Gross 2010; Cramp 2011) and commonly high student-staff ratios (Rotheram 2008). As more students enter HE, academic workloads increase, and that exacerbates the lag in the system between submission and return of work (Cann 2014).

Engagement with feedback is indicated by the students application of points of learning to future work. Mayhew (2016) found that 78% of her students believed that the video format had been the motivating factor behind their improved level of engagement with feedback over text. Many shared, or discussed feedback with peers, friends and family. (Crook et al. 2010; Hynson 2012). Students would watch the video initially and then later view it multiple times while taking notes and actively revising papers, whilst others dislike the inconvenience and requested a transcript of the audio track (Moore and Filling 2012). Some studies set out to deliberately ensure that feedforward elements of learning were included in the feedback artefact returned to students (Crook et al. 2010; Moore and Filling 2012). Separately Moore and Filling (2012) and Denton (2014) demonstrated successfully the feedforward effect of video feedback on a writing assignment, with significant improvement in grades between submission and re-submission. Although it should be noted that of both small samples the majority were teacher trainees or education majors, and therefore have a vested interest in pursuing the potential of the method.

Some studies have been done into the use of ‘generic’ feedback to solve timely delivery issues (Crook et al. 2010; Gomez 2010; Crook et al. 2012). ‘Generic feedback’ is where the same artefact is returned for review to entire cohorts or classes of students without reference to individual student work. By returning a single video covering common issues, students have time to learn and feed learning forward, and their grade expectations are lowered as they realise their mistakes ahead of receiving an individual grade (Stannard 2008). This has several advantages for staff. By producing only one piece of feedback for all students taking an assessment turnaround times can be fast. With experience, the video may be produced in advance of submission offering students immediate feedback (Klappa 2015). If the same assignment is used year on year the same video can be returned to the next cohort of students. However, be aware that students talk to each other across cohorts, and therefore if the video merely demonstrates a model answer there is a risk that the following year every student may hand in identical submissions. In addition, some students do not like generic feedback and say it de-personalises the experience for them (Crook et al. 2012). Klappa (2015) suggests that an individual approach makes the student feel valued and important, which is reduced, or lost, if only generic feedback is produced. Hence why it has been used as a precursor to individual feedback (Stannard 2008). Initially that might seem to offer no time saving, but now the individual feedback does not have to cover the aspects already covered in the generic video, and the students have still received some feedback very quickly.

Student perceptions of what is a reasonable time frame for feedback delivery vary. Getzlaf et al. (2009) study was in the context of an online course where students suggested a reasonable time period to wait for feedback was anything between 24 hours to 2 weeks. There is the potential for this perception to be different in a course with attendance. An online student doesn't see the other activities of the staff, or the numbers of student's staff must deal with. Nor did this study specify a type of assignment to consider. This study demonstrated the importance of managing student expectations in this matter. Students wanted to know when they could expect their feedback, and if there was a problem meeting that deadline they wanted to be informed as soon as possible (Getzlaf et al. 2009).

3.4.7 Class context

The term 'class' is used here loosely as a collective noun to describe a set of students involved in a single study, since for the purposes of categorisation students are regarded as a group, regardless of whether they are all in the same taught class. The class has attributes in common, namely that they are involved in the same study and subject to video feedback delivered in a specific context. The context forms the set of variables for comparison between the scenarios in which video feedback is implemented. McCarthy (2015) suggested a set of attributes for consideration, which are very similar to those discussed here. The system implementation details are normally selected with the student audience (class), and the assessment they will complete, in mind, therefore the attributes of the class have significant influence over the system implemented. They are the class size, the subject and type of assessment, the academic level and groups that make up its diversity.

Class size

The class size is an indicator of workload, which is one of the main concerns expressed by staff regarding video feedback. For a true sense of the work required, and therefore, the relevance of study findings, three measures regarding the size of a class are required. These are:-

- Numbers of students in the class
- Numbers of staff sharing the marking workload
- Longevity of the study

It may be difficult to determine the size of the class, because some researchers include numbers of students a) receiving video feedback or b) responding to surveys, but not necessarily both. Those who only include one figure don't always specify what it represents. Some researchers acknowledge that they are basing conclusions on small sample sizes (Parton et al. 2010, Cranny 2016, p.29117). Others specifically state that their samples sizes are too small to make generalisations from (Stannard 2008; Ghosn-Chelala and Al-Chibani 2013) . Most studies returning individual video feedback involve between 15 and 50 students (Gould 2011;Moore and Filling 2012;Denton 2014;Brereton and Dunne 2016; Cranny 2016; Mayhew 2016; Sprague 2016). A few studies based on attended courses have successfully responded to over a hundred students with video feedback (Marriott and Lim Keong 2012; Henderson and Phillips 2015), although not necessarily in a single submission. Online courses have also used video feedback with larger numbers of students. These numbers are usually below the normal size of cohorts enrolled on some popular courses today. Those returning 'generic' feedback, (that is a single video response to a group of students) have studies involving larger numbers (Crook et al. 2012; Gomez 2010).

The numbers of staff involved indicate the numbers required to make the workload feasible in practice yet is rarely explicitly reported. From the details that can be ascertained, when looking at attended courses some are working alone (Mayhew 2016) or in pairs (Moore and Filling 2012; Thompson and Lee 2012; Henderson and Phillips 2015). Where publications cover several studies it becomes harder to discern staff numbers, however, no one claims they added staff to their marking team when switching to use video feedback. One can speculate that staff are not given extra resources since they are, in fact, hoping that use of video feedback will lighten the workload.

Studies are, in the main, short term eg: a single semester (Brereton and Dunne 2016) or assignment (Jones et al. 2012; Henderson and Phillips 2015) and therefore, it is unclear whether the momentum of the use of video feedback can be kept up in the long term. This maybe the result of a desire to publish soon after the first attempt to trial video feedback in practice. The significance of these short term trials can be elevated with a follow up paper if video feedback has been in use for a longer period of time. The lessons learned over that period could be very useful with regard to best practice.

Assessment subject and type

The subject studied by the class is an indicator of the types of assignments that are likely to be relevant. These often determine the selected source of the recording (see section 3.4.2 Recording Source). Subjects with the highest representation among the research are: -

1. Those with an acute interest in the purpose e.g., education or teacher training (Tochon 2001; Parton et al. 2010; Turner and West 2013; Borup et al. 2015; West and Turner 2016).

2. Those with an overlap with facets of digital video as a media e.g., media and arts, or computing (Cruikshank 1998; Inglis 1998; Stannard 2008; Gould 2011; McDowell 2011; McDowell 2012a; Schilling 2013; McCarthy 2015).

3. Those with an interest in the audio explicitly e.g., languages (Tochon 2001; Harper et al. 2012; Séror 2012; Sprague 2016).

Each of these areas have at least 4 studies where other subjects have only 1 or 2. Some areas overlap, e.g.: Technology integration for Education Majors (Thomas et al. 2017). Examination by submission type shows that courses where the format of the submissions is academic writing are well represented e.g., English (Stannard 2008;

Henderson and Phillips 2015), professionalism (Hyde 2013), project management (Jones et al. 2012), children's literature (Moore and Filling 2012), statistical analysis (McDowell 2012b), defence policy (Mayhew 2016). Some studies are conducted across a variety of subjects which are not explicitly reported and so they may cover the large numbers of subjects not represented here.

Academic level

The research demonstrates feasibility of video feedback on taught courses from foundation stage (McDowell 2011) and freshers McDowell 2011; Harper et al. 2012; McDowell 2012a; Ghosn-Chelala and Al-Chibani 2013; West and Turner 2016) to post graduate level (Parton et al. 2010; Gould 2011; Jones et al. 2012; Henderson and Phillips 2015). Descriptions are sometimes inaccurate in so much as the language used in education is not precise. Terms referring to undergraduate 'final years' may mean year 3 or 4, depending on the course. Postgraduates may be masters level or undertaking taught sections of a PhD. Even though it is usually reported, education level is not examined anywhere. Most studies do not include multiple levels offering no comparisons to discuss. Others cover several levels (Crook et al. 2012; Jones et al. 2012) and discuss them as one large group leaving no means to identify any differences.

Diversity

Findings relevant to particular subsets of students within the class are likely to yield small numbers for analysis, making the contribution of the figures appear insignificant at first. Collected together with the results from other studies they may provide evidence of useful findings. Groups commonly in small numbers in studies include: -

- Mature students
- International students
- Students with additional learning needs
- Students with particular learning styles

Comparative studies rarely break the results into age groups. For instance, Orlando (2016) complains about the generic use of the term 'postgraduate' without indication of age. Where studies do identify age groups, it is noticeable that mature students often prefer text as feedback, and younger students prefer video feedback. Numbers preferring text are usually very low and often not commented upon specifically.

However, viewed as a whole across the literature it is clear that those preferring text are often mature students. Orlando (2016) reports this finding, since the majority of students involved in that study are non-traditional working adults, and therefore the results are significant. The student sample in McCarthy (2015) found mature students and two students in the lowest age bracket, preferring text. An interpretation of these figures could be that the mature students received feedback as text when they last studied so that is what they expected. The very youngest students are the most recent to move from school and so they also expect to receive text as feedback. Other students may be used to media being used in education and are used to it being a part of their life wherever it appears. In which case, familiarity is playing a part in student preferences as shown by the 22% of students in the study by McCarthy (2015) who preferred text as feedback, (however in this case the delivery method was also a potential contributing factor). If the contributing factor is age, that effect may become less prevalent over time (Orlando 2016).

There are a number of studies regarding students specifically studying languages, but very little to represent international students studying other subjects. In the study by Jones et al. (2012) the student population was 75% Indian, learning in Wales, UK; being taught in English (rather than Welsh). Sometimes these students did not want to admit when they did not understand something, and they appreciated the option to re access the video to work it out for themselves. Sprague (2016) concluded that students prefer video as feedback regardless of first language. Students make use of additional non verbal cues to derive meaning from their feedback, which are not available in the hand written comments they were used to.

The diversity of additional learning needs makes reporting results complex as each individual set of needs are likely to be made of an intricate combination, with varying degrees of impact of each aspect, and therefore difficult to categorise. Although diagnoses can be used as categories in real terms each covers a broad spectrum of types and degrees of difficulty.

Dyslexia is a recognised difficulty under the UK Equalities Act 2010 (Parliament 2010), and internationally by e.g., the Americans with Disabilities Act 1990 (ADA). The acts both say that reasonable adjustment should be made to prevent people with dyslexia from being at a disadvantage. Since the nature of dyslexia is a difficulty when processing text it is not surprising that some studies have reported some students preferring video feedback over text ((McDowell 2011); Marriott and Lim Keong 2012; McDowell 2012b). As a subject area it is thought that computer games development attracts higher than average proportions of learners affected by dyslexia and/or Asperger's syndrome (McDowell 2012b) and therefore, there is the potential for video feedback to improve learning for many students on courses with similar proportions.

Additional learning requirements can affect staff as well as students. If at no other time, when marking student work, staff feel they should communicate professionally and with accuracy to students since they are sitting in judgement on the student work. For those who struggle to express themselves in text, video feedback may work as a viable alternative for those who live with e.g., dyslexia, releasing them from a pressure to generate large quantities of well-formed text in short time frames (Jones et al. 2012).

It is accepted in modern education that students have preferences for learning styles which enable effective learning (Schilling 2013). Students who describe themselves as visual learners (Jones et al. 2012) auditory learners (Moore and Filling 2012) and indeed, auditory and visual learners (Turner and West 2013) claim video feedback appealed to their learning style more than written comments. The improved variety of information available has the potential to appeal to a greater diversity of learning styles (Stannard 2008; Crook et al. 2010; Schilling 2013; Mayhew 2016). Students may be developing new learning strategies all the time to suit their style as technology evolves. It is important we monitor for changes and ensure the feedback continues to be suitable (Schilling 2013).

Student perceptions

There are a set of attributes of the learning message reported by students as shaping their perspective when feedback is returned as a video. These are: -

- Message Clarity
- Depth
- Detail
- Nuanced Non-verbal communication
- Tone of Voice
- Personalisation

- Dialogue

On the whole, clarity depth and detail contribute to the improved quality of the learning message and the students understanding of why they received the grade given, while the tone of voice, personal touches and dialogic style go a long way towards building a supportive relationship.

Improved learning message

The benefits of feedback are only realised if the message is well communicated (Cranny 2016, p.29117) by making clear issues in the work and how a student can go about improving future work. Many students report lack of clarity as an issue with feedback as text (Gould 2011). Cruikshank (1998) and Moore and Filling (2012) found students were clear about why a tutor was criticising their work, and in the case of a failing student, it is still possible to elicit a positive response as long as the way to move forward is clear (Jones et al. 2012). Both Mayhew (2016) and McCarthy (2015) found clarity to be the biggest impact on the improvement in student satisfaction, with students claiming video feedback helped them clarify areas they did not previously understand.

Improved levels of depth and detail are often cited as the reason for clearer explanations. We speak faster than we can write, or most of us can type (see Table 3.2 below), therefore the elaboration, which is often omitted from text feedback in the interests of saving time, is often included with video feedback (Jones et al. 2012; Hyde 2013; Brereton and Dunne 2016). Comments from staff include being able to offer greater detail and to be more specific (Moore and Filling 2012). Mayhew (2016) found that 88% of her students felt that video as feedback improved the level of detail in comments on their work when compared to feedback as text.

Reference to study	Audio to Text word count ratio reported
Lunt and Curran 2010	6:1
Mayhew 2016	3-4:1
Henderson and Phillips 2015	2:1
Dagen et al 2008	2:1

Table 3.2: Audio to text word count ratios reported in literature

Students new to video feedback normally notice that they are receiving more information than they are used to through the newly available non-verbal communication. Text out of context is often interpreted in a more negative way than intended (Jones et al. 2012;

Brereton and Dunne 2016), and suffers from unsuccessful conveyance of nuances intended by the marker. In video, the content is more likely to be interpreted in the supportive manner in which it was meant to be received (Gomez 2010; McDowell 2011; Séror 2012; Hyde 2013), thus avoiding some of the misunderstandings possible when interpreting text (Jones et al. 2012).

With video, feedback review can be lifted from being a potentially negative experience by the tone of voice and nuances in the audio. Staff say they are more likely to provide positive comments and praise no matter what the grade achieved (Thomas et al. 2017). Comments can be pitched to the achievement without being negative, such as "Excellent job" for a first class piece of work, down to "You did your best and I'm sure you can do better next time" (Marriott and Lim Keong 2012, p.589), cushioning the experience of receiving bad news. Staff must, therefore, be mindful of their state of mind when marking to ensure a positive tone. The last student must receive the same level of enthusiasm and positivity as the first (Jones et al. 2012). Tiredness or frustration is difficult to hide in the narrative and will put students off listening if detected (McDowell 2012b). It's especially important to be careful with tone when the mark is a fail, however, as long as staff are considerate, tone can be used to soften the blow in a way that text cannot (Jones et al. 2012). In the study by Moore and Filling (2012) the students remarked on the fact that written comments could feel harsh, yet the video feedback encouraged students to feel improving their work was possible. Students will criticise an assessor who is not encouraging if they find comments hurtful (Cruikshank 1998).

Rapport and support

The ease of speaking compared to writing enables greater personalisation of video feedback (Marriott and Lim Keong 2012, p.595; Séror 2012; Turner and West 2013; Henderson and Phillips 2015; Orlando 2016; West and Turner 2016). Although written feedback may be individual to the student and the submission, with individual secure access to the VLE profile on which it is delivered; just hearing a member of staff say a student's name makes feedback feel much more personal (Getzlaf et al. 2009; Klappa 2015). When writing text, remarks regarding individuals e.g., "I noticed you were struggling with that in the lab last week", or directing students to other agencies such as e.g., well being for those known to suffer from exam anxiety (Klappa 2015), are the sorts of supportive messages that get omitted from text content (Borup et al. 2015) due to time pressure. However, when creating video feedback these are easy to include and make video feedback a much more personal experience (Hyde 2013). This emotional connection can improve student-staff relationships for the future.

Often literature merely reports that the feedback by video was regarded as more personal by students without elaboration. However, (Jones et al. 2012) expresses the importance of the tutor giving ‘ownership’ of the feedback to the student. What they go on to describe is a journey through the work in partnership, with the tutor offering personal attention to the work, and therefore to the student. A step-by-step level of granularity is invariably perceived as helpful, and motivational (Marriott and Lim Keong 2012, p.593). Similarly, Schilling (2013) suggests that text offers only sanitised final remarks, where video allows the student into the thought process of staff. By learning about how staff think about their work students may be able to apply some of those processes themselves to future work. It is this insight into the process of marking that provides students with understanding of how they obtained the mark given (West and Turner 2016) and contributes to a sense of fairness.

The modern perception of feedback is shifting from a one-way transmission towards feedback conceptualised as a dialogue (Nicol 2010, Cranny 2016, p.29116). Staff comment on enjoying the opportunity to express themselves in a more natural conversational style (Séror 2012; Borup et al. 2015), which makes it similar to a face to face meeting (Jones et al. 2012, Cranny 2016, p.29116). Although the asynchronous delivery prevents the video feedback from being an immediate dialogue, it is regarded by students as being close to hearing the marker’s half of the conversation in a face to face meeting (Jones et al. 2012, Cranny 2016, p.29116). Students appreciate the similarities of face to face conversation with the opportunity to absorb what is said, and without the need to think of an immediate response (Henderson and Phillips 2015) ie: without the performance anxiety. In this way, video feedback can form the beginning of considered conversation that goes beyond the current assignment (Harper et al. 2012; McDowell 2012a). This fits well with the modern perceptions of ideal feedback as a dialogue (Nicol and Macfarlane-Dick 2006, Cranny 2016, p.2913). Video may be a means of enabling the modern dialogic approach to assessment feedback.

3.4.8 Student perceptions

Positive student perceptions of video feedback are crucial to its potential as a feedback media. Students are generally very positive in their response to receiving video feedback noting the ease of use, personalisation and clarity of the message (McDowell 2012b, Cranny 2016, p.2914). Student satisfaction with video feedback, when expressed as a preference over other media, is usually reported as high (see Table 3.3 for a summary, and Appendix B.3 Table B.4 for more detailed information).

Research Study	Percentage of Students preferring Video Feedback
Gould (2011)	100.0%
Jones et al. (2012)	100.0%
Schilling (2013)	92.0%
Parton et al. (2010)	91.7%
McCarthy (2015)	91.0%
Mayhew (2016)	81.0%
Crook et al. (2010)	80.0%
Marriott and Lim Keong (2012)	71.8%
Cruikshank (1998)	67.0%
West and Turner (2016)	over 60.0%

Table 3.3: A summary of student preference for video feedback across studies (for complete table see Appendix B.3 Table B.4)

Students appreciate the effort taken over feedback when they can see and hear staff in action (Moore and Filling 2012). They can see how long they have spent looking at their work and they can detect the concern for them in their voice. This is thought to contribute positively to the relationship between students and staff.

For students to be willing to engage with feedback they must perceive it as useful (Brereton and Dunne 2016). Students engage with feedback in a number of ways. Videos may be watched multiple times, pausing and rewinding if required. Initially at least, the majority of students like to review video feedback in private on their own (Gould 2011). Students then discuss them with friends and peers (Crook et al. 2010) even family (Hynson 2012).

Students may perceive an improved experience through the use of video as feedback, but to date, results of studies attempting to ascertain actual improvement in learning are mixed. Ghosn-Chelala and Al-Chibani (2013) explicitly state that the students who did not receive video feedback showed greater improvements than those who did. However, this result appears inconsequential from a sample size of only 11. In the study by (Mayhew 2016) a larger sample still only delivered inconclusive results, therefore rigorous larger scale studies may be worthwhile. It is rare for the researchers of currently available literature to attempt to examine whether the use of video as feedback actually improves student results (Mahoney et al. 2018), however, students do report improved levels of engagement (Cranny 2016),

3.4.9 Student criticism

One aspect that is not so popular with students is the lack of a macro view of the feedback. Without a text version it cannot be skimmed as whole and essential bits picked out. Students who prefer text as feedback complain about this because they must listen to the whole piece in a linear fashion to find comments on particular points. Some students recognise the value of making their own notes whilst watching the video (Moore and Filling 2012; Mayhew 2016) whilst others dislike the inconvenience and request a transcript of the video audio (Moore and Filling 2012; Hyde 2013).

3.4.10 Staff perspective

On the whole staff want to congratulate students on their effort, and provide a means of improvement so that students do well on their course. The burden of creating feedback for students is one many staff could take pleasure in, except for the vast quantity of students and the consequential repetition, in a normally tight time frame (McGarvey and Haxton 2011).

The natural resistance to change in many of us means that often staff can be sceptical when suggesting a move to video as feedback (Jones et al. 2012; McDowell 2012a), yet in the end many prefer it (Orlando 2016). For staff to be willing to try something new, after years of something familiar, and good enough, there must be clear benefits. Ekinsmyth (2010) points out the difficulty of persuading colleagues of the need to change from what they perceive as working in the past, and to invest valuable time and effort in experimentation. Staff often correctly anticipate it taking longer to complete the marking load due to their lack of familiarity with the process (Haxton and McGarvey 2011; Hyde 2013) and incorrectly anticipate that the process will be difficult to master (Orlando 2016). Once the production of video feedback is practised time savings can be made (McDowell 2012a; Thompson and Lee 2012; Hyde 2013; Denton 2014), potentially halving the time taken (Henderson and Phillips 2015). Although there are studies suggesting the time taken is not improved (Jones et al. 2012; Schilling 2013) this may be dependent on the amount of practise by staff before the duration is measured.

In addition, the determination of improvement depends on previous experience. Where Klappa (2015) perceives 5-6 scripts an hour as a backwards step, Mayhew (2016) is impressed that an hour of marking now becomes an 8 minute video which is not only greater, but richer, in content. The time taken to produce video feedback is not normally reported in enough detail to usefully determine an improvement or to usefully compare to other studies, for instance, exactly which activities are included in the reported time taken. Some report the length of the video, while others may include preparation prior to clicking the record button, and upload times.

There are other potential advantages beyond time saving. Synchronising staff resources can also become less of a burden. Staff can use the video as a means of hearing themselves discussing student work with the student and/or groups. Assigning a mark can be taken to a separate process using the video as a tool for review (Cruikshank 1998) potentially overcoming scheduling issues with more than one marker, or enabling quality assurance strategies. It could be used among academics to ensure consistency of marking and reviewed by external markers (McDowell 2012a).

The contribution made towards building rapport between staff and student is usually framed as a benefit to the student. Once staff begin to experiment with video feedback they may find the constrictive limitations of using text are lifted, allowing staff to say things they have always wanted to say, and to illustrate and demonstrate things they have been unable to do so before. Marking becomes less of a burden allowing greater freedom of expression (Borup et al. 2014, 2015) and satisfaction from a job well done. As well as considering the work, staff can offer personalised pointers for feeding forward to future work and make an emotional connection with the student from their perspective, just as if the student was in the room with them (Jones et al. 2012; Klappa 2015).

3.4.11 Discussion

What is clear is that written feedback usually lacks sufficient impact to engage the majority of students during the review process (Gould 2011). It usually suffers from unsuccessful conveyance of nuances that are usually intended to be in the message by the marker (Gomez 2010; McDowell 2011; Hyde 2013). Although face to face feedback is often considered the most effective means of communication (Gomez 2010; Jones et al. 2012; Moore and Filling 2012) and it is not uncommon for students who are used to it to express a preference for it ((McDowell 2011); Moore and Filling 2012), some students find it intimidating especially if they feel their mark was inadequate, and there is no record of what was discussed when students attempt to make revisions to work at a later time (Moore and Filling 2012). With large student numbers face to face meetings are not feasible as resources rarely meet demand. Despite the potential for faster turnaround generic feedback is just that. The personalisation and individuality is lost (Crook et al. 2010). These, and others, are all issues that staff feel forced to ignore under the pressure of the workload.

Meanwhile video feedback is past the point of being hindered by technology. Instead it enjoys high rates of student satisfaction due to the capacity to deliver a clear and rich learning message with a personal and supportive tone that can contribute towards a positive relationship with staff. When staff are mindful of the recipient, the potential for good quality feedback is fulfilled. It has been proven feasible across a range of settings and subjects, but with limited evidence of the effects of refinements to practice. The current trend of staff studying video feedback in their own contexts has the potential to contribute to evidence based decisions for others in practice.

First there are indicators in the findings to date that indicate trends regarding the use of video feedback. However, each individual researcher is reporting the significant information as they see it, and omitting information where numbers appear too small to be significant. If researchers report all demographic and contextual information, and findings, no matter how insignificant they first appear in isolation, we can contribute to a global set of evidence for informed decision making in practice.

There is little by way of best practice guidance. There are some suggestions for the use of audio feedback (Carruthers et al. 2014b). Henderson and Phillips (2015) offer a set of guiding principles which apply to any media as feedback, but are especially pertinent to being mindful of the tone, which also matters greatly in video feedback. Orlando (2016) suggests a few best practices for faculty, which all relate to compensating for the technology, such as file sizes or sound quality, and to vendor specific products, rather than principles. Although best practise isn't discussed by Cruikshank (1998) the importance of prioritising pedagogy over technology is emphasised. Cranny (2016) and Haxton and McGarvey (2011) suggest guidelines specifically for screencasting, but do not cover the some of the same aspects, nor consider inclusive practice for students with additional learning needs. This is sometimes suggested as a focus for future research (McDowell 2011) and emphasises that there is never going to be a one-size-fits-all set of steps to follow.

3.5 Conclusion

Video feedback has the potential to facilitate high quality feedback as the norm, making the learning message more palatable than text or audio through its familiarity by the current generation of students. Despite constant calls for more research in using video in this way there are a number of studies reporting useful findings and despite many small sample sizes (Mahoney et al. 2018) progress is being made into its use for individual feedback with larger numbers of students, both online and for courses requiring attendance However, video is just a media. The staff creating the video have a great influence over its value to students (Borup et al. 2014; Henderson and Phillips 2015). If video feedback is successful in becoming widespread it may indicate a continued need to monitor the preferred communication channel of each new generation. Staff may need to look into creating 3D, or virtual reality feedback, soon.

The newness of video used as feedback means we haven't explored it to its full potential yet. Detailed descriptions of empirical studies are the key to developing strategies for best practice (Séror 2012). Therefore, in the interests of sharing and learning from our collective work, in the next chapter, a taxonomy is developed. It can be used as a means of sharing language and the basis for artefact development, such as a) a checklist of aspects to include when reporting on a study, or b) aspects to consider when implementing a video feedback production and distribution system, or c) guidelines for best practice. Most importantly, it can be updated, based on the progressive findings of the global research community.

Chapter 4

Development of a Taxonomy of Video Feedback

4.1 Introduction

Using video as feedback on HE courses as normal practice is still a rare occurrence. Currently researchers are setting out to solve today's problems, and making decisions based largely on experience, instinct and preference. They present aspects of their studies perceived as important to them and miss out others, which may in fact, contribute to building a useful and informed basis for decision making by teaching practitioners. The variety of studies available can leave more questions than answers (Thompson and Lee 2012). During the synthesis of the body of knowledge available it became clear that as numbers of studies analysed grows patterns are likely to emerge which may offer useful data for analysis. By using the literature as a development tool, the category descriptors will be derived from terms used in practice, the findings observed provide authentic outcomes, and the context information provides researchers with a useful frame of reference to compare to their own practice.

4.1.1 Why choose a taxonomy?

A taxonomy is mainly defined as a classification system (Usman et al. 2017). The organisation of information regarding a particular domain can make it easier to understand, and to share knowledge. The purpose of a taxonomy in its original domain of science, is to organise information by classification. In this work, the objects of classification are studies into the use of video feedback in practice.

An alternative to a taxonomy which may be considered, is an ontology. An ontology facilitates the description of complex entities and their relationships. In contrast, a taxonomy simplifies and organises complex information, and relationships are merely acknowledged. Hence why many ontologies contain subsections, which may be identified as taxonomies. The key motivation for staff to explore the use of video feedback is the potential for reduced workload. Therefore, creating a tool that is simple to apply is vital to its use, making a taxonomy the ideal structure.

4.2 Purpose of the taxonomy

The potential for learning from assessment feedback can be improved by producing the feedback as a video, and there is strong evidence that students prefer feedback in the video format. The evidence for this is prevalent in the literature. Currently there is little by way of guidance for practitioners using video feedback. Each publication reports the important points as perceived by their authors, but often not all of the data that impacts on the study is reported. A taxonomy may facilitate the production of artefacts providing comprehensive coverage of all significant considerations e.g., a checklist of information to include when reporting on studies in publications, to ensure all useful knowledge is available for analysis by other practitioners and researchers. Practitioners can only make well informed decisions about what will work for their students when they have all of the information. In addition, where results seem insignificant in individual studies, there is the potential for findings across many studies to provide useful evidence. For instance, if numbers of a minority group of students are low in a study the results for that group are often omitted from publications, or dismissed as insignificant, and how best to support that group of students is never properly explored. It is hoped that a comprehensive set of attributes that require consideration when using video feedback can form the foundation for guidance as a useful and robust contribution to best practice.

During the synthesisation of the literature it became clear that there is a core of information which researchers comment upon as having an impact on the practice of providing video feedback. Even when circumstances are unusual, resource availability is limited, or trialling something new, the comments are fundamentally one of 5 types. Therefore, it is intended that the following information from studies is classified into the taxonomy: -

1. System implementation details for production of video feedback in practice, including rationale for choices made.

2. Content and presentation style of the video feedback

3. Perceptions of students in receipt of video feedback

4. Demographics of students involved in the study

5. Perceptions of staff about producing video feedback

4.3 Development of a taxonomy

Development method for this taxonomy is a synthesis of those proposed by Nickerson et al. (2013) and Usman et al. (2017), with the structure selection advice from Kwasnik (1999). In each case, the concepts and constructed elements have previously been successfully utilised, and are now combined to form an artefact: a taxonomy development method. In turn, this method will be used to produce an artefact: a taxonomy of video feedback. The proposal and development of this combination of methods can be found in Section 2.5.4. The first seven steps consist of the tasks which require completion prior to beginning classification to ensure clarity of understanding and focus.

4.3.1 Preparation for classification

Step 1: Structure selection (Kwasnik 1999)

The structure selected is a faceted taxonomy. The rationale for this is the suitability for a new field of study, the flexibility of being able to store data regarding multiple unrelated facets of the same entity, and consequentially being able to view the data by filtering on one or more facets.

In this case the entities in question are studies into video feedback in practice. When analysing a study the user may choose descriptors from the appropriate facets to form a string. As an example Usman et al. (2017) creates a string made from classified characteristics of an ancient vase. The values classified into *Time period*, *Place*, and *Process* can form a descriptive string such as a ’19th century Japanese raku vase’. In this way the study can be explained by all of its facets, or a selected set of them. This is just one way in which the video feedback taxonomy will need to be applied to fulfil its purpose. In addition the structure used can be used to differentiate between studies by filtering on particular facets, or sets of them. In this way the faceted taxonomy offers views from selected angles on the same study (entity).

Step 2: Define terms (implied by Nickerson et al. 2013)

Nickerson et al. (2013) chose the term ‘taxonomy’ since the evidence of their research suggests that this would improve the likelihood of recognition. Pragmatically, the same will occur in this work, and the term ‘taxonomy’ will describe the artefact throughout. Here the term ‘taxonomy’ refers to the system, and the verb ‘to classify’, refers to the process of classification.

The points of classification also have a variety of potential terms. The main method being adapted (Nickerson et al. 2013, p.341) prescribes the points of classification are called ‘dimensions’ and values for those dimensions are called ‘characteristics’. However, the taxonomy being developed here has to consider the multiple perspectives which could be selected by a user and will therefore, be a multi-faceted taxonomy as described by Kwasnik (1999). In which case, the term ‘dimension’, will be replaced by the term ‘facet’ from this point onward. The term ‘characteristics’ will remain unchanged in its purpose and describe the values of facets.

Step 3: Become familiar with domain (implied by Nickerson et al. (2013, p.346) and Usman et al. (2017, p.44))

Ccrucial to the development process, the required familiarity with the domain has been achieved by conducting a literature review (see Chapter 3).

Step 4: Define the users of the taxonomy (implied by Nickerson et al. 2013, p.343)

The definition of potential users is said to help define the purpose of the taxonomy. The potential users apparent at this point in the development are intended to be academics performing one of three roles: - The first role is that of staff implementing a system for video feedback in practice. These staff are likely to be teaching staff, motivated by the potential increase in learning opportunities for students of video feedback. Teaching staff may need to collaborate with IT department staff, with skills and authority to set up such a system, and may be required to communicate implementation details with confidence that will be in the best interest of the students. Both staff who are very familiar with video feedback and those completely new to it are at risk of not remembering every aspect that needs consideration.
The requirement of a taxonomy from this role is : -

- a comprehensive list of set of implementation and context details for consideration from each study, so that nothing gets overlooked

- a shared vocabulary to ensure accurate communication.

A second role is that of teaching staff who are, or will be, producing video feedback in practice. The teaching team who will be involved in providing video feedback for students may use the taxonomy to benefit from previous experience of others, to understand the best way to use the system, and to present the feedback for their students.
The requirement of a taxonomy from this role is : -

- a comprehensive set of implementation and context details of each study, from which they can identify studies in contexts similar to their own
- a comprehensive set of findings regarding the perceptions of staff and students, and any other significant findings resulting from each study
- a shared vocabulary to ensure accurate communication.

The third role is that of researchers publishing articles regarding the use of video feedback. Currently staff publish their findings from an action research perspective i.e.: situated within the context of practice, but this need not always be the case in future. Sometimes researchers dismiss apparently low in number, or insignificant findings, thereby eliminating the potential for contributing to a global picture of that aspect. For example, the numbers of mature students in a class might be small but when the results from one small group are examined next to the results from the several small groups we may find that mature students have a particular preference or need regarding video feedback. Examining the taxonomy will show what is helpful to include in future reports on video feedback in practice. The requirement of a taxonomy from this role is : -

- a comprehensive set of implementation and context details to ensure reporting is comprehensive.
- a comprehensive set of findings regarding the perceptions of staff and students, and any other significant findings, which could be included to ensure reporting is comprehensive.
- a shared vocabulary to ensure accurate communication.

Step 5: Define the purpose of the taxonomy (implied by Nickerson et al. 2013, p.343)

The next step is to define the purpose of the taxonomy. We can do this by summarising the needs of the three roles identified in step 4.

- a comprehensive set of implementation and context details
- a comprehensive set of findings regarding the perceptions of staff and students, and any other significant findings
- a shared vocabulary to ensure accurate communication.

A shared vocabulary is clearly a requirement of any taxonomy, and therefore can be deemed objective (Nickerson et al. 2013) (see step 7), and eliminated from the purpose of this specific taxonomy of video feedback. What remains are two requirements to classify information on two distinct perspectives of the same domain. The matching sets of information from any study can be linked by the details of the particular study.

Step 6: Define meta characteristic (Nickerson et al. 2013, p.343)

As anticipated by Nickerson et al. (2013) the meta characteristic is not obvious at this point in the process. Therefore, it was considered necessary to mitigate against an incorrect decision by the addition of a step to the iterated section of the process defined by Nickerson et al. (2013). This is to ensure a review of the meta characteristics, to verify that they have been identified correctly. The meta characteristics identified are:-

- implementation and context details of a study
- perceptions of staff and students, and any other significant findings of the study.

Nickerson et al. (2013, p.355) states that the method defined here is for a single taxonomy. However, it is also explained that it is possible to create multiple taxonomies, possibly overlapping, for different subsets of a domain, Therefore, sets of dimensions from two perspectives can be defined as taxonomies separately, yet may be joined by some common facet. For this study it is considered potentially less complex to develop the two meta characteristics separately and merge them later if overlap becomes clear, rather than to attempt to untangle them at a later stage if it becomes clear that separation is necessary. Therefore, at this point, the taxonomies serving these separate meta characteristics will be known as the ’Implementation Taxonomy’ and the ’Perceptions Taxonomy’.

Step 7: Define ending conditions (Nickerson et al. 2013)

The development of the taxonomy will end when all the ending conditions are considered true. This will be considered during the process of classifying the studies examined in the literature review (Chapter 3), meaning a variety of studies will have been classified into the taxonomy successfully. Validation can then take place.

The ending conditions defined in the following tables are adapted from those defined by Nickerson et al. (2013). The two levels of objectivity defined by Nickerson et al. (2013) result in two tables of ending conditions. The objective ending conditions will satisfy the definition of a taxonomy, and can be seen in Table 4.1. The subjective conditions should be specific to the domain, and in this case are specific to a taxonomy of video feedback in practice. These are generalised by the terms concise, robust, comprehensive, extendable and explanatory, as the requirements which make a taxonomy useful (Nickerson et al. 2013). These subjective ending conditions are detailed in Table 4.2. Whether these have been met will be determined as 'Step 12: Determine if ending conditions have been met' (see Section 4.3.2), of each iteration.

Suggested objective ending conditions by (Nickerson et al. 2013)	Objective ending condition
All objects, or a representative sample, have been examined	A representative sample of objects have been examined
No object, dimensions or characteristics were merged, or split into multiple objects in the last iteration.	No characteristics were, split merged or changed, in terms of name, definition, or position within the structure, during the last iteration
At least one object is classified under every characteristic of every dimension	Every characteristic included was derived from literature or empirical study, and therefore none are empty.
No new dimensions or characteristics were added in the last iteration	No new relevant characteristics were discovered and added during the previous iteration
Every dimension is unique and not repeated	Every facet is unique and not repeated

Table 4.1: Video feedback taxonomy development method - Objective ending conditions adapted from Nickerson et al. (2013, p.344)

Subjective Ending Condition (Nickerson et al. 2013)	Questions - adapted from Nickerson et al. (2013)
Concise	Are the number of facets comprehensive without being overwhelming?
Robust	Are the facets sufficiently different to each other to make categorisation clear and easy?
Comprehensive	Can all characteristics of context, or findings, of any study, be classified?
Extendable	Can new characteristics can be easily added?
Explanatory	Is it clear from the names of the facets what they explain about a study?

Table 4.2: Video feedback taxonomy development method - Subjective ending conditions adapted from Nickerson et al. (2013, p.344)

4.3.2 Planning the Iterative classification process

This iterative section of the development process begins with Step 8. If in Step 12 it is determined that the ending conditions have not been met the process will return to Step 8, otherwise the classification process ends.

Step 8: Determine classification approach (Nickerson et al. 2013 & Usman et al. 2017)

The nature of each of the two taxonomies identified as a starting point are considered here, and how that impacts on the classification process. Finally, the approach used for the first iteration is discussed.

Implementation Taxonomy

It is intended that initially an inductive process is employed (Nickerson et al. 2013, p.334), being derived from the empirical and generalised to the conceptual across all the studies to realise column headings for a matrix. Each paper will be read and the characteristics for classification into a facet will be noted in the matrix.

Through the literature review process, it was known that some video feedback studies attempted to trial different things within the same reported study. A decision had to be made regarding how to classify the data whilst maintaining clarity. One option is to provide clarification by separating out the studies into two or more studies, which would require an additional identification characteristic for the separate studies, in such a way that also identified them as related. Another option is to treat the publication as one study and to enter multiple values in some facets when required. The latter was dismissed since it was impossible to work out how practice was implemented when there are multiple values for the same facet. For example, when you look at Table 4.3 is it possible to answer the following questions?

- Which assignment type was screen cast and which was recorded with the camera?
- How many students completed assignments of each type?

Therefore, when the information diverges at a single facet within the same study it will be split into two or more distinct entries in the taxonomy, even if that means much of the data is repeated. This will require a distinguishing facet being used to identify the different groups of results from the same study.

Subject	Recording Source	Assignment type	No. of students
Industrial Revolution	screen cast camera	essay presentation	232

Table 4.3: Example of how entering multiple values for a single facet, as characteristics of the same study, would reduce clarity

Perceptions Taxonomy

The facets in this taxonomy are conceptual labels for comments which make pertinent points regarding perceptions. Familiarity of the text means it is already known that sections of the text may contain overlapping points in the same paragraph or few sentences. Chopping phrases into increasingly small sections to prevent overlapping sometimes results in the loss of important contextual information, and sometimes division may be deemed impossible. Therefore, it was decided that comments may need to be repeated in different facets of the taxonomy if they were used as evidence of different points. An alternative approach is to classify general comments at a more general level.

Approach

Some iterations will follow the inductive approach, also chosen as a starting point, while other iterations will apply a deductive approach, moving from the conceptual to the empirical. This aligns with the recommendations of Nickerson et al. (2013, p.345) who suggests that different approaches are used with different iterations to ensure no new insights are missed.

Step 9: Define units of classification (Usman et al. 2017)

Usman et al. (2017) suggests defining 'descriptive bases', or a set of attributes used to classify subject matter instances. These are referred to by Nickerson et al. (2013) as 'dimensions', which in this faceted taxonomy translate to 'facets'.

According to Nickerson et al. (2013), the classification process is broken down into two separate branches which differentiate between the two approaches selected for the current iteration (inductive or deductive). Each branch consists of three steps. One step is the identification of new items (whether characteristics or dimensions, depending on approach), another regards grouping, and finally there is the revision of the taxonomy. It was quickly realised that if this process was followed to the letter the taxonomy always grows, as facets are never merged or removed. Although these options are briefly mentioned, the possibility of taking steps which may reduce the taxonomy size is not included in the diagram. Therefore, those steps are not explicitly followed here. The substeps considered useful here are :

- Optionally, classify characteristics to facets (ie: if approach is inductive).
- If a required change is identified to the facets, in terms of, creation, deletion, merge, rename or reposition in the structure, the taxonomy should be reorganised.
- Ensure no pertinent information was lost during any changes by reclassifying all data from moved or eliminated facets.
- If new facets were added during the reorganisation, previously examined objects may need re-examination to determine if characteristics exist for classification under the new facet.

Whilst taking care not to allow the taxonomy structure to grow too large, it is important to balance this requirement with ensuring a comprehensive taxonomy. The taxonomy of video feedback should be 'collectively exhaustive', (Nickerson et al. 2013, p.346) meaning that everything deemed pertinent should be classified. Therefore, additional facets may be created to sufficiently explain characteristics of practice, providing enough information to be useful to practitioners and researchers. Reconceptualisation of facets may mean that some are combined or deleted.

Step 10: Revise taxonomy (Nickerson et al. 2013, p.343)

Nickerson et al. (2013, p.343) positioned this step at the end of each of the two branches for both inductive and deductive approaches. Therefore, it occurs when either approach is implemented. A new version of the taxonomy is developed and may be re-diagrammed at this point.

Step 11: Revisit meta characteristic (Nickerson et al. 2013, p.343)

Since the meta characteristic may not become clear until later in the classification process, this explicit step will ensure the meta characteristic is reconsidered at this point.

Step 12: Determine if ending conditions have been met (Nickerson et al. 2013)

The ending conditions selected in step 6 will be examined at his point to determine if they have been met. If they are all met development will cease, and validation will begin. If they have not all been met the classification process will be repeated from Step 8 until the ending conditions are met.

4.4 Implementation of the iterative classification process

The initial set of units of classification were derived from the results of a thematic analysis of the literature (Braun and Clarke 2006) (see Figure 3.2). However, as the structure stood it was clearly unsuitable as a taxonomy. Some of the problems with the themes were only possible to spot by reviewing the proposed content. More fundamental problems with the existing themes were clear by examining the structure alone.

- There was a duplicated group of *Grades and Performance* under both Staff and Student perspectives, since both had made comments on this. Although it was intended to use these two subcategories to separate the perspective of staff from students, there were so few comments related to this the separation was not required.

- *Benefits* subcategory under the *Student* category contained comments regarding the benefits of video feedback, so many in fact that to be useful they needed splitting into categories relevant to the specific point being discussed.
- Although all themes were connected to *Video feedback* in the original layout, visually, they were presented as though they were external to *Video feedback*, rather than part of the whole.

As discussed in Section 4.3.1 Step 6, when defining the meta characteristics, it was realised that where there are two meta characteristics there is the potential for there to be two, albeit related, taxonomies. It was decided to create two taxonomies to match the meta characteristics. The process was to tease apart the themes of the literature review. It was accepted that a number of iterations may be required to achieve that separation, and that it may be a mistake to try to force that process through in a single iteration.

The next section explains the progression of the changes made for each iteration of the development process. Mappings of taxonomy facets between the incremental versions, and visualisations of each the taxonomy at the end of iterations are shown here where they illustrate specific points. A complete set can be found in appendices C.1 and C.2 respectively.

4.4.1 Iteration 1

The first iteration began with a baseline of themes from the literature and went through a process to transform these into facets of a taxonomy.

Step 8: Determine classification approach

For the first iteration the approach will be inductive based on some of the literature.

Step 9: Define units of classification

The themes of the literature review were created on an entirely ad hoc basis. Themes were created at the point where they emerged from the literature. The earliest version was unintentionally very much based on the structure of the publications. This later became something closer to categorisation defined by the data, but only sufficient to group information for a discussion on a general theme i.e.: to write the literature review. It was not sufficient to pick out specific details, or to enable study comparison. Therefore, the units of classification defined during the first iteration tended to be about making facets very specific.

The meta characteristic of ’Implementation’ seemed to be relatively easy to classify into facets. The meta characteristic of ’Perspective’ made sense while comments were relatively generic. However, there were many comments specifically regarding the ’learning message’, which were so many in quantity, and so specific, that it justified being at the same level as the previously identified meta characteristics. Nickerson et al. (2013) said that the meta characteristics may not become clear until later in the process so it was considered possible that the original selection had been incorrect. Now that there was a planned step to check the correctness of the meta characteristics at the end of each iteration, this could be left as under consideration for now with the potential for change later. Everything appeared to fit into one of three categories: -

- Message
  These were comments specifically regarding the attributes of the message in the video feedback, regardless of subject.

- Perspective
  These comments expressed the perceptions of an individual, or group of individuals, regardless of their role, in a general sense e.g., how individuals felt about video feedback.

- Implementation
  These comments were factual information about the system used to implement video feedback.

There were four specific types of changes made during the transformation process, as the themes from the literature review became facets of the taxonomy.

1. **Facet name changes -** where names of facets were amended as they were transformed from themes.

2. **Creation of new facets -** where new facets were created.

3. **Retiring themes/facets by absorption -** where original themes which became facets, were merged with others to become a facet.

4. **Move position of theme/facet -** where facets move within the structure to become part of a different group of facets.

Facet name changes

The theme regarding *Delivering a comprehensive message* remained in tact as a potential additional meta characteristic called *Message*, with only small changes to the names when translated to facets of the taxonomy. For instance, *Message clarity* became *Clarity*. This was because now the map was drawn out it appeared to be large, and with a view to a diagram, it made sense to shorten names to reduce duplication, which may also make room for rearrangement as an attractive visual element. Since *Clarity* was already within *Message*, it was thought it was already clear that the term referred specifically to the message conveyed. As the comments from more papers were examined it became clear that the term *Nuance* was not used as often as first thought, and so it was dropped reducing the theme name of *Nuance NVC (Non verbal communication) Tone* to a facet name of *Tone & NVC*.

Originally it was believed advice regarding the best way to go about the *Recording process* would be widespread. As it turned out, the recording process often lacks useful details. Where it is discussed, it very much depends on the software used, and the source of the visual element of the recording. For instance, recording videos on camera takes more steps to make the video available to students than a screen cast. In addition the editing function was thought to have been vital initially, and in reality is often not available in the software used, and rarely missed. Therefore, the original themes of *Recording process* and *Editing* mapped to *Software* and *Recording source* as facets in the first version of the taxonomy.

Creation of new facets

Previously there had been no category explicitly for consideration of screen content. It is one of those things that is rarely discussed in literature. It is treated as obvious, determined by instinct rather than decision, yet potentially one of the most impactful aspects of video feedback. Therefore a facet for *Screen Content* was added to the taxonomy, and the theme of *Demonstration* was moved from *Delivering a comprehensive message* to become a facet of *Screen Content*.

The original *Benefits* category was a jumbled collection of comments from both staff and students, regarding aspects of actual benefit and those which were preferred. Therefore, this collection was first split between the role of the person making the comment. Comments from staff were placed into the subcategory of *Benefits*. At this point students did not appear to have any criticisms, and comments from students could be split between their expression of generic *Preference* for video as feedback, or more specific comments regarding feelings of *Support*, perceived *Fairness* of the marking process, *Rapport* with staff, or how *Useful* they had found the message to be.

From the *student perspective* comments regarding their perceptions of staff fell into comments regarding the fairness of the marking process or the feeling that they had built a rapport with staff. Therefore, those comments were split between new facets of *Fairness* and *Rapport* in the taxonomy.

The *Implementation* of the system concerned itself with the appropriate *Duration* of the videos returned to students as feedback. There seemed to be issues in early papers with file sizes when storage was more of an issue than it is now. In addition, free online recording systems limit the duration of the videos stored on their systems. Therefore, it was anticipated that issues may reveal themselves, as more papers are reviewed, regarding the restrictions on the durations of videos. Therefore, characteristics of *Restricted* and *Unrestricted* were created under the facet *Duration*.

Comments regarding *Delivery & Access* tended towards two types. One was regarding the timeliness of delivery and the speed of delivery could being impacted by whether the feedback audience was individual or class receiving generic feedback. Therefore, these comments were re-classified into characteristics of *Generic feedback* or *Individual feedback*, under a facet of *Audience*. The second type was a set of comments regarding the ease of accessibility by students and the impact of the delivery mechanism. These were re-classified into *Accessibility* under the *Delivery* facet.

New facets were formed to collect information regarding less overtly discussed areas of *Screen content*. It seemed likely that if there was a requirement for a facet for *Feedforward* it was also likely that one would be required for *Feedback*, so that was created in case it became clear later what might go in there. (With hindsight this was clearly an error since all facets should have been derived from literature.) The original set of themes had nowhere for expressions of feelings of being supported to go, and so *Support* was created as a facet under learning.

Retiring themes/facets by absorption

The four aspects of *Diversity* could have been added to the new *General Communications* facet individually, however, that would have then become very large. It was decided that the facet of *Diversity* would be sufficient if it included all four original characteristics. This also offered flexibility by allowing for newly identified groups to be recorded here in future.

Learner performance is scarcely discussed in literature. Since normally the primary concern of both staff and students is that students fulfil their maximum learning potential, its rarity is probably less to do with the level of concern, and more to do with the difficulty of measurement. In fact levels of performance are most likely to be expressed by students in terms of how *Useful* they found the message in the video feedback to be, and whether they preferred to learn from video feedback than the media format of feedback they had previously been used to. Comments regarding this aspect had naturally ended up in the *Useful* or *Preference* facets, leaving the original *Learner performance* theme empty and so it was not implemented as a facet of the taxonomy.

The theme of *Staff Perspective* contained a theme called *Time saving and workload*, which had been considered the most important consideration for staff. However, following an initial flurry of comments seeing this in a positive light, that using video feedback could be viewed as having either a positive or a negative impact on workload. Therefore, the theme was absorbed into both of the more general facets of *Benefits* and *Criticisms*.

At first it had been thought that advice on *Best practice* for the use of video feedback would be commonplace and would need its own facet in the taxonomy. In reality there were very few suggestions. It was decided that these should be split into the facets to which each point referred rather than holding them together as a facet. The *Best practice* theme was not included in the taxonomy.

It was anticipated that the *Novelty* facet would contain many comments, and yet ended up with very few. Therefore, since it was always perceived as a potential criticism and always expressed by staff, *Novelty* became a characteristic of *Criticism* within the *Staff Perspective*.

Move position of theme/facet

The original *Criticism* theme was intended to hold the criticisms of staff and students. During examination of the first set of literature such comments only came from staff. The theme was moved to become a facet under *Staff* and within *Perspective*.

When analysed in greater detail comments regarding the ability to *Feedforward* turned out to be split between the whether the opportunity to learn was available in the video feedback message and the timely return of feedback to students. It was also determined that comments regarding *Engagement* were really looking at whether students had moved their learning forward and had time to do so. *Timeliness* was created as a characteristic of *delivery*, and *Feedforward* was moved to become a characteristic of the *Learning* part of the *Message*.

Step 10: Revise taxonomy

A diagram illustrating the changes made between the themes for the literature review and the taxonomy,is shown in figure 4.1. The visual presentation of the taxonomy was also considered. There was a sense that all the aspects needed to represent a whole, and that aspects would connect to each other across the whole, even though the connection type was not yet obvious. Therefore, a circular design was adopted to see if connections could be made across the centre between perspectives and implementation details (see Figure 4.2). No connections were made at this point but instinctively it felt that the circular visualisation may provide insight later into the process. In this way the original set of themes derived from the review of literature was transformed into the facets of the first version of the taxonomy.

Step 11: Revisit meta characteristic

At this point the feeling is that the original meta characteristics are correct but there is a significant volume of data to be recorded which does not appear to fit into that structure at this time. Many of the displaced comments are regarding the implementation of the learning message. Further examination is required before an appropriate means of classification can be determined.

Step 12: Determine if ending conditions have been met

Clearly there have been many changes to the taxonomy. Even if there had not been any changes however, the continued struggle with the meta characteristics would be enough

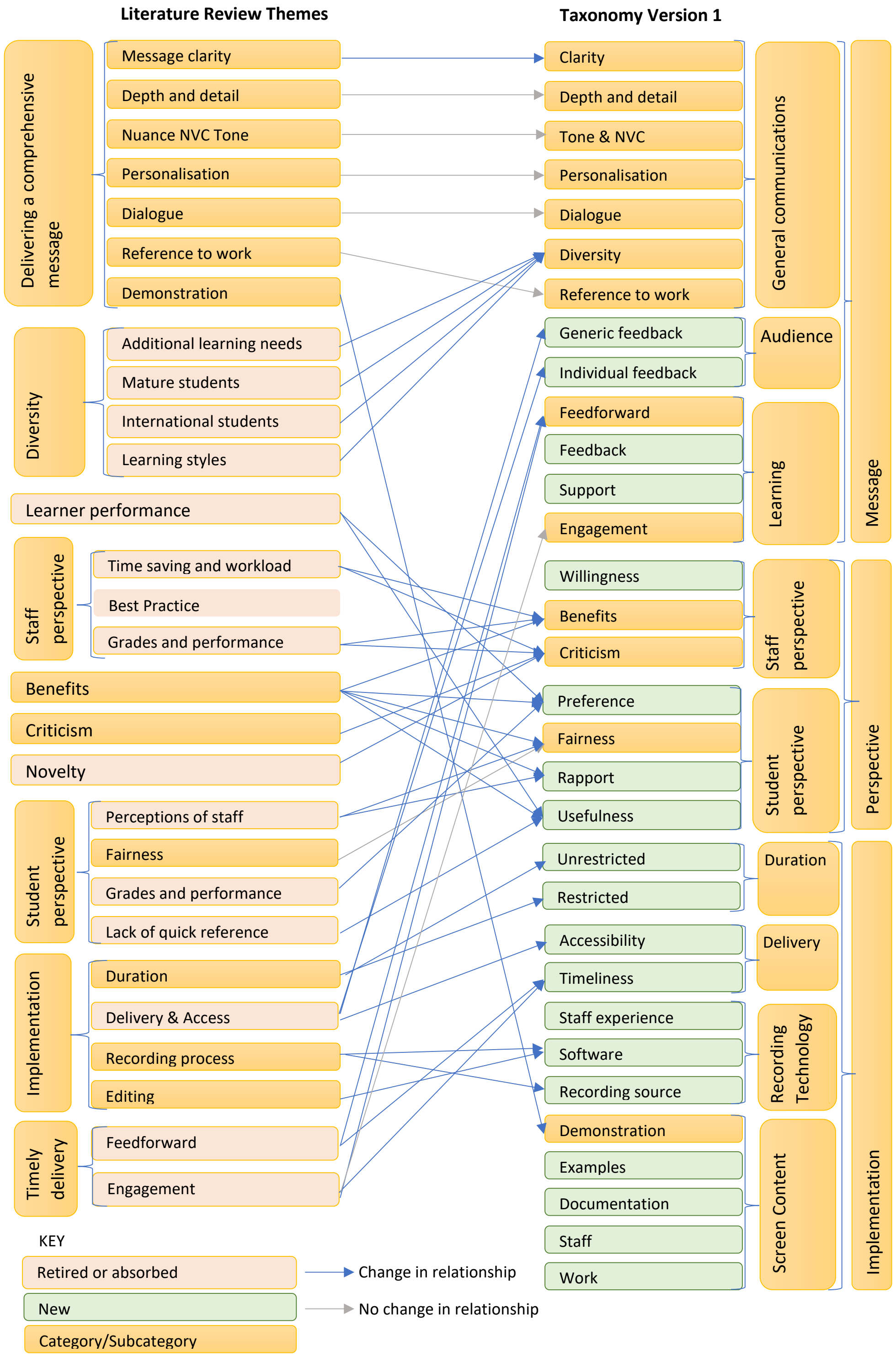


Figure 4.1: Mapping baseline themes for the Literature Review to the facets of the first version of the Taxonomy (version 1)

Figure 4.2: Taxonomy version 1

to justify a second iteration.

The tables of objective and subjective ending conditions by Nickerson et al. (2013) were brought together to form a checklist. In order to unify the tables, the questions used in the original subjective conditions were reworded as statements to enforce a binary response in the same way as the objective conditions.

Objective ending condition	Condition met
A representative sample of objects have been examined	false
No characteristics were, split merged or changed, in terms of name, definition, or position within the structure, during the last iteration	false
At least one object is classified under every characteristic of every facet	false
No new relevant facets or characteristics were discovered and added during the previous iteration	false
Every facet is unique and not repeated	true
Subjective ending condition	**Condition met**
Concise The number of facets are comprehensive without being overwhelming	false
Robust Facets are sufficiently different to each other to make classification clear and easy	true
Comprehensive All characteristics of any study can be classified	false
Extendable New characteristics can be easily added	true
Explanatory It is clear from the names of the facets what they explain about a study	true

Table 4.4: State of ending conditions at the end of iteration 1

4.4.2 Iteration 2

The ending conditions of the first iteration had not been met, and so a second iteration was necessary.

Step 8: Determine classification approach

The numbers of facets at this point were quite high at 33. In addition to the issue with the meta characteristics, this was a driver to consider division of the originally envisioned single taxonomy, into two taxonomies.

It was noticed that there was nowhere to keep the details of participant students playing the role of the *Audience* for the videos, such as the subject studied or the number of students involved, and so the content was re-examined. Therefore, an inductive approach was taken to re-examine the literature examined so far for these additional details.

Step 9: Define units of classification

Only three different types of changes to the taxonomy were made during this iteration, as this time there was no requirement to move facets between groups.

1. **Creation of new facets** - where new facets were created.
2. **Retiring facets by absorption -** where facets were merged with others to become a single facet.
3. **Facet name changes** - where names of facets were amended.

Creation of new facets

New facets were formed to store the details of the studies which may turn out to have an impact on the perceptions of the video feedback. They were *Student numbers*, *Subject studied* and *Academic level*.

Retiring facets by absorption

Comments regarding *Individual feedback* and *Generic feedback* were actually implementations designed to solve the problem of timely delivery of feedback, and so those comments were absorbed into *Timeliness* in the second version of the Taxonomy.

Most of the *General communications* facets remain unchanged, except *Reference to work* which is absorbed into the *Benefits* subcategory due to the lower than anticipated numbers of comments specifically regarding this aspect.

Facet name changes

The term 'General' in the category *General communications* did not seem to be adding anything to the title and was removed, resulting in a facet named *Communications*. A diagram mapping the changes made between the two versions of the taxonomy,is shown in figure 4.3.

Step 10: Revise Taxonomy

The second version of the taxonomy was created to include these changes. The visualisation of the second version of the taxonomy is shown in figure 4.4.

Step 11: Revisit meta characteristic

This time the diagram of the taxonomies triggered insight into how the large data set currently under the 'Learning Message' could be divided into the two originally identified meta characteristics, and that become the goal of the next iteration.

Step 12: Determine if ending conditions have been met

Since the meta characteristics have still not been resolved at this point the ending conditions have not successfully been achieved. It is anticipated that with greater clarity regarding the meta characteristics it is considered that many of the ending conditions will be resolved.

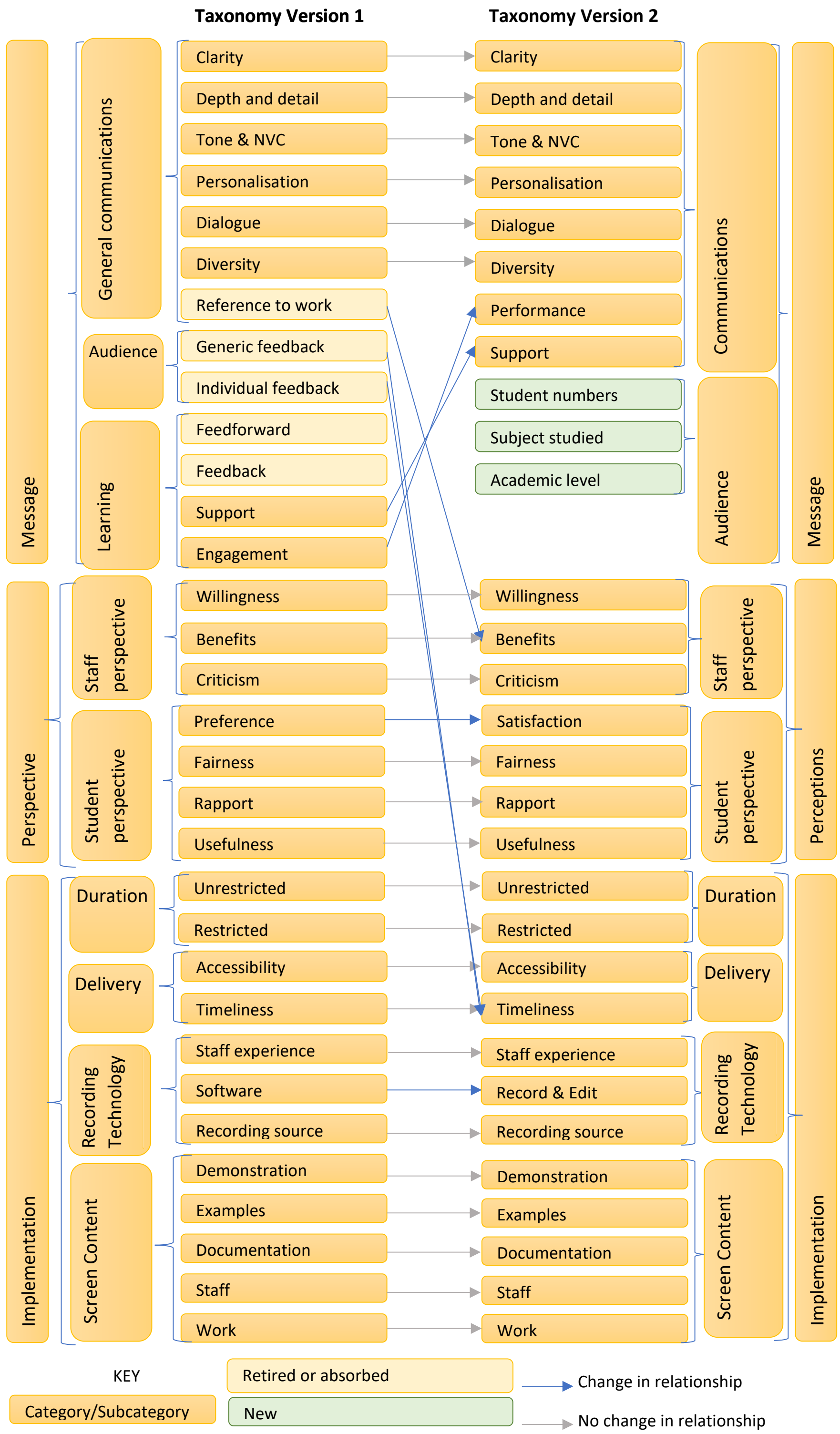


Figure 4.3: Mapping Taxonomy version 1 to version 2

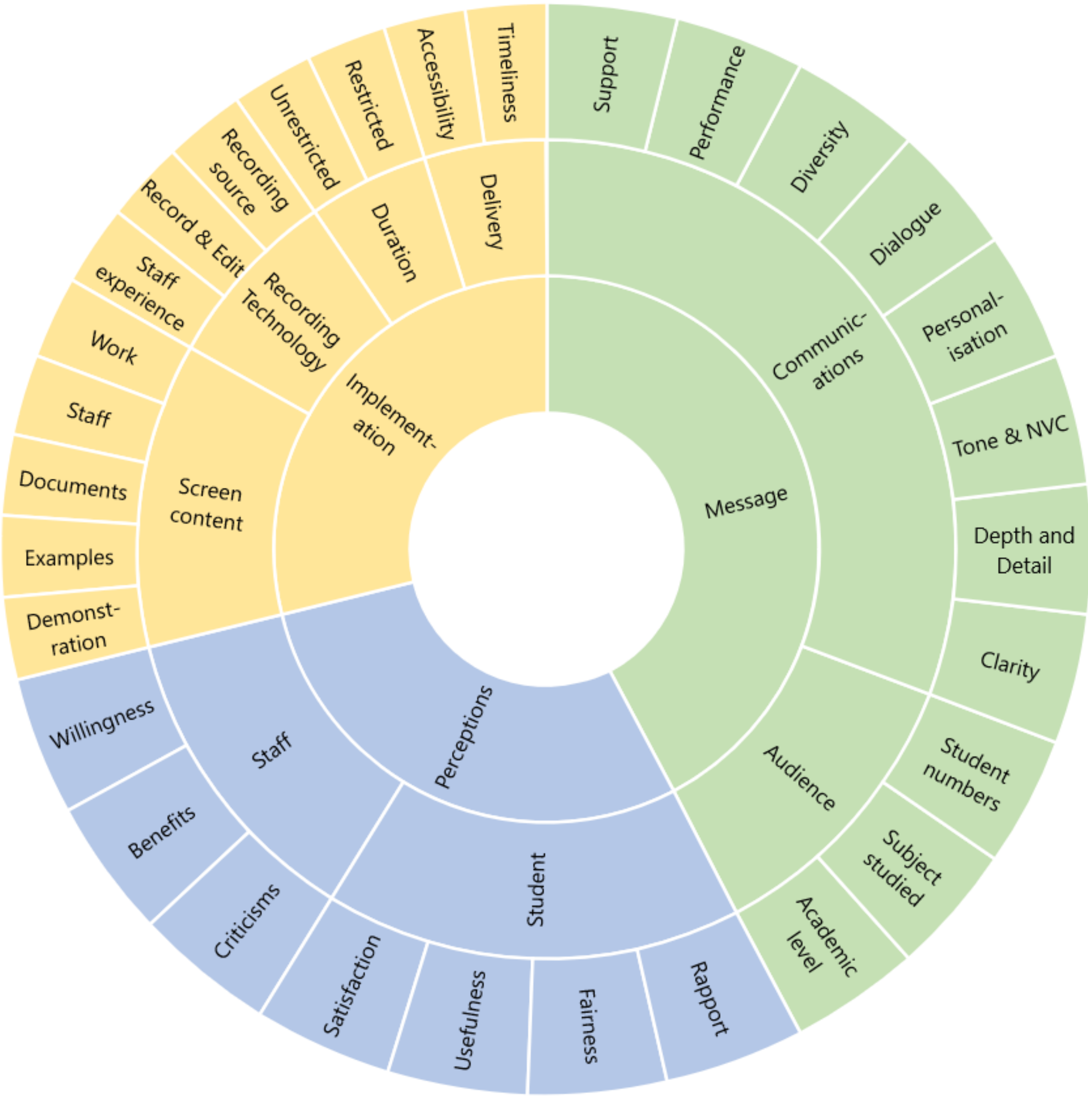


Figure 4.4: Taxonomy version 2

Objective ending condition	Condition met
A representative sample of objects have been examined	false
No characteristics were, split merged or changed, in terms of name, definition, or position within the structure, during the last iteration	false
At least one object is classified under every characteristic of every facet	false
No new relevant facets or characteristics were discovered and added during the previous iteration	false
Every facet is unique and not repeated	true
Subjective ending condition	**Condition met**
Concise The number of facets are comprehensive without being overwhelming	false
Robust Facets are sufficiently different to each other to make classification clear and easy	false
Comprehensive All characteristics of any study can be classified	false
Extendable New characteristics can be easily added	true
Explanatory It is clear from the names of the facets what they explain about a study	true

Table 4.5: State of ending conditions at the end of iteration 2

4.4.3 Iteration 3

By the end of the previous iteration several of both the objective and subjective ending conditions had not yet been met. Therefore, a third iteration of the development process was necessary.

Step 8: Determine classification approach

This iteration began with the conceptual and moved to the empirical. It was determined that conceptually, all attributes currently located in the *Message* meta characteristic were actually concerned with the 'Context' of the study or the 'Perceptions' of the staff and students. Widening the scope of the previous *Implementation* meta characteristic to a broader *Context* meta characteristic clarified its purpose as the 'cause' of the *Perceptions* by staff and students. Consequently it also clarified the purpose of the *Perceptions* meta characteristic as the expression of the 'effects' of the *Context* on staff and students. It was realised that analysis of the *Context* as the 'cause' and the resulting 'effect' expressed as *Perceptions* had the potential to provide crucial guidance to staff. By examining the 'cause' or *context* of their own practice staff can compare it to other studies. The 'effect' or *Perceptions* of similar studies would offer insight as to the likely 'effect', or *Perceptions*, resulting from their own practice.

This clear division meant that there really were only two meta characteristics, which could also be presented independently of each other as separate taxonomies. This would reduce the number of facets and characteristics that needed to be examined together if a user felt overwhelmed, as they might if always presented together. This crucial clarification in the conceptualisation of the meta characteristics as 'cause' and 'effect' facilitated significant progress.

With the clarification of purpose the *Message* meta characteristic, which at first had seemed essential, no longer fit with this view, and it was found that its contents easily could be identified as fitting into either the *Perceptions* or *Context* taxonomies. Therefore, a deductive examination of the structure was required.

Step 9: Define units of classification

In this iteration only two types of facet transformations were necessary.

1. **Creation of new facets** - where new facets were created.

2. **Retiring of facets** - where facets considered unnecessary were removed.

Creation of new facets

The new broadening of the *Context* meta characteristic as a set of 'causes' clarified the rationale for the existence and purpose of facets within it. The *Audience* facet was moved to the *Context* meta characteristic and renamed more appropriately as *Class*. The *Size* characteristic was created to contain the measurements of the size of the class. Workload is a very important consideration for staff choosing how to produce feedback and is often expressed in terms of student numbers. Being able to compare the workload of others to their own context may guide staff in their decision when selecting or dismissing video feedback as a possible format. Therefore, it was determined that the number of students and the number of staff sharing the marking load (cause) was a measure of workload feasibility (effect). In addition, there is the potential for a high workload to be maintained for short periods of time potentially motivated by the desire to make a success of the study. A study across a longer time frame demonstrates that the workload is manageable in normal practice. Therefore, where the data was available, the *Longevity* of the study was added as a measurement of class size. Revisiting of the literature was necessary to extract some of the data for the *Size* facet.

Some separate analysis regarding aspects of the *Context* identified a relationship between the type of assessment submission and the selection of the recording source between a camera or screen cast. Therefore, a characteristic of *Assignment type* was formed. The data here could be used to guide the decisions made by staff about which *Recording source* to choose.

The 'effects' were also now easier to understand as the perceptions of staff and students. Based on knowledge of literature read so far it was determined that messages that use the terms *Clarity*, *Depth*, or *Detail* are almost exclusively from students expressing perceptions regarding either how *Useful* feedback is, or how *Fair* students perceive the marking process to be. Similarly, messages that comment on *Tone, Non-verbal communication, Personalisation* or the similarities with a *Dialogue*, are reporting a sense of *Rapport* with staff, or expressing feelings of being supported by the video feedback message. Therefore, the two sets of terms each became facets. In the absence of a collective term not being determined in each case the collective strings '*Clarity Depth & Detail*' and '*Dialogue, Personal, Tone & NVC*' are used until an appropriate summarising term can be identified.

Staff experience was created to capture staff familiarity with software and systems used to create video feedback. However, it became clear that from an overall perspective of the literature read, the *Willingness* of staff to experiment and become familiar with systems was more significant, and so *Staff experience* was renamed *Willingness* and moved from being a part of the *Recording Technology* to being part of the *Staff* facet.

A single criticism of video feedback had started to emerge in the previous cycle which had been left under communications, as it was expressed as a desire to be able to scan the feedback for salient points just as could be done with text. Once accepted as a criticism, a facet needed to be added to allow for this and any further criticisms which may be found later to be classified. A *Criticism* subcategory was added to the student perspective, to mirror the one already in the *Staff* category.

Retiring of facets

Performance was dropped since it is rarely discussed and could be included as *Staff Perspective* under either *Benefit* or *Criticism* depending on the point being made. The duration *Restricted* and *Unrestricted* facets were eliminated as they could be identified by the software or cloud service used. This is because duration restrictions are caused by limitations of the software/cloud service used. In no instance has it been reported as a result of staff attempting to limit workload.

It was realised that *Demonstration* and *Examples* were conceptually comments on the same thing: anything that helped *Illustrate* the learning message. Although there is the potential for one to be interpreted as more interactive, or animated, than the other, there was no evidence to suggest that the terms were being interpreted in that way. Therefore, the new *Illustrate* facet replaced both of the former subcategories. All changes can be seen in figure 4.5.

Step 10: Revise taxonomy

Once the new structure was redrawn it was clear that the new 'taxonomy' could be divided into two independent, but related, taxonomies. The relationship between these two related taxonomies could now be made clear by splitting the circular shape of the taxonomy in visualisation into two semi circles. At this point there is nothing to connect the two halves, or therefore, to connect data from the same study in each taxonomy. This can be seen in figure 4.6.

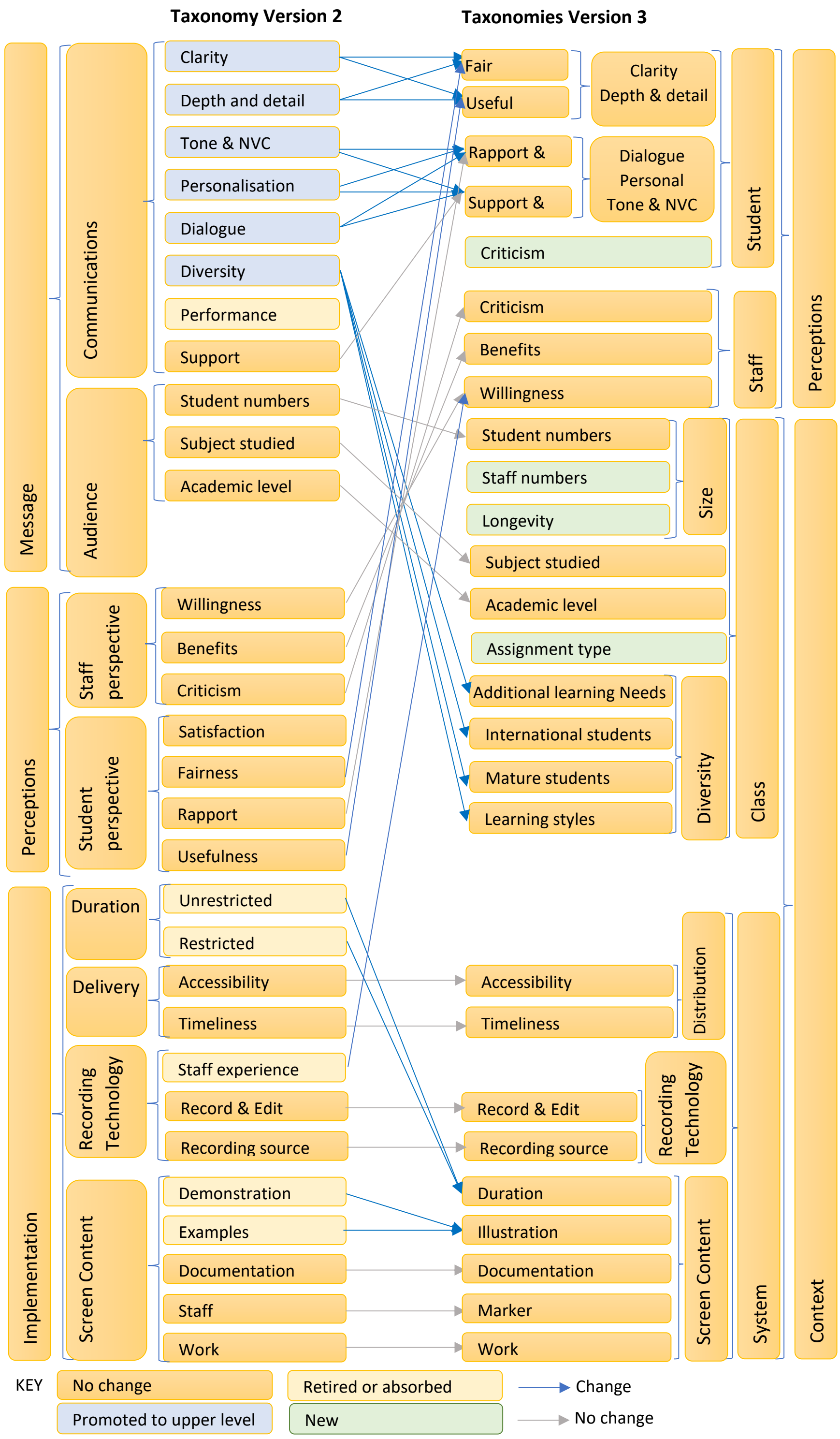


Figure 4.5: Mapping Taxonomy version 2 to Taxonomies version 3

Figure 4.6: Taxonomies version 3

Step 11: Revisit meta characteristic

The meta characteristics of the two taxonomies had finally been realised and could be confirmed as those which would be used from this point onward.

Step 12: Determine if ending conditions have been met

Due to the conceptual revelations in understanding achieved in this round, significant changes had been made to the taxonomies, therefore, at least one more iteration was required. The state of the ending conditions can be seen in table 4.6. With the exception of concision it was considered that the majority of the subjective ending conditions had been met. However, the objective conditions still needed work.

Objective ending condition	Condition met
A representative sample of objects have been examined	false
No characteristics were, split merged or changed, in terms of name, definition, or position within the structure, during the last iteration	false
At least one object is classified under every characteristic of every facet	true
No new relevant facets or characteristics were discovered and added during the previous iteration	false
Every facet is unique and not repeated	true
Subjective ending condition	**Condition met**
Concise The number of facets are comprehensive without being overwhelming	false
Robust Facets are sufficiently different to each other to make classification clear and easy	true
Comprehensive All characteristics of any study can be classified	true
Extendable New characteristics can be easily added	true
Explanatory It is clear from the names of the facets what they explain about a study	true

Table 4.6: State of ending conditions at the end of iteration 3

4.4.4 Iteration 4

At the end of the third iteration the taxonomies still had many facets, which partly contributed to not meeting the end conditions, particularly concision. The next iteration was taken with a view to simplification of the taxonomy.

Step 8: Determine classification approach

The purpose of the revision during the fourth iteration was, again, to reduce the number of facets and characteristics in the *Context* taxonomy. The rationale was to reduce the chances of it becoming overwhelming for users, particularly when viewed in conjunction with the *Perceptions* taxonomy. This was done with a deductive approach. The *Perceptions* taxonomy remained unchanged during this iteration.

Step 9: Define units of classification

This was possible by reducing characteristics visible with the intention to include these as points of description for their facets in two cases: the characteristics of the *Size* and *Diversity* facets. No other alterations were made at during this mapping process. The changes from this iteration can be seen in figure 4.7.

Step 10: Revise taxonomy

The revised *Context* taxonomy only showed the characteristics removed, making it less cluttered and hopefully less overwhelming. This can be seen in figure 4.8.

Step 11: Revisit meta characteristic

The meta characteristics still holds as potentially valid with these versions of the taxonomies.

Step 12: Determine if ending conditions have been met

Although the numbers of facets are still high at this point it was not felt that more could be removed without a detrimental effect on the comprehensive coverage of the domain. Now only one ending condition remained false in table 4.7.

Objective ending condition	Condition met
A representative sample of objects have been examined	true
No characteristics were, split merged or changed, in terms of name, definition, or position within the structure, during the last iteration	false
At least one object is classified under every characteristic of every facet	true
No new relevant facets or characteristics were discovered and added during the previous iteration	true
Every facet is unique and not repeated	true
Subjective ending condition	**Condition met**
Concise The number of facets are comprehensive without being overwhelming	true
Robust Facets are sufficiently different to each other to make classification clear and easy	true
Comprehensive All characteristics of any study can be classified	true
Extendable New characteristics can be easily added	true
Explanatory It is clear from the names of the facets what they explain about a study	true

Table 4.7: State of ending conditions at the end of iteration 4

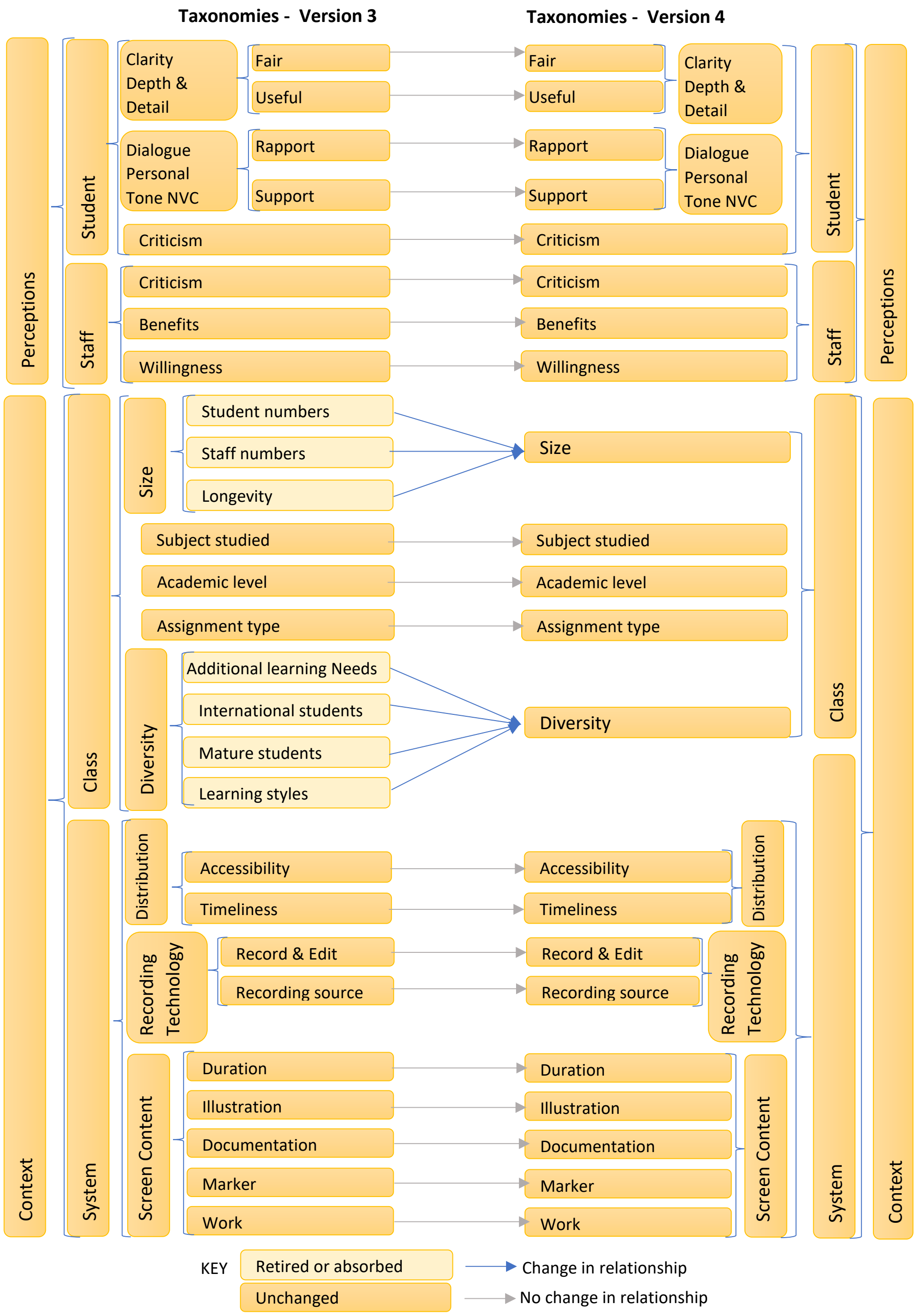


Figure 4.7: Taxonomies of video feedback- mapping version 3 to 4

Figure 4.8: Taxonomies of Video Feedback - version 4

4.4.5 Iteration 5

By the end of iteration 4 only one ending condition was not met, regarding changes to the taxonomy. Iteration 5 had the potential to meet that condition, but also to make changes which may violate other ending conditions.

Step 8: Determine classification approach

Iteration 5 employed an empirical to conceptual approach by adding a final few publications to the data set and with special consideration for points that may have been missed.

Step 9: Define units of classification

Only one type of facet transformation took place in this iteration, which was to create new facets. This was because, despite attempts to reduce numbers of facets, more were found at this point.

New facets in Perceptions of Video Feedback Taxonomy

It was realised that there was an issue regarding *Diversity*. Although there was a facet for it, it was on the *Context* taxonomy. This was intended to record the number of e.g., mature students, students with additional learning needs, international students and students with particular learning styles in the group of students participating in the study. There was currently nowhere to classify their perceptions separately from those of other students. Therefore a corresponding facet was required on the *Perceptions* taxonomy.

New facets in the Context of Video Feedback Taxonomy

Considerations of the required storage capacity for the sizeable video files, and the restrictions required on access to the videos to maintain student privacy, is often ignored. Implementations which use a cloud recording application often place videos in cloud storage automatically as part of the system. As such, because the location of the video is hidden it is assumed its capacity and privacy does not require consideration. There are potential issues with this assumption. Firstly, institution policy may not permit feedback personal to students to be stored in such a location, especially where there is no contract in place when a service is free. In this case there may be no consequences actionable by the institution if the privacy of the storage space is breached. In other words, the institution has no control over the protection of student personal information.

Current systems providing this service do not appear to be causing any issues since none are reported in literature. However, future services might provide e.g., limited capacity, or capacity for a limited time period, without making it clear that there are limits. They may have their service hacked and all the feedback videos made publicly available. Therefore, it is important to recommend that storage, and the privacy of the videos stored in it, are explicitly considered. Even where provision is in house, staff may find that space for storage is limited, and they may need to make special arrangements with their IT department when they switch from uploading relatively small files containing text, to significantly larger video files, as feedback. These new characteristics were placed under the *Distribution* facet. All changes implemented during this iteration can be seen in figure 4.9.

Step 10: Revise taxonomy

The new taxonomy was drawn up to include the new facets. It was noted that there was still no connection between the two taxonomies. Such a connection would facilitate a link between the 'causes' of one *Context* and the consequential 'effects' expressed as *Perceptions* of the same study.

Step 11: Revisit meta characteristic

The meta characteristics still holds as potentially valid with this version of the taxonomies.

Step 12: Determine if ending conditions have been met

Although it felt as though the completeness must now be within reach the additions potentially bring the implementation taxonomy closer to being 'overwhelming' again. Although only one ending condition was left as false in the previous iteration because facets were removed, in this iteration nothing was removed but facets were added, so there was still a single entry in the ending conditions which was false (see Table 4.8).

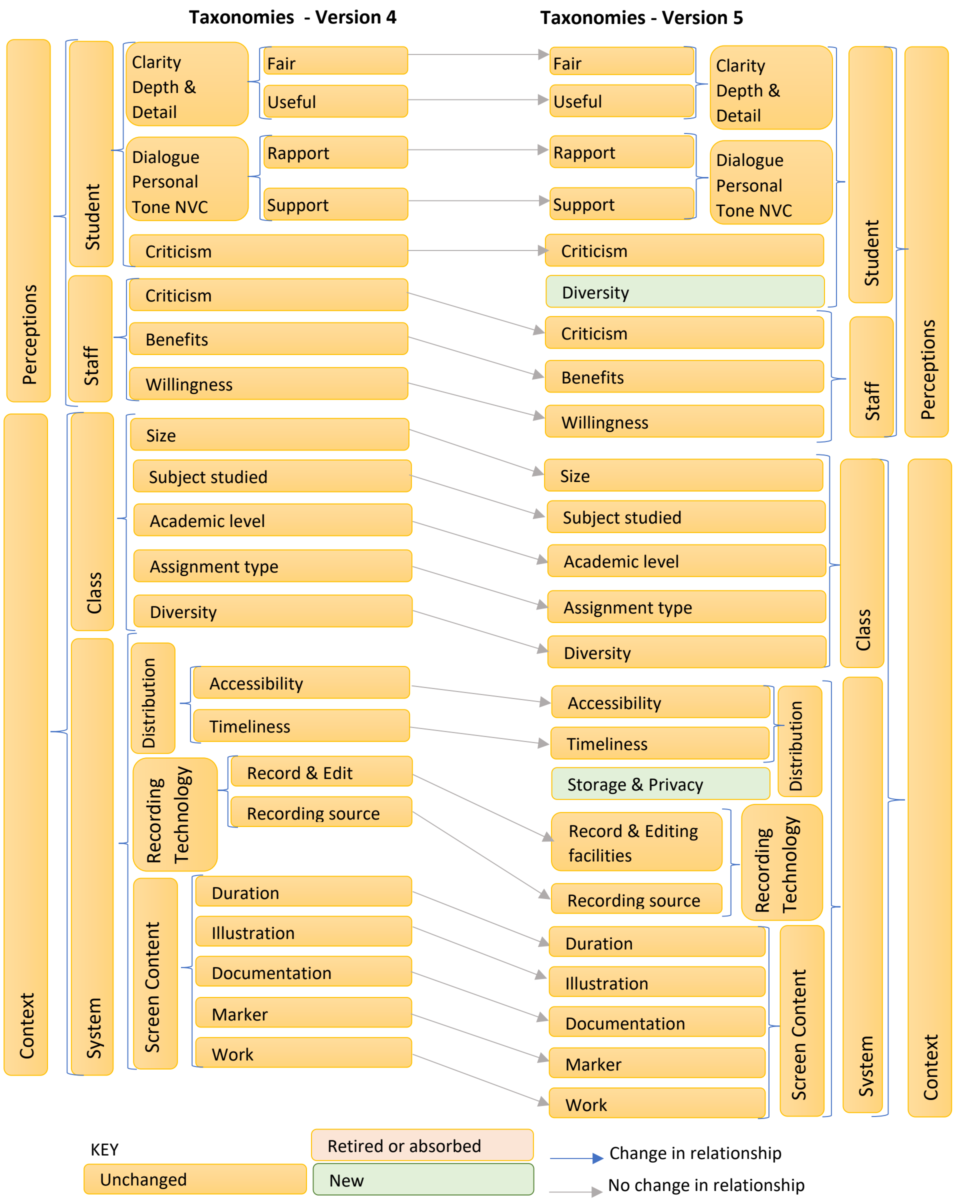


Figure 4.9: Mapping Taxonomies of Video Feedback - version 4 to 5

Figure 4.10: Taxonomies of Video Feedback - version 5

Objective ending condition	Condition met
A representative sample of objects have been examined	true
No characteristics were, split merged or changed, in terms of name, definition, or position within the structure, during the last iteration	true
At least one object is classified under every characteristic of every facet	true
No new relevant facets or characteristics were discovered and added during the previous iteration	false
Every facet is unique and not repeated	true
Subjective ending condition	**Condition met**
Concise The number of facets are comprehensive without being overwhelming	true
Robust Facets are sufficiently different to each other to make classification clear and easy	true
Comprehensive All characteristics of any study can be classified	true
Extendable New characteristics can be easily added	true
Explanatory It is clear from the names of the facets what they explain about a study	true

Table 4.8: State of ending conditions at the end of iteration 5

4.4.6 Iteration 6

The two separate taxonomies was nearly fully developed at this point, but still had no means of linking entries in the two taxonomies to the same study.

Step 8: Determine classification approach

A deductive approach was used for this iteration.

Step 9: Define units of classification

No changes were made to the structure of either the *Perceptions* or *Context* taxonomies during this iteration, despite taking the time to reconsider the names of some facets. However, additional facets identifying the studies were created. These would be present whenever either taxonomy was presented to maintain the relationship between the two related halves of each study.

Naming considerations of facets

In the student perception facet there were two characteristics called *Dialogue, Personal, Tone and NVC* and *Clarity, Depth and Detail* which were still needed consideration in terms of their names. Perceptions which discuss *Dialogue, Personal, Tone and NVC* tended to be about the an encouraging or supportive message conveyed through the video feedback. Where *Clarity, Depth and Detail* tended to describe the learning message being received from the video feedback. Candidate terms were *Learning message*, *Personal message* or *Supportive message*. It was decided that the current long names were likely to be clearer for users attempting to use the taxonomies for the first time. This may of course, be an aspect that is revisited during the validation process.

Identification of studies

The mechanism used to identify the studies would be the overlap point between the two taxonomies. Therefore, the study identification facets would need to appear if either taxonomy was examined independently of the other. There is already a mechanism in place for identifying published studies. Author-year citation formats use the Author's surname if singular, their surnames if there are two, and the first surname followed by *et al* if more than two authors contributed. The *Author(s)* could be recorded along with the *Year* of publication, particularly since the temporal climate of a technology based field is highly relevant. The *Title* of the publication would also be necessary in cases where the author publishes two papers on video feedback within the same year.

That left one remaining issue: the question of how to identify separate studies with e.g., different implementation details reported in the same publication. Currently, in the case of multiple papers being published within the same year by the same author cited in the same publication a letter is sometimes placed after the year in both citations and the references section. Appending letters to the year therefore would not work. An optional, and concise, *Study name* is required e.g., VF with camera, VF Screencast, 10 mins max, portfolios, essay, post-graduate, to differentiate between the groups being studied.

Step 10: Revise taxonomy

There were no revisions to either the *Perceptions* or *Context* taxonomies in this iteration, except an additional *Study* identity section to form an overlap connecting both taxonomies. A visualisation of the taxonomies can be seen in figure 4.11

Step 11: Revisit meta characteristic

The meta characteristics still holds as potentially valid with this version of the taxonomies.

Step 12: Determine if ending conditions have been met

All of the ending conditions have now been met, as can be seen in table 4.9.

4.4.7 Summary of the Iterative classification process

All the ending conditions were considered true at the end of iteration 6. Therefore the development cycle of the taxonomies ends here. There may, of course, be further changes to them as a result of validation.

Objective ending condition	Condition met
A representative sample of objects have been examined	true
No characteristics were, split merged or changed, in terms of name, definition, or position within the structure, during the last iteration	true
At least one object is classified under every characteristic of every facet	true
No new relevant facets or characteristics were discovered and added during the previous iteration	true
Every facet is unique and not repeated	true
Subjective ending condition	**Condition met**
Concise The number of facets are comprehensive without being overwhelming	true
Robust Facets are sufficiently different to each other to make classification clear and easy	true
Comprehensive All characteristics of any study can be classified	true
Extendable New characteristics can be easily added	true
Explanatory It is clear from the names of the facets what they explain about a study	true

Table 4.9: State of ending conditions at the end of iteration 6

Figure 4.11: Taxonomies of Video Feedback - version 6

4.5 Description of the taxonomies

The two taxonomies of video feedback - Context and Perceptions - are described here in detail, including the overlapping section now required to identify the relevant study. Here, what should be recorded for each facet, and the rationale for doing so, is explained in detail.

4.5.1 Context Taxonomy

This taxonomy is for the classification of attributes of the study context, which, if changed, may impact on the perceptions of the video feedback ie: the ’cause’ of the perceptions.

- **Class**
  In this case *Class* is a loose term for the set of students observed in a study, (rather than students in a single taught session). It may describe a small group of participants within a taught session group, or it may describe several cohorts. However, if numbers cross cohorts the group may need to be divided into separate studies in order to enable the recording of different attributes. For example, the first and second year students may be the group studied but one assignment might be a design, and another the production of a physical artefact. Therefore, the level studied, the type of assessment and potentially the recording source all vary.

  There are several characteristics that are recommended for classification regarding the *Class*.

  – **Academic level**
    The year of academic study.
    The use of common and therefore, easily comparative terms, is recommended here, but not too general. For example, ’Freshers’ is a common term for first year undergraduate students. ’Post graduate’ could mean anything from a seven year part time student on a research degree,to a three year full time taught degree, and ’undergraduate’ could mean any one of a four year span. It is recommended that the year of academic progress is an appropriate level of granularity.

  – **Subject studied** The degree, unit or topic may be recorded here, or all three. Be specific enough to avoid confusion due to generic titles.

The unit title may need the additional context of the degree title, since e.g., a ’communications’ unit on a teacher training degree will likely take an entirely different approach to one on a computing degree. Therefore, the appropriate granularity maybe the degree title or subject area of degree titles where mixed, and the unit.

– **Assignment type**

  The *Assignment type* needs to express the media of the assignment submission.
  The type of assignment submission impacts on the recording source selection. For example, is likely that the recording source for feedback submitted as an electronic essay is likely to be a screen cast. A physical sculpture will potentially have feedback recorded by camera.

– **Size**

  Three measures regarding the size of a class are recommended. These are:-

  * Numbers of students in the class
  * Numbers of staff sharing the workload
  * Longevity of the study

  The purpose of classifying the *Size* characteristic is to help staff determine the feasibility of the workload. Therefore, the number of staff in the marking team sharing the workload, as well as the numbers of students being assessed should be recorded here. A short term burst of intensive marking may be possible to complete a study which is not feasible over a longer period of time, hence the inclusion of the longevity of the study.

– **Diversity**

  Suggested characteristics for reporting are at least the numbers of: -

  * Mature students
  * International students or non native speakers
  * Students with additional learning needs
  * Students with particular learning styles

  Classifying the numbers of students in particular groups will enable comparison across studies in an area, where normally results would be dismissed as insignificant in a single study.

- **System**

  The system facet contains the characteristics of the system used to create and distribute the video feedback.

  - **Recording technology**

    This facet is for the classification of the recording technology characteristics. The recording technology can currently involve the integration of several elements of physical equipment, software and/or cloud services.

    * **Recording source**

      Whether a camera, screen cast or other recording source is used. Current literature suggests that the selection of the recording source is significantly impacted by the media of the submission. Current options are the use of a camera or screen casting. At the moment these are the only options, but this may change in the future as media formats evolve.

    * **Recording and editing facilities**

      The software or the cloud facility used for creation and editing is recorded here. If different services or software are required for different functions then each need to be listed.

      In some cases editing facilities may not be available at all and may not be missed. In others editing facilities may be very good but never used. Therefore, it is important to record what is used to inform judgements regarding how much to spend and on what services or software.

  - **Distribution**

    This facet holds the attributes the system used to distribute the videos, or to upload videos, for student access.

    * **Storage and privacy**

      The service used for storage and the facility for limiting access is classified here.

      There are several ways of using an account to limit access to storage.

The simplest is when storage is built into the virtual learning environment. However, video feedback could be stored on a cloud service and a link placed inside the VLE account. Perhaps that link is emailed to the student. Either way explicit consideration of the capacity of the storage system, and the means of protecting the students privacy requires consideration. Lack of capacity will cause staff frustration, and breaches of privacy will impact student perceptions.

* **Timeliness**
  The length of time taken from student submission deadline to returning feedback to students. It is anticipated that this will be expressed in days or weeks.
  This is an indicator of feasibility for meeting deadlines. Deadlines may come from implications for learning, institutional policies or impact on staff workload. This must be considered in conjunction with the *Size* of the *Class* in terms of student numbers and the size of the marking team.

* **Access**
  Concise description of the means by which students access their video feedback, including whether the access is via direct access or a hyperlink. Studies normally choose the virtual learning environment or email as a delivery mechanism currently. Email is normally limited in capacity for sending a video file, so hyperlinks can be sent to storage space elsewhere.

– **Screen Content** The visual content of the video is classified here. There are several suggested characteristics, several of which may hold values for a study, but it is unlikely that all will be used in a single study.

* **Work**
  Refers specifically to the student submission.
  Video feedback may answer the main criticism of audio feedback, which is the lack of direct reference to work (Ekinsmyth 2010), by placing student work on the screen. The facility to point out/highlight areas of work as they are explained, is considered very valuable (Marriott and Lim Keong 2012, p.593, Hyde 2013, Orlando 2016). This engages

students because it clarifies the learning message (Cranny 2016).

* **Marker**

  A video of the marker on the screen whilst they narrate.
  Some studies include this believing the additional non verbal communication cues will improve the message conveyed (Henderson and Phillips 2015; Mayhew 2016), although be aware that some students are not keen on being confronted by the marker on screen (Mayhew 2016).

* **Documents**

  Staff may use marking schemes and rubrics to explain why marks are given, or stress points in the assessment brief by highlighting them on screen.
  It is common to use documentation to demonstrate the differences between what was achieved by the student, and what was expected of high quality work. These types of documents have been used as on screen content in synchronisation with the work (Thompson and Lee 2012; Turner and West 2013; Denton 2014; West and Turner 2016).

* **Illustration**

  The illustration of learning points can be achieved with demonstrations, simulations, and bringing examples, diagrams, visual explanations on screen or hearing staff reading original and amended versions of written work (Jones et al. 2012) .
  Illustration aids understanding particularly of the reason why a change is an improvement (Ghosn-Chelala and Al-Chibani 2013).

* **Duration**

  Refers to the duration of the videos for the study participants. It might be expressed as an average, or additionally include the shortest and longest duration.
  There may be a point at which videos are considered too long by students. Some implementations limit durations on the free service. Are they long enough for a full explanation? Student opinion may be reflected in the *Perceptions* taxonomy.

4.5.2 Perceptions Taxonomy

This taxonomy is for the classification of perceptions and findings of the study. Examining perceptions may lead to the identification of improvements in the quality of video feedback. The *Perceptions* taxonomy is an expression of the ’effects’ of the system implemented and the context of practice.

- **Student**
  Student is a facet intended to collect perceptions of video feedback from students who are in receipt of it. It is the expression of the effects of video feedback on the key stakeholder. The benefits reported in literature as perceived by students far out weigh the number of criticisms. Due to the high volume, the benefits are divided between two conceptual areas - the learning message, and the supportive message. The facet names are identified by the topics usually discussed in these areas to make the identification of comments easier.
  - **Dialogue, personal, tone and non-verbal communication**
    This facet describes the benefits of specifically the *supportive and personal* element of the message. The name reflects the aspects discussed in literature in this type of comment in order to make them easier to identify.
    * **Support**
      This characteristic is for the classification of comments regarding the levels of *Support* students feel are conveyed through video feedback.
    * **Rapport**
      This characteristic is for the classification of comments regarding student perceptions of levels of *Rapport* perceived from video feedback.
  - **Clarity depth and detail**
    This facet describes the benefits specifically of the *learning* element of the message. The name reflects the aspects discussed in these types of comments in literature in order to make them easier to identify.
    * **Fair**
      This characteristic is for the classification of comments expressing the student perceptions regarding the *Fair*ness of the marking process.
    * **Useful**
      This characteristic is for the classification of comments expressing how

Useful students find the learning message in video feedback.

– **Criticism**

This facet is for the classification of any *Criticism* of video feedback perceived by students.

– **Diversity**

This facet is intended to reflect perceptions specifically related to issues of *Diversity*. For example, whether it helps or hinders students who are not native speakers. Does video feedback enhance or diminish the learning experience for certain types of additional learning needs? Do mature students express a preference for video feedback? Even if the numbers in a single study are low by collecting comments from multiple studies together we may be able to better inform practice.

- **Staff**

This facet contains the perspectives of staff involved in providing video feedback to students.

– **Benefits**

This facet contains the comments regarding the *Benefits* of video feedback as perceived by Staff.
These can then be examined for suggestions and ideas from staff related to 'causes', which may be found in the *Context Taxonomy*, and may lead to improvements in the quality of the video feedback and in the implementation which may impact staff satisfaction and workload.

– **Criticisms**

This facet contains the comments regarding the *Criticisms* of video feedback as perceived by Staff.
These comments can be examined for suggestions of 'causes', which may be found in the *Context Taxonomy*, and may lead to improvements in the quality of the video feedback and in the implementation which may impact staff satisfaction and workload.

– **Willingness**

This facet is for expressions of *willingness* to use video feedback.
Rarely discussed in literature as studies are normally conducted by staff who are positive about video feedback. However, it is not likely that all staff will enjoy switching to use video feedback from a format they are familiar with. Staff who are happy to trial video feedback in principle may not be so keen on learning to use the system.

4.5.3 Study: The set of facets common to both the Context and Perceptions Taxonomies

Study

This set of facets will appear in both taxonomies for two reasons: -

- To identify the attributes of a study within the taxonomies.
- To make it possible to connect related characteristics of a study across both taxonomies.

If either taxonomy is used in isolation the *Study* section must be included to identify the study which particular characteristics belong to.

- **Author(s)**
  This should follow the common format used in referencing of publications, with which academics will already be familiar. This means the use of surnames and initials for authors in a list.

- **Year**
  The date of the study will be useful in two ways: -
  - The identification of studies where authors have multiple publications.
  - Additional temporal context is an indicator of available technology.

- **Title**
  The title of the publication will aid identification, particularly where more than one is published by the same author within a year.

- **Study name**
  This enables the separation of studies from the same publication to ensure characteristics are stored separately.

By identifying the study in this way, researchers and practitioners are able to use these details to directly locate relevant publications, or to locate authors and practitioners, to seek further detail.

4.6 Outline of the validation of the taxonomies

Planning the method for validation of the taxonomy set is discussed in Chapter 2 Section 2.7. Three studies will be conducted to validate the taxonomies by utilisation. The following three chapters describe those studies. These are: -

- Chapter 5 - Audio Feedback on Trial
- Chapter 6 - Video Feedback on Trial
- Chapter 7 - Video Feedback in Practice

These validation studies will take the form of case studies carried out into the use of media as feedback in practice. The first will be a pilot study supplying audio as feedback to students. This will establish feasibility of media as feedback with lower resource overheads. There is the potential to find that the additional overheads required to produce video feedback are unnecessary. In other words, we may find that the majority of students are happy to receive audio feedback, and learn well from it. This study will serve as a baseline for comparison to video feedback, to see if the visual element provides any additional benefit.

The second study will involve the researcher returning video feedback to a sample of students as a response to an assessed submission. The final case study will employ the resources of the entire unit teaching team to return video as feedback to an entire cohort of students taking a programming unit on the first year of their Computing degree.

The details of *Context* and *Perceptions* taxonomies will be recorded for all three case studies. These records can then be examined to see if they work as a resource for comparison across studies, and as a potential means of examining the impact of the *Context* on the *Perceptions*.

The taxonomies were developed through examination of a variety of studies conducted in a variety of practice contexts. However, since the utilisation exercise will be performed in only one practice setting, to further ensure relevance to practice in other settings they will be reviewed by experts through a formal expert panel.

Details of all the methods of validation of the taxonomies, and the findings, will be discussed in detail in Chapter 8.

4.7 Conclusion

This chapter explains the development of a taxonomy of video feedback, which in fact resulted in the development of a pair of related taxonomies, one for the classification of facets of study contexts, and the other for the classification of the perceptions reported by stakeholders. The method employed has been described in detail to ensure replicable results. Finally, the methods to be used for validation of the taxonomies have been outlined (for more details see Chapter 8).

Chapter 5

Pilot Study: Audio Feedback on Trial

5.1 Introduction

This study marked the beginning of the validation phase for the taxonomies of video feedback. It is a means of testing the application of the taxonomies by utilisation (Usman et al. 2017) in practice. The reduced file sizes for audio meant resource requirements were less than video. The researcher was used to recording and editing digital audio, and therefore the learning curve was also reduced compared to video feedback. It is essential that in this live practice environment the feedback experience for the students goes smoothly, and that their education is not impacted negatively by this trial. Therefore, the reduced resource requirements, the small sample size and the experience of the researcher in the use of digital audio should reduce any risks. Although it would not be video feedback, most of the facets of the taxonomies remained applicable to audio feedback. In this way, the use of audio feedback was a step towards video feedback.

There was always the potential to discover that video feedback was not required, and that students could achieve satisfaction and improved learning from audio feedback alone, but this seemed unlikely when examining the literature, as researchers, such as Crews and Wilkinson (2010), maintained a preference by students for the incorporation of visual, auditory, and e-handwritten feedback.

5.2 Audio feedback

Audio feedback pre dates the digital age, yet still most case studies testing feedback as audio are small scale,(King et al. 2008,Merry and Orsmond 2008 Nortcliffe and Middleton 2007). In 2008 the Joint Information Systems Committee (JISC) funded a project called 'Sounds Good: Quicker, better assessment using audio feedback'. Experienced teachers from a variety of disciplines and educational levels delivered digital sound files containing feedback to students by Virtual Learning Environment (VLE), email and mobile devices (Rotheram 2008).

The results of this, and other such research, shows that there are three commonly recognised benefits of audio as feedback: -

- **The non-verbal element**
  The voice conveys far more complex and subtle meaning than written words (Nortcliffe and Middleton 2007; Ekinsmyth 2010). Non-verbal information available from audio is lost in the written word. Rotherham's (2008) participants noted extra clarity from the non-verbal element of audio communication.
- **Personalisation**
  The personal touch of audio feedback was found by Rotheram (2008) and Merry and Orsmond (2008). Rae and Cochrane (2008) discovered the use of names in audio added to an impression of personalisation of feedback.
- **Volume of feedback**
  Providing assessment feedback is labour intensive (King et al. 2008; Ackerman and Gross 2010) and time consuming (Carless 2006; Rotheram 2008) particularly if hand writing is still the norm (Ekinsmyth 2010). Current research states that in the same time it takes to produce written notes a greater volume of audio feedback can be recorded. This usually results in greater depth and detail (King et al. 2008; Merry and Orsmond 2008; Rotheram 2008; Starbuck and Craddock 2012; Jonsson 2013)..

VLE's and the plethora of mobile devices commonly available to students, means audio files are a well-tested format which is available anywhere, anytime (Merry and Orsmond 2008; Crews and Wilkinson 2010). Some studies used email as a delivery mechanism where limitations on space sometimes caused problems (Merry and Orsmond 2008; Starbuck and Craddock 2012). VLE's appear to be more generous with upload limitations and are potentially more reliable, and just as accessible.

A number of studies also discuss the effect of modern day increased cohort sizes (Handley et al. 2007; Ackerman and Gross 2010; Cramp 2011) and commonly high student-staff ratios (Rotheram 2008).

5.3 Study context

At the time of the study, the first year cohort on the undergraduate Computing framework at Bournemouth University was regularly around 200. This was an increase of over 50% in the previous ten years. On the programming unit, each student submitted many pieces of work during the first semester and 4 per student were chosen at random for marking. In the second semester a single larger piece of work was submitted, and all submissions were marked. With so many pieces of work to mark a marking team is essential. Each member of the programming unit teaching team marked up to 50 pieces of work per week. The assessment policy turnaround deadline is three weeks from the hand in date to returning work to students, and is strongly upheld.

5.4 The problem

Traditionally feedback for programming was on paper. Programming code on paper can be annotated directly. However, it is a long process to illustrate a better version of the code where the overall architecture requires comment and example. This entails either handwriting or typing, the whole idea out from scratch and printing it out to include with the feedback. Modern Computing students do not expect to have to deal with assignments on paper. Since the introduction of the VLE, students have been able to find their assignment specification, and feedback, on the VLE. When the pilot study took place, the VLE had been in place for two years.

During the same two years, to encourage regular practice on the programming unit, the assessment had been changed, from one or two larger assessments, to relatively small, frequent tasks. Students responded positively to the change and they said it improved their motivation to work throughout the unit, rather than focusing efforts towards deadlines. However, the marking team realised that students were potentially not reading, or addressing issues noted in feedback. The same comments were being rewritten for the same students with each subsequent submission, and students were not engaging with feedback. Other studies also recorded similar observations

(Ackerman and Gross 2010), and that students only cared about the mark given, (Mutch 2003; Starbuck and Craddock 2012) or indeed that students didn't even collect their assignment (Mutch 2003; Carless 2006; Handley et al. 2007). The question of the extent to which students were reading and engaging with the feedback on the programming unit naturally arose.

5.4.1 The original marking process

When delivering feedback by electronic text, the marking team copies the code from the submitted file into a development environment to execute the code. They then work through a set of marking criteria and marks for each section are entered on to a spreadsheet to calculate the overall mark. The marking criteria and the grade calculator spreadsheet are essential enablers of consistency across the marking team. The comments are pasted back into a feedback section on the VLE including the overall mark. The overall mark is additionally pasted into another text box on the VLE for inclusion in the 'gradebook'.

It is relatively simple to draw attention to parts of code by copying them into the feedback text. Example code can also be pasted into the feedback. Since the student work is already available as a starting point there is opportunity for placing example code next to submitted code for comparison. However, code examples significantly increase the amount of text delivered as feedback, which may be considered off putting by students.

There are a lot of software applications open at the same time during the marking process (VLE, programming code development environment, spreadsheet for marks calculation, marking criteria in the word processor) however, the staff using the applications are all used to managing such environments.

5.4.2 Audio feedback: a step towards Video Feedback

Storage resources of the scale required for individual video feedback for every student were not available for one assignment, let alone many, and cloud storage was still costly. Clearly proof was required that video feedback was not only feasible, but useful to students, to justify the required future investment. Therefore, before video could be considered, it seemed appropriate to consider a trial of audio feedback initially. The reduced file size of audio meant that the limited storage areas allocated to the computer programming unit on the VLE could be used, but only if a sample of students received audio feedback. After all, it may be possible to gain the same advantages reported on video feedback, and keep resource requirements lower, by using audio as feedback.

5.5 Pilot Case Study

A case study is useful when a situation needs to be explored in its real-life context. To find out whether audio feedback could be useful to Computing students taking a programming unit, a pilot case study was carried out using Yin (2008) as a guide. According to Yin (2008) there are five important components of research. In this case study they are as follows: -

Case study questions

- Q1) Is audio feedback on programming code assignments technically feasible?
- Q2) How will producing audio as feedback impact staff workload?
- Q3) How will audio feedback on programming code assignments be perceived by students?
- Q4) How will students perceive the two proposed delivery mechanisms? Which are :
  - a. embedded audio player
  - b. embedded animated avatar

Case study propositions

To answer the case study questions the following propositions are suggested: -

- P1) Audio feedback on programming code assignments is technically feasible
- P2) Students prefer audio feedback delivered by an audio player embedded into the feedback area of the VLE, to digital text feedback
- P3) Students prefer audio as feedback delivered by avatar to both text feedback and audio feedback delivered by embedded audio player.
- P4) There will be no increase in time spent by staff completing the marking process
- P5) It will be possible to deliver greater depth and detail by using audio than by text

5.5.1 Unit of analysis

The unit of analysis is an individual first year Computing student at Bournemouth University carrying out a single programming assignment. All students enrolled on the programming unit will be able to submit the assessment for marking. Approximately 50 students will be chosen at random to be marked, and they will receive feedback as both audio and text. The rest of the cohort will only receive electronic text as feedback. All students in the sample receiving the additional audio version will be invited to participate in data collection.

5.5.2 Linking the data to the propositions

- P1) Audio feedback on programming code assignments is technically feasible The feasibility of audio feedback will be determined by whether the feedback can be delivered, and by examining the mechanism that makes this possible.
- P2) Students prefer audio feedback delivered by an audio player embedded into the feedback area of the VLE, to digital text feedback This will be determined by asking for student opinion by online questionnaire.
- P3) Students prefer audio as feedback delivered by avatar to both text feedback and audio feedback delivered by embedded audio player. This will be determined by asking for student opinion by online questionnaire.
- P4) There will be no increase in time spent by staff completing the marking process This will be determined by monitoring the time spent by staff on creating the feedback.
- P5) It will be possible to deliver greater depth and detail by using audio than by text. Student opinion will be sort regarding their perception of this aspect of the feedback. This is considered a more useful indicator than an actual content comparison.

Criteria for interpreting findings

Findings will be interpreted according to the following criteria: -

- P1) Audio feedback on programming code assignments is technically feasible. The feasibility of audio feedback will be determined by examining the mechanisms attempted to deliver the audio as feedback. It will be deemed feasible if the audio feedback is successfully delivered to students using a mechanism deemed acceptable by the marking tutor for use in normal every day practice. Findings related to both P2 and P3 will be analysed in the same way:

- P2) Students prefer audio feedback delivered by an audio player embedded into the feedback area of the VLE, to digital text feedback
- P3) Students prefer audio as feedback delivered by avatar to both text feedback and audio feedback delivered by embedded audio player. Student questionnaires will be analysed both in terms of quantitative analysis and qualitative analysis of free format comments.
- P4) There will be no increase in time spent by staff completing the marking process The member of staff conducting the audio feedback will also be conducting the written feedback for the same students on the same piece of work. Therefore, the workloads associated with each format can be compared.
- P5) It will be possible to deliver greater depth and detail by using audio than by text Student opinion will be sort about how they perceive the depth and detail delivered across the two formats. This is considered more useful as a measure of value to students, than a comparison of actual content.

5.5.3 Pre-study survey

Firstly, an anonymous survey was carried out across the cohort of 200 students enrolled on the programming unit (see Appendix D.1), to gauge student perception of the unit and current feedback methods.

The survey was developed to cover aspects which were considered influential on student attitude to the feedback. The number of questions was limited by the number available free of charge on the survey tool. To mitigate against this limitation, two free format comments boxes were included at key points allowing students the opportunity to express themselves, in case they had not been given the opportunity to get across points important to them. Students might have also used this space to express frustration with poor questions, however there was no indication of this. Multiple choice answers were used for 8 of the questions. The order of these was organised along a scale of positive to negative. The order was reversed on some questions to make it easy to identify where a student selected options in the same position vertically, indicating superficial participation and lack of sincere consideration of the questions. For similar reasons, in an attempt to ensure considered opinion was obtained, there was no neutral option available as an answer to questions.

It was felt that it was important to gauge student attitude to the unit, in case this was impacting the results pertaining to feedback. Apart from general attitude towards programming as a subject in the context of the unit, other factors identified as potentially impacting student opinion of the feedback were a) student opinion of their own progress compared to the pace of the unit and b) the grades awarded.

Fifty-two students responded taking on average 2 mins 43 seconds each. When asked about the pace of the unit (see Appendix D.1, Q1), 45% of students felt they were keeping pace or racing ahead of the unit delivery, and only 5 students out of 52 respondents felt they were getting left behind. When asked about their grades (see Appendix D.1, Q2) students were even more positive with 82.3% of students feeling their grades were ’ok’ or ’good’. The student attitude to the unit is indicated as positive on the whole, with 74.51% claiming to ‘love’ or ‘like’ it. Another 19.61% are putting up with it safe in the knowledge that if they can pass the first year they don’t have to do anymore programming to pass the degree. Only 3 students say they ‘dislike’ programming. Although there is a natural tendency towards telling staff what they want to hear, this survey is anonymous, and students could have taken this opportunity to express frustration. Students were considerably less positive about their progress, and more positive about their grades, indicating a considered response. Therefore, it was unlikely that negative attitude to feedback was significantly being tainted by the attitude to the unit.

It was important to find out, as a point of comparison, how students felt about the electronic text feedback on their programming assessments. When asked about how useful students found their feedback (see Appendix D.1, Q4) 47% found it at least some use and another 49% found it helpful or very helpful. Only 2 students graded it as ‘pointless’.

Since the status quo is to issue feedback, and students are expected to understand that they should independently use that feedback for learning, two questions focussed on how students use their feedback. Students were asked how often they read feedback and everyone claimed to read some part of it at least sometimes (see Appendix D.1, Q5). 82.35% said they read some part of it either ’often’ or ’always’. When asked about how much of it they read (see Appendix D.1, Q6) nearly half claimed to read nearly all of it in detail. Clearly answers to these questions will largely return what students believe staff want to hear. However, this at least indicates, that students understand that they are expected to review their feedback.

The purpose of feedback is to guide student learning, and so students were asked if they felt they learned from feedback (see Appendix D.1, Q7). Only 3 students said they never did, with the majority learning from it sometimes (59%) or often (25%). The remaining 10% claimed to always learn from feedback. When asked about the frequency with which students applied learning to future work (see Appendix D.1, Q8) results followed a predictable pattern of being similar, but always slightly less positive than the question about learning. Only 2 students said they never applied feedback to future work with the majority learning from it sometimes (35.29%) or often (39.22%). The remaining 21.57% claimed to always apply what is learned in future work. However, these responses to questions 7 and 8 do not make any useful contribution to knowledge as they contain contradictory results. More students claim to always feedforward learning than those who always learn, although it may be interpreted as, students always feedforward learning when it occurs. However, the 3 students who say they never learn does not contain the subset of 2 students who never feedforward. That means 3 students who claim they never learn, claim that they do feed forward learning.

The final question was an opportunity for students to feedback what they would change about their feedback (see Appendix D.1, Q9). The most common criticisms were that students wanted more detail, and some expressed a desire for more contact time with staff. The second most frequent comment was that nothing should change, or it was already good.

> *"Nothing, [should change] the feedback is nearly always tailored to your code when necessary and extremely useful at explaining something when I've messed something up."*

Many other comments suggested improvements in areas, to which the literature said audio feedback may contribute positively

- Feedback is confusing
- Marking is too harsh
- Marking needs to be faster
- Feedback is too formal

- Feedback needs to show students where to improve

Based on these results going ahead with the audio feedback study seemed to be the next logical step.

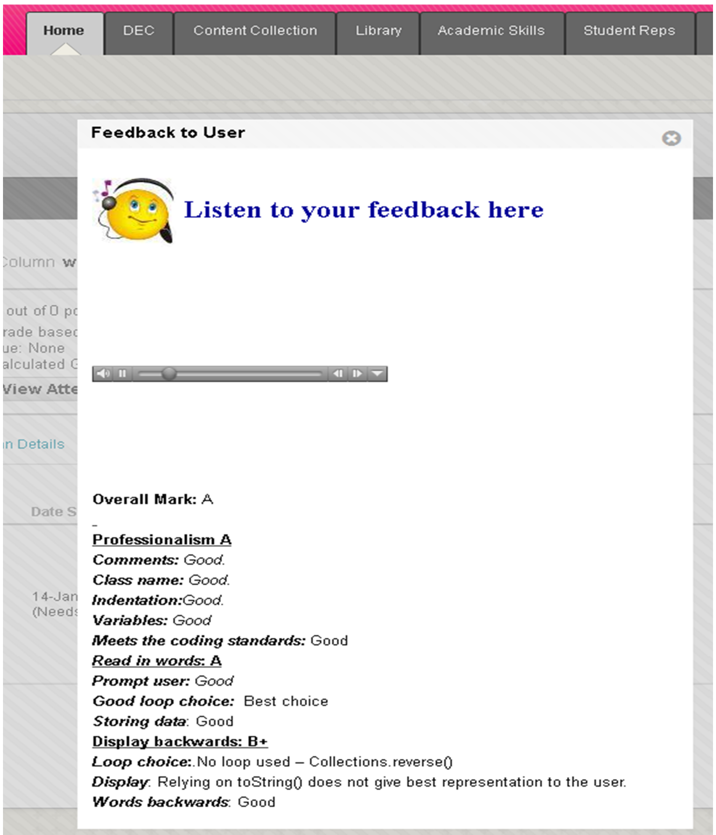
5.5.4 Study method

Audio feedback was implemented as part of the marking process of a single piece of coursework. The coursework for the year consisted of two online tests, 4 small coding exercises and one final larger assessment. The assessment in question was the last of the small coding exercises, therefore students had already received feedback on previous exercises as electronic text only.

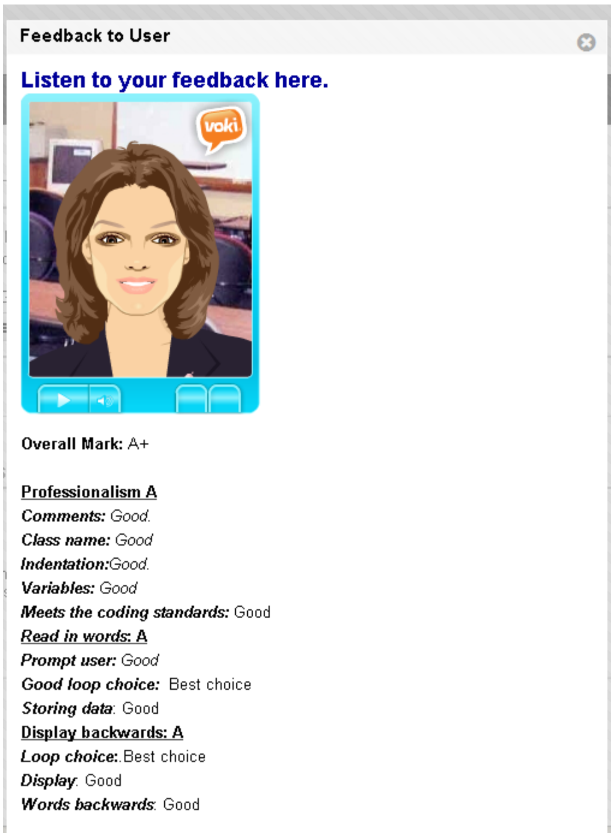
The student sample receiving the audio recording was selected at random. The written feedback stayed in place for every student on the cohort, including the sample receiving audio feedback to maintain consistency across the cohort. The written feedback also became the notes for the recording. The audio was recorded using Audacity (Audacity Team 1999) software. Students in the sample were divided into two groups: a) to receive feedback via embedded audio player and b) to receive audio feedback via avatar. The decision about which students would receive which format was made on implementation issues i.e.: the limited recording duration permitted by Voki.com (Oddcast Inc 2013) without charge, or using the full classroom application. Therefore the duration available by Voki.com (Oddcast Inc 2013) did not limit the length of the audio recorded. The numbers of students receiving each format could still evenly split, and so 15 received audio by embedded audio player and 16 received audio by embedded animated avatar.

From the student perspective, the audio is available at the top of the feedback page in the VLE. This is followed by the feedback in text, which was received by every student in the cohort. For students receiving audio via embedded mp3 player on the feedback page within the VLE, a picture of an emoticon-style face listening through headphones was inserted on the page to highlight its presence (see Figure 5.1a).

For students receiving feedback via avatar, all audio files were uploaded to the Voki website (Oddcast Inc 2013) and linked to the animated avatar. These are then linked to the student feedback pages on the VLE so that they appear to be embedded on the page (see Figure 5.1b).



(a) Student perspective of the audio player on the feedback page in the VLE



(b) Student perspective of the Voki (Oddcast Inc 2013) avatar on the feedback page in the VLE

Figure 5.1: How audio feedback is presented to students

5.5.5 Post study surveys

Two post study surveys were carried out with the sample participants: one for those receiving audio feedback by audio player (see Appendix D.2), and another for those students receiving video feedback by animated avatar (see Appendix D.3). The differences between the survey questions were minimal. In all questions but one, the wording was only changed to make it appropriate to the media in question ie: where one survey said, 'audio player' the other said 'avatar'. There was only one other difference, where students receiving feedback by avatar were additionally asked if they would like to select their own avatar.

Having only a quarter of the student cohort assigned to be marked by the marker using audio feedback (50), this number was then further reduced by non-submissions or unacceptable submissions (31 submissions to be marked). This group was then split in two with each group receiving a different format. Response numbers were therefore expected to be low, although the percentage response rate is similar to that of the pre-study survey (26.66%).

	Audio player	Avatar
Received feedback in format (count)	15	16
Responded to survey (count)	4	5
Response rate (%)	26.66%	31.25%

Table 5.1: Audio feedback - Sample size and response rates by delivery format

Students receiving feedback via audio player

All respondents receiving feedback by audio player found their feedback easily. One student could not listen to it, and another student found that the player did not work when off campus. Perhaps the student who could not listen was also off campus.

Only one student said they would not like to have audio feedback by audio player in future. They prefer to be able to scan the text as a whole, rather than needing to listen to the whole thing to find particular points. This same student does not think audio feedback will improve the chances of review or applying suggested changes to future work.

The other 3 respondents would prefer audio feedback in future and do think audio feedback will improve the chances of review, or applying suggested changes to future work. When invited to comment one of these respondents suggested the use of screen cast video as preference to audio, *“Maybe a screen video, with your cursor highlighting problems as you talk through what we did wrong and right“*.

Students receiving feedback via avatar

Survey respondents receiving audio feedback via animated avatar were not so positive. Lack of compatibility with the Chrome (Google 2008) browser software was a significant contributor, since it was favoured by computing students of the day. When asked about which format they preferred for future feedback, the same three students who had difficulty accessing it, expressed a preference for written feedback. Of those who preferred only written feedback two expressed contentment with what they were used to, *“I am comfortable with the written feedback given”*. Only one student preferred the avatar, and another wanted to keep the text with the avatar. When asked if students would prefer feedback by avatar in future two students expressed concern for how long it would take to return feedback to students, anticipating that it would take longer than writing text, yet the feedback in this case was delivered in the normal time frame at the same time as the rest of the cohort.

Two students who successfully accessed their avatar feedback without difficulty both said they thought it would improve the chances of both reviewing feedback and applying learning from it to future work. Although it was thought that students might enjoy selecting their own avatar, none did so, and when asked about it in the survey, none wanted to.

5.5.6 Conclusion

The evaluation of the original propositions are shown in Table 5.2, and these are then explained in more detail. Of the original propositions it has been possible to show that creating audio feedback for assessments of programming code is feasible (P1) and that students do prefer audio feedback (P2) as long as it is easily accessible. It was expected that computing students might enjoy the presentation of feedback by animated avatar, however, this did not appear to be the case (P3). The experience may have been tainted by implementation problems. Once the first student had been marked by audio, and the

Proposition	Valuation
P1) Audio feedback on programming code assignments is technically feasible	TRUE
P2) Students prefer audio feedback delivered by an audio player embedded into the feedback area of the VLE, to digital text feedback	TRUE
P3) Students prefer audio as feedback delivered by avatar to both text feedback and audio feedback delivered by embedded audio player	FALSE
P4) There will be no increase in time spent by staff completing the marking process	TRUE
P5) It is possible to deliver greater depth and detail by using audio than by text	TRUE

Table 5.2: Audio Feedback: Evaluation of propositions

process was familiar, the time taken to create the feedback for the other students was no longer than it took to deliver the written feedback (P4), and sometimes shorter, although usually only insignificantly shorter. It was anticipated that pasting in the links to the media might take a while, or that waiting for uploading of media may extend the process, but the upload can occur as a background process, and with shorter recording times than writing times, pasting in the links still had no impact on the overall workload.

The idea suggested in literature, that it is possible to deliver more detailed feedback using audio than written word (P5) certainly occurred in this study. In this case the text was used as a basis for the audio and there was a natural inclination to elaborate. This did not necessarily result in more detail per se, but it was felt that it lent itself to a more encouraging tone, rather than sticking to the exact words of the written version.

5.5.7 Discussion

Respondent numbers in both surveys following receipt of audio feedback are very small, and certainly of no use for drawing generalisations. Discussing with students why they select their answers i.e.: seeking the same clarity students' desire when they receive feedback, would be useful. It may be useful to run the case study earlier in the academic year. Early deployment, when students are potentially more enthusiastic, may result in greater student contribution.

From the staff perspective, the time consideration involved in creating the audio was small and the technology was easy to use, as was found by Emery and Atkinson (2009). Long term, giving students richer feedback will save time, as students take more notice of the feedback, will need less repetition of the same feedback, and therefore, require less critical feedback in future, as their work improves (Rotheram 2008) . Audio feedback should be viewed by staff as a long-term investment.

It is clearly useful to students to have audio feedback when accompanied by the written word. How the audio is best delivered requires further investigation. These results are interesting but not of the volume, or rigour, required to base decisions for the future upon. Therefore, this study is the very beginning of a long journey, of just one aspect, towards helping students realise their potential.

In the past the only practical means of conveying feedback has been in person or by written word. Now that communication technology has advanced and become commonly accessible we, as academics, should be challenging ourselves to respond in any way which helps student learning, rather than constraining ourselves by tradition. Professionals in HE are in search of the way to deliver the ultimate learning experience for our students. Research which challenges tradition and utilises technology is essential in moving forward.

The next step with this set of studies is to see if the addition of the screen cast video is feasible, and whether it also contributes positively to the student experience.

5.6 Applying relevant sections of the Taxonomy of Video Feedback to audio feedback

The taxonomy for video feedback is applied here as a version adapted to audio as feedback. Only the screen content section was impacted by using audio feedback. When students receive feedback by Voki (Oddcast Inc 2013) avatar, or audio player, the text version of the feedback is on screen, so although the screen content is not the code itself, there is something to hold the students visual attention.

5.6.1 Study

The Study section of the taxonomy should always appear, even when the Context and Perceptions Taxonomies appear separately, to identify the study to which the details belong. The Study section of the taxonomy is repeated here for convenience in Figure 5.4

Figure 5.2: Study section from the Taxonomy of Video Feedback diagram

Facet	Characteristic(s)	
Author	Atfield-Cutts, S.	
Year	2013-2014	
Title	Audio feedback on a Programming unit, 1st Year Computing Bournemouth University	
Group	Delivery by Audio player	Delivery by Voki Avatar

Table 5.3: Taxonomy entry for studies in practice - Study section

5.6.2 Context Taxonomy

This taxonomy describes the context of the practice being in which the study took place. The visual representation of the Context Taxonomy is repeated in Figure 7.17 for convenience. From this point on some details are split into separate entries by group. Others are identical for both groups and are shown once here, across both groups, for presentation reasons.

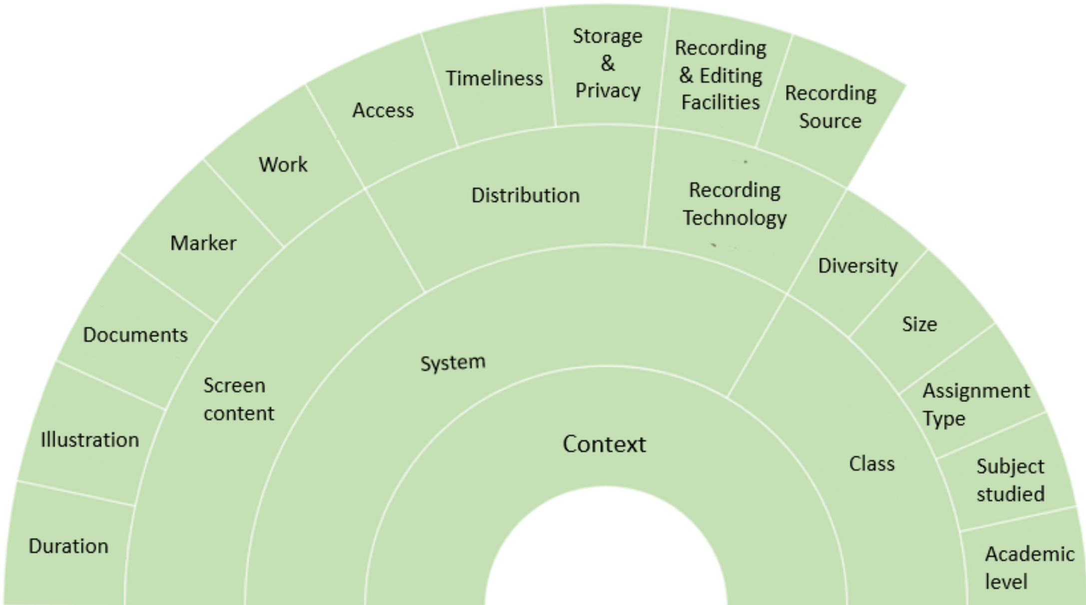


Figure 5.3: Context Taxonomy from the Taxonomy of Video Feedback diagram

Facet	Characteristic(s) by Group	
	Delivery by Audio player	Delivery by Voki Avatar
SYSTEM - Screen Content		
Duration	Not recorded	Restricted by Voki.com to under 1 minute
Illustration	Not available	
Documents	Not available	
Marker	no	Embedded avatar
Work	Not available	
SYSTEM - Distribution		
Access	VLE student feedback page	
Timeliness	Work returned in same time frame as text feedback	
Storage	VLE	Voki.com
Privacy	VLE credentials to access embedded audio player	VLE credentials to access embedded Voki player
SYSTEM - Recording Technology		
Recording & editing	Audacity - Editing rarely used	
Recording source	Microphone	
CLASS		
Diversity	not available	
Size		
Population	200	200
Sample receiving audio feedback	15	16
Survey Respondents	4	5
Markers	1 out of 4 providing audio feedback	
Assignment type	Java Programming exercise	
Subject studied	Programming unit, Computing BSc(Hons)	
Academic level	First year undergraduate, Level 4	

Table 5.4: Context Taxonomy entry for studies in practice - Class section

5.6.3 Perceptions Taxonomy

The Perceptions Taxonomy (Figure 5.4) is for the classification of the opinions of stakeholders and findings of the study (see Table 5.5).

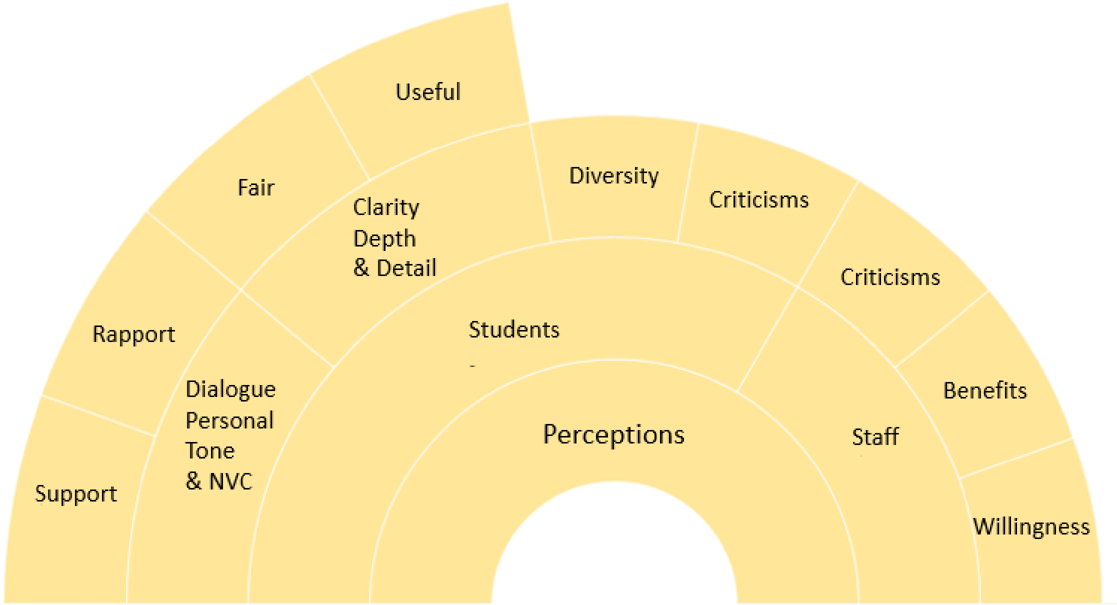


Figure 5.4: Perceptions Taxonomy of Video Feedback diagram

Findings of applying the video feedback taxonomy to audio feedback

The questions asked of students did not return a range of responses which would cover all available classification points of the taxonomy. For instance, students were not asked about any diversity or learning needs. Responses regarding perceptions were limited. To resolve this, specific questions would be included in future questionnaires to access this data, particularly with respect to usefulness and fairness. However, the lack of storage space, at the time, felt like an impossible hurdle to overcome. The size of video files and the amount of storage space available meant there had to be help and guidance from the IT department before the next validation study could be implemented.

Facet	Characteristic(s) by Group	
	Delivery by Audio player	Delivery by Voki Avatar
STUDENTS - Dialogue Personal Tone and NVC		
Support	Not available	
Rapport	Not available	
STUDENTS - Clarity depth and detail		
Fair	Not available	
Useful	Not available	
Diversity	Not available	
Criticisms	Lack a facility to scan the whole to find pertinent points	Browser compatibility issues
STAFF		
Criticisms	Lack of storage facility to implement across a larger sample	
Benefits	Potential to save time if audio is used alone. Both formats were produced in acceptable time frame	
Willingness	Keen to solve the problem of lack of student engagement	
	Markers previous experience in the radio industry meant there were no concerns about being able to complete the task	

Table 5.5: Perceptions Taxonomy entry for studies in practice

Chapter 6

Video Feedback on Trial

6.1 Introduction

The previous study used audio as feedback for first year computing students (see Chapter 5) and was a step towards using video as feedback in practice. The experience of using media that was less resource hungry than video had already brought up issues regarding file storage, and browser compatibility, which required resolution to facilitate the trial of video feedback. This study is the first time the taxonomy of video feedback had the potential to be validated in practice and in its entirety.

The conclusions of the audio feedback trials clearly showed that it is useful to students to have audio feedback when accompanied by the written word. How the audio is best delivered requires further investigation. Although the next step is not an audio feedback study, the delivery of audio is an appropriate consideration for the narration of the video feedback as well. The results of the audio feedback study were both positive and interesting, but not of the volume, or rigour, required to make sound decisions about future implementations. The next step is to see if the addition of the screen cast video is feasible, and whether it contributes positively to the student experience.

6.1.1 Considerations of the impact on the student experience

This research was motivated by a desire to improve assessment feedback for students, and it would not be acceptable to have a detrimental impact on students involved in studies, even if the final taxonomy was considered beneficial. With practical issues of browser compatibility and storage capacities yet to be resolved, and the unknown workload impact of using video feedback, it was decided that the student experience was still at risk and required serious consideration.

It would be unhelpful for students if the feedback, which students are at least familiar with, and those who engage with it find of some use, was changed without being certain that the replacement can deliver at least just as well as the current format. It is hoped that the additional visual channel augments the narration, but it is untested on a first year programming unit at this time. Several studies into video feedback begin cautiously by partially replacing written feedback with video feedback. Parton et al. (2010) made a gradual switch, as the first assessment feedback was written, the second written plus a video and finally a video on its own. Similarly, Henderson and Phillips (2015) also began with written feedback on student's first assignment and introduced video later. Therefore, this study continues to use the written feedback alongside the new media of screencast video as feedback.

In this study it is possible to validate all aspects of the context taxonomy in practice, and to gather perceptions from students to test the perceptions taxonomy. Although the questionnaire will be redesigned to encourage responses that cover all aspects of the perceptions taxonomy the use of a sample, compared to responses from the entire cohort, reduces the chances of receiving comments which cover all areas. However, the learning experience of current students must take priority.

The marking team on the programming unit will deliver written feedback, as previously used on the unit. This will facilitate consistency across the students, whether they are part of the sample receiving video feedback or not, and leaves all students with feedback on their work in a format they are used to receiving, even if the video feedback is completely inaccessible for some reason.

The written feedback consists of a set of written headings, designed to enable consistency across markers, and written notes will be made under each heading e.g., Professionalism, Structure, Functionality, Testing, along with a grade for that section. For a random sample of students, a screencast video will also be delivered and the written feedback will accompany the video feedback. This measure will ensure marking consistency across the cohort, from the student perspective, whilst also enabling the new format to be trialled.

6.2 Applying the taxonomy to developing the system implementation

The steps in the process of this study begin with determining the implementation of the system for video feedback. This was done by using the taxonomy of video feedback as a check list, to ensure all aspects of the implementation are considered, The perceptions and results of the audio feedback study were also under consideration during the system development process. In this way the learning from the points classified in the perceptions taxonomy of the previous study became the feed forward message into this study. This principle will be applied from one study to the next ensuring forward progression. In this way the taxonomy informs the study environment, and clarification of these details makes this study replicable, and the results of similar research directly comparable.

The findings of previous studies, and the implementation of their systems, also require review. They may contain useful information that can guide decisions about the implementation of future studies, including this one. Therefore, this case study will consider the results of previous studies published in literature. For each subsequent study, the perceptions of earlier studies, and examination of their context, become the guiding influence over the implementation of the next, ensuring constant and consistent improvement. This is provided by the very same feedback mechanism this work attempts to improve for students. Each application of the taxonomy to the study provides feedforward information for the next study (see Figure 6.1). It is important that during

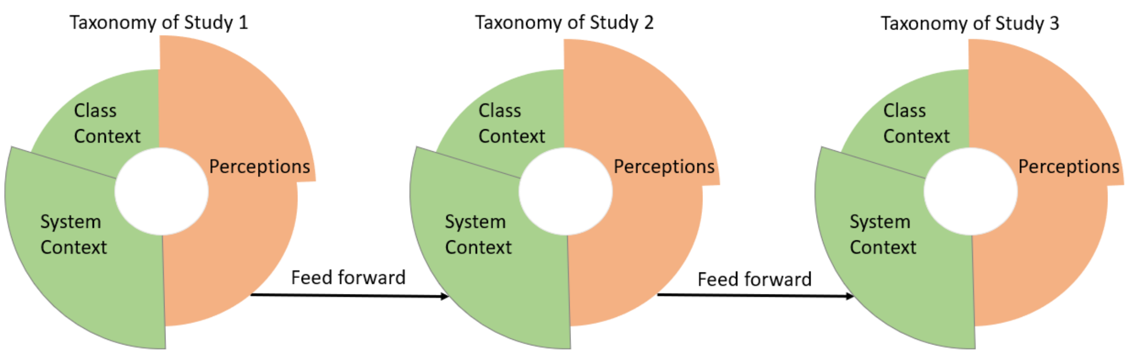


Figure 6.1: Feeding forward the perceptions of one study to inform the next version of the Taxonomy

this first application of the taxonomy, in the ‘system’ section, missing criteria, and adjustments to current criteria categories, are recorded. In addition, any new insights that do not fit areas of the current ‘perceptions’ criteria, and ideas about changes in categorisations of perceptions are also recorded. All adjustments should also be rationalised here, to prevent reversal without consideration of issues arising at this point in the study, in future iterations.

The taxonomies are divided between two main areas. These are: -

- **Context Taxonomy**
  Details of how the system is set up to enable the production and distribution of video feedback, and of the demographics of the class of students.
- **Perceptions Taxonomy**
  The perceptions of students and staff.

6.2.1 Measuring student perceptions

All of the students enrolled in the programming unit will be invited to participate in a pre-study survey regarding their attitude to the programming unit and programming as a subject. During the normal marking process a sample of students will receive video as feedback in addition to accompanying text feedback. The same sample of students will then be invited to participate in a second survey regarding their perceptions of video feedback specifically.

6.2.2 Prioritisation of Perceptions

Perceptions regarding video feedback are likely to come from two types of stakeholders: students and staff. Since there may be some incompatibility between implementations that benefit each perspective, it was decided to prioritise benefits to students and to monitor the impact on staff. Students usually report that, in video feedback, staff respond to their work with positive and supportive messages, which build rapport, in terms of personalisation, dialogue, tone and other non-verbal communication.

Ensuring personalisation

Personalisation is identified as a benefit by many studies into video feedback (Getzlaf et al. 2009; Jones et al. 2012; Séror 2012; Turner and West 2013; Hyde 2013; Henderson and Phillips 2015; Klappa 2015; Orlando 2016; West and Turner 2016). Gomez (2010) and Crook et al. (2012) used generic feedback, that is returning the same feedback to a whole class, or cohort, of students who submit work for the same assessment. Even though, by nature, the feedback could not hold the personalised element students often claim to desire, the response was still very positive.

To maximise the potential benefits for the students involved in this study it was decided that individual feedback was necessary, and to make it a rule to begin by saying "Hello <student name>….". In addition, the final comment was to end with the student name as well eg: "You've made significant progress. Well done <student name>" or "Those are the things you need to work on and if you do that for next time your grade will improve <student name>". Although attempts were made to mention previous communications with students, such as commenting on contact in the class room e.g., *"I noticed you struggled with that last week and now you've got it sorted. Well done"*, this was not always possible. For logistical reasons to do with workload, the marker was allocated students from across the cohort at random, and therefore, was not necessarily being allocated students they had taught in the classroom.

Presenting feedback as a dialogue

The dialogic nature of video feedback appears to come from the use of the narration which is necessary for the majority of the communication. The main consideration here is to ensure that the use of the microphone is of good quality and that the marker is aware of the clarity and tone of voice during delivery. During the recordings for this study a conscious effort was made to ensure a positive tone, and to sound energetic during recordings.

Ensuring clarity

Many students report lack of clarity as an issue with feedback as text (Gould 2011). Mayhew (2016) and McCarthy (2015) both found the biggest impact on student satisfactions was clarity. The marker may need thinking time built into the production process to ensure explanations are clear. Therefore, it was important that the software for recording had the facility to pause the recording via a hot key, facilitating time for thinking, even after recording has begun.

Ensuring depth and detail

Previously methods of providing text feedback had been the source of frustration for staff. It was difficult to include large quantities of detail without spending a lot of time per student. It was hoped this would be eased by the ability to convey more information in the same or less time and in a more meaningful way. The marker was anticipating being able to bring in examples and re-run amended code on screen to illustrate best coding practice. This would mitigate the need for students to read lots of re-written code. They would then need to write the changes into their own code correctly to be able to run and observe any difference. This may not be possible if they did not know where exactly the new code should go.

6.2.3 The System

Screen content

The screen content would be the work itself, since the main complaint about generic video feedback had been the disconnection from the work. Henderson and Phillips (2015) found some students thought the use of the face on the screen was intimidating. Although students studied by Mayhew (2016) did on the whole respond positively to her face on screen, there was still one student who specifically asked for it to be removed in future. Therefore, to maximise student benefit it was decided that the screen content should consist of the work and materials for illustration only.

Distribution and access

The videos would be distributed via the VLE along with the text version of the feedback so that all feedback was in one place, and that place was where students expected to find their feedback. Since resources where not available in house, videos would be stored on YouTube (2005). Student access would be available via a hyperlink on the feedback area of the VLE. The permissions on the video would be set to ‘hidden’ meaning that the video would not appear in any search results. The video would only be available by clicking on the hyperlink, which would only be placed in the student feedback area. This maintained student privacy, since the student feedback area is only available by logging into the student account on the VLE. The only other access is by logging in as a member of staff who is teaching the unit, which is necessary to be able to insert feedback.

Purchasing the recording software

Video recording technology was not readily available, so a piece of software was purchased taking into consideration the requirements. These were to be able to record a screen cast rather than video from a camera, and to be able to pause the recording by hot key. There was one more constraint, since this was considered a small scale trial, budget was an issue. With all these requirements under consideration Snagit (Techsmith 1996) was purchased.

6.2.4 The Case Study

To find out whether video feedback could be useful to Computing students taking a programming unit, a case study was carried out guided by Yin (2008). There are five important components of research. In this case study they are as follows: -

6.2.5 Component 1: The case study questions

The case study questions for using screen cast video in a trial, are the same commonly recognised benefits of video screen cast feedback in small scale case studies.

- Q1) Is video feedback on programming code assignments technically feasible?
- Q2) How will producing video as feedback impact staff workload?
- Q3) Will students prefer video feedback delivered by a link to a video on YouTube (2005) embedded into the feedback area of the VLE, to digital text feedback?
- Q4) Will students perceive a benefit from the visual reference to their work?
- Q5) Will students perceive a benefit from the narration, due to:-
    a) additional nonverbal communication
    b) increase in the volume of information
    c) perceived personal and friendly tone.
- Q6) Will video as feedback increase engagement with feedback as screen cast video?

How the Case Study Questions originated from the Taxonomy of Video Feedback

The case study questions are focused on what makes the validation of the taxonomy of feedback possible. The feasibility of video feedback (Q1) is a fundamental question. Lack of feasibility would make validation of the taxonomy by utilisation (Usman et al. 2017) in practice impossible. It is highly unlikely that this would occur since other studies into using video feedback have been successful, but there is no guarantee and it still has the potential to negatively impact this work.

The impact on staff workload (Q2) is a similarly serious risk to the project. In order to carry out a further study into the use of video feedback in normal practice for all students the rest of the marking team have to be persuaded to participate. A negative impact on workload could prevent staff from embracing such a change. Therefore, in turn the validation of the taxonomy of video feedback would also be at risk, and less robust methods would need to be used.

If the students do not prefer video feedback (Q3) then an investigation would need to be considered regarding continuation of this work. The question specifies the mode of delivery because there is the potential for that to be the cause of any problems rather than the feedback itself. This is evidenced by the preference for video as feedback in the literature. When this evidence is considered along side the fact that there is no example in the literature reviewed to date of a practice using the same proposed delivery mechanism as will be used in this study, it makes the possibility of a rejection of the delivery mechanism more likely than rejection by students of the video feedback. Therefore, if students do not prefer the video feedback they receive, another study using a different delivery mechanism may be required before progression can be made to a study using video in feedback in practice with the full cohort of students.

How students perceptions express benefits from the visual channel (Q4) and from the narration of the video (Q5) may impact the implementation of the next study, and therefore, it is important to classify those perceptions into the taxonomy. The subsections of Q5 cover facets of the perceptions taxonomy specifically.

The ultimate aim of a study into feedback is to ensure that it is possible for students to engage with it (Q6) in a meaningful way. The original motivation for this work was evidence of lack of engagement with feedback among students. Unless video feedback improves engagement over those with text feedback, there is no point in going to the trouble of changing systems, persuading staff, and indeed, developing a taxonomy of video feedback.

Therefore, all of these questions are fundamental to the development and validation, or even to the existence, of the taxonomy of video feedback.

Component 2: The propositions

To answer the case study questions the following propositions are suggested: -

- P1) Video feedback on programming code assignments is technically feasible.
- P2) There will be no increase in time spent by staff completing the marking process
- P3) Students will prefer video feedback delivered by a link to a video on YouTube (2005) embedded into the feedback area of the VLE, compared to digital text feedback.
- P4) Students will perceive a benefit from the visual reference to their work.
- P5) Students will perceive a benefit from the narration in the form of
    a) additional non-verbal communication
    b) increased depth and detail
    c) personal and friendly tone.
- P6) Video feedback will increase engagement with feedback

Component 3: The unit of analysis

The unit of analysis is an individual first year Computing student at Bournemouth University carrying out a single programming assignment. All students enrolled on the programming unit will be able to submit the assessment for marking. Approximately 50 students will be chosen at random to be marked, and all of those students will be invited to participate in data collection.

Component 4: The logic linking the data to the propositions

- **P1) Video feedback on programming code assignments is technically feasible**
  The feasibility of video feedback will be determined by whether the feedback can be delivered, and by examining the mechanism that makes this possible.
- **P2) There will be no increase in time spent by staff completing the marking process**
  This will be determined by monitoring the time spent by staff on creating the feedback.

The following propositions will be determined by asking for student opinion by questionnaire.

- **P3) Students will prefer video feedback delivered by a link to a video on YouTube (2005) embedded into the feedback area of the VLE, compared to digital text feedback.**
- **P4) Students will perceive a benefit from the visual reference to their work.**
- **P5) Students will perceive a benefit from the narration in the form of**
    a) **additional non-verbal communication**
    b) **increased depth and detail**
    c) **personal and friendly tone**
- **P6) Students will engage with video feedback**

The VLE supplies all kinds of statistical data regarding student engagement with learning materials. Unfortunately there is no information available regarding student access to the feedback area of the VLE specifically. The level of engagement will be determined by examination of the statistical data available from YouTube (2005).

Component 5: The criteria for interpreting findings

Findings will be interpreted according to the following criteria:

- **P1) Video feedback on programming code assignments is technically feasible**
  The feasibility of video feedback will be determined by examining the mechanisms attempted to deliver the video as feedback. It will be deemed feasible if the video feedback is successfully delivered to students using a mechanism deemed acceptable by the marking tutor for use in normal every day practice. That includes student use, as well as feedback production by staff. Therefore, it must be accessible for students via the VLE feedback area, and the content must be inaccessible by anyone other than the student and the marking staff.
- **P2) There will be no increase in time spent by staff completing the marking process**
  The member of staff conducting the video feedback will also be conducting the written feedback for the same students on the same piece of work. Therefore, the workloads associated with each format can be compared.

- **P3) Students will perceive a benefit from the visual reference to their work.** A questionnaire will be delivered to students. It will contain questions for quantitative analysis and free format comments for qualitative analysis. The results from the survey will be examined for evidence of this in the free format comments sections.

- **P4) Students will perceive a benefit from the narration in the form of: -**

  a) **Additional non-verbal communication**

  b) **Increased depth and detail**

  c) **personal and friendly tone**

  The results from the survey will be examined for evidence of this in the questions designed to capture such data, as well as in the free format comments sections.

- **P5) Students will engage with video feedback** The results from the survey will be examined for evidence of this in the free format comments sections.

6.2.6 Pre-study survey

The same pre-study survey (see Appendix D.1) used in the pilot study on the use of audio as feedback (see Chapter 5), was released to students prior to this trial of video feedback . Again, it was felt that it was important to gauge student attitude to the unit. This was a means of checking that the results of the post study survey was truly reflecting the student attitude to video feedback, rather than to the unit itself. It was considered that if the students had a negative attitude to the unit, or to programming as a subject, they may be negative towards their feedback, regardless of the format. The questions asked students for their feelings regarding the unit, their progress and their grades. Then it asks students about their feelings regarding the feedback they had received on the programming unit up to this point as text. This offered a means of comparison to the results of the post study survey, to see if attitudes changed between the use of the two formats of feedback. The quantitative results were analysed using SPSS (IBM 1999) and the comments were analysed using thematic coding in NVivo (QSR International 1999).

In the previous study into audio as feedback, the pre-study survey was deployed in February. It was hoped that releasing the pre-study survey earlier in the academic year would catch students at a time of greater enthusiasm, and would therefore result in greater numbers of respondents. However, moving the study to November in this study actually resulted in 19 fewer participants as only 33 students responded out of 231, compared to 52 out of approximately 200 students, in the previous academic year.

Taking the survey earlier in the year may have also impacted on the results. For instance, when asking the students about the pace of the unit, 69.69% of students felt they were keeping pace or racing ahead of the unit delivery compared to 45% in the previous academic year when the survey point was later, when there was more time for students to fall behind, or for the pressure of upcoming exams to become more acute. Almost exactly the same percentage of respondents felt they were getting left behind on the programming unit as the previous cohort (9.09%).

A similar trend follows when asking students how they feel about their grades, as 90.91% feel they are ok or good compared to 82.3% when the survey was taken earlier in the previous academic year. Therefore, once again, it is unlikely that any negative attitude to feedback was being tainted by the attitude to the unit.

The difference is less marked when examining the student opinion of the unit (see Table 6.1), with 74.51% responding positively in the 2012 academic year, compared to 78.78% in the 2013 academic year. The most frequent comment made in the free format text box accompanying ‘Q3 How do you feel about the programming unit?’, was an expression of positive enthusiasm for programming, or the programming unit specifically, as the ”*Best unit of computing framework so far. If the other units were like this it would be better*”.

Date Survey deployed		Love it	Like it	Put up with it	Dislike it	Total
Academic Year	Month	% (count)	% (count)	% (count)	% (count)	(count)
2012-2013	February	17.65% (9)	56.86% (29)	19.61% (10)	5.88% (3)	(51)
2013-2014	November	45.45% (15)	33.33% (11)	18.18% (6)	3.03% (1)	(33)

Table 6.1: Survey Results - Question: How do you feel about the Programming unit?

Interestingly there is a significant shift from how many students merely ‘like’ the unit to how many ‘love’ it. This may mean that the students harbour greater enthusiasm at this point in the year, but this is contradicted by the lower respondent numbers. Therefore, it is more likely that the sample just happens to contain a group of students who are more enthusiastic about programming compared to the previous year’s sample.

The survey data provided a set of ordinal variables, to which statistical techniques for non parametric data could be applied, such as correlations by Spearman (1904). Other techniques, such as principle component analysis (PCA), were considered, but since there was no anticipated requirement for further investigations there was no need to over complicate the analysis. The full table of results can be found in Appendix E.2 Table E.1.

The students who are positive about the programming unit significantly, and strongly, correlates to those who feel positive about their progress ($r=.765$, $p<0.001$), yet the relationship between how students feel about the unit, and their grades specifically, is much weaker ($r=.235$, $p=.188$), meaning with this group of students, there is a difference in perceptions between grades and progress.

The next five questions were specifically targeted at finding out how students felt about the electronic text feedback on their programming assessments.

Usefulness

When asked about how useful students found their feedback 47% found it at least ’some use’ and another 49% found it ’useful’ or ’very useful’. Only 2 students graded it as ‘pointless’. The strongest correlation with usefulness is, unsurprisingly, with how often students feel they learn from their feedback ($r=.591$, $p=<.001$). How students feel about their grades and how often they feel they can apply learning to future work are also significant. The relationship between the student opinion of how useful the text feedback is, and how often they look at the feedback they receive is neither of great significance or strength ($r=.312$, $p=.077$). Therefore, perceived usefulness is not an indicator of engagement in this case.

6.2.7 Engagement

‘Usefulness’ is the key to student engagement with feedback (Weaver 2006). Questions regarding engagement with feedback were asked of students to answer Proposition 6 -

Significance (p value)	Positive Moderate Correlation
.000**	How often students feel they learn from their feedback (r=.591)
.004**	How students feel about their grades (r=.487)
.040*	How often students feel they apply learning to future work (r=.359)

Key: * Significant at .05 level

** Significant at .01 level

Table 6.2: Significant correlations to students perceived usefulness of text feedback

Students will engage with video feedback. Two facets of engagement were investigated.

First, students were asked how often they read feedback, and everyone claimed to read some part of it at least sometimes, and 82.35% said they read some part of it either 'often', or 'always'. The strongest correlations here were, as expected, with perceptions regarding learning activities, such as how much they read, and motivated by how they feel about their grades (see Table 6.3).

Significance (p value)	Positive Correlation
.002**	How much of the feedback is read (r=.521)
.005**	How students feel about their grades (r=.474)
.012*	How students feel about the unit (r=.433)
.017*	How often students feel they apply learning to future work (r=.412)
.024*	How often students feel they learn from their feedback (r=.391)

Key: * Significant at .05 level

** Significant at .01 level

Table 6.3: Significant correlations to the chances of students reviewing at least part of their text feedback

Secondly, when specifically asking students how much of their feedback they read, as anticipated, most students claimed to read 'all of it in detail' (72.73%), with a further 21.21% reading 'most' of it. It is no surprise that all students claimed to read at least some of it. As already indicated, the most significant positive correlation with how much feedback was read was how often it was read. A second significant correlation is with how students feel about their grades (r=.421, p=.015).

The strong correlation between these two similar aspects of engagement in terms of how often and how much feedback is reviewed, indicates a shared consensus of what constitutes engagement. Since it is clear that students understand what engagement is, answers to these questions may largely return what students believe staff want to hear. However, this at least indicates, that students understand that they are expected to review their feedback. This is certainly the case with this sample of students when receiving text as feedback on their programming unit.

Learning

Students were asked if they felt they learned from feedback. Only one student said they never learned anything from feedback, with the majority learning from it ‘sometimes’ (42.42%) or ‘often’ (39.39%), and the remaining 15.15% claimed to ‘always’ learn from feedback. The two most positive categories have greatly improved response rates, where the previous year the bulk of responses (58.82%) had been in the ’sometimes’ category.

Regarding how often students feel they learn from their text feedback, the perceived usefulness of the feedback is highly, and positively, significant ($r=.591$, $p<.001$), and how students feel about grades is still a very important motivation for learning from feedback ($r=.499$, $p=.009$). The relationship between how often students feel they learn from feedback and how often students feel they apply learning to future work, is of moderate strength ($r=.440$, $p=.010$), indicating that some learning that takes place may not necessarily be fed forward to other work, or that students are not aware of applying learning from feedback in the same way as when they learn in the first place. Already discussed are correlations to how often students read feedback ($r=.421$, $p=.020$), or how much of a piece of feedback they read ($r=.360$, $p=.039$). Surprisingly, how students feel about the unit does not significantly correlate to how often students feel they learn from feedback in this sample (see Table 6.4).

6.2.8 Feedforward learning

When asked about the frequency with which students applied learning to future work results were predictably similar, but always slightly less positive than the question about learning. Only 2 students said they ‘never’ applied feedback to future work with the majority applying learning ‘sometimes’ (35.29%) or ‘often’ (39.22%). The remaining

Significance (p value)	Positive Moderate Correlation	Positive Weak Correlation
<.001**	How useful students find feedback (r=.591)	
.009**	How students feel about their grades (r=.449)	
.015*	How often students read feedback (r=.421)	
.031*	How often students apply learning to future work (r=.376)	
.039*		How much of the feedback for a piece of work do students read (r=.360)

Key: * Significant at .05 level

** Significant at .01 level

Table 6.4: Significant correlations to how often students feel they learn from feedback

21.57% claimed to 'always' apply what is learned in future work. However, these responses do not make any useful contribution to knowledge as they contain contradictory results. More students claim to always feedforward learning than those who always learn, although it may be interpreted as, students always feedforward learning when it occurs. However, the 3 students who say they never learn does not contain the subset of 2 students who never feedforward. That means 3 students who claim they never learn, claim that they do apply learning.

With such questionable results it is difficult to see how conclusions can be drawn from the data regarding learning, but the significant correlations are shown here for the record (see Table 6.4). Previously regarding how often students feel they learn from feedback their opinion of the programming unit was insignificant, yet when it comes to applying learning to future work, student opinion of the unit appears to be the most strongly correlated factor ($r=.524, p=.002$). With this result appearing next to the analysis of which students learned from feedback and those who apply it, these results suggest it is more likely there may be a fault with these two questions, otherwise the students may be less concerned with accurate answers than it was hoped.
The final question was an opportunity for students to feedback what they would change about their feedback. The most frequently occurring type of comment was regarding the lack of timeliness of delivery.

> *"We get it too late. By the time we receive the feedback we would have already uploaded the next few weeks uploads and thus can't implement it into the work."*

Two students found feedback as text difficult to understand, and whilst one just wanted it to be 'clearer' the other went on to explain how lack of understanding impacted negatively on future work. One student commented on the methods of creating the feedback, correctly concluding that the process often included the copying and pasting of commonly used comments.

> *"It feels generic. Some of the comments seem like they have been copy-pasted in, they are accurate, but it seems distant. The commentary does however allow me to see what is wrong in my work."*

Only one student commented on quantity of feedback, asking for "*just more comments*".

These comments therefore, suggest improvements are required in areas, to which the literature said video feedback may contribute positively

Significance (p value)	Positive Moderate Correlation	Positive Weak Correlation
.005**	How students feel about the unit (r=.479)	
.017**	How often students read any part of feedback (r=.412)	
.031*	How often students feel they learn from feedback (r=.376)	
.039*		How much of the feedback for a piece of work do students read (r=.360)
.040*		How useful students find feedback (r=.359)

Key: * Significant at .05 level

** Significant at .01 level

Table 6.5: Significant correlations to how often students feel they apply learning from text feedback to future work

- Feedback needs to be clearer to improve understanding
- Feedback needs to be delivered faster
- Feedback needs greater quantity of comments
- Feedback needs more specific comments

Based on these results, going ahead with the video feedback study seemed to be the next logical step.

6.3 The Case Study Method

This case study was implemented across two academic years. In each of those academic years the coursework consisted of two online tests and 4 small coding exercises. Video feedback was applied only to some coding exercises.

Only one out of the 4 members of the marking team marker was using video feedback. The marking was allocated to the four markers randomly, therefore making it unlikely that the marker using video feedback would mark the same person more than once.

Which exercises were selected for marking using video as feedback during the academic year was determined largely by work load pressures on the member of staff using video marking. However, the first two exercises were also excluded to prevent creating expectations in students, that their feedback would be delivered as video for the rest of the year.

Although the university has a three-week turnaround policy on marking, the time frame was only a week. At that point the next exercise was submitted by the student cohort. Therefore, to take more than a week to deliver feedback to students would be to be behind schedule. In that tight time frame the marker of the sample of students receiving video feedback, would provide two sets of feedback: as text and as video. Both formats were delivered to maintain consistency across the cohort, and to maintain the understanding that the use of video was a trial only.

Implementation

The video was created using the software Snagit (Techsmith 1996). Designed especially for screen casting, Snagit (Techsmith 1996) was chosen because it was the only low cost option which included the facility to edit videos. Although it was not expected that the editing facilities were quite so limited as they are, they were not often needed, and this had very little impact. The need to rerecord a video only occurred once.

The students work was downloaded from the VLE and opened in the development environment, so that it could be both read and executed (see Figure 6.2). The software allowed for the area of the screen to be recorded to be selected. This meant that the clutter of the toolbars in the development environment, and taskbar icons associated with the operating system, could be excluded from the recording. Whilst getting used to the system, a set of on screen buttons to control the recording could be used. They were kept on screen, but out of the recording area. After a while it became routine to use the hot keys to start, pause and stop recordings, making this unnecessary.

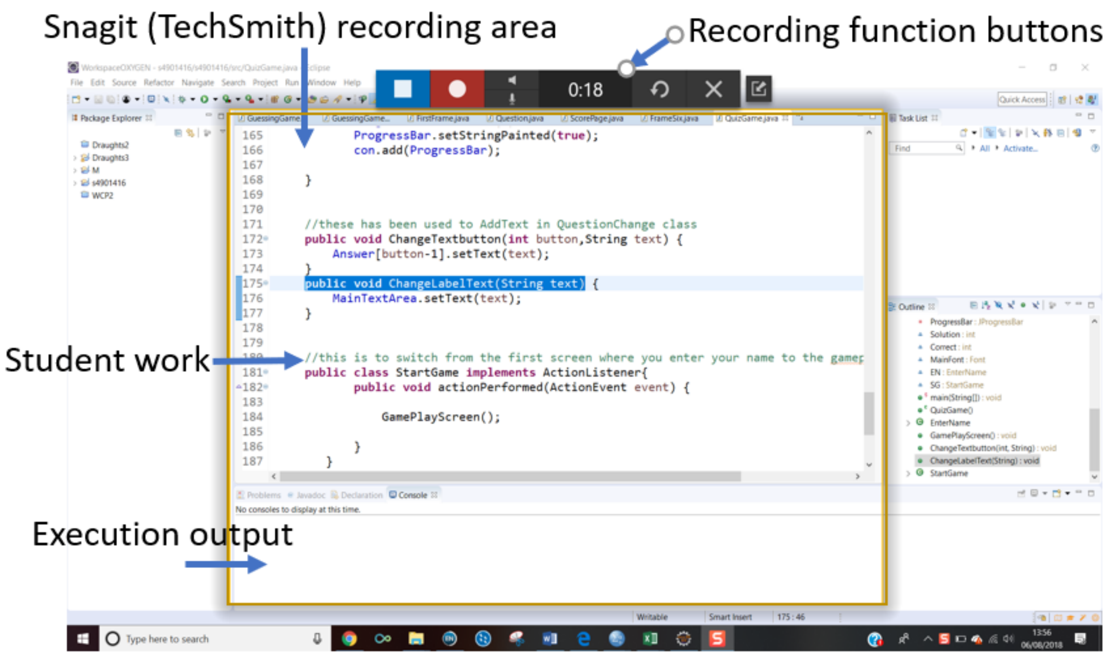


Figure 6.2: Eclipse (Eclipse Foundation Inc 2004) software opens student work. Snagit (Techsmith 1996) records the section of the screen containing student code and the code execution output areas.

During recordings the cursor was used to direct student's attention to specific parts of the code as they were discussed. Code could be executed, altered and re-executed demonstrating the impact of changes. By having other documentation open in another window, the content of the screen could be switched at any point during the recording. This was used frequently to clarify any apparent misinterpretation of the question, or to clarify how marks were being allocated according to the marking scheme.

The narration began by saying hello to the student by name. There was then a description of the exercise being examined so that the student understood which exercise had been selected from the three candidate exercises for that week for discussion. The detailed discussion started by running through the code looking for professionalism issues, such as layout and naming conventions, and then how the code performed.

The finished video was left on the markers computer until all marking was complete. Files were named using the students name and student id. In the sample from the first academic year, attempts were made to store videos within the VLE storage space, or linked to space on the marker's server space. Storage space was not sufficient in either case, or even when both spaces were used in combination. At this point it looked as though video feedback was not feasible. However, the following year permission was granted to store the videos on YouTube (2005) using a 'hidden' link. That meant that the videos could be placed online and linked to the student storage area. From the student perspective, the videos would be embedded in the VLE feedback area. From a YouTube (2005) users perspective, if they searched for the videos they would not appear in the list of results. Therefore, the only access is via the student's account on the VLE.

To link the video to the students account a spreadsheet was kept of the links from YouTube (2005) to make it a more streamlined task. Then only the VLE needed to be open and the links were pasted in to each account (see Figure 6.3). This speeded up the solution to a technical issue which occurred due to the random nature of the links issued by YouTube (2005) eg: https://youtu.be/IWSEkp6-FCg. If the link contained a hyphen ('-') the rest of the string was truncated when pasted into the VLE eg: https://youtu.be/IWSNkp6. The link had to be manually edited in the HTML mode of the page to restore the hyphen and following characters. Therefore, every link had to be checked for validity, and edited if necessary. This process could be partially automated by pasting links into a spreadsheet and searching for strings containing hyphen characters, but it still added to the workload. Whichever storage space was used, from the student perspective, the video feedback is delivered by the VLE. Delivery from the internal storage space appeared as a link. Delivery from YouTube (2005) appeared as an embedded video and video player. The videos were available at the top of the feedback page. This is followed by the feedback in text, which was received by every student in the cohort.

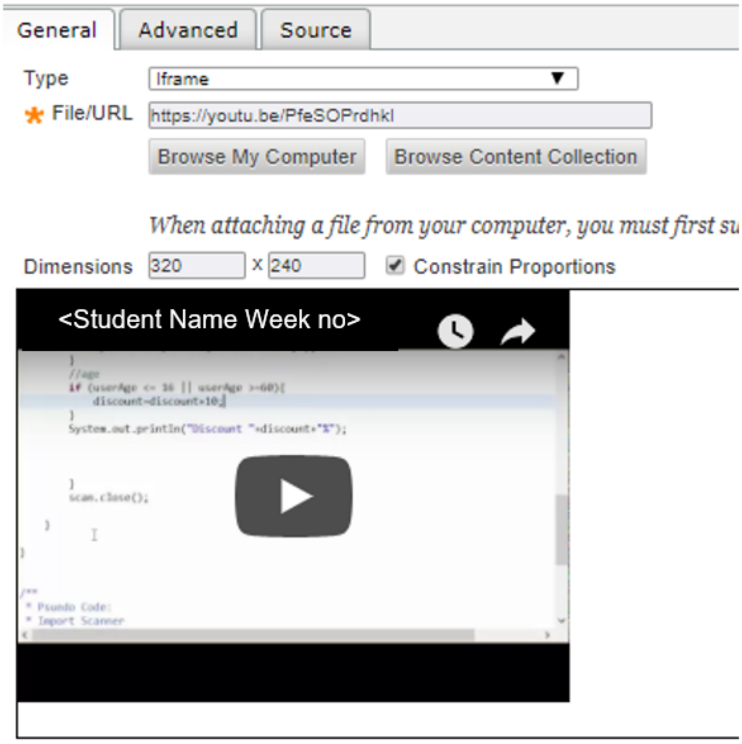


Figure 6.3: Screen shot of interface when inserting a YouTube (2005) video into the student feedback area of the Blackboard (2018) interface - the marker's perspective.

6.3.1 Post study survey

A post study survey was carried out with all sample participants. A quarter of the student cohort was assigned to be marked by the marker using video feedback, this number was then further reduced by non-submissions or unacceptable submissions. Of the remaining students, only those who followed the link through the gradebook section of the VLE, to the feedback area would see the link to the survey. It was posted, with a paragraph of introduction, on the same page as the video feedback, so that students could see it was there as soon as they saw their feedback area.

During the December of the first academic year 14 students responded, and when another batch of marking was completed in January a further 9 responded. During the following academic year, the video feedback was issued earlier in the year in the hope of improving response rates and an additional 23 responded. Over the period of the trial 46 students responded in total.

One question asks the students about their previous experience of video feedback. Only two students had received video feedback once each before, and none more than that. The majority of students are therefore experiencing video feedback for the first time.

Access to feedback

One question was to find out if the student had managed to watch their feedback successfully. In case students had not managed to watch their feedback, the next few questions were intended to gather information about the platform used for viewing to enable an investigation of common factors between platforms where viewing had failed. Fortunately, all students watched their video feedback successfully. Although the majority of students viewed their feedback on a laptop, a variety of platforms were used (see Figure 6.4). Therefore, video feedback is feasible and can be viewed on all major platforms.

Although all the students successfully viewed their feedback it was not an error free experience. A number of issues were reported with the links, which the computing students were knowledgeable enough to work around, but other students may not be able, or be willing, to make the adjustments to make it work. Most of the issues are with the file extension, which identifies the format. These errors were only reported by students using the Chrome (Google 2008) internet browser software. There is the small possibility that this connection is coincidental since the majority of computing students use the Chrome (Google 2008) browser (see Figure 6.5). Students have already been discouraged from using Chrome (Google 2008) by the IT department due to issues with other services and so this advice will hold for now, and will probably resolve itself through browser evolution.

Ease of engagement with feedback

The propositions state that students will perceive benefits from video feedback both from the visual reference to the work (P4), and with the narration (P5). One survey question asks students ‘How easy is it to engage with your video feedback, compared to traditional written feedback?’. The null hypothesis for these questions is that there is no difference in ease of use between text and video as feedback. Students were asked to indicate ease of use of video feedback for 8 different types of engagement compared to the ease of use of text as feedback. The aspects considered by this set of questions were: -

1. To understand
2. To identify errors
3. To revise from

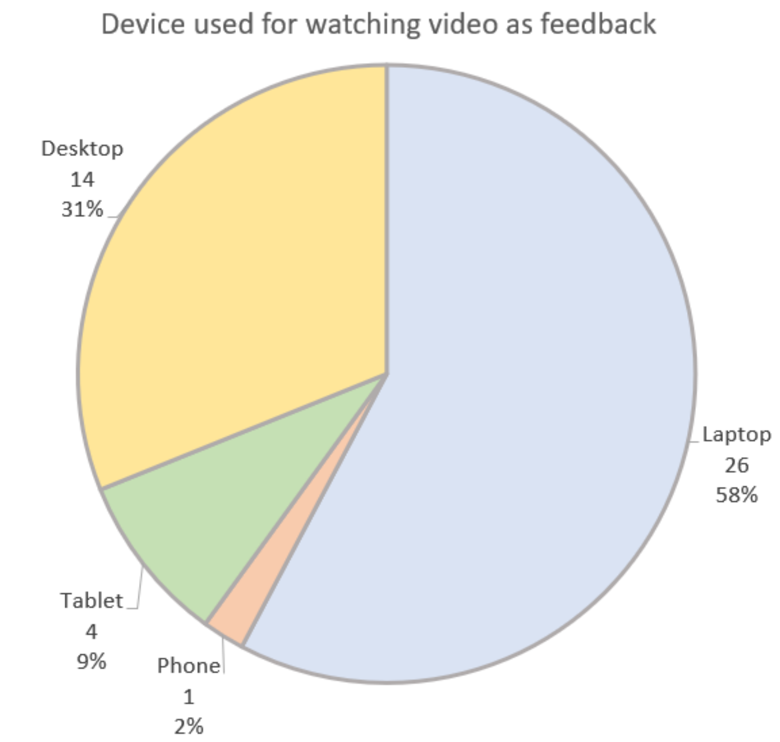


Figure 6.4: Types of devices used to review video feedback

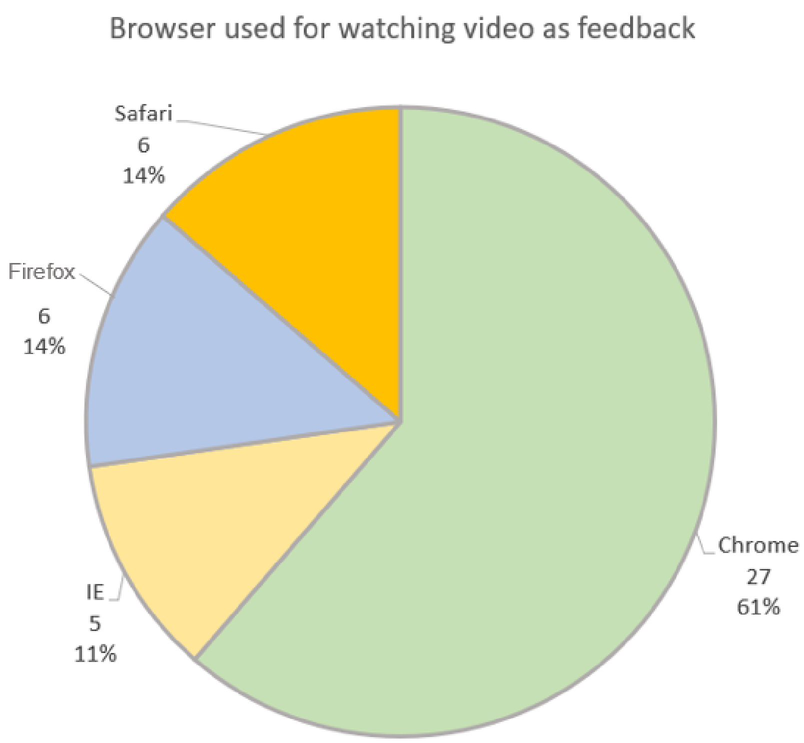


Figure 6.5: Internet browser software used to review video feedback

4. To watch (as opposed to reading text feedback)
5. To identify future improvements
6. To understand errors
7. To revisit
8. To learn from

Positive responses range from between 89.13% (41 students) and 95.65% (43 students) for each type of engagement (see Table 6.6). Not only was the response strongly positive but the fact that there was only one negative reaction across all the tasks indicates that students perceive ease of use benefits in video feedback.

Engagement tasks	Much easier % (count)	Easier % (count)	No difference % (count)	Harder % (count)	Much harder % (count)
To understand	73.91% (34)	19.57% (9)	6.52% (3)	0.00% (0)	0.00% (0)
To identify errors	80.43% (37)	15.22% (7)	4.35% (2)	0.00% (0)	0.00% (0)
To revise from	69.57% (32)	23.91% (11)	6.52% (3)	0.00% (0)	0.00% (0)
To watch (v to read)	71.74% (33)	17.39% (8)	8.70% (4)	2.17% (1)	0.00% (0)
To identify future improvements	76.09% (35)	17.39% (8)	6.52% (3)	0.00% (0)	0.00% (0)
To understand errors	84.78% (39)	10.87% (5)	4.35% (2)	0.00% (0)	0.00% (0)
To revisit	67.39% (31)	21.74% (10)	10.87% (5)	0.00% (0)	0.00% (0)
To learn from	78.26% (36)	17.39% (8)	4.35% (2)	0.00% (0)	0.00% (0)

Table 6.6: Results of Question 3 - How easy is it to engage with your video feedback, compared to traditional written feedback?

Ease of use component analysis

A principle components analysis (PCA) (Pearson 1901) was run on these 8 ’ease of use’ questions, to see if a single ease of use factor could be derived from the data. This could then be used as a scale variable in further investigations. The suitability of PCA was assessed prior to analysis. The number of responses (46) is well above the recommended minimum of 10 for this type of analysis.

Inspection of the correlation matrix showed that all variables had at least one variable coefficient greater than 0.4 (see Appendix E.3 Figure E.3). The overall Kaiser-Mayer-Olkin (KMO) (Kaiser and Rice 1974) was 0.794 with individual KMO measures of all greater than 0.6, and classifications of ‘middling’ to ‘marvellous’ (Kaiser 1974a). Bartlett’s Test of Sphericity (Bartlett 1950) was statistically significant ($p < .001$), indicating that the data was not an identity matrix, and likely factorizable (see Appendix E.3 Figure E.4).

The PCA revealed one component that had eigenvalues greater than 1, and which explained 71.492% of variance (see Table 6.7). Eigenvalues for other components were well below 1, the highest being .725, making the examination of a scree plot unnecessary (although the scree plot is available in Appendix E.3 Figure E.8). Only one

	Initial Eigenvalues			Extraction sums of squared loadings		
Component	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %
1	5.719	71.492	71.492	5.719	71.492	71.492
2	.725	9.068	80.560			
3	.546	6.823	87.383			
4	.412	5.156	92.539			
5	.237	2.963	95.502			
6	.191	2.390	97.893			
7	.118	1.470	99.362			
8	.051	.638	100.000			

Table 6.7: Principle Component Analysis of aspects of ease of use - Total variance explained - output from SPSS (IBM 1999)

component was extracted and therefore, the solution was not rotated. In addition, a single component solution met the interpretability criterion. The interpretation of the data was consistent with the intended design of these questions as a means of measuring ease of use. As such, one component was retained. All of the outputs from this PCA are available in Appendix E.3.

Ease of use questions - free format responses

There was a comments box following the ease of use questions, available for free format text. Eleven students used it to express their positive support for the use of video feedback, including one student who said video feedback was a *”vast improvement”*, and who had clearly discussed their feedback with their family, as the *”family were also very impressed with this feedback method”.*

The next two most common sets of positive comments were regarding the facility for identifying errors and issues, and understanding how to improve them.

> *”I found that having the video feedback helped a lot more in seeing what i have actually done wrong and where the improvements need to be made in future.”*
>
> *”It really does allow me to see clearly where I have made mistakes and identify what I need to change in the future. Thank you.”*

Visual aspects

There were several references to the visual aspect of the content, including a student declaring themselves as a visual learner.

> *”Love the video feedback, great for people like me who are very much visual learners! Much better than text feedback”*
>
> *”It was a lot easier to see what was meant by the improvements when I could see them being done.”*
>
> *”The ability to see the recommended changes to my code visually shown was much easier than reading.”*

Other points remarked on the use of video feedback being quicker and easier to review, and improved clarity and levels of understanding. Although it is impossible to identify whether the majority of the positive comments are related to benefits perceived in the narrative, or visual component of the video, it is clear students prefer video feedback according to their free form comments volunteered regarding ease of use.

Preference for video in future

The preference for video feedback over text is further confirmed when asking students if they would like video feedback in future and 45 out of 46 students responded positively.

> *"Definitely, much easier to follow your tutors voice and you can follow as they look through your work. You can also see changes they make instead of just listening to their advice."*

When asked which format they would prefer the options included video and text together. A majority preference for video was once again confirmed (59%). An additional 37% indicated a preference for having both text and video formats available (see Figure 6.6). Only 2 students who opted for both formats offered insight into their

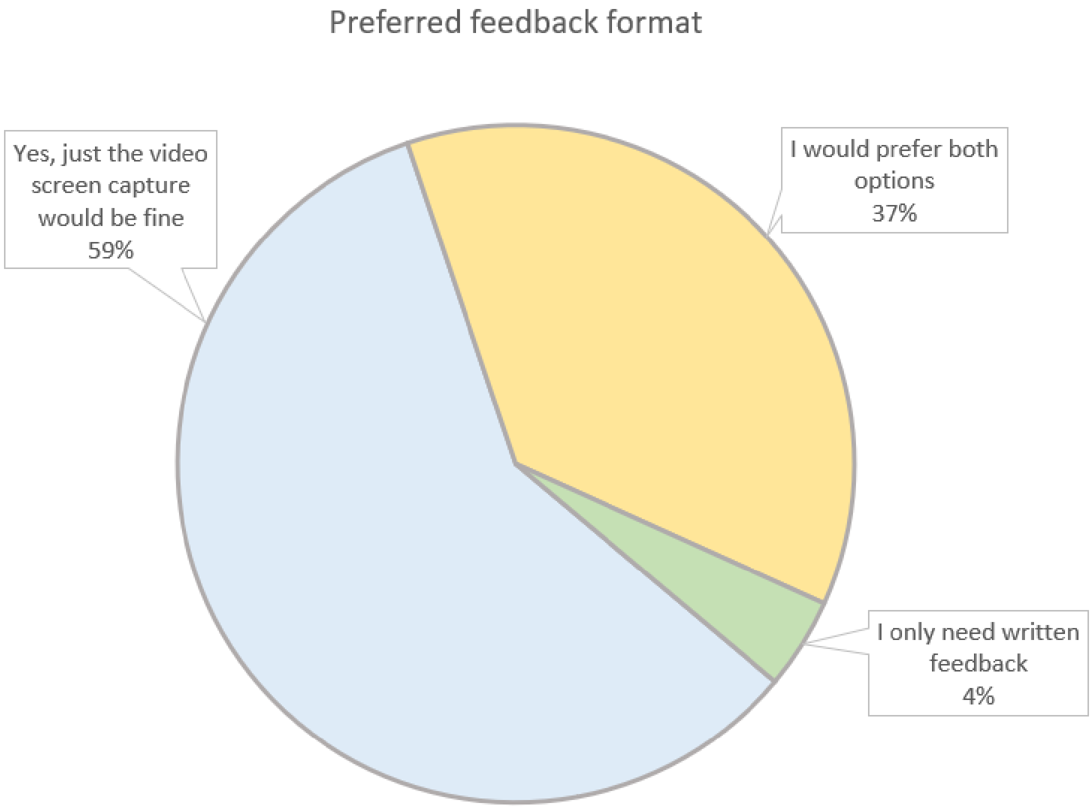


Figure 6.6: Results of Q5 - Do you think you would like video screen capture feedback on assignments in future?

choice via the free format comments box. One student believed text would be better for larger assignments, and wanted to be able to 'keep' the feedback, and so wanted to be able to download the video. It could be that the ability to copy the text version was the reason for wanting to keep it. The second student preferring both formats who left a comment saw the advantages but simply thought video feedback was ahead of its time.

> *”It’s too soon I think to replace the written feedback with video, however I think it is a far more powerful and easier way of giving students feedback, especially with coding.”*

To find out whether that preference is just students seeing the opportunity to have both options, or whether there is a preference for text in that set, it was decided that the option to have both media formats should be removed from future questionnaires. Although there was a free format text box was available for students to make their own format suggestions no one suggested an alternative media, or media combination.

Other comments accompanying this question on preferred format usually described the rationale for the selection, which revealed perceived increased levels of detail, and friendly tone, as well as ease of understanding and clarity of how to improve.

Improve chances of review and applying recommendations

Students were then asked about whether they believed the video feedback would improve the chances of them reviewing their feedback in future and 44 out of 46 responded positively. When asked if they believed video feedback would improve the chances of applying changes recommended in the feedback in the next assignment, the response was slightly less positive with 41 out of 46 responding positively. Of the other 5, only one student used the free format comments box, and said that they would make the changes regardless of the format.

How students feel about receiving video feedback

Finally, students were asked how they felt about their video feedback, compared to traditional written feedback, in terms of a set of particular aspects (see Table 6.8). Students selected from a scale indicating whether video feedback was an improvement over text, or worse. There are only 3 negative selections across the matrix covering all 11 aspects and all 46 students. The aspect that faired least well was time consumption with two of those negative selections and therefore the lowest improvement. However, even that aspect was far from considered detrimental, and largely reported as no different to written feedback.

Aspects considered	vastly improved % (count)	improved % (count)	no difference % (count)	not as good % (count)	much worse % (count)	total responses count
Engaging	73.91% (34)	23.91% (11)	2.17% (1)	0.00% (0)	0.00% (0)	46
Friendly	67.39% (31)	30.43% (14)	2.17% (1)	0.00% (0)	0.00% (0)	46
Encouraging	45.65% (21)	52.17% (24)	2.17% (1)	0.00% (0)	0.00% (0)	46
Helpful	78.26% (36)	17.39% (8)	4.35% (2)	0.00% (0)	0.00% (0)	46
Useful	76.09% (35)	19.57% (9)	4.35% (2)	0.00% (0)	0.00% (0)	46
Personal	69.57% (32)	26.09% (12)	4.35% (2)	0.00% (0)	0.00% (0)	46
Clarity	73.91% (34)	19.57% (9)	6.52% (3)	0.00% (0)	0.00% (0)	46
Enjoyable	52.17% (24)	34.78% (16)	13.04% (6)	0.00% (0)	0.00% (0)	46
Fair	45.65% (21)	41.30% (19)	10.87% (5)	2.17% (1)	0.00% (0)	46
Entertaining	42.22% (19)	31.11% (14)	26.67% (12)	0.00% (0)	0.00% (0)	45
Time consuming	21.74% (14)	31.11% (10)	43.48% (20)	4.35% (2)	0.00% (0)	46

Table 6.8: Survey results from Question 9 - How did you feel about your video feedback, compared the traditional written feedback? – ordered by sum of positive response count

Some of the aspects were selected because of their similarity with others as a potential means of cross checking interpretation of the terms. Due to the non parametric nature of the data, a Spearman (1904) correlation was performed on each pair of terms which was anticipated would be interpreted as having similar meaning. As expected there is a significant positive correlation, of moderate strength, between enjoyment and entertainment ($p<.001$, $r=.651$), (see Figure 6.7a), and a significant string positive correlation between helpfulness and usefulness ($p<.001$, $r=.834$), (see Figure 6.7b).

Aspects of being Enjoyable and Entertaining Non parametric Correlation (Spearman 1904)

			Q9) How did you feel about your video feedback?: Enjoyable	Q9) How did you feel about your video feedback?: Entertaining
Spearman's rho	Q9) How did you feel about your video feedback?: Enjoyable	Correlation Coefficient	1.000	.651**
		Sig. (2-tailed)	.	.000
		N	46	45
	Q9) How did you feel about your video feedback?: Entertaining	Correlation Coefficient	.651**	1.000
		Sig. (2-tailed)	.000	.
		N	45	45

**. Correlation is significant at the 0.01 level (2-tailed).

(a) Correlation between perceived qualities of Enjoyment and Entertainment

Aspects of being Helpful and Useful - Non parametric Correlation (Spearman 1904)

			Q9) How did you feel about your video feedback?: Useful	Q9) How did you feel about your video feedback?: Helpful
Spearman's rho	Q9) How did you feel about your video feedback?: Useful	Correlation Coefficient	1.000	.834**
		Sig. (2-tailed)	.	.000
		N	46	46
	Q9) How did you feel about your video feedback?: Helpful	Correlation Coefficient	.834**	1.000
		Sig. (2-tailed)	.000	.
		N	46	46

**. Correlation is significant at the 0.01 level (2-tailed).

(b) Correlation between perceived qualities of Usefulness and Helpfulness

Figure 6.7: Survey question: How did you feel about your video feedback, compared the traditional written feedback? - Correlation (Spearman 1904) between perceived qualities - output from SPSS (IBM 1999)

Other significant and strong relationships are shown between friendliness and usefulness ($p<.001$, $r=.736$), and friendliness and the video being regarded as engaging

($p<.001$, $r=.714$). This kind of relationship implies an impact of the perception of friendliness on the perceptions of the other two aspects.

A principle components analysis (PCA) (Pearson 1901) was run on the 11 questions from the questionnaire that measured how reviewing video feedback makes students feel relative to text as feedback. The null hypothesis is therefore, that there is no difference in how students feel about receiving video as feedback compared to text. The aspects that were considered by asking these questions are: -

1. Encouraging
2. Time Consuming
3. Personal
4. Friendly
5. Enjoyable
6. Useful
7. Engaging
8. Clarity
9. Entertaining
10. Fair
11. Helpful

The rationale behind running the PCA was to see if a single factor of student satisfaction could be derived from the data. This could then be used as a scale variable in further investigations. The suitability of PCA was assessed prior to analysis. The number of responses (46) is well above the recommended minimum of 10 for this type of analysis.

Inspection of the correlation matrix showed that all variables had at least one variable coefficient greater than 0.4. The overall Kaiser-Mayer-Olkin (KMO) was 0.880 with individual KMO measures all greater than 0.8, and classifications of ‘meritorious’ to ‘marvellous’ (Kaiser 1974b). Bartlett’s Test of Sphericity (Bartlett 1950) was statistically significant ($p < .001$), indicating that the data was not an identity matrix, and likely factorisable.

PCA revealed one component that had eigenvalues greater than 1, and which explained 56.592% of variance. The second component contributes very close to one at .984 (see Table 6.9). Visual inspection of the scree plot (see Appendix E.4 Figure E.19) indicated that two components should be retained (Cattell 1966), since a two component solution also improves the total variance explained to 65.54% (see Appendix E.4 Figure E.18).

The pattern matrix (see Table 6.10) shows that the aspects of video feedback considered by students which load on to component 1 are engaging, helpful, useful, clarity, friendly, enjoyable, personal, fair, and encouraging. These aspects relate to the learning message (engaging, helpful, useful and clarity); the aspects related to the tone of the message (friendly, enjoyable, personal and encouraging) and an understanding of where the marks came from (fair). The aspects loading on to component 2 are those which relate to the format of video (entertaining), the marking process itself (fair) and the practical aspect of how long it takes to review the video (time consuming). There are some overlaps with fair being slightly more heavily loaded to component 1 and encouraging being slightly more heavily loaded to component 2. Therefore the interesting and most useful component will be component 1 as the improvement in learning message factor.

The resulting graph of the components plotted in rotated space (see Figure 6.8) demonstrates the relationships in a different way. The helpful and useful aspects are overlapping, demonstrating the students understanding of the terms as very similar. Close by are the clarity and engaging aspects, collecting all the aspects related to learning close together. Friendly, enjoyable and personal are close together representing the tone of the video feedback. The outlier is the video being time consuming to learn from as the only practical aspect considered here, since all other practical aspects were exactly the same as for text feedback.

There is a significant positive correlation, of moderate strength, between the newly formed how-students-feel factor and the learning improvement factor ($p<.001$, $r=.612$).

Finally, students were offered the opportunity to suggest improvements to video feedback in a free format text box. These tended to be generic positive comments. One comment indicated that video feedback may specifically be an improvement for students with additional learning needs saying, ”*Please keep doing video feedback! It helps us Dyslexics greatly*”.

	Initial Eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings
Component	Total	% Variance	% Cumulative	Total	% Variance	% Cumulative	Total
1	6.225	56.592	56.592	6.225	56.592	56.592	5.932
2	.984	8.948	65.540	.984	8.948	65.540	3.608
3	.848	7.705	73.245				
4	.700	6.360	79.605				
5	.594	5.396	85.001				
6	.456	4.150	89.150				
7	.386	3.506	92.657				
8	.350	3.183	95.840				
9	.202	1.833	97.673				
10	.165	1.497	99.170				
11	.091	.830	100.000				

Table 6.9: PCA on how students feel about aspects of video feedback output from SPSS (IBM 1999) - Total variance

	Component	
Aspect	1	2
Engaging	.936	
Helpful	.907	
Useful	.902	
Clarity	.883	
Friendly	.825	
Enjoyable	.562	
Personal	.481	
Fair	.430	.373
Time consuming		.918
Encouraging	.372	.562
Entertaining		.545

Extraction method: Principal component analysis

Rotation method: Oblimin with Kaiser normalisation.

Rotation converged in 7 iterations

Table 6.10: How did you feel about your video feedback?

Output from SPSS (IBM 1999) - Pattern matrix

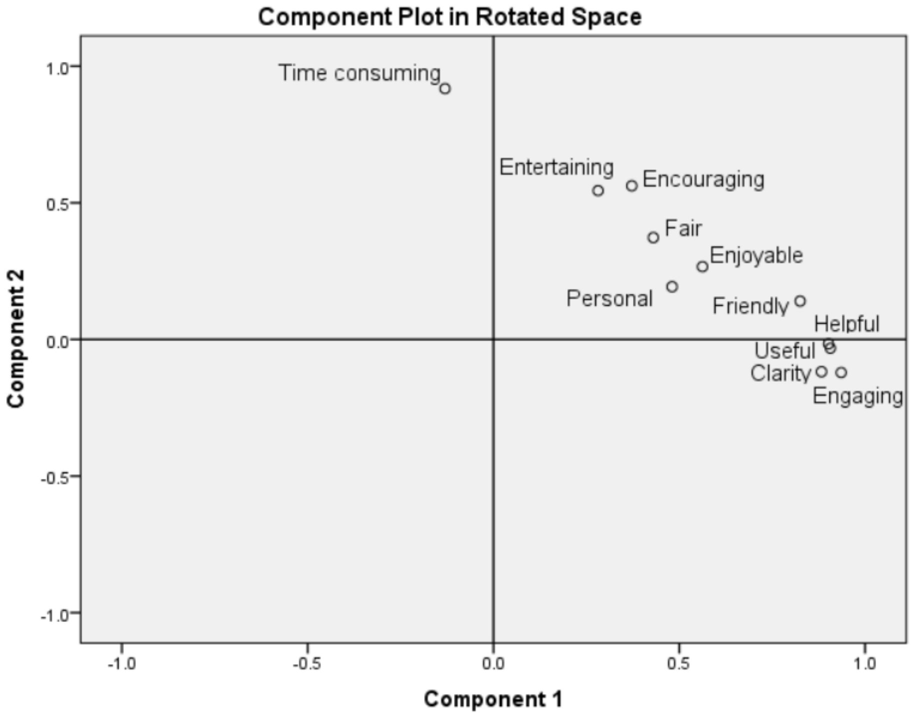


Figure 6.8: PCA 'How do you feel...?' questions
Component plot in rotated space (graph)
output from SPSS (IBM 1999)

6.3.2 Conclusion

The evaluation of the original propositions are shown in Table 6.11, and these are then explained in more detail.
This section will review the results in terms of the five propositions originally proposed for the case study.

It proved feasible to create video feedback (P1) and it was reviewed successfully by all of the students. From the student perspective, there were issues with users of the Chrome browser (Google 2008). It is recommended by Blackboard (2018) the VLE vendor, that users should view the VLE using the Firefox browser (Mozilla Corporation and Mozilla Foundation 2002). Reinforcement of that message may help students avoid these problems. This can be done both verbally, and with strategically placed instructions on the VLE. Feedback is accessible by students if they avoid the use of the Chrome browser(Google 2008). However, that particular browser is relatively young compared to it's main competitors, and its continued development may render this problem obsolete in the near future.

Proposition	Valuation
P1) Video feedback on programming code assignments is technically feasible.	TRUE
P2) There will be no increase in time spent by staff completing the marking process	TRUE
P3) Students will prefer video feedback delivered by a link to a video on YouTube (2005) embedded into the feedback area of the VLE, compared to digital text feedback.	TRUE
P4) Students will perceive a benefit from the visual reference to their work	TRUE
P5) Students will perceive a benefit from the narration in the form of • a. Additional non-verbal communication • b. Increased depth and detail • c. personal and friendly tone.	TRUE
P6) Video feedback will increase engagement with feedback	TRUE

Table 6.11: Video Feedback on trial: Evaluation of propositions

From the marker perspective, the process of creating and delivering the feedback is cumbersome but has only one major issue. That is where the links generated by YouTube (2005) contain a hyphen. When those links are pasted into the VLE they are truncated, making them invalid. Therefore by storing them in a spreadsheet first and running a search for hyphens on the spreadsheet the links which will become invalid can be identified. Following pasting the links into the VLE the invalid ones can be manually edited. It adds to the workload, but in a small way, which is considered worth tolerating at present. The feedback is delivered by a mechanism deemed acceptable by the marker as feasible for every day practice, but is not at all streamlined and there is a lot of scope for reducing workload as technology progresses.

It was still possible to return all the feedback, including the written version, in the normal time frame (P2). The time taken to create and distribute each individual video was not recorded, as the monitoring process would have significantly increased the work load in itself. However, when recording feedback for tasks issued at the beginning of the first semester, the video durations are averaging 1 minutes 44 seconds (see Table 6.12). There is one anomalous week (week 6), but in general, as the tasks increase in difficulty, by the end of the first semester the length of the videos has increased. The longest is 6 minutes 17 seconds and the average is 4 minutes 51 seconds.

Exercise	Shortest	Longest	Average
Week 1 exercise	00:00:42	00:03:03	00:01:44
Week 5 exercise	00:01:00	00:03:58	00:02:12
Week 6 exercise	00:03:51	00:10:35	00:06:11
Week 8 exercise	00:01:36	00:04:53	00:02:46
Week 9 exercise	00:03:15	00:06:17	00:04:51

Table 6.12: Summary of durations of videos recorded

Examination of the viewing figures from YouTube (2005) show that each video was watched at least twice, in fact, up to 12 times in one case, although the average number of views is 4. Of course this does not mean that the students watched their own video each time. In fact, on entering one taught session following the release of video feedback a group of students had switched seats and were watching each others feedback.

Clearly these are durations from the smaller exercises in the first semester. In the second semester the students will receive one large piece of work, which may require longer durations of recording.

Students have expressed a preference for video feedback over text (P3). Forty-five out of 46 would like to see video feedback on future assessments and 95.55% believe it will improve the chances of them reviewing their feedback in future.

The figures show that, for the majority of students, video feedback supplies an engaging message with a supportive tone that is friendly and encouraging. The message is valued by students as clear, helpful and useful (P4). It is personalised to them (P5), and their own work. Students are able to see why they have the mark they have and therefore, regard it as fair. It even has the potential to be enjoyable and entertaining.

The majority of students regard the use of video feedback as an improvement over text in many aspects of feedback, such as being friendly (P5), personal (P5), encouraging and engaging (P5), and easier to understand, both where errors have occurred and how to correct them in future. The source of those perceived benefits is harder to identify. There are some clues in the comments. As already discussed, some students have mentioned perceived increase in detail levels (P5) and friendly tone. There are also some references to the visual aspect and more may be intended, however, common phrases such as ‘I can see exactly where something was wrong’ may not actually be a reference to the visual content of the video, but an expression of clearer understanding. Other comments refer explicitly to the media channels.

> *”It was a lot easier to see what was meant by the improvements when I could see them being done.”*
>
> *”It was good to actually hear someone reviewing my work rather than written feedback, which at times can seem quite general.”*
>
> *”I found this type of feedback much easier to understand. [Name of marker] showed me how to fix the errors instead of just saying what was wrong with the program.”*

There is one major bias occurring with the research to date, which is that the researcher is also the marker, and is therefore keen to see this method of feedback succeed. Their previous experience in working with media may be affecting the perceived ease with which the marking task is completed. Future studies should involve other staff as markers.

System data analysis

The distribution platform (YouTube 2005) records data about how viewers interact with the videos stored on them. Data about how long viewers watched and how many times they watched is available for each video. YouTube (2005) hosted 37 of the videos for this trial. Each was stored under a ’hidden listing’ meaning it would not come up in search results.

The viewing figures from YouTube (2005) are summarised in Table 6.13. The total watch time is the sum of all viewings. The average duration watched is across all viewings, excluding those which registered as zero (a zero is registered when viewers watch less than a second). The average percent a viewer watched per view is the percentage of the duration of the video. Every single video was viewed at least twice, and one was viewed twelve times. The average duration of the videos was three minutes. The average total watch time at 00:04:55, shows that students watched 163.89% of the duration of their videos on average. In other words they did not watch it twice all the way through, as might have been assumed from the number of views. This all begs the question ’what counts as a ’view’ on YouTube (2005)?

There are several different explanations for how a ’view’ is counted. Some websites say it is the number of times play is intentionally clicked, but that doesn’t account for landing on the page and the video automatically starts playing. Others claim that if you watch your own video, to prevent people boosting their own popularity, 1 is deducted from the total when you move away from the page. Some suggest a different algorithm is used to count views once the number of views reaches 300. Others talk about gaps in time making a return visit count. The likelihood is that all of these things have been a part of the algorithm at some point and that it has evolved over time, therefore, an accurate definition has not been found. All strategies explained appear to be attempting to work out the numbers of visits by different people, or return visits following a gap longer than a day. The search for clarification began when it was noticed that the maximum average duration watched per view is over 100%.
YouTube (2005) is not the only distribution platform making it difficult to ascertain accurate figures regarding interaction. In other cases, such as Panopto (2018), focus is

Unit	minimum	average	maximum
Views	2	4	12
Duration	00:00:28	00:03:00	00:10:35
Total watch time (minutes)	00:01:00	00:04:55	00:26:00
Average duration watched	00:00:20	00:01:14	00:04:40
Average percentage of duration watched per view	6.30%	43.91%	113.21%

Table 6.13: Viewing figures from video feedback distributed from YouTube (2005)

on the number of visitors rather than the duration watched and how an individual watched. They intend to tell the creator how many people were reached, and not how an intended audience of one individual watched a video. Some calculations were done to ascertain the accuracy of the figures supplied by (YouTube 2005). Clearly they cannot be independently checked as there is no independent means of finding out how the videos were viewed, but we can see how they work together to verify each other, particularly with regard to the elusive 'view' figure. All of the averages in Table 6.13 are calculated from the figures supplied by YouTube (2005) for the 37 videos of this study. The average percentage of duration watched indicates that if students are watching an average 43.91% of the video per view, and the average duration is 3 minutes, they are watching 00:01:19 per viewing on average. This means to complete the average watch time of 00:04:55 takes 3.73 views averaging 00:01:19 each. This number correlates closely to the figures supplied by YouTube (2005) as an average of 4 views per feedback video.

6.4 Discussion

Using video feedback is at the edge of what the technology can do. The minor technical problems are caused by using a set of disconnected pieces of software to do different parts of the process. The best fix would be to have an integrated system built for this purpose, preferably built into the VLE. This would streamline processes and reduce workload as well as eliminating the compatibility problems encountered here. At this point in time non of the major VLE vendors have such a system. To have one custom built is cost prohibitive, and particularly difficult to sell to managers while (albeit clunky) systems can be pulled together from disparate parts. Small fixes are worth tolerating so that it can be made known that there is a need for such a system in future. VLE's are moving in the right direction, for example, Brightspace (D2L Corporation 2014) has a button to record video feedback, which offers a limited duration of 3 minutes but only from a camera, so screen casting is still not available at this time. Screencast-o-matic (Gregory 2006) offer a plugin to bridge that gap, but at additional cost. A purpose-built system could be the difference between the acceptance of video feedback by staff, or not.

The students clearly perceive benefits to the use of video feedback when returned with the text feedback, and it has been shown here that they do watch their video feedback. The next step is to use video feedback in practice to find out if the text version is a necessary accompaniment or if students perceive the same benefits when receiving only video feedback, and if it is practical for use in practice by any marker, and not just someone familiar with working with media.

6.5 Applying the taxonomy to Video Feedback on Trial

The taxonomy for video feedback is applied here to the study into video feedback on trial discussed throughout this chapter. In doing so this becomes part of the validation process by utility demonstration (Usman et al. 2017). The details of the taxonomy, and its development can be found in Chapter 4, and the validation process will be discussed in Chapter 8. Entries into the taxonomy at this point are formatted as per the guidance prepared for the Expert Panel validation exercise (described in Chapter 8), and as such, will validate the documentation for that exercise simultaneously.

The following section shows the Taxonomy of Video Feedback and the data from this study which is classified into the relevant facets.

6.5.1 Study section of the Taxonomy of Video Feedback

The Study section should always appear with each of the two taxonomies, even when they appear separately, to identify the study to which the details belong. The visual representation of the taxonomy is repeated here for ease of reference in Figure .

Figure 6.9: Study section from the Taxonomy of Video Feedback diagram

Facet	Characteristic(s)
Author	Atfield-Cutts, S.
Year	2013-2015
Title	Programming unit, 1st Year Computing, Bournemouth University
Group	not applicable

Table 6.14: Taxonomy entry for studies in practice - Study section

6.5.2 Context Taxonomy

The context taxonomy is shown here for reference in Figure 6.10. The entry for the context in which this study took place is described in Table 6.15.

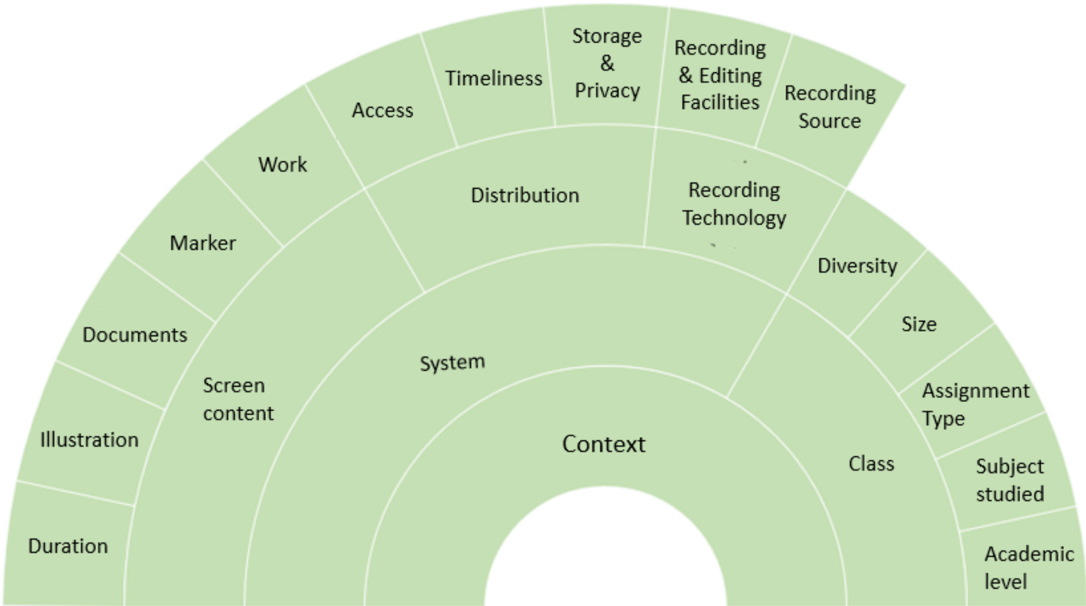


Figure 6.10: Context Taxonomy from the Taxonomy of Video Feedback diagram

Facet	Characteristic(s)
SYSTEM - Screen Content	
Duration	
shortest	00:00:42
average	00:03:00
longest	00:10:35
Illustration	Execute code before and after corrections
Documents	Marking scheme and assignment brief
Marker	no
Work	yes
SYSTEM - Distribution	
Access	Student access via the VLE student feedback page
Timeliness	3 weeks maximum
Storage	Hidden listing on YouTube (2005).
Privacy	Accessed by student login credentials via VLE
SYSTEM - Recording Technology	
Recording and editing	
Recording	Screencast or web cam. Can record whole or portion of the screen.
Editing	Cant insert into middle of timeline, but can add to beginning and end. Editing never used
Recording source	Screencast and text
CLASS	
Diversity	Survey is anonymous. Not known.
Size	
Population	231 in 2013-2014 and 253 in 2014-2015
Sample	Approx 1/4 of student population receives video feedback
Survey Respondents	46
Markers	Sample marked by 1 out of 4 staff
Assignment type	Programming exercises in java
Subject studied	Programming unit on Computing BSc(Hons) degrees
Academic level	First year undergraduate. Level 4

Table 6.15: Context Taxonomy entry for studies in practice

6.5.3 Perceptions Taxonomy

The Perceptions Taxonomy is for the classification of the opinions of stakeholders and findings of the study, and the entry for this study is described in Tables 6.16, 6.17, and 6.18.

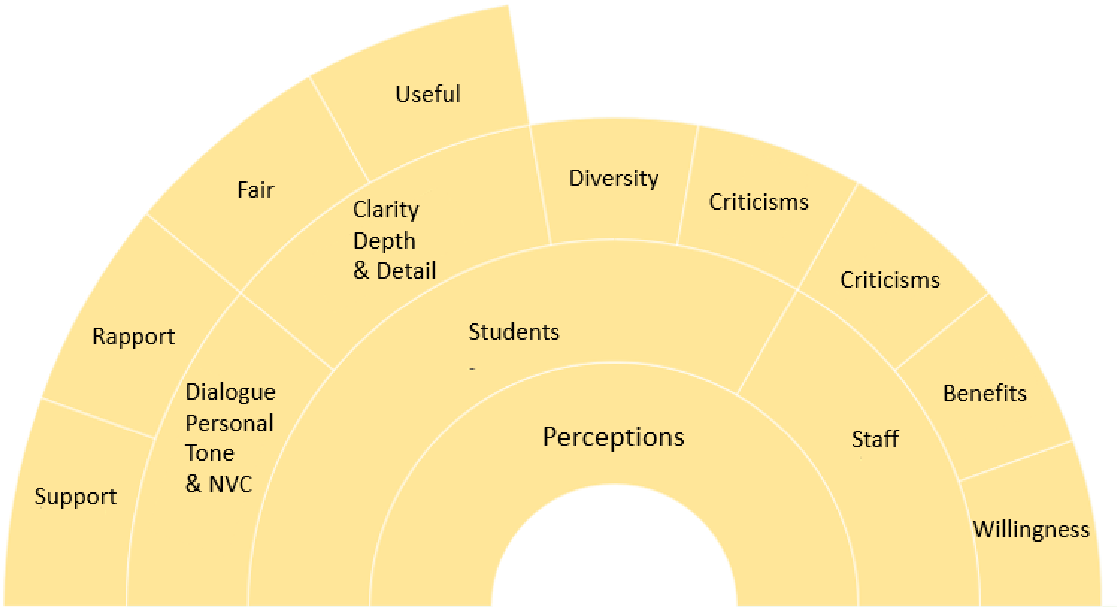


Figure 6.11: Perceptions Taxonomy of Video Feedback diagram

Facet	Characteristic(s)
STUDENTS - Dialogue Personal Tone and Non Verbal Communication	
Support	97.82 % of students who responded to the survey (46) found the use of video feedback to be more encouraging than text feedback. There were no negative responses.
Rapport	Students found it more personal being referred to by name. 95.66% of students who responded to the survey (46) found the use of video feedback to be more personal than text feedback. There were no negative responses. 97.82% of students who responded to the survey (46) found the use of video feedback to be more friendly than text feedback. There were no negative responses

Table 6.16: Perceptions Taxonomy entry for video feedback on trial - part 1 of 3

Facet	Characteristic(s)
STUDENTS - Clarity depth and detail	
Fair	87% of students said fairness of marking was improved compared to text feedback.
Useful	Positive response rate for video compared to text: - - usefulness 85% - helpful 95.65% - clarity 93.48% Positive responses ranged from between 89.13% (41 students) and 95.65% (43 students) for each type of engagement measured, such as, to understand, identify errors, revise, identify future improvements, revisit, learn from. Comments suggest improvements in the following areas: - - Identifying mistakes - Understanding how to apply improvements - Clarity in general - Levels of detail - Quicker and easier to understand than reading Other comments: - Understanding comes from direct reference to work specifically Students commented on the usefulness of the audio narration specifically Student believes its easier for staff to explain complex issues Students think they are more likely to remember points made in the video than in text. One student felt being able to re-watch the video would help when they come to do the next piece of work.

Table 6.17: Perceptions Taxonomy entry for video feedback on trial - part 2 of 3

Facet	Characteristic(s)
STUDENTS - Clarity depth and detail	
Diversity	”Love the video feedback, great for people like me who are very much visual learners! Much better than text feedback.” ”Please keep doing video feedback! It helps us Dyslexics greatly.”
Criticisms	Browser compatibility issues with the currently installed version of Chrome (Google 2008)
STAFF	
Criticisms	Lack of storage facility required to enable implementation across a larger sample
Benefits	Potential to save time if video is used alone, as both formats were produced in acceptable time frame. Felt as though you had the ability to express yourself in a way that would create better explanations.
Willingness	Keen to solve a problem i.e.: lack of feedforward by students. Markers previous experience with audio feedback meant there were no concerns about being able to complete the task

Table 6.18: Perceptions Taxonomy entry for video feedback on trial - part 3 of 3

Findings of applying the Taxonomy of Video Feedback to a trial of video feedback

The study section of the taxonomy set was easy to complete and there were no sets of students, or ’groups’ required in this set of data, as there were no differences that might require the recording of different characteristics into the same facet. Therefore the ’Study’ section is perfectly adequate for this data set.

Data was easy to classify into the Context Taxonomy. There were two values for the *’population’*, but that could have just as easily been recorded as a single number since there were no other differences between the two cohorts.

Decisions about what to include in the classification process of the Perceptions Taxonomy was the most time consuming process. Currently, although summarised, editing was not brutal and the data classified into the ’*Useful*’ facet appears to be quite long. These are all relevant findings however, and whether the length matters is another consideration. Perhaps the classification of further studies will reveal a means of dividing findings from this section further.

Chapter 7

Video Feedback in Practice

7.1 Introduction

There had been some practical issues when trialling video feedback, the main one being the storage of the quantity of video for a full cohort of students. Another barrier to putting video feedback into practice had been the willingness of the unit leader to allow it. Finally, after two years of trials, these two issues were resolved. Firstly, the university purchased a video system for recording lectures, which had the storage capacity and functionality that also makes it suitable to be used for recording screen casts of assessment feedback. Secondly, following a presentation of the research to date, the programming unit leader made the decision to make all the feedback on the unit as video.

7.2 The study context

For this study the marking team on the programming unit delivered only video feedback, using the same set of headings used previously when producing text feedback as a guide to enable consistency across markers e.g., Professionalism, Structure, Functionality, Testing. Video feedback was delivered to all students enrolled on the unit for every assessment submission.

7.2.1 The marking team

In this study all students enrolled on the programming unit would receive video as feedback which meant involving the whole marking team in its production. Instead of being marked by a single marker, the marking team now consisted of 4 members of staff, including 3 members of staff who had never delivered video feedback before, and none of the team members had ever used the recording software used in this implementation before.

7.2.2 Applying the taxonomies to ensure an effective implementation

This study still considered the recommendations of publications when determining the implementation of the system to deliver video feedback. However, now the more significant influence was the first-hand experience of the trials of video feedback. The taxonomy was once again, used as a checklist to ensure that all aspects of the implementation were considered.

7.2.3 Taxonomy of Perceptions

The taxonomy of perceptions is divided between two sets of perspectives: those of students and staff. During the trials of video feedback, the student perceptions had been prioritised. The results had shown that the students perceived benefits to video feedback delivered by that implementation. Now with a team of staff contributing, their perceptions also needed careful consideration.

Student perceptions The cohort in receipt of video feedback for this study would contain very few students who had been involved in the previous study, if any. This is because the unit would be run for a new cohort, containing very few students repeating the unit, and among them there is only a one in four chance of them having participated in the study the previous year. There were very few implementation changes taking place, and none that would be visible to students even if they had participated in the study which ran the previous academic year.

Ensuring personalisation Personalisation had been perceived by students as a benefit of video feedback in the trials. To continue to maximise potential benefits for students it was decided the group would share a policy of opening recording narration by saying “Hello <student name>. Marking was still allocated to markers randomly.

Each student submitted 3 exercises per week and one was chosen at random for marking. That way the student would have to complete all exercises to be sure they would be marked. Each marker was allocated a single question to mark, negating the need to thoroughly understand all the possible ways in which a student might tackle all of the exercises and therefore speeding up the process of marking. Students were allocated to a marker randomly by virtue of the exercise that would be marked, so students allocated were not necessarily those taught by the marker. Although where possible attempts were made to mention previous communications with students the marker was allocated students from across the cohort and not necessarily allocated students they had taught in the classroom.

Presenting feedback as a dialogue All markers were supplied with suitable microphone equipment and access to software to ensure good quality recordings of the dialogue and screen. Hot keys were still available in the new software enabling pauses for thought and consideration of explanations to ensure clarity. It was discussed between markers that the tone should be positive and friendly.

Ensuring depth and detail It was anticipated by the marking team that marker frustration would be eased by being better able to convey full and meaningful explanations to students, in ways which had previously not been possible when using text.

Staff perceptions Perceptions of benefits and criticisms would become apparent after use and so those were collected, and will be considered later in this chapter. A training session was undertaken to ensure all markers understood the process required, particularly with regard to securing permissions on video files.

7.2.4 Context Taxonomy

Screen content and recording source The screen content would be focused on the student work, but markers were free to use whatever visual materials they deemed suitable to communicate the intended message. Putting the face of the marker on screen was not something the markers felt comfortable with. Just getting used to the new way of doing things was enough of a hurdle to deal with, especially since, in literature, students had apparently perceived benefits to the video feedback without including the marker in the screen content. Therefore, the only recording source required would be a screen cast rather than a camera.

Storage and privacy Previously videos had been stored external to the university system on YouTube (2005). Now the video feedback was becoming part of normal practice it was felt that the storage of feedback should be under university control. That meant either storing the videos internally or with a cloud service with which the university had a contract. At about the same time the university had introduced Panopto (2018) for recording lectures. It was suggested we could use this service for recording video feedback. In addition to facilities for recording and storing lectures, Panopto (2018) has the facility to set file permissions on a per video basis enabling a mechanism to ensure student privacy, and to utilise the system for providing feedback.

It was anticipated that the new Panopto (2018) platform was now able to cover all of these requirements to some degree. However, there were some differences which felt like backward steps compared to the previous system implementation. The key differences in the system implementations used are summarised in Table 7.1. Snagit (Techsmith 1996) allowed you to record part of the screen so that a) the screen was decluttered of unnecessary content, and b) enabling some items to be kept out of the recording whilst still easily available on screen. Panopto (2018) only allowed a recording of the whole screen. At the point when the study began no editing facilities were available and any unwanted errors resulted in re-recording. The link to editing facilities was on the screen, and they were later developed, but for the first year at least, there was no option but to rerecord. The main advantage to using Panopto (2018) was the storage facility. With student privacy being a legal obligation, it was more important to have greater control over the security of the videos than to be concerned about the loss of rarely used editing facilities and the lack of the option to declutter the screen content.

Distribution and access Videos were still distributed via the VLE so that video feedback continued to be delivered in the same place as other feedback, where students expected to find it. Setting up that distribution was complex. The hyperlink to the video is copied from the Panopto (2018) interface to the feedback area of the VLE. There are no longer any issues with hyphens in path names (as in the previous study), since there are none. However, each video must have permission for the student to view it explicitly added (see Table 7.1). This involves copying the student user name from the VLE into the permissions text box on the Panopto (2018) interface. It became policy to name the video files with the VLE user name so that it appeared on the Panopto (2018) screen, removing the need to switch back to the VLE interface to copy the username.

	Video Feedback on trial		Video Feedback in practice			
Academic Years	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
VLE	Blackboard				Brightspace	
Recording platform	Snagit (Techsmith 1996)		Panopto (2018)			
Recording facilities						
Screencast	✓	✓	✓	✓	✓	✓
Part screen recording	✓	✓	X	X	X	X
Editing	limited		none		limited	
Storage	External-YouTube (2005)		External under contract Panopto (2018)			
Distribution	URL pasted into HTML				Select file via dialogue box	
Privacy	YouTube (2005) hidden listing		Set up permissions per video			

Table 7.1: Case study context differences per cohort

7.3 Case Study

A case study was carried out in practice, and as with previous studies, Yin (2008) was used as a guide. In this case study five important components of research (Yin 2008) are as follows: -

7.3.1 Component 1: The case study questions

The case study questions for using screen cast video in a practice, are similar to the commonly recognised benefits of video screen cast feedback in small scale case studies, including those perceived by students in the previous trial study. Now the video feedback will be delivered in isolation, without text accompaniment, and in addition the increase in scale of the task is considered from a staff perspective.

Q1) Is video feedback on programming code assignments technically feasible for a large undergraduate cohort?

Q2) How will producing video as feedback in practice for every assessment submission, for a large undergraduate cohort, impact staff perception of workload?

Q3) What impact will be perceived by students of using video feedback to replace text, which they are previously used to?

Q4) Without the presence of the text version of the feedback, will students continue to perceive benefits from the visual reference to work, and other materials used as screen content, to illustrate feedback?

Q5) Without the presence of the text version of the feedback, will students continue to perceive benefits from the audio narration of the video, such as: -

- Q1) additional nonverbal communication
- Q2) the increase in volume of information
- Q3) perceived personal and friendly tone

Q6) Without the presence of the text version of the feedback, can video feedback alone improve student engagement with feedback?

7.3.2 Component 2: The propositions

To answer the case study questions the following propositions are suggested: -

P1) Video feedback on programming code assignments is technically feasible for a large undergraduate cohort.

P2) There will be no perceived increase in staff workload, when compared to that of delivering feedback as text.

P3) Even without the text feedback as a point of reference for direct comparison, students will continue to express a preference for video feedback over what they might have expected to receive as text feedback.

P4) Students will perceive a benefit from the visual reference to their work.

P5) Students will perceive a benefit from the narration in the form of

   (a) Additional non-verbal communication

   (b) Increased depth and detail

   (c) personal and friendly tone.

P6) Video feedback will increase engagement with feedback

7.3.3 Component 3: Unit of analysis

The unit of analysis is, once again, an individual first year Computing student at Bournemouth University, completing the programming unit on one of 3 academic years. All students enrolled on the programming unit for three academic years will have feedback returned to them as video only, for all assessment submissions to the programming unit. All students were invited to participate in the survey for data collection purposes.

7.3.4 Component 4: The logic linking the data to the propositions

P1) Video feedback on programming code assignments is technically feasible for a large undergraduate cohort.

The feasibility of video feedback will be determined by whether the feedback can be delivered in practice, using a particular implementation mechanism, which will also be examined.

P2) There will be no perceived increase in staff workload, when compared to that of delivering feedback as text.

The perception of staff workload is the closest measure we have of ascertaining any impact of the change in format, without imposing additional burden by the process of measurement itself. The university policy states that marks and feedback must be returned within three weeks of submission. However, the continuous assessment format of the programming unit means that each batch of marking must be returned within a week to avoid impacting on the next batch of marking.

Propositions 3, 4 and 5 will be determined by asking for student opinion by questionnaire. They are: -

P3) Even without the text feedback as a point of reference for direct comparison, students will continue to express a preference for video feedback over what they might have expected to receive as text feedback.

P4) Students will perceive a benefit from the visual reference to their work.

P5) Students will perceive a benefit from the audio in the form of: -

(a) Additional non-verbal communication

(b) Increased depth and detail

(c) personal and friendly tone.

Student opinion will be sought using an online survey. Students will no longer have the text version of the feedback to compare to the video feedback. Therefore, they will only be able to make judgements about video feedback against what they anticipate they might have received. They have their experience of feedback at previous educational institutions and on other units on the Computing undergraduate course to make that judgement against, as most of previous feedback is likely to have been as text. Students will be asked as part of the survey whether they have any previous experience of receiving video feedback. The student opinion ascertained from the survey in this study may vary considerably compared to the results of the survey following the trial.

P6) Students will engage with video feedback

An increase in engagement is not possible to determine since there is no information available regarding student access to the feedback area of the VLE specifically. The level of engagement will be determined by examination of the statistical data available from Panopto (2018).

7.3.5 Component 5: The criteria for interpreting findings

Findings will be interpreted according to the following criteria:-

P1) Video feedback on programming code assignments is technically feasible for a large undergraduate cohort.

The feasibility of video feedback will be determined by examining the mechanisms attempted to deliver the video as feedback. It will be deemed feasible if the video feedback is successfully delivered according to the following criteria: -

- Using a mechanism deemed acceptable by the marking team for use in normal every day practice
- Accessible for students via the VLE feedback area, and inaccessible to anyone other than the student and the marking team.
- Video feedback is delivered for all students
  - in the same time, or less, than was taken to deliver feedback as text.
  - With the same number of staff as was taken to deliver feedback as text

P2) There will be no perceived increase in staff workload, when compared to that of delivering feedback as text.

The marking team will be consulted regarding the time taken to deliver the feedback.

P3) Even without the text feedback as a point of reference for direct comparison, students will continue to express a preference for video feedback over what they might have expected to receive as text feedback.

P4) Students will perceive a benefit from the visual reference to their work.

P5) Students will perceive a benefit from the audio in the form of

(a) Additional non-verbal communication
(b) Increased depth and detail
(c) Personal and friendly tone.

Findings related to P3, P4 and P5 will be determined by analysis of a questionnaire delivered to students. It will contain questions for quantitative analysis and free format comments for qualitative analysis.

P6) Students will engage with video feedback

The statistical data associated with the videos on the Panopto (2018) storage system will be analysed.

7.3.6 Case study method

This case study was implemented across three academic years. In each of those academic years the coursework consisted of two online tests and 4 small coding exercises. Video feedback was applied only to all coding exercises.

All 4 members of the marking team responded to all assessed student work using video feedback. The marking was allocated to the four markers randomly. Although the university has a three-week turnaround policy on marking, the time frame was only a week. At that point the next exercise was submitted by the student cohort. Therefore, to take more than a week to deliver feedback to students would be to be behind schedule. In that tight time frame the marker would have to provide video feedback to every student allocated to them.

7.4 Practice system implementation

The main change to the system implementation between the trial of video feedback and its use in practice, was the switch from using Snagit (Techsmith 1996) for recording videos, and YouTube (2005) for storing them, to using a single integrated application and cloud platform for both functions. Designed primarily as a platform for the recording and distribution of lectures and classroom sessions, Panopto (2018) provides the capacity for securely storing the quantity of videos required to make video feedback feasible, and to restrict student access to only their own feedback. Panopto (2018) lacked the facility to edit videos when it was first installed. The inexperience of the marking team in editing media, and the lack of requirement to do so in the trial of video feedback, meant that this was not seen as a significant obstacle.

General system settings

There are some general system settings in Panopto (2018) that need setting up before use (see Figure 7.1), and are available on the 'Settings' tab. Only one key setting is mentioned here to enable replication of the implementation used in this case study. For details of other settings refer to the Panopto (2018) user guide.

Minimize when recording This allows for the use of hot keys during recording. It means that the recording interface does not become part of the video as it is out of sight as soon as recording begins. Under the 'Primary source' section of the interface, to set

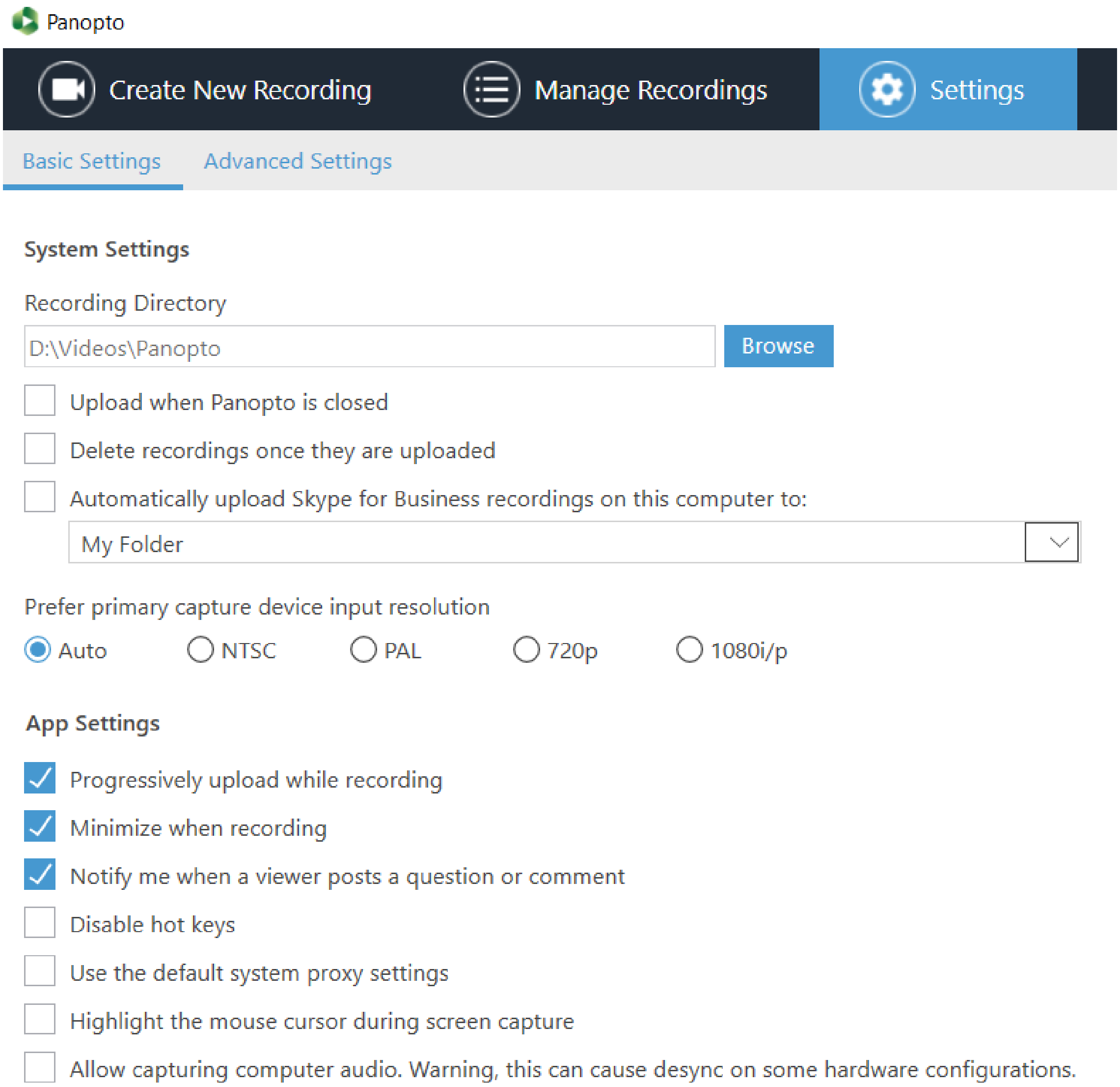


Figure 7.1: Panopto (2018) general settings interface

up a screen cast: -

1. The video recording source does not need setting, as it is used to select a camera, and none were used in this implementation. Therefore the ‘Video’ combo box remains on the default option of ‘none’.

2. The audio recording source (microphone) should be selected from the combo box.

3. The audio levels should be checked by speaking into the microphone. The level indicators should largely indicate the highest volume in the green zone. Flickering occasionally into the yellow zone is acceptable. If the volume is high enough to go into the red zone the microphone gain needs reducing. If the volume never reaches at least the end of the green zone the microphone gain needs increasing. The volume can be adjusted using the slider below the level indicators. This check should be done whilst simulating the same levels of animation, enthusiasm and tone anticipated once recording begins.

Under the ‘Secondary source’ section of the interface: -

4. Set the main video source to be the ‘main screen’ by ticking the box. Once selected the source of the recording can be checked by ticking the box labelled ‘Enable screen capture preview’. This will show the section of screen to be recorded. It may look odd if you are using the application on the same screen you intend to record as it shows the iterative feedback effect (see Figure 7.2). This view is normal and an indicator of operating as expected.

Under the ‘Session settings’ section of the interface: -

5. The correct folder for the batch of submissions should be selected. Use the arrow at the end of the ‘Folder’ combo box to browse to the correct folder.

When the marker is ready to start recording individual items of feedback:-

6. The filename is entered. This was set to be the students first name and last name, followed by their student ID number. This was included for two reasons: -

    (a) It is a good habit to include the student id in case there are two students with the same name in a single cohort

    (b) The student ID is also the student username for the VLE. This is used to set up permissions to files within Panopto (2018). By using it as the filename it appears on screen at the point where permissions need to be set up. This negates the need to switch screens to look it up.

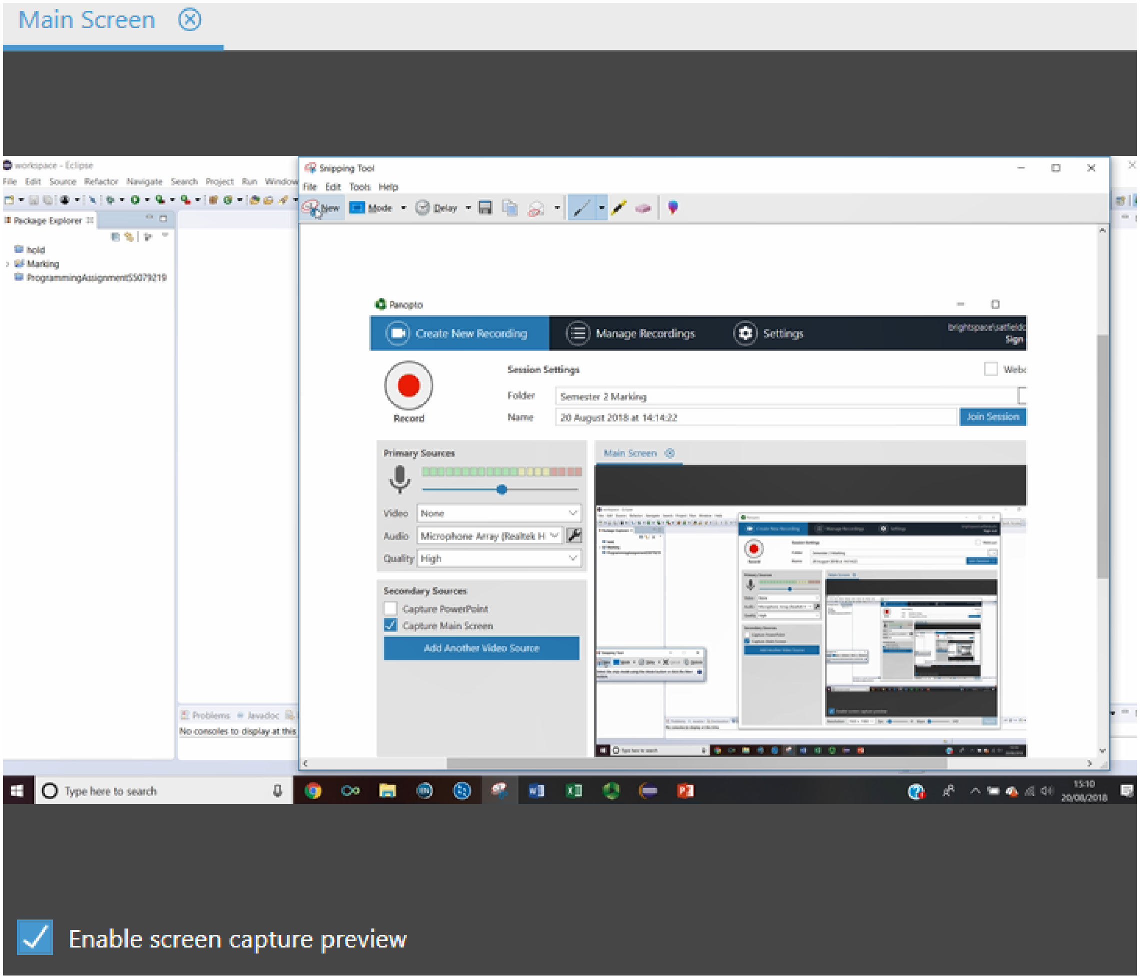


Figure 7.2: The Panopto (2018) interface - illustrating the normal view of the feedback loop effect of selecting the 'Enable screen capture preview' option

7. The students work was downloaded from the VLE and opened in the development environment, so that it could be both read and executed.

Although these settings take time to read through, in reality, they take only seconds to perform. The marker is now ready to click, or to use the hot keys, to begin recording.

During recordings the cursor was used to direct student's attention to specific parts of the code as they were discussed. Code could be executed, altered and re-executed demonstrating the impact of changes. By having other documentation open in another window, the content of the screen could be switched at any point during the recording, and back again. This was used frequently to clarify any apparent misinterpretation of the question, or to clarify how marks were being allocated according to the marking scheme.

Markers consistently began narration by saying hello to the student by name. There was then a description of the exercise being examined so that the student understood which exercise had been selected from the three candidate exercises for that week for discussion. The detailed discussion started by running through the code looking for professionalism issues, such as layout and naming conventions, and then a discussion of how the code performed followed. There was usually an encouraging comment, and the final mark for the piece, to finish.

The finished video was uploaded to the Panopto (2018) cloud, using a file name format of the students name and student id eg: 'Joe Bloggs s123456'. Uploading the video into the folder identified in the batch settings earlier, began automatically whilst recording was still taking place, negating the need for a separate upload step by the marker. However, permissions needed to be set to enable restrictions to videos by only the relevant student (see Figure 7.4). The system default is for all users to have access to everything, and only by setting permissions could privacy be maintained.

During the first two academic years of the study the Blackboard (2018) VLE was used. This was replaced with Brightspace (D2L Corporation 2014). The video hyperlinks were pasted into Blackboard (2018) in the feedback area as they had been in the trial (see Chapter 6). Brightspace (D2L Corporation 2014) had a specific menu item to insert a Panopto (2018) video, which embedded the video hyperlink in a much more user friendly way. Unfortunately this integration did not include carrying through permissions for the student to view the video. From the student perspective, the videos were embedded in the VLE feedback area, no matter which VLE they used.

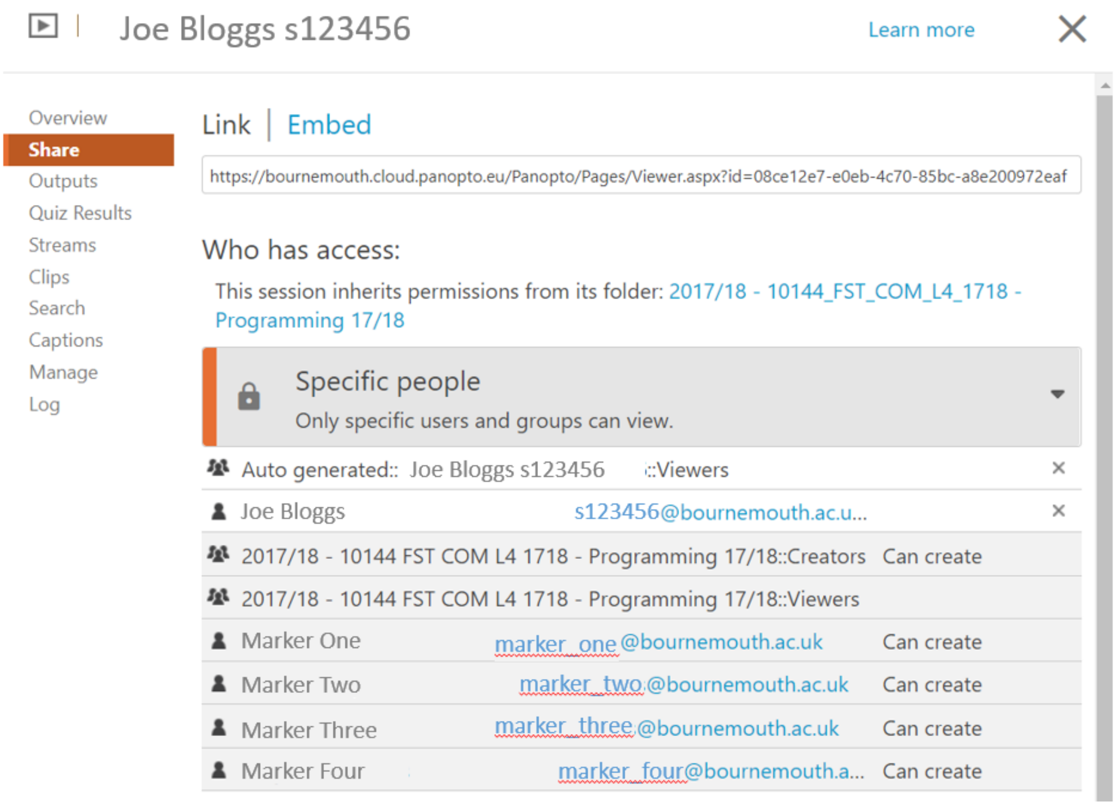


Figure 7.3: Screenshot from the Panopto (2018) interface where hyperlinks to the video can be found and permissions, for viewing and creation of videos, are set.

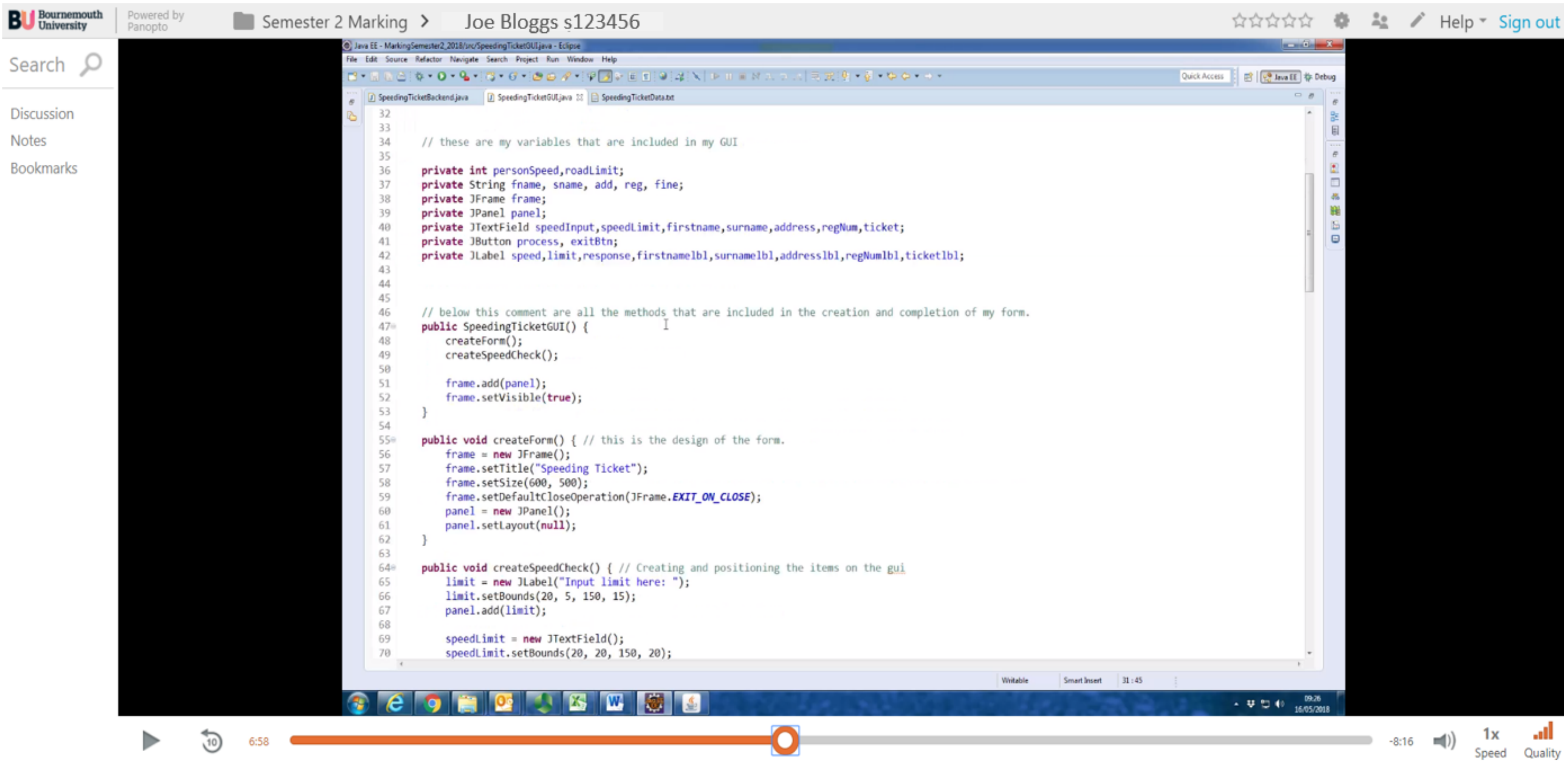


Figure 7.4: Screenshot from Panopto (2018) of the student video feedback playing

7.5 Data sources

From a pragmatic approach within a case study, data which informs the research can be drawn in from any relevant source. In this case study there were three sources of information. The opinion of students matter the most and so their opinion was sort regularly through surveys and through interviews. Marking staff have to feel comfortable with the use of video feedback for it to be successful, otherwise the tone and staff attitude could negatively impact the feedback, and subsequent student opinion, therefore the opinion of staff will also be sought. Summary data describing the student cohort as a whole will be obtained from student records. Finally, there is the data available from the platforms used for recording and distribution of the video feedback.

7.5.1 Student perceptions of video feedback - Post study survey

Surveys were taken to access student perceptions across three cohorts covering academic years beginning in 2015, 2016, and 2017. For the full schedule of surveys issued see Appendix F.1. Each time the survey was issued it had evolved. Different formats, questions and points in the year were used in an attempt to improve response rates and quality of responses.

Timing of survey distribution and impact on responses

The very first exercise submitted by students is very simple, designed to ensure a positive first submission experience. Therefore, the second and subsequent exercises contain significantly more detailed explanations and useful points for feeding learning forward. It was important that the survey was released only after they had received feedback that was likely to feel meaningful to them. To ensure that each student had received feedback on at least two exercises before taking the survey, the earliest useful point of delivery is early December. During each of the academic years a survey was issued to students during December regarding the video feedback they had received up to that point.

All students enrolled on the programming unit of the Computing undergraduate degree, who submitted a second assignment, were invited to participate in a post study survey. Therefore, the number of potential participants was reduced from the total cohort by non-submissions or unacceptable submissions. Of the remaining students, only those who clicked through the hyperlink on the grade, and went through to the 'gradebook' section of the VLE, to the feedback area would see the link to the survey. Therefore, participants were only likely to be those students who were able to offer an informed opinion of video feedback because they had reviewed it to some degree, even if only to see the video embedded on the page. The survey link was posted, with a paragraph of introduction on the same page as the video feedback, so that students could see it was there as soon as they saw their feedback area.

Original survey

During the first academic year the survey was issued two ways. The first time it was issued on Survey Monkey (1999) in December and used only the 10 questions available free of charge. Where in previous surveys the invitation to participate had been issued by leaving a link near the video in the feedback area, this time the link was emailed out, This resulted in 35 responses out of 298 students at a response rate of 11.74%, an increase of over 2% on the survey issued when video feedback was on trial. A second version of the survey went out at the end of the academic year with a view to seeing if student perceptions had changed once they had received feedback on several submissions. The question this was intended to answer was whether the novelty had worn off by this point. However, even though the second survey was very different, no respondent answered both versions of the survey so no direct comparison was available.

The new version of the survey was developed on Mentimeter (Mentimeter AB 2018). This platform was designed to make taught sessions more interactive, for use in classrooms with students answering questions live, and to be able to view responses live. Students had responded well to its use in lectures. They also responded well when using it as a survey tool with a response system with a rate of 28.52%. However, the quality of responses had dropped as students seemed to regard it in a more trivial and less thoughtful way. Their approach reflected the intended purpose in lectures, as a temporary response that would be of no future consequence. A number of responses were off topic, trivial or nonsensical and useless. This was not something which had occurred in results of any previous surveys. Additionally questions needed to be shortened to fit the word limit of the system, making them less precise, and response types were also limited. Had the students responses been just as thoughtful as with Survey Monkey (1999) it may have been worth pursuing in future as a survey tool, but not with so many limitations.

The following academic year the next version of the survey was again deployed on Survey Monkey (1999) within the free 10 question limit, and the response rate dropped back to 9.26%, similar to when video feedback was still on trial two years earlier.

Two things happened prior to the most recent survey being released. First, Bournemouth University now subscribed to JISC Online Surveys (formerly BOS) (JISC 2017) and second, Panopto (2018) had the facility to place the survey within the video. This meant the survey was developed on a very similar platform to Survey Monkey (1999), which was intended to maintain the more formal and less flippant approach by students, when compared to Mentimeter (Mentimeter AB 2018).

New distribution system of the survey

The distribution of the survey was done by inserting it so that it appeared at the end of every feedback video. That meant that students could interact with it immediately the video finished, from within the same window the video had been presented in without any need to follow a link to find it. The first survey question was presented as soon as the video feedback ended. Just in case students did not want to watch the video all the way through to the end. which would result in them not seeing the survey through the video window, a link to the survey was also placed as part of an announcement on the VLE. These changes to the distribution mechanism are likely to be the largest contribution to the response rate improvement to 25.64%. The result is 219 responses from first year students across 3 academic years. For survey platforms and distribution methods used, and the corresponding response rates, see Table 7.2.

Academic Year	Date	Platform	Invite	Response count	Student count	Response rate
2015-16 2015-16	Dec 15 Mar 16	Survey Monkey Mentimeter	email link weblink	35 85	298 298	11.74% 28.52%
2016-17	Dec 16	Survey Monkey	email link	29	313	9.26%
2017-18	Dec 17	JISC Online surveys	link in video	70	273	25.64%

Table 7.2: Survey platforms used and response rates

Original design of the survey instrument

The survey was initially kept concise to enable the use of Survey Monkey (1999) with no charge. The questions were kept similar to the wording used in the survey used in the trials of video feedback (see Chapter 6) for comparison purposes. Some questions were no longer appropriate. For example, question 6 had asked students participating in the trials if they thought video feedback could ever replace the text feedback. Since the text had now been replaced with video feedback on the Programming unit this question was reworded. It now asked students 'Could video ever replace written feedback on other units?'.

Redesign of the survey instrument

Access to the JISC Online Surveys (JISC 2017) became available through institution subscription enabling a longer set of questions. Questions were grouped into sets to gather the following types of information. The first section was designed to gather identity and demographic information. This includes information volunteered by students regarding diversity and their own learning needs. Next students were asked if they had successfully accessed their feedback, since without access the rest of the survey is not relevant.

In the previous study of video feedback on trial there had been a pre study survey in order to assess the student attitude to the unit. Without the limit on the length of the survey, questions to ascertain the student attitude to the unit at the time of taking the survey could be included in the same survey.

The following section asks students about any previous experience they might have of video feedback, and that is followed by details of the client platform they choose to watch the feedback on, in case there are any issues with e.g., particular operating systems or browsers.

The next section asked how students chose to review their feedback; whether they watch the video all the way through, watch sections, rewatch it, and so on. This section was followed by questions asking about other ways students might be likely to engage with their feedback, in comparison with text as feedback. Will the use of video feedback improve the chances of reviewing feedback, learning from feedback, feeding forward learning to future work and so on.

Another set of questions asks students whether they are willing to share their feedback with others. Based on anecdotal information it seemed some students liked to keep their feedback private while other shared with peers and family. This section of questions was designed to find out if sharing was popular,and if so who did students share with.

Students were asked if they have a preferred format and asked to choose between video or text, or there was a free format text box where students could let us know which media format, or combination of media, they would prefer. They were also asked if they thought video feedback would work for other subjects and other assignment types.

Whether the response was positive or negative, it was important to find out the reason for the students preference. Therefore, the next set of questions asked about how easy it was to use the video feedback for a range of engagement tasks, such as understanding, identifying errors and revising. This was followed by a set of questions asking students how they felt about their video feedback. Did they find it an improvement over text feedback in terms of being useful, friendly, clear, encouraging and so on?

In every section where there was a set of responses to choose from there was also at least one free format text box to allow students to express themselves without being constrained by the thought process of the researcher. In addition to these free format text boxes there is a set of questions at the end of the survey asking students for examples of what they have learned, asking them about the advantages and disadvantages of video feedback, and finally, space to suggest improvements that staff could make to video feedback.

7.5.2 Student perceptions of video feedback - Interviews

Interviews with students were designed to get student opinion as a 'door step' interview style (Cohen et al. 2013, p.411). The purpose of the interview was to improve the depth of responses gained when compared to those returned by the questionnaires, and to find alternative opinions and ideas about video feedback to those expressed so far. The hope was to gain insight into ways in which students use their video feedback that perhaps they were not even aware of. They might see their reaction to it as natural, especially if they see their peers reacting similarly, and therefore not realise it is worthy of note. Meanwhile the staff would be unaware of these new activities and therefore unaware of how to maximise the potential usefulness of the feedback. It was hoped that the personal interaction might offer insight by means of the non verbal communication into how students really feel. Communication that might indicate that a further question would offer more than the exact answer to the question first asked. The hope was for richness and authenticity, which might be more forth coming in a personal interview, as opposed to the questionnaires used to date.

The questions were designed with a focus on how the students use their feedback, rather than what they thought of it. The intention was to deviate from the planned questions where clarity was required or where ideas appeared new or interesting. Initially students were chosen at random based on their attendance at a free study area and only those who were clearly not involved in concentrated study at the time were to be approached, so that there was no negative impact on the work they were doing. After two students were asked to participate, word got around and approach by the interviewer became unnecessary. From that point on students were self selecting. Therefore, on the whole, the students were willing participants, volunteering out of curiosity, to find out what was going on. Fifteen interviews were conducted in a quiet corner of the study area out of earshot of other students, and each were between 5 and 10 minutes long.

The formality of the ethical approval for interviews and the set questions was gained ahead of the first interview. Information regarding the research purpose was made available to students ahead of interviews taking place. Having taken away the information sheet they could choose whether to return with the signed form to complete the interview, and some did not. Signed permission from students to record interviews and publish results was formally acquired in each case. The results of the analysis of the interviews can be found in Section 7.6.2.

7.5.3 Staff perceptions of video feedback - Reports

The marking team consisted of five members of staff plus the researcher making six in the team altogether. Three members of staff had responded to multiple submissions throughout the academic year, along with the researcher. Two additional markers had been asked to help with the final submission only. Since it was the largest piece of work there was concern about whether the work load was manageable for the original team of four.

All 5 of the members of the marking team (excluding the researcher) submitted a written report for this research. They were asked to write about how creating video feedback made them feel, and the advantages and disadvantages they perceived in its use for themselves and for students. A written report was the format chosen by markers, to ensure time for consideration and clear expression of thoughts and feelings.

Thematic analysis was conducted across the submitted reports following the method recommended by Braun and Clarke (2006). The reports were imported into qualitative analysis software Nvivo (QSR International 1999) and an theme emergent coding process was completed. The results can be found in Section 7.6.3.

7.5.4 Data from the video recording and distribution system

The platform used to record the feedback videos is Panopto (2018), which provides data about how viewers interact with the videos recorded and stored on it. However, Panopto (2018) is designed to be used as delivery system for lectures and taught materials, and is focused on data about the number of viewers of a video, since the primary reason for recording the data is to inform staff about how many students watched the video. Data about how long viewers watched is retrievable, however, how many times they watched is rounded up to whole minutes and is not possible to ascertain with greater accuracy. Although it promised to be a thoroughly useful set of data initially, on further inspection not all of the data is useful when the audience is a single individual, not all the variables are clearly defined, and contradictions in the data show some is rounded up or in other ways, not accurate enough to draw conclusions from. Therefore, only a subset of the data will be selected for analysis. The results can be found in Section 7.6.4.

7.6 Results of data analyses

The results of this case study come from 3 data sources, including two sets of data from students. The analyses of these data sets are in the following sections: -

- Section 7.6.1 Student perceptions of video feedback from the post study survey
- Section 7.6.2 Student perceptions of video feedback from interviews
- Section 7.6.3 Staff perceptions of video feedback as reports
- Section 7.6.4 Recording and distribution system data

7.6.1 Student perceptions of video feedback from the post study survey

The results of all the questionnaires taken over all of the academic years of the study were amalgamated for analysis and are discussed here by data source. The questionnaires gathered demographic information, details regarding accessibility of videos such as devices used, information regarding any previous experience regarding video as feedback, how easy video feedback was to use, how students felt about the feedback they received, and how they felt about receiving it in future on programming and other subjects.

Demographics

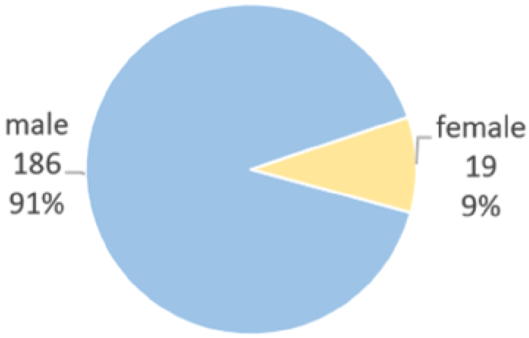
The first section of the questionnaire gathered demographic data. On examining the statistics it was found that the respondents to the questionnaire are typical of the three cohorts of students forming the population of the study. For example, The ratio of male to female respondents is approximately 10:1. (Even though students were given the opportunity to identify as other genders none did so.) When examining the ratio of male to female first year students during the academic years beginning 2015, 2016 and 2017 the numbers are very similar (see Table 7.3 and a visualisation of the data in Appendix F.3).

Group	male % (count)	female % (count)	undisclosed % (count)
Respondents	91% (186)	9% (19)	
2015 population	89% (248)	11% (32)	
2016 population	90% (275)	10% (30)	
2017 population	90% (257)	8% (24)	2% (5)

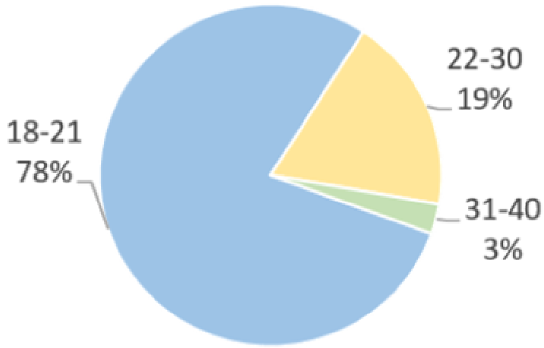
Table 7.3: Gender ratio data - comparing respondents to study population

Previous experience of video feedback

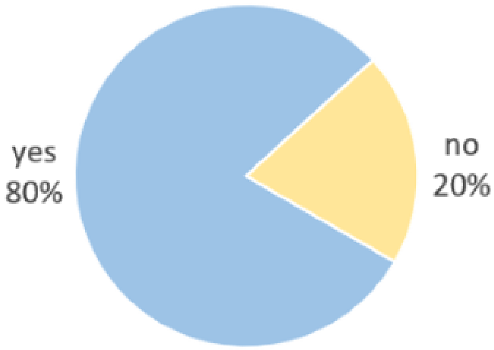
In the previous year, during the trials of video feedback (see Chapter 6), the percentage of students receiving video feedback from a previous school or college was at 9.09% and no one had received it more than once. One year on and 15 students (7.14%) have received video feedback before, with 5 students having received it ’regularly’. Although this indicates that, where it is used teachers are using it regularly, it is still uncommon, and the majority of students involved in the study are experiencing video feedback for the first time.



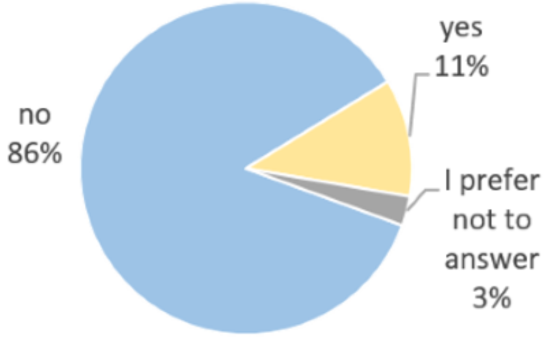
(a) Gender



(b) Age range



(c) English as first language



(d) Additional learning needs

Figure 7.5: Demographics of respondents

Access to video feedback

The transition from trialling video feedback to using it in practice, meant ten times the number of undergraduate computing students would now be receiving it. It was being used to respond to all assessment exercises instead of just a few, and four members of staff were now using the implemented system to provide video feedback instead of one. The new system had to cope with large volumes of stored media and be able to distribute it on demand. The largest point of demand would be when, simultaneously, all student's are informed that the marks were released following the marking of each exercise. It is usual for many students to review their marks and/or feedback in the period immediately following the release of the marks. For the system to be feasible in practice it had to prove capable of coping with the larger volume of media.

The questionnaire asked students if they had successfully reviewed their feedback. Since the trials the previous year browser versions had moved forward and there were no more comments regarding browser compatibility problems. This question was only asked during the first year of this study as it became clear it was no longer necessary. Out of 110 students only 5 claimed to have not been able to view their feedback, but all five also made comments later in the survey that indicated that they had managed to access it at some point. The explanation for the contradictory answers may be in one of the comments made by one such student, when they say, '*Still don't completely understand how to access it*'. The VLE used at the time was Blackboard (2018), and there was a known usability issue that had to be explained every year to students. To get to the feedback area of their profile students had to click on the awarded mark, which was hyperlinked to the feedback area, without any indication on screen that this was the expected route to find feedback. Once the new VLE was introduced no students reported any problems accessing their feedback. This interface issue is likely to explain the difficulties encountered by the five students claiming they could not review their feedback.

Just in case students had not managed to watch their feedback, there was a set of questions intended to gather information about the platform used for viewing to enable an investigation of common factors between platforms where viewing had failed. However, students successfully watched their video feedback across a whole range of platforms, including mobile devices, different operating systems including a variety of Linux flavours, and a range of web browsers (see Figure 7.6). Larger screens are still preferred over smaller ones, possibly due to the practical issues of reading the code in the video at reduced size. Therefore, it was concluded that the new implementation of the system for delivering video feedback is feasible for use in practice.

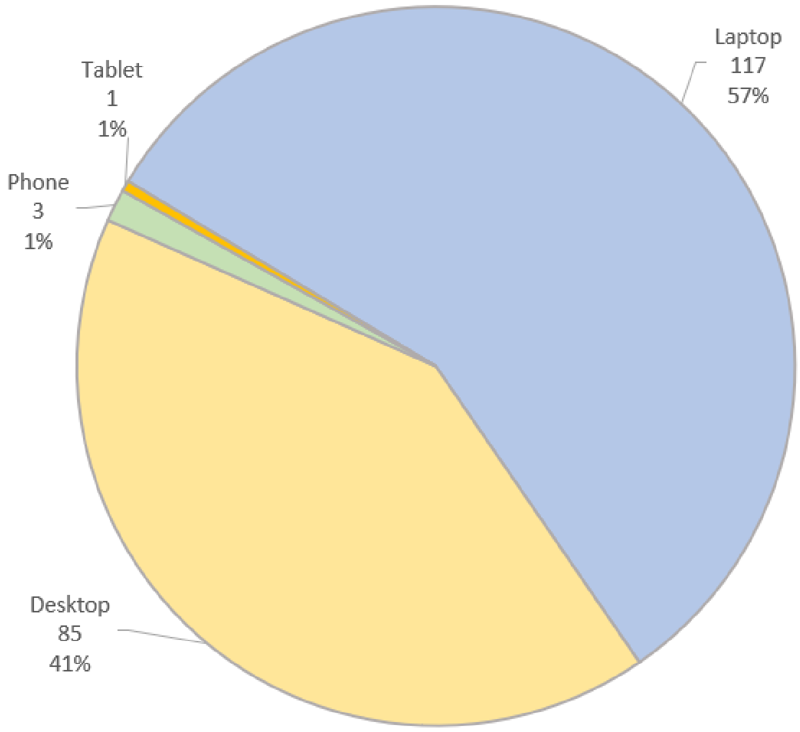


Figure 7.6: Types of devices used to review video feedback

Ease of use

Students were asked to indicate ease of use of video feedback for different engagement tasks compared to the ease of use of text as feedback (see results in Table 7.4). Positive responses range from between 67.32% (138 students) and 88.73% (181 students) for every type of task. The response was not as strongly positive as the results from the trials. There are two significant differences: -

1. **The whole cohort is receiving video feedback, for every assignment submitted.**
   This has potentially reduced the 'novelty' factor and normalised video feedback.

2. **All members of the marking team are providing video feedback**.
   Different levels of experience and approach when producing videos could be impact the presentation of the videos, such as: -

   - Experience with presenting videos
   - Experience with producing videos

- Energy levels at the time of recording
- Apprehension about being recorded

Any of these things could impact the tone of the feedback message, which it was explained in the literature, is very important to students.

3. **Video feedback is being produced for every submission.**
All students (excluding non submissions) are being marked every two weeks. That is a long period of time to maintain a positive tone through every recording, especially when each round of marking is a few days of the next.

Engagement tasks	Much easier % count	Easier % count	Same % count	Harder % count	Much harder % count	Positive response % count	Negative response % count
Understand	60.00% (123)	27.32% (56)	6.83% (14)	2.44% (5)	3.41% (7)	87.32% (179)	5.85% (12)
Identify errors	63.09% (131)	23.41% (48)	4.35% (14)	1.46% (3)	4.39% (9)	87.32% (179)	5.85% (12)
Revise from	43.35% (88)	25.12% (51)	18.72% (38)	8.87% (18)	3.94% (8)	68.47% (139)	12.81% (26)
To watch (v to read)	59.22% (122)	23.79% (49)	10.19% (21)	4.37% (9)	2.43% (5)	83.01% (171)	6.80% (14)
Identify future improvements	57.56% (118)	25.37% (52)	10.73% (22)	3.90% (8)	2.44% (5)	82.93% (170)	6.34% (13)
Understand errors	62.75% (128)	25.98% (53)	6.37% (13)	1.47% (3)	3.43% (7)	88.73% (181)	4.90% (10)
Revisit	48.29% (99)	19.02% (39)	21.46% (44)	7.80% (16)	3.41% (7)	67.32% (138)	11.22% (23)
Learn from	57.07% (117)	28.78% (59)	9.27% (19)	2.93% (6)	1.95% (4)	85.85% (176)	4.88% (10)

Table 7.4: Results of Question 3) How easy is it to engage with your video feedback, compared to traditional written feedback?

For most engagement tasks negative responses are below 6%, but in two cases the negative responses approximately double. Student perceptions are that the ease of use becomes more difficult when returning to the video, to re-access or revise from the material. One student referred to this problem specifically, as being, *"troublesome, as time stamps can't be made, thus you'd have to note the time or watch the lot."*, which concurs with a similar sentiment expressed both in literature, and in the trials of video feedback (see Chapter 6). A number of comments from other points in the survey agree with this student. The facility to add bookmarks to videos is now available from inside Panopto (2018), but students are probably unaware of this function. All other free format comments in the 'ease of use' section were generally expressing positive support for the use of video feedback and there were no negative comments.

Ease of use principle component analysis

A principle components analysis (PCA) (Pearson 1901) was run on the 8 'ease of use' questions, to see if a single ease of use factor could be derived from the data. This analysis method is a repetition of the PCA of 'ease of use' responses performed in the study of video Feedback on trial (see Chapter 6). The two results can then be compared to see if the continuous use of video feedback alters student perceptions of its ease of use. The suitability of PCA was assessed prior to analysis. The number of responses (210) is well above the recommended minimum of 10 for this type of analysis.

An inspection of the correlation matrix showed that all variables had at least one variable coefficient greater than 0.4 (see Figure F.3). The overall Kaiser-Mayer-Olkin (KMO) (Kaiser and Rice 1974) was 0.896 with individual KMO measures of all greater than 0.6, and classifications of 'meritorious' to 'marvellous' (Kaiser 1974a). Bartlett's Test of Sphericity (Bartlett 1950) was statistically significant ($p < .001$), indicating that the data was not an identity matrix, and likely factorisable (see Figure F.4).

The PCA revealed one component that had eigenvalues greater than 1, and which explained 66.303% of variance (see Table 7.5). Eigenvalues for other components were below 1, the highest being .824, making the examination of a scree plot unnecessary (although the scree plot is available in Figure F.8). Only one component was extracted and therefore, the solution was not rotated. In addition, a single component solution met the interpretability criterion. The interpretation of the data was consistent with the intended design of these questions as a means of measuring ease of use. As such, one component was retained. All of the outputs from this PCA are available in Appendix F.4.

These results correlate to the PCA of responses to questions designed to measure 'ease of use' from the trials of video feedback (see Chapter 6). This implies that

	Initial Eigenvalues			Extraction sums of squared loadings		
Component	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %
1	5.304	66.303	66.303	5.304	66.303	66.303
2	.824	10.298	76.600			
3	.556	6.949	83.549			
4	.354	4.422	87.971			
5	.312	3.896	91.867			
6	.291	3.642	95.509			
7	.204	2545	98.054			
8	.156	1.946	100.000			

Table 7.5: Principle Component Analysis of aspects of ease of use - Total variance explained output from SPSS (IBM 1999)

continued use throughout the academic year is unlikely to change student perceptions of the ease of use of video feedback. It does not, of course, preclude a change in perceptions if video feedback is used more often during the academic year than it was here, for instance, if it was to be adopted by multiple taught units.

Ease of Use free format responses

Out of substantially more responses than in the trials of video feedback only three comments were left in the free format text box associated with ease of use. One complained about the difficulties of trying to find key points of the video, as students have done before, yet still expressed a preference for it, saying *"I do prefer video feedback overall but it can be quite time consuming to look for the important parts but it is a great way of marking and i encourage it."*. Another student commented on the *"more personable response"* of their feedback. Finally, a student commented on how useful it is to *"see the marking from the perspective of the marker, so you know that they've looked at everything there"*.

How students feel about video feedback

A principle components analysis (PCA) (Pearson 1901) was run on the 11 'how do you feel...?'questions, to see if a single 'how students feel about video feedback' factor could be derived from the data. This analysis method is a repetition of the PCA of 'how do you feel...?' responses performed in the study of video Feedback on trial (see Chapter 6).

The two results can then be compared to see if the continuous use of video feedback alters how students feel about video feedback. The suitability of PCA was assessed prior to analysis. The number of responses (210) is well above the recommended minimum of 10 for this type of analysis.

An inspection of the correlation matrix showed that all variables had at least one variable coefficient greater than 0.4 (see Appendix F.12). The overall Kaiser-Mayer-Olkin (KMO) (Kaiser and Rice 1974) was 0.925 with individual KMO measures of all greater than 0.8, and classifications of 'meritorious' to 'marvellous' (Kaiser 1974a). Bartlett's Test of Sphericity (Bartlett 1950) was statistically significant ($p < .001$), indicating that the data was not an identity matrix, and likely factorizable (see Appendix F.13).

The PCA revealed one component that had eigenvalues greater than 1, and which explained 64.659% of variance (see Table 7.6). Eigenvalues for other components were well below 1, the highest being .764, making the examination of a scree plot unnecessary (although the scree plot is available in Appendix F.18). Only one component was extracted and therefore, the solution was not rotated. In addition, a single component solution met the interpretability criterion. The interpretation of the data was consistent with the intended design of these questions as a means of understanding how students feel about their video feedback. As such, one component was retained. All of the outputs from this PCA are in Appendix F.5. These results correlate to the PCA of responses to questions designed to measure how students feel about their video feedback from the trials of video feedback (see Chapter 6). This implies that continued use throughout the academic year is unlikely to change student perceptions of video feedback. It does not, of course, preclude a change in perceptions if video feedback is used more often during the academic year than it was here, for instance, if it was to be adopted by multiple taught units.

Student engagement

Student's perceptions of their own engagement were considered in terms of the difference in impact between receiving video and written feedback. Now that the entire cohort was in receipt of video feedback no one had the written version to compare to. Therefore, perceptions would be based on the students own previous experience of receiving written feedback in other subjects at university, and from previous schools and colleges. Some questions ask students whether the chances of their engagement with feedback had improved, others asked students how they had used their feedback.

	Initial Eigenvalues			Extraction sums of squared loadings		
Component	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %
1	7.112	64.659	64.659	7.112	64.659	64.659
2	.764	6.942	71.600			
3	.692	6.292	77.892			
4	.543	4.941	82.833			
5	.419	3.806	86.639			
6	.393	3.576	90.214			
7	.281	2.559	92.773			
8	.269	2.443	95.216			
9	.220	1.998	97.214			
10	.170	1.543	98.757			
11	.137	1.243	100.000			

Table 7.6: Principle Component Analysis of 'How do you feel about...?' questions - Total variance explained output from SPSS (IBM 1999)

Student perceptions of impact on engagement

There was always the potential for students to find new ways of using video feedback that had not been possible with text. Ideas could come from students that had not been anticipated by staff. Therefore, students were asked how they use their feedback.

Students were asked about whether they believe video feedback had improved the chances of their engagement with it in various ways. Most responses were positive, and happily, the most positive response was regarding the chances of learning from feedback at 96.55% (see Table 7.7 and the visualisation in Figure 7.7).

How students engage with their video feedback

First of all questions asked about how much of the video was watched (see Figure 7.8). If it became clear there was a cut off point where students gave up watching this could be very informative. The results of *"I just look at the grade. I never watch the feedback"* is almost a mirror of *"I watch all of it"*, indicating that the majority of students claim to watch all of the video at least once. Some students say that they are reviewing their video feedback more than once. Even if students are only saying what they think staff

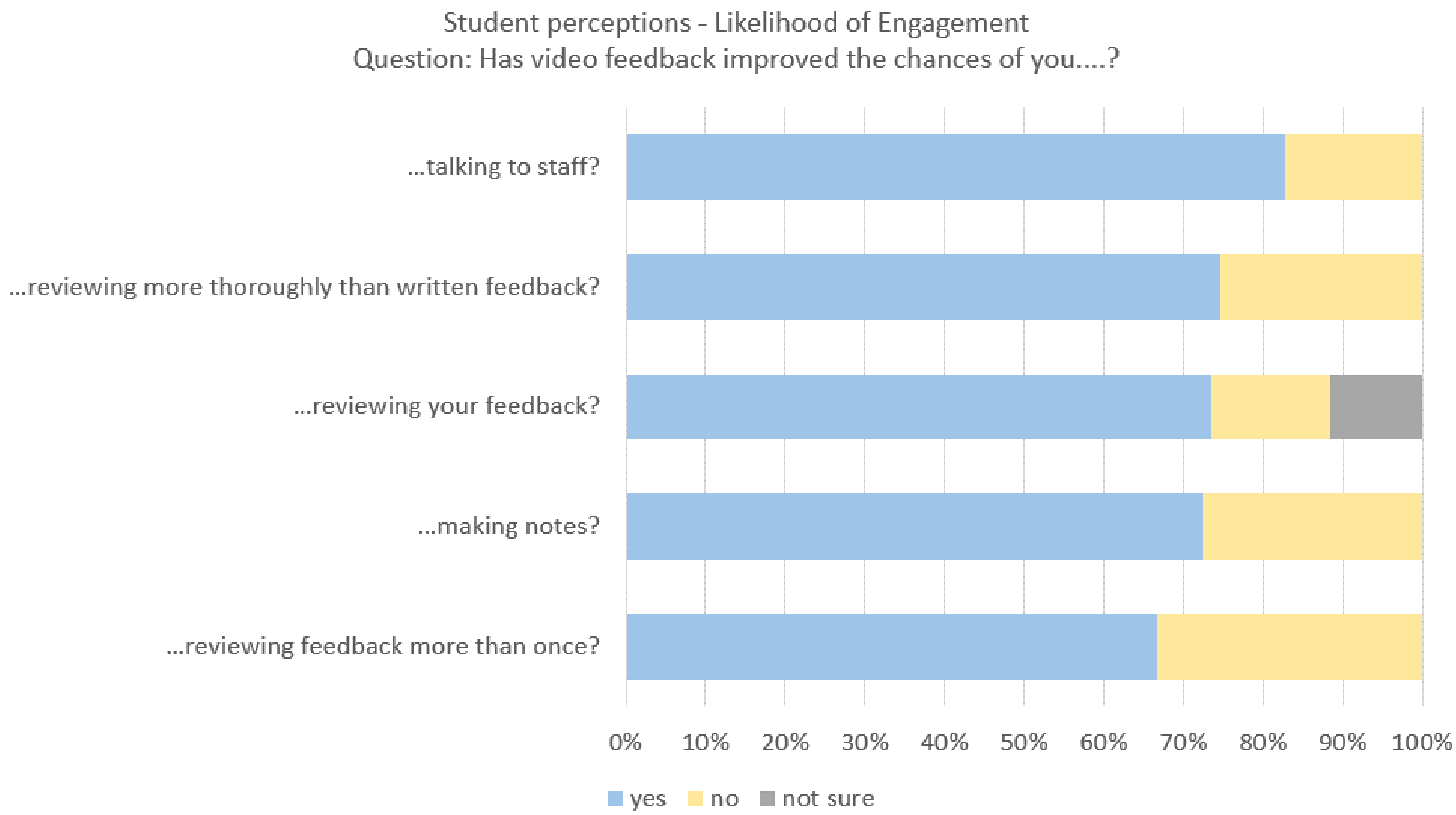


Figure 7.7: Student perceptions of how video feedback has impacted their engagement with feedback

Question: Has video feedback improved the chances of you...?	yes	no	not sure
…learning from feedback?	96.55%	3.54%	
…discussing feedback with students?	93.10%	6.90%	
…applying changes recommended in future?	83.33%	9.20%	7.43%
…talking to staff?	82.76%	17.24%	
…reviewing more thoroughly than written feedback?	74.67%	25.33%	
…reviewing your feedback?	73.56%	14.94%	11.43%
…making notes?	72.41%	27.59%	
…reviewing feedback more than once?	66.67%	33.33%	

Table 7.7: Student perceptions of how video feedback has impacted their engagement with feedback

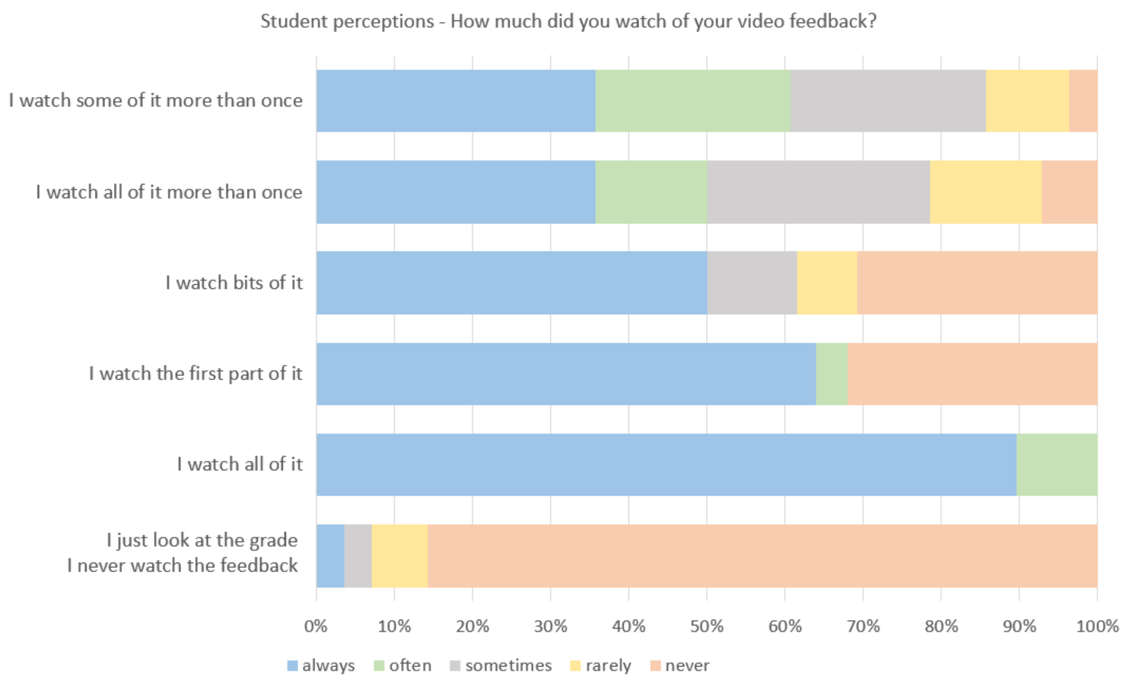


Figure 7.8: Student perceptions of their own engagement with video feedback - how much they watched

would like to hear, students clearly understand that they are expected to engage their video feedback.

Students were also asked about how they engaged with their video feedback with a view to feeding forward their learning (see Figure 7.9). Not many students re-watch the video before working on the next piece of work and nor do many make notes whilst watching. Students prefer to correct their code and re-run it to see how it changes the result. Most students claim to 'always' use the feedback to improve the next piece of work. All but two of those students correlate to specific activities having selected 'always', or 'often', against 'making notes', 'correct my code' or 'watch again'.

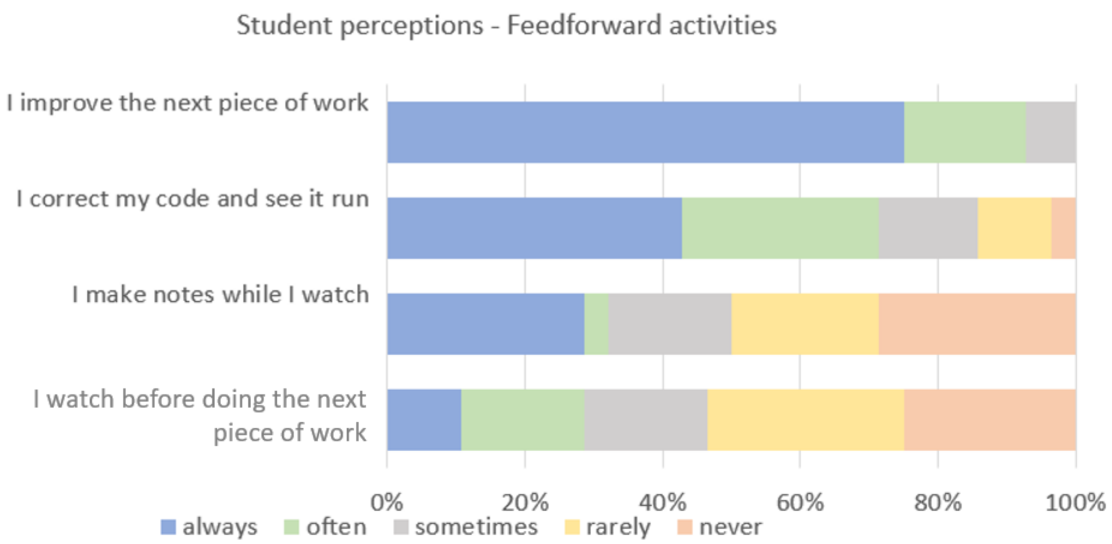


Figure 7.9: Student perceptions of their own engagement with video feedback - feed forward activities

Students were also asked how they felt about their video feedback, compared to traditional written feedback, in terms of a set of particular aspects (see Table 7.8). Students selected from a scale indicating whether video feedback was an improvement or detrimental compared to text. The figures show that, for the majority of students, video feedback supplies an engaging message with a supportive tone that is friendly and encouraging. The message is valued by students as clear, helpful and useful. It is personalised to them and their own work. Students are able to see why they have the mark they have and therefore regard it as fair. It even has the potential to be enjoyable and entertaining.

Aspects considered	Vastly improved % (count)	Improved % (count)	Same % (count)	Not as good % (count)	Much worse % (count)	Total responses count
Engaging	59.69% (117)	31.63% (62)	5.61% (11)	2.04% (4)	1.02% (2)	196
Friendly	63.08% (123)	28.72% (56)	5.64% (11)	1.54% (3)	1.03% (2)	195
Encouraging	51.56% (99)	34.38% (66)	10.42% (20)	2.08% (4)	1.56% (3)	192
Helpful	69.19% (137)	21.72% (43)	5.05% (10)	2.53% (5)	1.52% (3)	198
Useful	67.69% (132)	23.59% (46)	5.64% (11)	1.03% (2)	2.05% (4)	195
Personal	69.90% (137)	24.49% (48)	3.57% (7)	1.02% (2)	1.02% (2)	196
Clarity	63.78% (125)	26.53% (52)	6.63% (13)	1.53% (3)	1.53% (3)	196
Enjoyable	53.89% (97)	34.44% (62)	9.44% (17)	0.56% (1)	1.67% (3)	180
Fair	51.37% (94)	28.42% (52)	16.39% (30)	2.73% (5)	1.09% (2)	183
Entertaining	48.04% (86)	28.49% (51)	17.88% (32)	2.23% (4)	3.35% (6)	179
Time consuming	33.15% (59)	32.02% (57)	18.54% (33)	12.36% (22)	3.93% (7)	178

Table 7.8: Results of Question 3 - How easy is it to engage with your video feedback, compared to traditional written feedback?

Preference for video feedback

The preference for video feedback over text is further confirmed when asking students if they would prefer to receive video feedback in future. The reasons are related to how useful it has been, *”It has helped me significantly with programming, and I would like feedback on all of my programs if there was time!”* and its similarity to a face to face dialogue,*”It’s almost like having a face to face conversation but better because I’m able to revisit it constantly.”* Overwhelmingly 91% of students expressed a preference for video as feedback (see Figure 7.10). The only student who selected an option other than text, audio or video, requested a combination of text and video. Certainly this would address the only major criticism of video feedback of being unable to scan the whole for key points in the way it is possible with text.

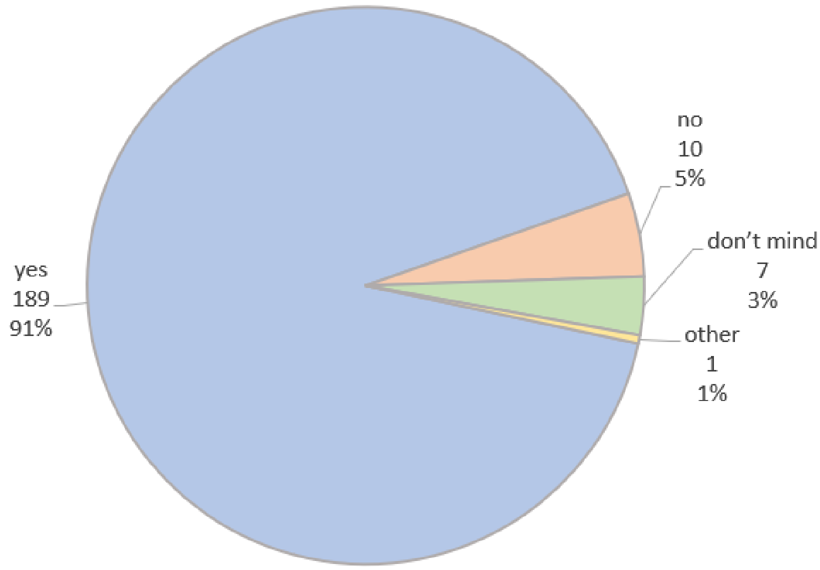


Figure 7.10: Preference for video feedback over text

It is interesting that several students assume that others would prefer text. For instance, two students who said they preferred video feedback themselves also said, *”written feedback works better for other people”* and *”having written feedback is just a classic way to receive feedback, and some people just won’t want to take to it [video]”*. Another student explained that *”written feedback is the norm and most people prefer it. It would take quite a while to replace it with video feedback”*, even though that was exactly what they were experiencing.

When students were asked if video feedback would improve the chances that they would review their feedback five who answered ’no’ or ’not sure’ also left free format comments to say that they would review feedback *"whatever form it comes in"*, or similar. However, four out of five of these students still have a preference for video when asked to select their favourite format, so perhaps despite being keen to let staff know that they would always review feedback, however it is presented, they do perceive benefits in the video format.

Free format student perceptions

Students had several opportunities to freely express their thoughts. Every version of the survey had a free format text box available for comments with as many questions as possible. A template analysis (Brooks et al. 2015) was conducted on the free format comments from the surveys. The starting point was the student perceptions section of the taxonomy (see Figure 7.11).

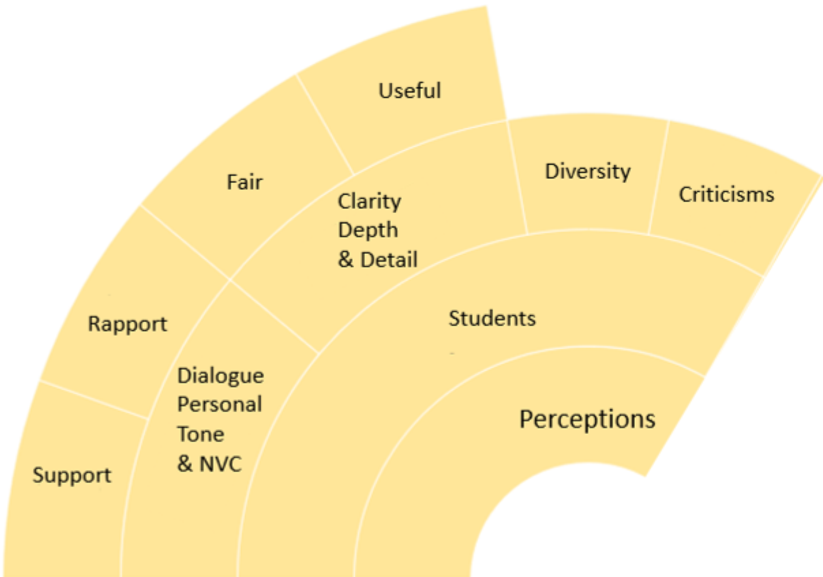


Figure 7.11: Student perceptions section of the Taxonomy of Video Feedback

Helpful and useful feedback

The largest volume of comments were positive expressions regarding how helpful or useful students found video feedback.Students explained the video feedback is a *"more engaging audiovisual experience"*. This is because *"I have a teachers full explanation instead of a few words on a paper"*. Staff often *"demonstrate the changes made to the program so I can use it to correct similar issues in future work"* and *"fully explain what they mean and also show you what is wrong and right with the work submitted, better than written words could"*. The idea that *"Video feedback is also more memorable"* was expressed several times.

As expected, video feedback is regarded as *"a brilliant personal experience"* and that is because *"it's also explained by my teacher as though they're in the room with me"*. That helps students because it *"makes the course feel a bit more personal and not just one member in a crowd of 300"*, and they realise that staff are spending time on them, and their work, because it *"Felt like I was actually having time made for me"*. However there is a downside to the personal aspect which has been mentioned before. For one student it is a double edged sword as, *"Honestly i'm not sure. on the one hand I love the video feedback. On the other hand, when i get a sub-par grade i am all too nervous to watch the video"*.

The level of concern can be conveyed through video feedback, which contributes to building rapport with students. They can see that, *"Its obvious that the lecturer cares enough to put time in the video, when you only see text it doesn't feel like it means as much"*. Video feedback also offers reassurance that the mark given is fair because *"we can see the flow of thoughts of the marker"*, which *"shows the lecturer has actually gone through work fully"* and *"it's definitely fair as you can see exactly where marks have been awarded"*.

How students engage with video feedback

Students explain how they use the video feedback. Several students said they *"try to watch it soon after it comes out"*, and that they *"like to improve the things that are mentioned after watching it the first time"*. One student suggested that by doing that there was *"Less chance you need to follow up feedback"*.

Ideally for improved learning, students should be making their own notes in words they will understand, rather than *"being be given a list"* as one student requested, and altering their own code since it is *"easy to follow along with the video while you can write it out yourself"*. One student suggested that *"If you [marker] make the effort of changing things in the video allow us to have the document [amended code]"*. This student has not understood that making the changes yourself will result in a better learning experience than merely saving a file someone else has written. One student showed that they understood the value of such engagement when they said they would *"aim to encourage the student to modify the code along with me in the video feedback"*. Certainly explicitly managing expectations with regard to engagement is explicitly discussed with students early on, including directly after students receive their first piece of feedback.

Visual aspects of video feedback

Two of the propositions of the case study point to enquiry regarding the narrative and visual aspects of the feedback. One student alluded to why several others suggested that video feedback is more memorable when they said, it *”Sinks in more when you’re being shown what to improve with your work on the screen”*. It appears to be important that *”you can see what the lecturers looking at”*, as though that shared visual experience is the key to conveying understanding. Being able to grasp the rationale behind changes made on screen is also important to students.

> *”Written feedback is static. Where as with video you can see the changes being made and the reasons behind them”*

.

Narrative of video feedback

In contrast, the narrative was explicitly mentioned half as often as the visual aspects, and one of those students is severely visually impaired, making the narrative especially important. Another student works ”*through the problem while listening to feedback and I don’t need to switch back and forth*”, implying they do not use the visual element. Two students mention poor audio quality, which could be the result of lack of attention to audio levels, background noise and the result of staff who rely on the microphone in the computer to avoid having to wear a headset. With our current set up there is no means of monitoring recording quality without investment in audio interface hardware.

Criticisms of video feedback

The most significant criticism is that it *”takes more time to go through than written feedback”*. This issue crops up as the disadvantage of video feedback every time student perceptions are sought. Its difficult to know what exactly students mean by this. There are two potential aspects to this which are specifically mentioned. The first is that some students believe it *”Takes time to review all the feedback”* because they cant *”just skim over and work out the key points”*. They have to listen to the whole video because they cant pick out items under headings or important parts as you might in text. Second, this is also an issue when re-accessing videos for revision or revisiting videos when working on the next submission. When asked what they would improve about video feedback a common response from students is that a transcript of the narration should be included.

Some assessments have been completed by the time students participate in the survey and they still do not appear to understand that feedback will be electronic, regardless of the format it takes. Some criticisms indicate this lack of understanding with comments such as, *"I prefer a one to one"*, or its *"better on paper"* because it is *"still reassuring to have a physical copy of the feedback"*. Not all students seem to have picked up that they need internet access to collect feedback, even if it is delivered as text, complaining that they are *"needing to have a computer around"* which is an odd complaint for a student on a computing course to make, and is surely based on familiarity of school, where feedback is generally delivered on hard copies. Those who prefer text offer only one of two reasons: a) being able to find points more quickly, and b) text is what they are familiar with.

Students were asked what they would change if they were the ones doing the marking. There were almost as many responses explicitly saying *"nothing really, it think it is great what you're doing"*, as there were suggestions for change at a ratio of 24:31.

7.6.2 Student perceptions of video feedback from interviews

The questions began with the setting in which the students usually reviewed their feedback, largely to enable the interviewer to visualise the setting. Most students said they were at 'home' when they first reviewed their video feedback. What they referred to as home could be their term time accommodation or their non-term-time home. The rationale for that was varied, but were based around two key reasons: because that was where they happened to be when they received notification that the results and feedback had been released, and because they wanted to be alone to watch their feedback, at least for the first time.

There was one student who had watched it in a fast food restaurant, on the bus and in the university computer labs. It was very important to him to watch the feedback as soon as it was available. For similar reasons, one student stated they usually watched the feedback for the first time in the computer labs, because that was where they normally were when the results were released, and they were not alone as they explain *"Cos it got released like afternoon time, so we'd normally all just be in here like listening to our videos"*.

Students definitely expressed a preference for watching their video feedback alone, at least for the first time. Headphones play a key role in making this possible as it is the sharing of the narrative that apparently makes students feel most vulnerable. Students were happy to watch the videos in the computer labs as long as they had headphones. The one student who watched whilst on the go also said that the headphones facilitated the privacy required to be able to do that. Some students went further and *”never watched it in uni or anything...”*, deliberately waiting until they were at home before reviewing feedback, *”...just in case it was bad....but the first time I was on my own just to make sure I was happy with it”*. For most students the potential judgement of others was the key reason for maintaining the privacy, but for two it was to facilitate concentration on what was being said.

Other students happily shared their feedback videos with others because, *”my mates know what grades I got so they can watch it if they want to”*. One student said there would have to be a good reason, *”like than rather than just for...to brag or something”*. Some continued the discussion after seeing the feedback videos friends received, *”then we’d talk about it”*. Others, *”just didn’t see the need to”*. One student went beyond their peer group and *”I did actually share with my parents..I said it was quite useful”*.

Most students claimed to have watched the videos all the way through the first time. Of course, there is the potential for some students to be saying what they know staff want to hear. Only one admitted to only ever watching two out of four they received, and then only ’skimming’ through and probably seeing about a third of it. His rationale was that his marks were excellent and therefore there was nothing he could learn from it, and in fact such a sentiment was expressed by another student who said that he got *”10 out of 10 so …there was no feedback sort of thing but on the other ones when I had feedback I watched them all the way through”*.

Some students watched at least parts of the videos again, usually for clarity of understanding, or to double check that they had not missed anything important. However, others who watched multiple times watched it all the way through each time they watched, *”it varied but 2 or three times per video”*. One person did not feel the need to re watch the video because they had made notes whilst watching the first time. In fact, only two students made physical notes from their feedback videos, and only two more altered their own code whilst watching. Others all relied entirely on their memory for learning.

Among the marking team there were some who had made some very long videos, certainly compared to those made during the trials of video feedback, and when compared to studies in literature where many were limited to only 5 minutes per video by the platform they used. Among our team, markers regularly continued for ten minutes or more, and our longest was close to half an hour. The students interviewed did not seem concerned about the duration of the videos at all saying, *"it was kind of justified cos it was kind of stuff to talk about so it depends on how large the assignment was really and how much they have to mark and go through, so it was fine by me"*. One student was concerned about how much there is to learn from a long video, *"When it got to the 17 minute ones it was a lot to take in"*. One student was concerned that that three minutes was too short because, *"I prefer if it's a bit longer because you get a bit more explanation and a bit more description and what I could have done better"*.

Almost all students believed they had learnt from their feedback. However, when asked for an example most students gave an example from the very first submission. This trend could mean that, firstly, they do all feel they learn from video feedback in general and the first time was the most memorable, or secondly, they have not really learned anything since the first submission, or finally, the natural thought process is to always to go back to the beginning to think of an example, or some other reason, or a combination of all three reasons.

Students were asked two separate questions about how positive feedback impacted them, and how negative feedback impacted them, when in a video format. Students were very positive towards how the video feedback made them feel. This could be because students do not feel able to confess to feeling bad if feedback had a negative impact on them. However, some provided a rationale that made the positive attitude seem likely, such as *"Its probably better as voice because then you can hear a tone, and there's more likely additional comments made"* Students said that positive comments by video feedback made them feel *"confident, positive and motivated"* because *"it just takes ages and then you put in so much time and then you feel like you got rewarded for all the time you put in"*. Negative feedback was still deemed useful because, *"they were all constructive, so I would think 'Oh that's why', and now I know how I can improve it"*. Out of concern for some students, they were asked if they thought the negative comments were too harsh, but the response was always similar to, *"that was my fault, but it didn't negatively affect me or anything"* and *"They were never harsh, it was always supportive feedback so even when it was something negative"*.

When asked if video feedback should be used on other subjects most students began with a negative response, but once pushed to comment on specific subjects or assignments their response was once again positive. For example when asked to consider the units that they have had to create models for, *"It would work in terms of the modelling and diagrams"* and when designing a network in virtualisation software, *"actually could be quite helpful in networking because then we can have someone visually show us what we did wrong"*. Most agree that it *"Wouldn't work so well with an essay"*. However, some said straightaway, that they would prefer video feedback no matter what the subject or assignment because, *"I found it really beneficial so if I had it for all my subjects I feel like I could learn more from my mistakes"*.

In the hope of uncovering some useful ideas students were all asked to put themselves in the position of the marker, and to tell us what they would do differently. One suggested that the mouse needed better highlighting on the screen, and it turned out that at least one marker had not got the setting switched on that meant the cursor could be seen on screen. One student commented on the tone of one marker, but no new ideas were revealed.

Finally, interviewees were all asked how they would feel about seeing the marker on the screen at the same time as the work. One commented that knowing the name of the marker would be enough, as one marker inexperienced in using the video format, had failed to give their name. It happened that the student had never been taught by this marker, and so did not recognise the voice either. It became clear from the collection of comments on this point that as long as students know who is narrating their feedback, *"because I know what you look like I can just visualise it anyway"*, they do not want to see them on screen as it is *"too personal"*.

There were no radical ideas coming from this exercise, however, the picture of the way students use their feedback is clearer. It demonstrates that some students like to be alone with the markers remarks, and others happily share. Long durations of videos do not bother students as long as the comments are useful and done with a supportive tone. The students seem to have a limited perspective of the usefulness of video feedback for other subjects, despite unanimously being positive about its use as a response to programming assignments. One thing they all agree on is that as long as they can picture the marker themselves, because they have met them before, they do not want to see them on screen.

7.6.3 Staff perceptions of video feedback - Reports

The five reports submitted by staff were thematically analysed (Braun and Clarke 2006).

Staff found themselves anxious about their first ever recording, and even *"suffering from a little bit of stage fright"*. This is not surprising considering the use of a recording process that is brand new, not only for this purpose, but also for any purpose, since none of the staff had used Panopto (2018) to record lectures yet either. They had to find out how to express themselves in a completely different way than they were used to, whilst discovering the possibilities the recording system could offer simultaneously. With so much going on, they still managed to recover to a position of productivity after a few recordings.

After some practice some members of the team still found the job *"onerous"* whilst others were, *"surprised both by how easy it was and how much I enjoyed doing it"*.

The similarities to a dialogue were seen as an advantage over text, in that it felt *"much more like a conversation"*, because it *"does feel rather like one, even if strictly speaking it's a monologue"*. This appeared to be the basis for a sense of engagement with students. Not only could markers interact with student work, but by doing so they were simulating interaction with students. Even background noises such as birds tweeting, phones ringing, contribute to the sense of conversation. Although asynchronous, the conversation continued when students responded with emails.

> *"I've had emails and comments from students thanking me for the feedback, saying both how valuable it was in their understanding of their grade, but also in that it allowed them to improve subsequent assessments. They really did seem to get value from it. I've never had emails from students thanking me for my marking before."*

The interaction with student work meant that points could be illustrated and explained in ways that staff wanted to be able to do before, but had been constrained by the limitations of text. One marker pointed out that you could write long explanations in text but *"I doubt many students enjoy or read much dense text in their feedback anyway"*. Being able to talk through the programming code, execute the code, alter the code, and re-run the code to demonstrate a different and improved result was considered an improvement over explanation by text.

Markers found they could say more in the videos than they could write as text in the same time. The advantage of being able to say more is likely what facilitates greater specificity. As in literature our markers found a clear advantage in the use of video to be more specific than in text (Moore and Filling 2012). One particular marker explained that enabling specificity was her aim in using video and had found it a positive experience in that sense. She explained that when creating feedback as text, it is not possible to put comments next to programming code open in a development environment, in the same way as it is possible to do in word processing software.

> *"E.g., "This variable 'fred', isn't well-named; use descriptive names, like you've done with 'averageSalary'" rather than, "there are some poor variable names". To make this easier I wanted to be able to point at a specific part of the answer and write feedback about it in situ instead of writing extra verbiage just to explain which section I was referring to. Easy enough when marking a text document - just add review comments at the relevant place! - but not an option when I need the file to be open in Eclipse [development environment] rather than a word processor."*

However, one marker perceived specificity as a disadvantage and suggests that, *"for the student ambiguity may help them to consider their own work critically"*.

Specificity, such as in the detail of the work, can also be seen in the personalisation of the feedback. One marker commented on the student positive reaction to the personalisation they perceive in video feedback. Another found video feedback facilitated the use of humour as a response to specific comments students had put in their work.

The tone of voice available through the narrative is considered a source of additional information to students. Whilst one marker had to keep calm to prevent over reactions being conveyed to students, another made use of being able to portray a sense of approval or disapproval. A third used tone explicitly to *"soften the blow of a poor assignment"*.

Most markers found pointing, clicking and talking, less tiring than formulating explanations as text, and that *"marking definitely did not feel the chore it has been in* *other years"*.

There are disadvantages perceived by staff beyond the initial anxiety of the first recording. The physical issues include the time spent talking when marking large numbers of students. One member of staff lost their voice for a long period of time shortly after the academic year began, and recording up to forty videos per week may well have contributed to that. However, one could argue that the number of assessment points in that first semester was unnecessarily high. Although the pedagogical reasoning behind that decision, of ensuring the students get into good habits of working outside the taught sessions, is sound.

All markers commented on the environment in which they created recordings. Some staff perceive a requirement for a quiet environment. Others realise the potential for interruptions and background sounds to add to the conversational style, others are seeking perfection in performance. There are of course limits. Markers commented on being able to record in a shared office. It is possible to record in an office where others understand you need to be quiet and will not interrupt recordings. It is also possible to record in an office where others are recording, providing headphones are used. However, when one marker feels claustrophobic in headphones and prefers to use the microphone on the device they have to speak at a higher volume, which impacts others trying to record in the same space. Similarly recording at home is not a problem when family members understand and do not interrupt recordings but this might be difficult for children to understand.

When staff take the approach of perfecting a performance work load increases, as they make notes prior to recording, and are more likely to feel the need to re-record if something small interrupts their flow, whether its a pause in memory or external noise.

One member of staff expressed frustration with memory overload as exercise complexity increased, and expressed concern regarding maintaining consistency in marking as a result. It takes practise to remember to use the pause button to give yourself time to think, or to give yourself time to locate materials to use on screen. The marker believed more practise would solve the problem.

Two markers commented on being unable to search the content of the recording or to summarily scan through it to find particular points.

Conclusions from the staff reports

It immediately became clear that the two markers who had been drafted especially for the final submission were less positive than those who had been marking the smaller submissions throughout the the year. Not only were they dealing with a steep learning curve, but much more complex submissions from students than the rest of the team had been dealt on their first go, emphasising a need for practice to become comfortable with recording video feedback.

There is the potential for greater specificity in remarks and reference to work when compared to text as feedback. One marker saw this as a huge advantage whilst another viewed it as a disadvantage. Although it can be understood when a marker says ambiguity may encourage the student to think critically about their own work, specificity could be a major contributor to the improved level of understanding expressed by students.

There are arguments on both sides for specificity. Whilst significantly aiding understanding it may negate the burden on the student to critically evaluate their own work. With arguments for both sides, what is required is continual adjustment based on the evidence of student understanding, a balance which needs to be struck by the marker (Nicol 2010).

To summarise, the advantages found by our marking team are the facility of conveying messages with nuance and tone, personalisation, in a style that feels like a one to one conversation. There is the facilitation of interaction with student work enabling illustration through demonstration and specificity.

Mental pressures may cause cognitive overload at times, and it takes practice to remember to use the pause button to take relief. On the other hand it is considered easier to form explanations for learning, in a way that feels more satisfactory and complete.

One issue comes up any time opinion regarding video feedback is sought from any source, and these interviews are no different: the lack of facility to skim read, find particular points, or get an overview of the narrative content. The answer to this problem is a text transcript. Although obvious, it is not yet usually available, and certainly not without significant cost for the volume required for a modern large cohort of undergraduates.

> *”What I need is brilliant voice recognition making transcripts as I go. Meanwhile, back on this planet...!”*

Even if it were available within budget and time constraints, there are arguments against it. If students can scan through the text there is the potential to discourage viewing the video, and therefore to detrimentally impact opportunities to build rapport with staff, improve understanding from visual material and to engage with feedback by e.g., taking notes. A delay in the availability of the text from a voice recognition system might be ideal. One which will do a good job of processing content, but will take long enough to process, so that the compulsion by students to examine their feedback as soon as it is released has been sated by initial viewing, before the text version is ready. When students are looking to review particular points later the narrative is available for scanning and time stamps, or perhaps even hyperlinks to move to the right point of the video.

7.6.4 Recording and distribution system data analysis

The platform used to record the feedback videos is Panopto (2018), but, as discussed earlier, only a subset of the data will be used for analysis, largely because Panopto (2018) is designed for presentation of learning materials to large audiences, and therefore, the data provided is aimed at helping academics in that way, and not always suitable for our purposes.

Approximately half of the students in the cohort were marked each week. Therefore, half the students were chosen to be marked at random for the first submission, and those students not marked in week 1 are marked in week 2. This pairing of submissions goes on through the first semester. The sample of the videos analysed was based on this randomly selected group from the 2016 cohort who had their first submission marked and is approximately half of the cohort. The sample points examined are the first and last submissions by these students.

For the first submission of the year 121 feedback videos were created, out of which 99 were viewed. The video durations range from just over a minute to nearly half an hour (see Table 7.9). The variety in durations reflects the variety in submissions. The first submission is a program which prints a few strings describing the student. The final submission is an application with a graphical user interface (GUI), including a class diagram and interface designs, the programming code and a test plan with results, for a small application chosen by the student e.g., hangman game, address book, speeding ticket fine calculator. As expected, the numbers of submissions for the final assessment

Submission	Shortest	Average	Longest
First submission	00:01:03	00:04:26	00:10:21
Final submission	00:01:17	00:12:58	00:28:42

Table 7.9: Durations of feedback videos

for the unit are reduced compared to the first submission. However, a similar percentage of the videos created were watched to some extent (approximately 81%). Although students are more likely to watch more than 10% of the video for the final submission, they are also less likely to watch the video to the end. Only 36.73% watched over 90% of the video, where over half watched at least 90% of the first submission. This is not unexpected, since there is no obvious future assessment to take the learning forward into from the final submission. The data used to compare engagement between the videos returned for both the first and last submissions are in Table 7.10.

	First submission	Last submission
Number of Videos		
Videos created / Submissions (count)	121	98
Videos watched (count)	99	80
Videos watched (%)	81.82%	81.63%
Watched to the end		
Watched to the end (count)	56	26
Watched to the end (%)	46.28%	26.53%
Watched over 90% of duration (count)	62	36
Watched over 90% of duration (%)	51.24%	36.73%
Watched very little		
Watched less than 10% of duration (count)	15	4
Watched less than 10% of duration (%)	15.15%	5.00%
Numbers of views		
Highest number of views for a single video	13	8
Average number of views for a single video	2	2

Table 7.10: Comparison of videos data between first and last submission

Videos with audio narrative replaced by text

By coincidence there was an unexpected circumstance at the first sample point which enabled an investigation into videos without audio as narration. One of the four markers lost their voice. Students knew if a feedback video had no sound as soon as they saw the video on the page of the VLE. The marker has put a splash screen on the front to manage student expectations (see Figure 7.12). The videos created by this marker were 'narrated' by text on the screen. Fortunately, this particular marker is a trained touch typist and so the length of the videos was only slightly impacted. In fact videos made by this particular marker were significantly longer than other markers when created with audio in any case. For comparison, when looking at the final submission where all makers recorded with audio narrative, the average durations of other markers is between 10 and 13 minutes. The marker who lost their voice averaged over 17 minutes. Therefore, typing the narrative probably made no difference to duration. As can be seen

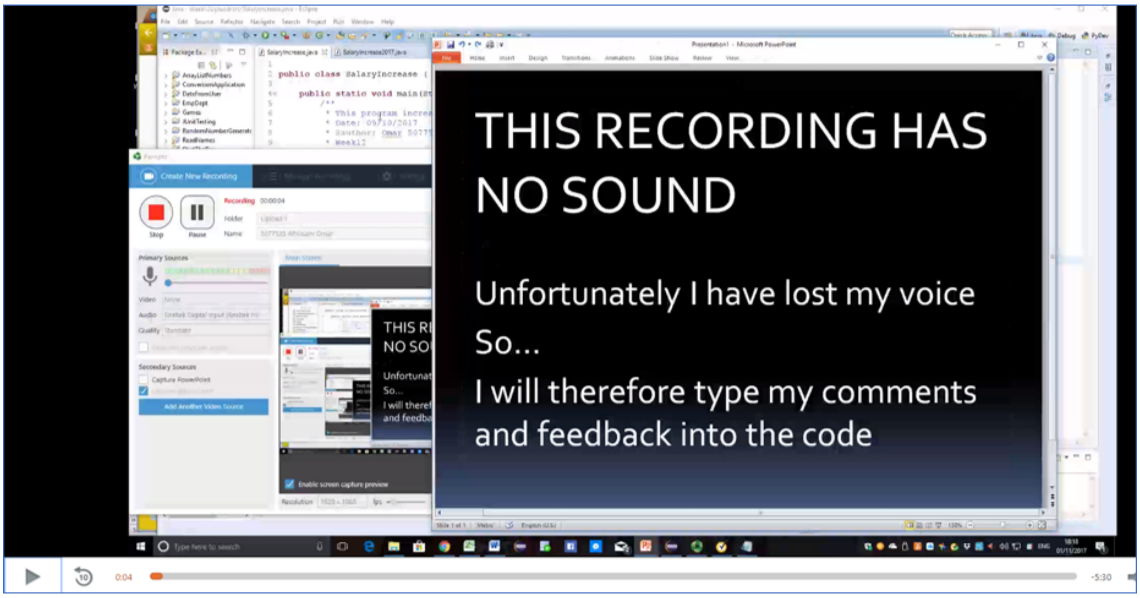


Figure 7.12: Screen shot of feedback without narration

in Table 7.11, the percentage of videos watched, no matter for how long, is 80.46% with audio narrative, and even higher at 85.29% when the narrative is typed. Unfortunately comparison is not possible with text feedback as the corresponding figures are not available from the VLE. However, students are less likely to sit through the whole video. The difference in percentage of students who watch more than 90% of the video drops from 56.32% to 38.24% when the audio narrative is replaced by text. Just to confirm this trend, only 12.86% of students watch less than 10% of the video when there is an audio narrative. When you replace the narrative with text that figure increases to 20.69%. Therefore, figures show students are even more likely, to watch the feedback videos at all when they know they are silent. This could be inflated by curiosity to see how the message will be conveyed in the absence of sound, since they know from the splash screen there will be no audio. However, students watching text narrative are less likely to watch for as long as students in receipt of video feedback with audio narrative. Therefore, the narrative as audio does impact the engagement of the students.

	Markers with audio	Marker without audio
Video Duration		
Shortest	00:01:03	00:02:27
Average	00:03:38	00:06:29
Longest	00:10:01	00:10:21
No of Videos		
Videos created	87	34
Videos watched (count)	70	29
% of videos watched to some extent	80.46%	85.29%
Watched to the end		
Watched over 90% of duration (count)	49	13
Watched over 90% of duration (%)	56.32%	38.24%
Watched less than 10% of duration		
Watched less than 10% of duration (count)	9	6
Watched less than 10% of duration (%)	12.86%	20.69%

Table 7.11: Comparison of videos with and without audio narration

Duration of the videos analysed by grade

Duration of videos created for the 2015 cohort was compared to the grades received. The grading system for the first semester is by alphabetical letters A-D and F for fail. Failures rarely receive a video because it usually means there is not enough content to comment on. ’D’ is rarely given as if a student has made some effort they usually achieve a ’C’. Therefore those two grades are omitted here. If the duration of the video can be taken as a measure of effort on the part of the marker, then based on the average duration of videos made per weekly exercise and by grade, the results show that the marker effort is concentrated on weaker students (see Figure 7.13).

The longest videos made each week, as expected, are consistently returned to students receiving a grade ’C’. (see Figure 7.14). What this demonstrates is that the effort goes into helping the students who need it most. Those who achieve a grade A for simple

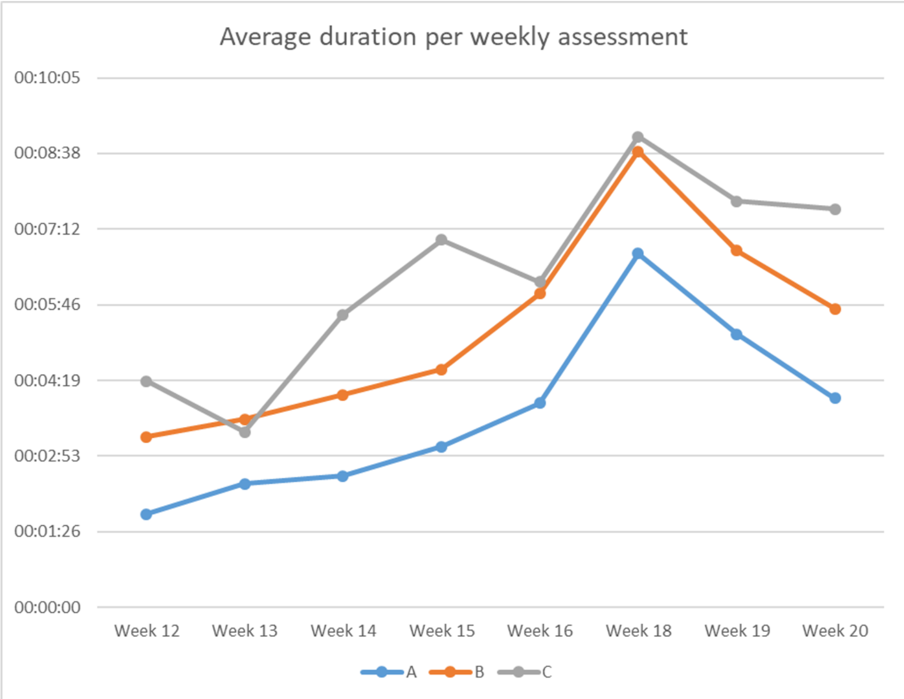


Figure 7.13: Average duration of video feedback created as a response to weekly exercises, analysed by grade

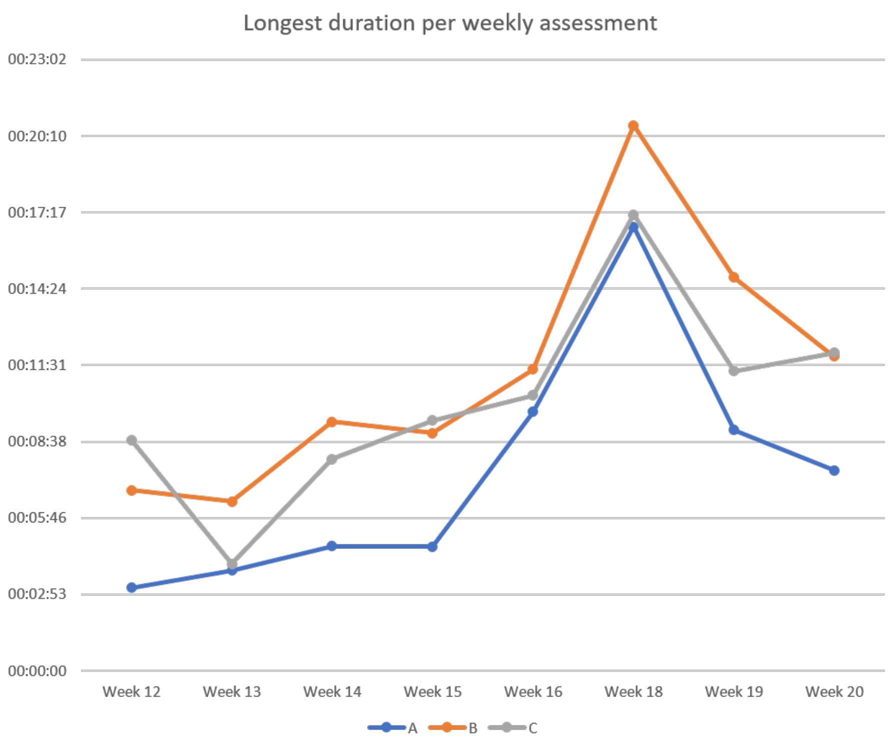


Figure 7.14: Longest videos created each week, analysed by grade

exercises may well have perfect solutions, and therefore just need a video that congratulates and encourages their effort. Once exercises are less simple there is more to discuss such as alternative approaches, but explanations of how things work are not required for these students and so the videos are shorter. Those students receiving a 'C' can be so muddled that when things go wrong it is unclear the direction they intend to take, and these students might require several options to be discussed.

7.7 Conclusion

The evaluation of the original propositions are shown in Table 7.12, and these are then explained in more detail and followed by other points of note.

Proposition	Valuation
P1) Video feedback on programming code assignments is technically feasible for a large undergraduate cohort	TRUE
P2) There will be no perceived increase in staff workload, when compared to that of delivering feedback as text	TRUE
P3) Even without the text feedback as a point of reference for direct comparison, students will continue to express a preference for video feedback over what they might have expected to receive as text feedback.	TRUE
P4) Students will perceive a benefit from the visual reference to their work	TRUE
P5) Students will perceive a benefit from the narration in the form of • a. Additional non-verbal communication • b. Increased depth and detail • c. personal and friendly tone.	TRUE
P6) Video feedback will increase engagement with feedback	TRUE

Table 7.12: Video Feedback on trial: Evaluation of propositions

This section will review the results in terms of the six propositions originally proposed for the case study.

Very few changes occurred in the implementation of video feedback when compared to the implementation in practice. The VLE changed part way through the study but this had no real impact once setup, testing and training for use with video feedback was complete. There were no major problems delivering video feedback on programming code for a large undergraduate cohort (P1). One member of staff explicitly said it was faster to provide feedback by video rather than text. Another suggested there it was labour intensive because they felt the need to go through the work writing notes first, however everyone still completed marking within the time constraints of the institution marking policy (P2).

When asked about their preferred format for feedback in future 91% of students chose video as their favourite (P3). Students believed they learned from feedback, and thought it was helpful and useful. This could be because they enjoyed the personalisation of their feedback and perceived the marking to be fair because they were able to follow the thought process of the marker. Some say that they feel less likely to need to follow up on feedback with staff, because it is clear and easy to follow. Although students sometimes respond negatively to the idea of using video feedback for other subjects, when asked about particular types of assessments, they can visualise how video feedback would be of benefit.

The sharing of an experience in a visual format is made explicitly clear by the narrative. It may be that there is greater confidence in the understanding gained, safe in the knowledge that you are thinking the same thing as the marker. Therefore, Students clearly perceive a benefit from the visual reference to their work (P4).

Clearly students found video feedback easier to use saying it was easier to understand (77.32%) and learn from (85.85%). Students mentioned receiving a ”full explanation” and compared it to a few words in text, which points to the narrative element as a source of greater depth of information compared to written feedback (P5b). They also comment positively on the personalisation they perceive from video feedback, which clearly comes largely from the narrative making it clear staff are examining their own work. Where cutting and pasting of generic comments is possible in text, the narrative makes it clear this is not happening when delivering video feedback (P5c).

The actual engagement with video feedback cannot be directly compared to that of text feedback, as there was never a mechanism in place to measure engagement with written feedback. However, to a limited extent, the records of engagement with feedback as video provided some useful information. It showed that students do watch their videos, although not always all the way through. They are less likely to watch if there is no following assignment to feed learning into. Students were asked about several reasons they might engage with feedback and the majority were very positive. The most positive response was regarding the chances of learning from feedback at 96.55% (P6).

Very few students have ever received video feedback before. Students normally watch the videos in the university computer labs or at home. This is usually determined by where students are when they receive notification that the marks and feedback are released. Most wait until they are in a private place to watch, although often wearing headphones in a computer lab is apparently private enough Most students prefer to watch alone when they first receive a video, and reactions to the prospect of sharing are mixed. Some never would, some are happy to share with peers, others tell their family about it.

The ease of use questions correlated so strongly with each other that it was possible to form a single statistical factor, indicating that video feedback is, on the whole, considered easy to use to complete a variety of learning tasks. Similarly students were positive about how they feel about receiving video feedback. Most students believe that when compared to text as feedback, they are more likely to engage with video feedback.

Most students claimed to watch the whole of the feedback at least the first time they watch it, although the distribution system shows that actually only approx 62% watched over 90% of the first video of the year. Not many students re watch their videos before working on the next piece, but that could be because they were already working on the next piece by the time the feedback came out. In our practice there was not a time gap long enough to allow that to happen between submissions. This explains why so many of our students found that they could rely on their memory rather than taking notes. Some students skip through and watch parts on subsequent occasions, but others always watch all the way through even when watching multiple times. Longer durations are not an issue, and sometimes short videos are thought to be too short.

Students agree that they do not want to see a video of the marker on screen at the same time as the work. They do want to know who is marking however, so identifying the marker in the opening portion of the video, and having met the marker before, is very important.

Once more, the only major issue found is not being able to skim the video in a similar way to text. To find specific points you have to watch the whole video or note time stamps of important points.

7.8 Applying the taxonomy to video feedback in practice

The taxonomy for video feedback is applied here to the study into video feedback in practice discussed throughout this chapter. In doing so this becomes part of the validation process by utility demonstration (Usman et al. 2017). The details of the taxonomy, and its development can be found in Chapter 4, and the validation process is discussed in Chapter 8. Entries into the taxonomy at this point are formatted as per the guidance prepared for the Expert Panel validation exercise (see Appendix H.1), and as such, will validate the documentation for that exercise simultaneously.

The following section shows the Taxonomy of Video Feedback and the data from this study which is classified into the relevant facets.

7.8.1 Study section of the taxonomy of video feedback

The Context and Perceptions Taxonomies may appear separately, since both are not always required. The Study section should always appear with each of the two taxonomies, even when they appear separately, to identify the study to which the details belong.

Figure 7.15: Study section from the Taxonomy of Video Feedback diagram

Facet	Characteristic(s)		
Author	Atfield-Cutts, S.		
Year	2015-2018		
Title	Programming unit, 1st Year Computing, Bournemouth University		
Group	2015-2016	2016-2017	2017-2018

Table 7.13: Taxonomy entry for studies in practice - Study section

7.8.2 Context Taxonomy

This taxonomy describes the context of the practice being in which the study took place. From this point on some details are split into separate entries by group. Others are identical for all three groups and are shown once here, across all three groups, for presentation reasons.

Figure 7.16: Context Taxonomy from the Taxonomy of Video Feedback diagram

Facet	Characteristic(s) by Group		
	2015-2016	2016-2017	2017-2018
SYSTEM - Screen Content			
Duration			
shortest	00:00:32	00:01:03	–
longest	00:20:34	00:28:42	–
average	00:05:00	00:08:42	–
Illustration	Execute code before and after corrections		
Documents	Marking scheme and assignment brief		
Marker	no		
Work	yes		
SYSTEM - Distribution			
Access	Student access was via the VLE feedback page for the programming unit under the student login		
Timeliness	3 weeks maximum, normally 2 weeks		
Storage and Privacy	Storage on Panopto (2018). Access permissions set per file to each student VLE Accessed by student login credentials		
SYSTEM - Recording Technology			
Recording & editing	Recording:Panopto can record screencast or web cam Can record whole or portion of the screen Editing: Cannot insert into middle of time line, but can add to the beginning and end. Editing very rarely used		
Recording source	Screencast		

Table 7.14: Context Taxonomy entry for studies in practice

Facet	Characteristic (by Group)		
	2015-2016	2016-2017	2017-2018
CLASS			
Diversity			
Gender	(KEY: m=male, f=female, u=undisclosed)		
	M:248 F:32	M:275 F:30	M:257 F:24
	M:89% F:11%	M:90% F:10%	M:90% F:8% U:2%
Additional learning needs	Respondents: no 86%, yes 11%, Prefer not to answer 3%		
English first language	Respondents: yes 80%, no 20%		
Age	Respondents: 18-21 years 78%		
	22-30 years 19%, 31-40 years 3%		
Size			
Population receiving video feedback	298	313	273
Survey Respondents	120	29	70
Interview Respondents	–	–	15
Markers	4-6	4	4-6
Assignment type	Programming exercises in java		
Subject studied	Programming unit on Computing BSc(Hons) degrees		
Academic level	First year undergraduate. Level 4		

Table 7.15: Context Taxonomy entry for studies in practice - Class section

7.8.3 Perceptions Taxonomy

The Perceptions Taxonomy is for the classification of the opinions of stakeholders and findings of the study.

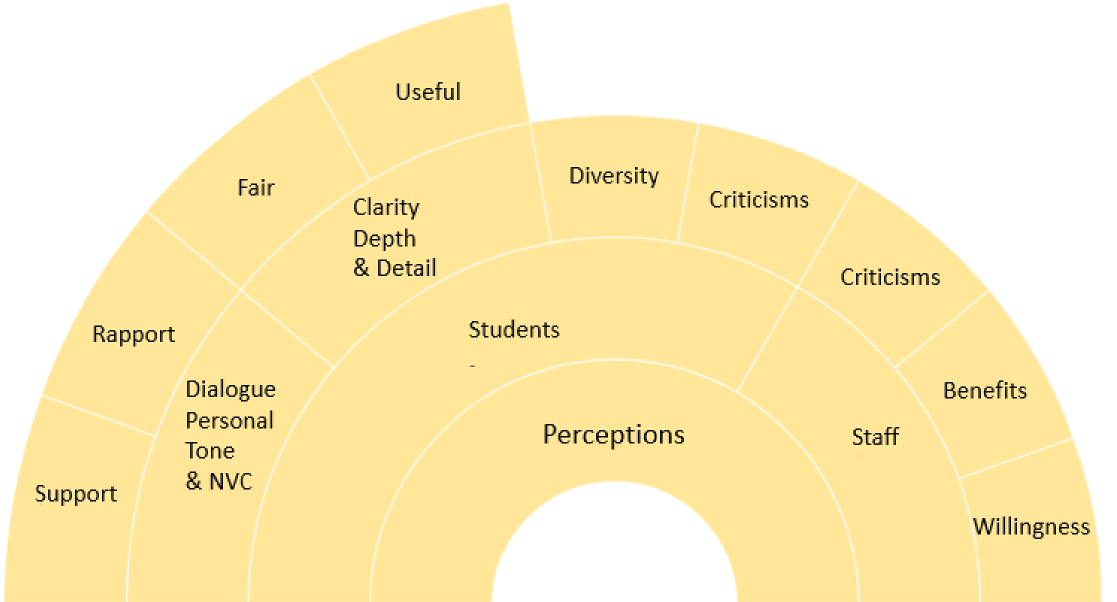


Figure 7.17: Perceptions Taxonomy of Video Feedback diagram

Facet	Characteristic(s)
STUDENTS - Dialogue, Personal, Tone and Non verbal communication	
Support	”They were never harsh, it was always supportive feedback even when it was something negative”
Rapport	Positive response rate for video feedback compared to text: - - Improved chances of talking to staff - 86.76% - Friendly 91.8% - Personal 94.34% *”Its obvious that the lecturer cares enough to put time into the video.”*

Table 7.16: Perceptions Taxonomy entry - Student Perceptions part 1 of 2

Facet	Characteristic(s)
STUDENTS - Clarity depth and detail	
Fair	*”Reasons for grade are made more clear when explaining problems”* Students perceive an improvement in the fairness of marking compared to text - 79.79% positive response
Useful	Positive response rate for video feedback compared to text: - - Helpful 90.91% - Useful 91.28% - Easy to understand 87.32% - Improved chances of learning from feedback 96.5% Students find videos more memorable than text Long durations eg over 10 mins, are not considered a problem by students because it is helpful.
Diversity	Among respondents are students with dyslexia, dyspraxia, ADHD, asbergers, autism and a student registered severely sight impaired 25 students registered for additional learning needs say video feedback enhances their experience English is the first language of 87% of respondents. There are 12 other native languages among the other 13% of students.
Criticisms	Students prefer larger screens, since videos were not clear on small screens. *”A more mobile friendly website or app could be helpful!”* *”On the one hand I love the video feedback. On the other hand, when i get a sub-par grade i am all too nervous to watch the video.”* *”Provide a written transcript (even if its automatically generated with some errors)”* *”having written feedback is just a classic way to receive feedback, and some people just won’t want to take to it [video]”*

Table 7.17: Perceptions Taxonomy entry - Student Perceptions part 2 of 2

Facet	Characteristic(s)
STAFF	
Criticisms	Staff were anxious before starting recording for the first time. Staff need to look after their voices and take rest breaks. Sometimes staff find recording onerous. Sometimes staff had difficulty keeping track of what they wanted to say, and what they had already said. Staff saw difficulties in finding a quiet environment to record in. Text is easier to change and to search through.
Benefits	Allows marker to point to code on screen and comment on it. ”It solves my ’point at it and add the feedback here’ problem.” Staff find feedback is less tiring, even enjoyable, to create. ”Personalisation has been very popular with students” Feedback is more nuanced. Tone provides a sense of approval/disapproval. Tone and humour allows you to interact with students and to soften the blow of a poor assignment. ”Encouraged more students to actually engage with their feedback, rather than just look at their mark” ”I can also SHOW how the work could be improved...running the program to illustrate what happens.”
Willingness	—

Table 7.18: Perceptions Taxonomy entry - Staff

Findings of applying the Taxonomy of Video Feedback to video feedback in practice

The study section of the taxonomy set was easy to complete and there were 3 sets of students, or 'groups' required in this set of data, as there were some differences between the cohorts that might require the recording of different characteristics into the same facet. Therefore, the 'Study' section is perfectly adequate for this data set.

It was relatively easy to classify comments into facets of the Taxonomy of Video Feedback. The difficulty came in editing a large quantity of information down to something concise enough to not be overwhelming to the reader. However, this is a study of considerable depth, pulling in information from a variety of sources.

The purpose of the 'Willingness' classification is less clear than originally thought. In reality, it is not clear what kind of comment might be classified into this facet. One of the markers in our team described creating video feedback as 'uncomfortable', yet that does not necessarily mean that the marker is unwilling to participate.

Decisions about what to include in the classification process of the Perceptions Taxonomy was a time consuming process. Classifying the data into the Perceptions Taxonomy was less onerous than in the previous study (see Section 6.5.3). This may have been achieved by practice in previous studies.

Chapter 8

Validating the Taxonomy of Video Feedback in Practice

8.1 Introduction

The taxonomy of video feedback was developed as described in Chapter 4. Three empirical case studies were based on a single context with implementation variations over time.To ensure the relevance of the taxonomy across a variety of practices, the development of the taxonomy was based on thorough examinations of reports on studies in a variety of contexts. The validation by utilisation process (Usman et al. 2017) then began, by applying the taxonomy to the three case studies (see Sections 5.6, 6.5 and 7.8). The validation continues with consideration of the taxonomies by an expert panel. The planned methods applied in this chapter were previously discussed in section 2.7.

8.2 Validation by utilisation

Through the design science concept of emergence an artefact has been developed in the form of a pair of taxonomies, which together, cover the domain of video feedback in practice. The method used was adapted from that of Nickerson et al. (2013). However, Nickerson et al. (2013) did not devise a step by step guide for validation in the same way as for development, and so a plan for validation was sought elsewhere. There are some foreseeable potential weaknesses in the taxonomy of video feedback as it stands at this point. Although the taxonomy is derived from research performed in practice, it is also suggested by some authors that not all reports discuss all aspects useful to other practitioners, or that reporting is too vague. For instance, Orlando (2016) complains about the generic use of the term 'postgraduate' without indication of age , others report the numbers of students, or the numbers of survey respondents, but not both, or it is unclear what some values represent. Without the expertise of an IT professional reporting on the implementation, details of the context will often be incomplete in literature. Therefore, reliance on literature may still leave the taxonomy at risk of being incomplete. This makes the validation process an important step in ensuring the usefulness of the taxonomy of video feedback.

8.2.1 Methods of validation by utilisation

The taxonomies will be validated by utilisation as suggested by Usman et al. (2017). They suggest utility can be demonstrated in one of four ways: -

1. by classifying existing literature
2. by case study or experiment
3. by classifying subject matter examples
4. by expert opinion

1. Classifying existing literature

The taxonomy was developed based on literature, and so validation by the same method is unlikely to form a useful, or critical evaluation.

The following validation exercises were carried out and are explained here.

2. Case Study and 3. Classifying subject matter examples

Three case studies were conducted into the use of video feedback and the real-world data was classified into the taxonomy. The use of case studies is considered the most rigorous of the validation methods Usman et al. (2017).

4. Expert Panel

Since all other work was conducted by a single researcher, an expert panel is intended to bring welcome objectivity to the validation process.

Summary of validation by utilisation methods carried out

The methods of validation that were completed are:-

1. Application of the taxonomy of video feedback to the three case studies, by classification of the details of the case studies into the taxonomy.
2. Application of the taxonomy of video feedback by an Expert Panel according to their own experience.

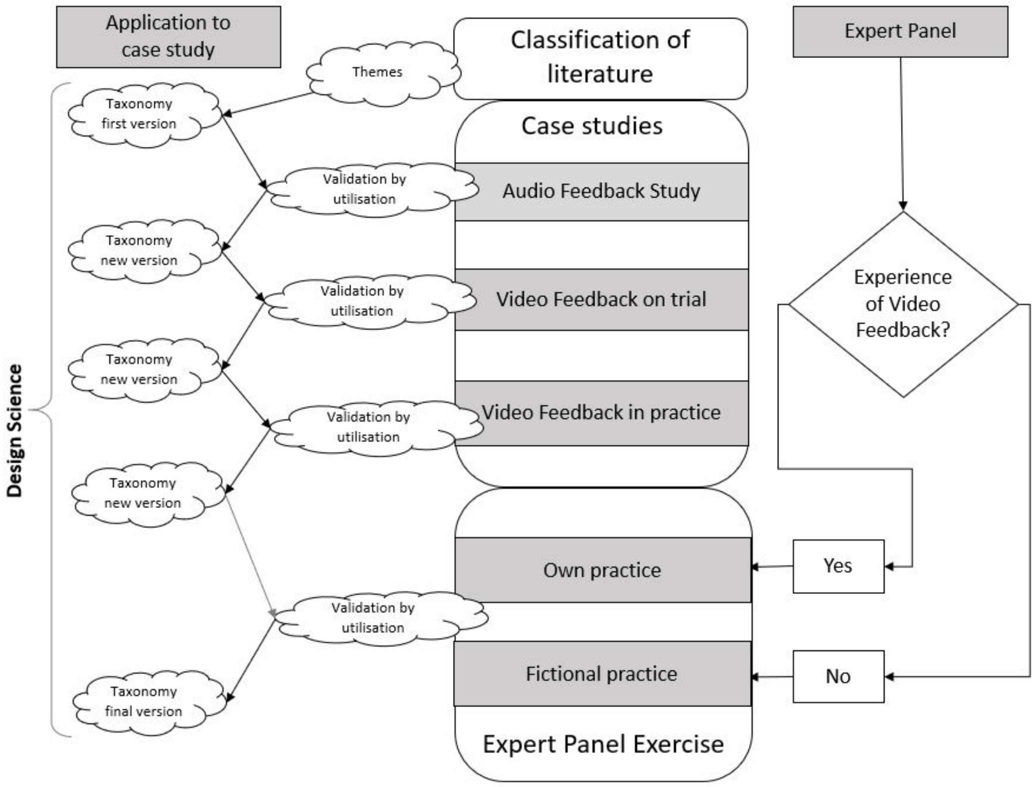


Figure 8.1: A visualisation of the validation process

8.3 Validation by classifying subject matter of case studies

Three case studies were carried out into the use of media as feedback, to enable the validation of the taxonomy of video feedback in practice.

The first was a pilot study supplying audio as feedback to students. This established the feasibility of media as feedback for the subject of programming, with lower resource overheads. Findings could have shown that the additional overheads required to produce video feedback are unnecessary, but that was not the case, with students complaining of lack of reference to work. This study serves as a baseline for comparison.

The second and third studies were case studies into the use of video as feedback. The second study involved the researcher returning video feedback to a sample of students as a response to an assessment submission. The final case study employed the resources of all members of the programming unit teaching team to return video as feedback to an entire cohort of students taking a programming unit on the first year of their Computing degree. This was carried out over 3 years, establishing the feasibility of video feedback to large cohorts in real-world practice, and a strong preference by students for video feedback.

Having conducted all three studies, each was classified into the taxonomy. Those entries can be found at the end of each chapter (see Table 8.1).

Chapter	Case Study	Utilisation of the Taxonomy
5	Pilot Study: Audio Feedback on Trial	Section 5.6
6	Video Feedback on Trial	Section 6.5
7	Video Feedback in Practice	Section 7.8

Table 8.1: Sections of studies reporting utilisation of the Taxonomy of Video Feedback

8.3.1 Results of validation by classifying subject matter from a case study

Validation by application to Case Study 1: Audio Feedback on Trial

The taxonomy was clearly never intended to be used to classify details of a study into audio feedback. The information available for classification was limited and the data was not available to form entries for every facet of either taxonomy. There was no detail available for any of the ’screen content’ for the Context Taxonomy. Even though there was no ’screen content’ as such, the feedback by Voki avatar (Oddcast Inc 2013) did have the potential to hold the student’s visual attention.

The range of questions asked of students did not cover the range of facets in the Perceptions Taxonomy. For instance, students were not asked about any diversity or learning needs, and numbers of responses were small.

Application to this study was an opportunity to spot any glaring errors, and none were found as the information available did have facets to classify them into, however, many facets were unfilled. Of course, this may well occur in reality and is not an issue, but the low number of filled facets means this case does not form a comprehensive validation of the taxonomy, except on the appropriateness of the classification points which are utilised. The facets filled in this case are considered fit for purpose.

Validation by application to Case Study 2: Video Feedback on Trial

The study section of the taxonomy set was easy to complete since there were no sets of students, or 'groups' required in this set of data, and the context data was a good fit for the Context Taxonomy.

Determining the content of the Perceptions Taxonomy classification entries took a little longer than anticipated, but still space was found for all relevant data and important findings. It is worth considering the length of the findings, and perhaps classification of further studies will reveal a means of dividing findings from this section into sub sections, whilst also being comprehensive enough to accept all findings.

Validation by application to Case Study 3: Video Feedback in Practice

Classification of comments into facets of the taxonomy of video feedback was straight forward, even though there was a large quantity of information to classify. This is a study of considerable depth, pulling in information from a variety of sources, and demonstrates the potential of the taxonomy to concisely present the findings of a study.

Decisions about what to include in the classification process of the Perceptions Taxonomy was a time consuming process. In practice, it is unclear what kind of comment might be classified into the 'Willingness' facet and therefore, at this point, the 'Willingness' facet was under consideration for removal from the Perceptions Taxonomy.

8.4 Validation by Expert Panel

The expert elicitation exercise in this case is being employed to evaluate a conceptual model, namely the taxonomy set developed for video feedback in practice. Studies have been validated by small samples of experts in studies before by completing a questionnaire (Beecham et al. 2005). Expert elicitation can be used to explore an area of limited knowledge before evidence is available, if applied systematically (Knol et al. 2010). The difficulties in its use lie in selecting and synthesising expert opinion into a concrete implementation in context (Martini 2014). However, it can be used to provide estimations, or evaluations of models, as is required in this case. In this work currently the knowledge is limited to that which is gleaned from literature and empirical studies, of which all are conducted in a single practice setting. Knol et al. (2010) offers a method for application but stresses that they are only concerned with what works in their own domain of integrated environmental health impact assessment (IEHIA). They have drawn on several existing methods to form their own, making it less likely that this method requires adjustment to translate to a different domain. The seven steps of the process they use are: -

1. Characterisation of uncertainties
2. Scope and format of the elicitation
3. Selection of experts
4. Design of the elicitation protocols
5. Preparation of the elicitation session
6. Elicitation of expert judgements
7. Possible aggregation or reporting

Beecham et al. (2005) has an 8 step process which is more practical and previously applied in the world of software engineering. The steps in this case are: -

1. Highlight the objectives for building the model
2. List the criteria identified during the initial stages of model development
3. Explore alternative methods for testing how the criteria are reflected in the model
4. Design a validation instrument to test the success criteria (to include methods for reporting/analysing responses)
5. Select an expert panel to reflect the population of experts in the domain
6. Present results of the validation instrument
7. Relate results to the success criteria to gain an impression of strengths and weaknesses
8. Discuss how these strengths and weaknesses might affect objectives

8.5 Method of conducting the Expert Panel

The method closely follows that developed by Beecham et al. (2005). However there are some significant steps missing from the process, which are included in the method outlined by Knol et al. (2010), or implied by Beecham et al. (2005). These steps are explicitly included in the method executed here. The steps taken, and the original source of inspiration for them, are summarised in Figure 8.2.

Step 1: Highlight the objectives for building the model

The aim is to develop a model representing the implementation and context details of a teaching practice in HE where video feedback is used. The primary objective of the video feedback taxonomy is to provide information which may inform education practitioners towards evidence based best practice.

The Context Taxonomy describes the classified implementation and the practice details. These can be viewed as the ’cause’ of the ’effect’. The effect is described by the Perceptions Taxonomy which contains classified comments and opinions of video feedback as expressed by the main stakeholders: staff and students. The objective is that staff can use the video feedback taxonomy set to identify studies in practices which are close to their own. They can use previous experience of others to be aware of potential issues. These can be compared to other studies where those issues did not occur and to find ways to prevent or mitigate negative impact. Where practice results in positive perceptions these practices can be replicated because the details will be available to do so. This should be possible with a taxonomy that is easy to understand and use.

Step 2: List the criteria identified during the initial stages of model development

The development method by Nickerson et al. (2013) utilised a set of ’ending objectives’ to mark the end of the iterative development cycle. Although these were examined at the end of each iteration, since the decision rests with a single researcher, it would be appropriate to have these objectives validated as complete by experts. The objective ending conditions are those which satisfy the definition of a taxonomy, where the subjective ending conditions are specific to this taxonomy. Therefore, the success of the taxonomy development depends on these criteria being met.

Beecham et al. (2005) used a set of success criteria and describes the purpose for

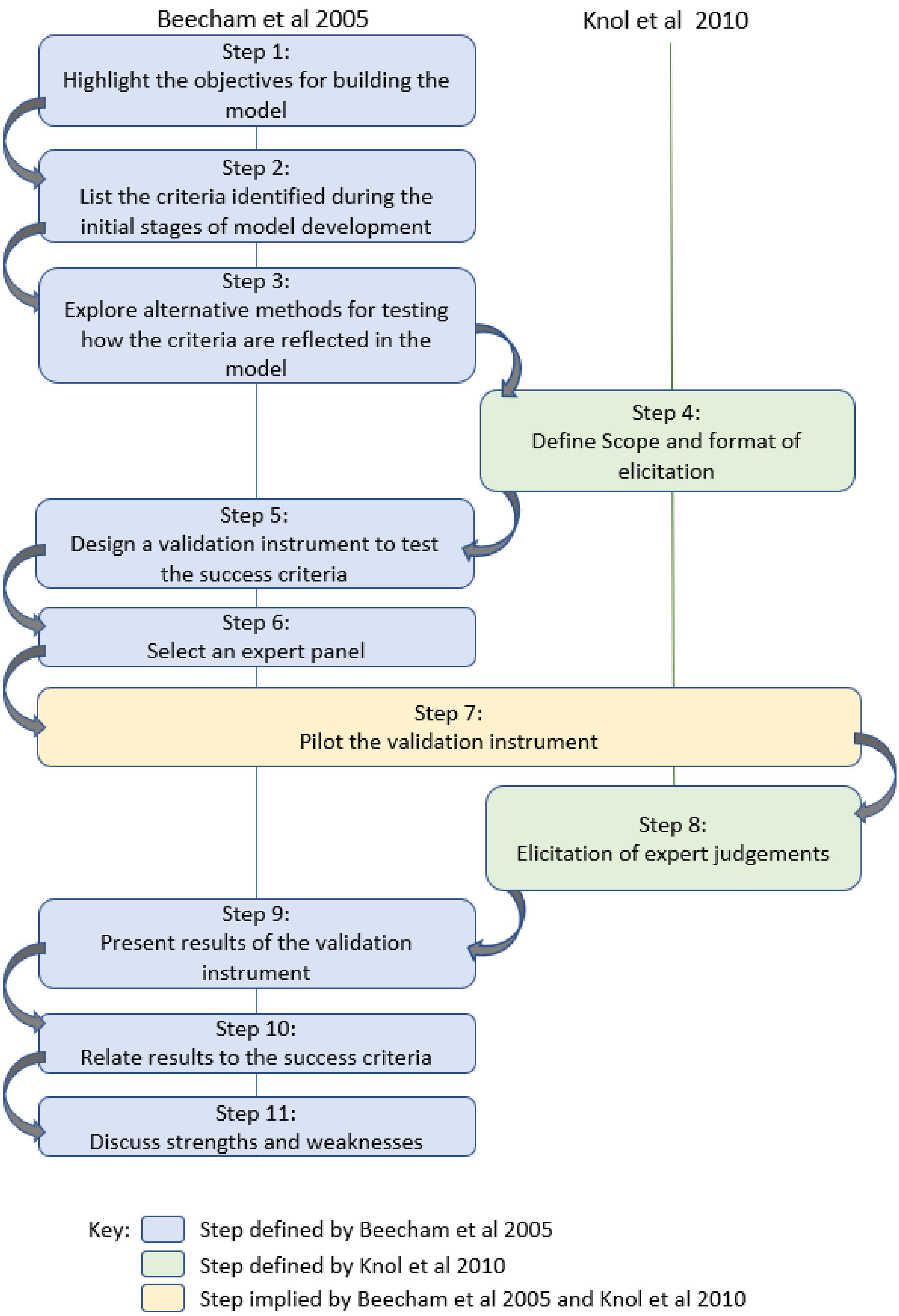


Figure 8.2: Expert Panel method

applying the criteria, the rules to apply, and the source of the criteria, in a table format. The ’ending objectives’ by Nickerson et al. (2013) were reformed as success criteria and added to the criteria recommended by Beecham et al. (2005). The success criteria for the taxonomies of video feedback in practice are defined in Table 8.2.

Step 3: Explore alternative methods for testing how the criteria are reflected in the model

The best way to test the model is to use it. However, instead of the researcher performing the classification process that task will be completed by the expert panel.

Criterion of Concision

This can be tested by ensuring that all of the facets are useful in that when given a scenario, it is possible to extract the details and classify the data. This will determine if any facets are redundant or repeated.

Criterion of Robustness

This can be tested by asking experts to classify two examples of practice where some facets are similar.

Criterion of Comprehensiveness

This test will require experts to determine if there are any details they felt have no place to be recorded.

Criterion of being Expandable

Experts can be asked to comment on any additional practice details or perceptions they would like to contribute, but have no appropriate facet to classify these under, this is similar to the exercise to test for comprehensiveness. The test for being expandable will occur when we ask experts to determine where the new facet they require should go.

Criterion of being Explanatory

The taxonomy should not contain every tiny detail of the object, but enough to explain the nature of objects classified within it (Nickerson et al. 2013). To test this criteria experts will be requested to form an explanatory sentence by choosing descriptors from the appropriate facets to form a string (Kwasnik 1999, p.40). The string formed about a pottery vase used by Kwasnik (1999) would be a useful example to provide to members of the expert panel. It is close enough to see what the exercise is intended to achieve,

Criterion	Purpose	Rule	Source
Concise	To prevent cognitive overload of the user.	At least one object is classified under every characteristic of every facet. None are redundant or repeated.	Nickerson et al. (2013)
Robust	Ensure clarity of classification.	Contains enough facets and characteristics to clearly differentiate objects of interest.	Nickerson et al. (2013)
Comprehensive	Ensure completeness by recording all details of any relevant object.	Classifies all known objects within the domain of video feedback in practice.	Nickerson et al. (2013)
Extendable	Prevent the taxonomies becoming obsolete.	Easy to add/remove new facets or characteristics for new types of objects	Nickerson et al. (2013)
Explanatory	Facilitates (1) finding an object in the taxonomies (2) identification of characteristics of an object found in a taxonomies.	Provide useful explanations of the nature of the objects, without describing every detail.	Nickerson et al. (2013)
Easy to use	Complex models are unlikely to be acceptable to users and may be too difficult to use without training.	There must be a balance of simplicity and meaning. Requires little or no training to use.	Beecham et al. (2005)
Limited scope	To simplify the part of the system likely to be outside of the experience of practitioners and record relevant details about the context.	Includes implementation details of the system/subsystem directly related to the production and distribution of video feedback, but exclude, for instance, non related parts of the VLE. Includes class demographics, context details and perceptions of stakeholders	Beecham et al. (2005)
Consistent	To ensure accurate communication there should be consistent use of terms.	Consistent use of terms.	Beecham et al. (2005)
Understandable	To ensure accurate communication.	Terms used should be those commonly used in practice.	Beecham et al. (2005)
Verifiable	Validation of the taxonomies may improve the model and help with research.	Taxonomies are assessed against their objectives to determine their usefulness.	Beecham et al. (2005)

Table 8.2: Success Criteria for the Taxonomies of Video Feedback in Practice

but far enough away from the situation of assessment feedback to prevent simple cloning.

Criterion of Ease of Use

There are two options to test this criteria: -

1. Ensure there are opportunities for experts to comment on how they felt about completing the tasks and examine these comments for which discuss ease of use.
2. Ask the experts directly how easy they felt the taxonomy set is to use.

Including both options in the expert panel exercise may provide more robust results.

Criterion of Limited Scope

This criteria could be tested by asking experts to describe where they think the scope boundaries are. Another option is to offer examples of context details and perceptions and ask experts if they believe they are within the scope of the taxonomy set. Again, including both options in the expert panel exercise may provide more robust results.

Criterion of Consistency To ensure accurate communication the terms used should be consistent throughout. Asking experts to comment on the terms used and whether any are thought to have similar meaning is one way to identify any inconsistencies, or to examine any comments regarding confusion of understanding to find out if the terms used are the cause of the problem.

Criterion of being Understandable Again the approach here is to explicitly ask experts if there are any things they are uncertain about, or that they do not understand, and to examine other comments for indicators of confusion.

Criterion of being Verifiable The condition explained for this criteria is that it is possible to perform this type of validation exercise, and that will need to be determined by examining the results.

Step 4: Define Scope and format of elicitation

At this point Knol et al. (2010) includes this useful extra step to ensure the scope and format of the elicitation are explicitly considered.

Limitations on time frames or other resources may impact on the number or selection of experts. In this case the format of elicitation will largely be determined by resources available. Face to face formats take more time to set up and coordinate. Where online modes still have significant setup times but no requirement for coordination. They also eliminate the need for travel. It is possible that experts feel the responsibility of forming a considered opinion when responding in person as opposed to distance methods. However, such a resource hungry method may prove prohibitive.

Face to face sessions may be individual or in a group setting. The amount of time required to conduct several individual interviews can be prohibitive but they often result in targeted answers and clarity of understanding. Group sessions may result in dominance by personalities or highly respected individuals. Instead of several perspectives the results is group-think where the group attempts to form a consensus as implied by the social setting.

Certainly the danger of the only result being a collective opinion must be avoided and therefore a face to face group setting is deemed inappropriate. In order to gain as much diversity as possible there will be attempts to recruit from various institutions and therefore travel costs could become prohibitive. To maintain feasibility this expert panel exercise will be conducted online, in a similar fashion to Beecham et al. (2005).

Step 5: Design a validation instrument to test the success criteria

A written exercise was be supplied to experts online and distributed using the Online Surveys (JISC 2017) platform. It includes the purpose of the Taxonomy of Video Feedback and what it is endeavouring to represent. It explains the model components which guide experts from the high level framework to a detailed explanation including the purpose of each facet for classification and the format of the data to be recorded there. Care was taken not to overwhelm experts with preparatory information (Knol et al. 2010), particularly where there was the opportunity to explain information in person and so, where possible the expert was visited initially to explain how the process was intended to work, and to thank them for their contribution.

There are a set of exercises for experts to complete. The set of questions the expert sees depends on whether the expert has previous experience with video feedback. If they have previous experience they are asked to enter the details of their own practice. If they have no prior experience of providing video feedback they are given the details of a fictional practice to work from. The details of the fictional practice are derived from a combination of real practices described in literature and in that way are feasible.

Each exercise relates to the objectives for the development of the taxonomy set out in Table 4.1 and 4.2 as objective and subjective ending conditions (Nickerson et al. 2013), and reformed as success criteria in Section 8.2 (Beecham et al. 2005). Space is included to allow for ample free format responses and personal contact details are included to ensure a fast response on any specific issues or information.

Exercises for Expert Panel members to complete

Ex 1) This exercise has to be different depending on whether the expert has experience of using video feedback or not.

- Experts in using video feedback will classify their own practice into the Context Taxonomy
- Experts who do not have experience in using video feedback will be given a description of a practice to classify into the Context Taxonomy.

Applicable Taxonomy: Context
Criterion tested: Verifiable and Concise
Measure of Verifiable: Extent to which experts were able to classify details of video feedback practice.
Measure of Concision: Any facets which are not used or not considered useful.

Ex 2) Experts are given a set of perceptions from literature to classify.
Applicable Taxonomy: Perceptions
Criterion tested: Verifiable and Concise
Measure of Verifiable: Extent to which experts were able to classify perceptions of video feedback practice.
Measure of Concision: Identification of any facets which are not used or not considered useful.

Ex 3) List and describe any attributes of the context or perceptions, which experts felt should be recorded but had no place to be classified.
Applicable Taxonomy: Context and Perceptions
Criteria tested: Comprehensive and Robust
Measure: Whether additional attributes for inclusion were found.

Ex 4) Determine where a new facet should go if any are found. If none are found a new facet will be suggested to ensure the criteria is tested.

Applicable Taxonomy: Context and Perceptions

Criteria tested: Expandable

Measure: The degree to which restructuring must take place to include a new facet.

Ex 5) Form an explanatory sentence from classified values based on an example (Kwasnik 1999, p.40).

Applicable Taxonomy: Context and Perceptions

Criteria tested: Explanatory

Measure: The extent to which experts can form an explanation of the practice set up.

Ex 6) Comment on how easy they found the exercises and report the time taken to complete them.

Applicable Taxonomy: Context and Perceptions

Criteria tested: Ease of Use

Measure: How easy the experts claim to have found the exercises and how long it took them to complete all of them.

Ex 7) Describe where the boundary of the system included in the taxonomy set is.

Applicable Taxonomy: Context and Perceptions

Criteria tested: Limited scope

Measure: Extent to which the boundary is described with clarity.

Ex 8) Exercise:Determine if a set of items given are within the scope of the taxonomy set

Applicable Taxonomy: Context and Perceptions

Criteria tested: Limited scope

Measure: Extent to which items are correctly identified as inside/outside the intended scope of the taxonomy set.

These exercises were formulated into the online exercise, which can be found in Appendix H.1.

Step 6: Select an expert panel

It is important to reflect the population of experts in the domain (Beecham et al. 2005) within the expert panel. Knol et al. (2010) warns of some pitfalls to avoid during the selection process, such as using experts from similar training, experience or influence, may reduce the potential for diversity. Martini (2014) explains that experts should be verified as experienced and not just the 'celebrities' of their field. Despite the difficulties in selection of an expert panel the consensus in literature is that the judgements of all experts selected for an elicitation exercise should be taken into account (Martini 2014). There are other ways in which the expertise required may be limited. More obvious is that the best selection of experts may not be available.

An expert is defined in this case as someone who has either published papers, or has professionally recognised significant experience in either 1) the development of taxonomies 2) teaching computing subjects in HE or 3) using video feedback in practice. As suggested by Martini (2014) and Beecham et al. (2005), the backgrounds of the experts invited covers a variety of experience. Shortages of resources may impact on the diversity of expert opinion and therefore on the quality of knowledge available.

Expert panel recruitment process

Experts were recruited in two ways. Either they were approached in person, or by email. Ten were invited to participate originally, and although initial responses were positive only 6 actually took part. Having waited until teaching and exams were over to avoid overloading the academics involved, it seemed some were now unavailable for various reasons, including annual leave and conference attendance.

Expert panel demographics

Three of the expert panel have used video feedback in practice for a number of years. One on the computer programming unit at Bournemouth University, another on an electronic music unit on a Music and Sound Production degree also in Bournemouth, and another at the Keller School of Business in the USA. All of the participants teach, as well as publishing in their field. The expertise of the panel is summarised in Table 8.3.

Field of expertise	Role			
	Teaching	Research	Teaching & Research	Total
Taxonomy development			2	2
Video feedback	1		2	3
Teaching computing	3		2	5
Total	3		6	–

Table 8.3: Number of experts with field of expertise

Step 7: Pilot the validation instrument

In this case an online exercise was conducted, therefore the completed design for the exercise was implemented on to Online Surveys (JISC 2017) before the pilot could take place.

A fellow academic with no experience of using video feedback was recruited to pilot the expert panel exercise. The numbers of academics known to have used video feedback are limited. Therefore it was important that as many of those people were recruited as panellists. Additionally, one of the purposes of piloting the exercise was to have someone examine it with fresh eyes, free of preconceptions. In the interests of maximising the potential variety of experience available to the expert panel recruitment pool, and in the interests of objectivity, the assistance of an academic, with no previous experience in using video feedback, was enlisted.

Step 8: Elicitation of expert judgements

Knol et al. (2010) discusses this step as the face to face meeting conducted by them. In this case an online exercise was conducted, therefore the introduction proposed by Knol et al. (2010) in this step has already been included in the design of the instrument. All the invited panellists had been approached prior to the distribution of the exercise. The Online Surveys (JISC 2017) system on which the exercise was built also provides a distribution service. It was used to email the link for the survey to each of the panellists, who were all expecting to receive such an email. When surveys were completed each panellist was emailed to thank them for their contribution.

8.6 Results of the Expert Panel

In the last three steps of the method the results of the expert panel are presented. Step 9 presents the results of each of the exercises in turn. Step 10 then relates those results to each of the success criteria and evaluates them. Finally, step 11 is a discussion of the strengths and weaknesses of the taxonomy of video feedback. This is followed by the conclusions of the expert panel.

8.6.1 Step 9: Present results of the validation instrument

This section steps through the exercise in stages and explains the responses received in each section.

The Expert Panel exercise format

The introduction to the exercise explains the purpose of the research and what taking part involves. The first few questions pertain to the identity of the participant.

The first, and largest section of the exercise consists of a series of questions related to recording the characteristics of the 'Study' section, which identifies the study, and 'Context Taxonomy' of video feedback in practice. The first question related to whether the participant has any previous experience of video feedback and subsequent questions are selected according to their answer.

If the participant says they have no previous experience of video feedback they will see a page containing a description of a fictional practice scenario. It is explained that this description will also appear on the same page as every question so that they do not have to move back and forth between pages, or make any notes.

At this point whether or not participants have previous experience of creating video feedback, they were presented with an explanation of the taxonomy of video feedback as a whole. From then on the questions are almost identical. The only differences between the two sets of questions presented dependant on experience, is that one has the description of the fictional scenario with each question and one does not. On account of this difference alone there are some slight wording differences.

Exercise 1) Evaluation of Concision and Validity - Classification using the Context Taxonomy

The participant is asked to fill in characteristics from practice, (fictional or real), into the taxonomy set for the Study section and the Context Taxonomy. For each facet of the taxonomy they are asked to fill in, the participant sees :-

- **Description** - a description of the facet
- **Purpose -** the purpose for recording the characteristic of that facet
- **Format** - a description of the format to be used
- **Example** - examples of entries for that particular facet

Some facets also included information regarding: -

- **Rationale** - how it is anticipated that the information will help the user
- **Guidance** - on under what circumstances certain entries would be made
- **Literature** - related comments from literature, largely included as evidence for the purpose or rationale.
- **Example** - examples of entries for that particular facet

Responses from experts who have not used video feedback before

Three of the participants are entering details regarding the fictional practice scenario. Therefore it is no surprise that in the Study section all answers are identical except the Group facet. Two participants prioritise diversity and would like to split groups by non-native and native speakers, by those with additional learning needs or none, or by gender.

One of the experts got slightly muddled between the platforms where the assignments were stored and where the feedback was stored, but otherwise al three experts answered based on the scenario as anticipated, indicating that they understood what was asked of them.

Responses from experts with experience of video feedback

Two of the three panellists with experience of video feedback answered as anticipated, of how they used individual video feedback in their own practice. The third responded with answers from their own practice where generic feedback had been used, ie: one piece of feedback (one video) for all students in the cohort. However, it still consisted of responses that made sense in the context of the taxonomy, it was just less particular than the other two. It was anticipated that the taxonomy would be used for recording details of practice of individual feedback rather than generic feedback, but this exercise shows there is no reason why it cannot be used for both. For clarity an additional facet should be added to explicitly record the intended audience of the feedback video.

Exercise 2) Evaluation of Concision and Validity - Classification using the Perceptions Taxonomy

In this exercise the experts were given a set of 8 extracts from literature and asked to classify them under the facets of the perceptions taxonomy of video feedback. Almost all of the participants selected the same extracts to classify under particular facets and then often added some more as well.

It was anticipated that experts would select two particular extracts as relevant student comments regarding support. One of those got selected by all of the panel, and the other got selected by three out of five panellists. However most panellists selected two or three additional extracts to classify under 'support'. Similarly, when classifying under the 'Rapport' four out of five experts who answered the question agreed on a single extract, and then selected other facets as well.

There was a high level of agreement regarding which extracts to be placed in three of the facets. Two of those facets were 'criticism': one for staff criticism and one for criticism by students. Out of the four experts who answered those questions the facet was agreed upon by all panellists selecting the same extract, and only one expert chose more than one facet in both cases.

Exercise 3) Evaluation of Explanatory quality - Analysing an entity from classified values

All of the panellists managed to form explanatory sentences from the characteristics classified in the given taxonomy example.

> Example 1:
> *"Screencast of executing program code with assignment brief and marking scheme for an average of 8 minutes. Programming Unit for 320 Level 4 students with 4 markers for java code."*
>
> Example 2:
> *"A recording technology i.e. screencast is used to record the illustration which is a executable programming code. This involved using a marking scheme with around 5-12 minutes of video feedback provided. This is for the programming unit/subject with 321 students. It's a level 4 unit and the assignment comprises a java programming code.*

Exercise 4) Evaluation of Comprehensiveness - Additional attributes for classification

None of the participants suggested any additional facets which they felt were required.

Exercise 5) Evaluation of the facility to Expand - Restructuring around a new facet

Since none of the participants suggested any additional facets which they felt were required none suggested by them could be positioned. A suggestion had been included in the exercise in case none had been created, but none of the participants attempted to include that in the taxonomy either.

Exercise 6) Limited scope evaluation – defining the boundary

The experts were given a list of 28 aspects that may be considered related to video feedback and asked to determine whether these should be considered inside, or outside of the scope of the taxonomy. An option to select 'Not sure' was also available but was only used twice. The results show (see Table 8.4) that nine of the aspects were considered within the scope of the taxonomy by all of the experts. The one aspect which stands out as not currently considered as within the scope of the taxonomy of video feedback is the assessment feedback turnaround policy of the institution. It is not normally mentioned in literature except as a common existing constraint. Most of these policies show the turnaround limit from submission deadline to return of marks and feedback are very similar, usually in the region of three weeks. The similarity and commonality of these policies means that the purpose of recording such information seems unnecessary. Other aspects which are considered external to the current version of the taxonomy but which are within scope according most panellists are items like the headsets and microphone used to record the videos. Although completely different concepts they have similar properties, in that they are commonly used in practice and are very similar in functionality. If in future some headsets or microphones have beneficial additional functionality which others lack recording the type used would be useful. Meanwhile, the lack of necessity means their omission contributes to the criterion of concision.

Of those aspects which one expert placed outside the scope of the taxonomy, several are assessment documentation. The set of documentation which can form the basis of an assessment, e.g.: assignment brief, rubric, marking scheme, case study, templates, bibliography, are many and the combination used can vary greatly. At the moment, rather than recording these individual documents as separate facets in the taxonomy, the 'Documentation' facet is open for the staff to record the types of documentation which they generally use as screen content, rather than maintaining a facet for every single one. This seems to be a pragmatic and practical compromise which fits with these

Aspect	Response count		
	Inside	Outside	Not sure
Recording software	5	0	0
Editing software	5	0	0
Storage platform for videos	5	0	0
Feedback review page for a specific student	5	0	0
Hyperlink to the video	5	0	0
Video player embedded in page	5	0	0
Quality of the feedback video recording	5	0	0
Marking Staff	5	0	0
Assessment feedback turnaround policy of the institution	5	0	0
Permissions on video feedback files	4	1	0
Device student watches feedback on	4	1	0
Headset used when recording the video	4	1	0
Time taken to record the videos	4	1	0
Number of students in the class	4	1	0
Assessment rubric	4	1	0
Assignment brief/specification	4	1	0
Students	4	0	1
Software used to view student work	4	0	0
Section of VLE where student reviews marks	3	2	0
Device staff use to record the video	3	2	0
Microphone used to record the video	3	2	0
Camera used to record the video	3	2	0
Assessment marking scheme	3	2	0
Students submitted work	3	1	1
Software used to demonstrate learning points	3	1	0
Title of the course	3	1	0
Title of the unit/module	3	1	0
Home page of the VLE	2	2	0

Table 8.4: Expert panel scope exercise - results

differences of opinion.

Only one expert said that the number of students, and the time it takes to create video feedback, are not inside the scope of the taxonomy. This particular expert is used to creating generic feedback, and returning a single video to the whole cohort. In which case, factors impacting on workload would be far less of a concern for staff. Another member of staff seemed less concerned with the setup staff use for recording, placing the pc or device used for recording, microphone and camera, beyond the scope of the taxonomy.

Exercise 7) Ease of use evaluation

Participants were asked to asses the ease of use of the taxonomy based on each of the exercises they had completed. A Likhert-style scale was used to capture expert opinion with options ranging from very easy to very difficult. Only two responses were negative (see Table 8.5). Both of these negative responses were related to the fact that none of the experts found a necessity to create additional facets. This meant this exercise was not completed by any one. It could be that thinking of something new to test the taxonomy with was too difficult, or it could be that adding a new facet was considered too difficult. Since none of the other participants saw it as a problem it seems unlikely that the issue is a major flaw, such as being unable to expand the taxonomy.

Exercise	very easy	easy	neutral	difficult	very difficult
1. Classification - Context Taxonomy	3	2	0	0	0
2. Classification - Perceptions Taxonomy	2	2	1	0	0
3. Analysing an entity	2	2	1	0	0
4. Additional facets	1	2	2	1	0
5. Restructuring around a new facet	1	1	2	1	0
6. Scope definition	3	1	1	0	0
Total	12	10	7	2	0

Table 8.5: Expert panel - results of ease of use questions

There was a free format text box available to participants to convey their comments on ease of use, which two experts made use of. One expert said that a visual representation in the form of the diagram with example values in it would be useful. A second expert said that they had to repeat themselves a few times due to the comprehensiveness of the taxonomy. The reason for that being that the taxonomy was designed for use with practice that produced individual video feedback, and this particular expert was used to creating generic feedback: a single video distributed to the whole cohort.

8.6.2 Step 10: Relate results to the success criteria

Each of the success criteria set out in Table 8.2 are examined here and the extent of the success achieved is discussed.

Criterion of Concision

Rule: At least one object classified under every characteristic of every facet. None are redundant or repeated.

Evaluation of success criteria: Every expert managed to enter characteristic details for every taxonomy facet. Only one expert found some repetition, and this was because in their practice they produced generic feedback, rather than individual feedback.

Criterion of Robustness

Rule: Contains enough facets and characteristics to clearly differentiate objects of interest.

Evaluation of success criteria: The purpose of the Study section of the taxonomy set is to identify the study or practice recorded in the taxonomy. No suggestions were made to change this section. When explicitly asked, none of the experts suggested additional facets for any purpose, including identification of entities.

Criterion of Comprehensiveness

Rule: Classifies all known objects within the domain of video feedback in practice.

Evaluation of success criteria: When explicitly asked, none of the experts suggested additional facets for any purpose and managed to classify all objects presented to them.

Criterion of being Expandable

Rule: Easy to add/remove facets for new types of objects

Evaluation of success criteria: Experts were asked to comment on any additional practice details or perceptions they would like to contribute, but have no appropriate facet to classify these under. However, none of the experts suggested additional facets for any purpose.

Criterion of being Explanatory

Rule: Provides useful explanations of the nature of the objects, without describing every detail.

Evaluation of success criteria: Experts were asked to form an explanatory sentence by choosing descriptors from the appropriate facets to form a string (Kwasnik 1999, p.40). The string formed about a pottery vase used by Kwasnik (1999) was provided as a useful example to experts. All the experts managed to create an explanatory string from the data available. Two provided a set of facets they would use as a template to form one to identify each study.

Criterion of Ease of Use

Rule: There must be a balance of simplicity and meaning. Requires little or no training to use.

Evaluation of success criteria: Expert responses to direct questions regarding how easy they felt the taxonomy set is to use were largely positive. Only one negative response was reported, which was in response to the difficulty of expanding the taxonomy. This may have been caused by the lack of ideas experts had for additional facets with which to expand the taxonomy, rather than difficulty with the process itself.

Criterion of Limited Scope

Rule: Includes implementation details of the system/subsystem directly related to the production and distribution of video feedback, but exclude, for instance, non related parts of the VLE. Includes class demographics, context details and perceptions of stakeholders.

Evaluation of success criteria: Experts were offered 28 examples of context details and 8 examples of perceptions and asked if they believe they are within the scope of the taxonomy set. Four out of five experts managed to classify every single one of the 8 perceptions. The last expert made the same entry for every single one, and its suspected therefore, that they ran out of time. All the experts managed to classify the 28 aspects which may be considered part of the system, as 'inside' or 'outside' the scope of the taxonomy, apart from five that were skipped, and only two which were classified as 'Not sure'. This means experts identified 95% of what they believed to be the scope of taxonomy should be.

The question then is how does the scope of the taxonomy as defined by the experts match the scope of the taxonomy as it stands in its current form? All the aspects which experts agree should be included in the taxonomy are already included, except one, which is the assessment feedback turnaround policy of the institution. This is the document most HE institutions have in place which defines a policy of maximum duration between submission deadline and return of marks and feedback. Since these are so commonly found and usually around 3-4 weeks, it is unclear what useful information this will add. However, should these policies begin to change and there is variety across the sector it may be worth incorporating this into the taxonomy.

Other things included by experts are again, clearly part of the system, but have so little variety that it is not clear how useful it would be to include them e.g.: Headset and microphone used when recording the video. Since most headsets consist of earphones and a microphone, unless some additional functionality becomes common place there seems little point in noting the type used.

The experts did not agree wholeheartedly about any of the 28 aspects being external to the taxonomy. For each aspect, at least one expert decided it was within the scope of the taxonomy. Yet 6 of the aspects are considered outside of the scope of the taxonomy in its current format by the researcher.

1. Home page of the VLE
2. Section of VLE where student reviews marks
3. Feedback review page for a specific student
4. Device student watches feedback on
5. Students submitted work
6. Software used to demonstrate learning points

These are all things that are not used in the video feedback production or distribution process, e.g.: Home page of the VLE and the device student watches feedback on; are merely the connection between the VLE and the process e.g.: Feedback review page for a specific student; tools for showing student work as content e.g.: Software used to demonstrate learning points or the work itself.

Criterion of Consistency Rule: Consistent use of terms.
Evaluation of success criteria: None of the experts commented on inconsistency of terms, or on misunderstanding because of terms used. In fact, the positive ease of use

responses reflect a high level of understanding and therefore, likely consistent use of terms.

Criterion of being Understandable Rule: Terms used should be those commonly used in practice.
Evaluation of success criteria: None of the experts commented on a lack of understanding. The 'ease of use' questions received largely positive responses. However, the free format text area for 'ease of use' comments offered one suggestion for additional examples, which may be interpreted as a requirement for greater clarity.

8.6.3 Criterion of being Verifiable

Rule: Taxonomies are assessed against their objectives to determine their usefulness.
Evaluation of success criteria: The condition explained for this criteria is that it is possible to perform this type of validation exercise, which it clearly is. The validation of each criterion is summarised here.

- **Criterion of Concision** All of the facets are useful in that when given a scenario, it is possible to classify the data. It was not possible to validate that the data could be extracted without more data being classified into the taxonomy prior to the start of the exercise. If the taxonomy is used to classify a practice where generic feedback is used some facets may be considered duplicated or unnecessary.

- **Criterion of Robustness** No suggestions were made for any additional facets or any other means of improving identification of entities.

- **Criterion of Comprehensiveness**
  None of the experts had an requirement for additional facets.

- **Criterion of being Expandable**
  None of the experts had an requirement for additional facets, therefore this criterion was not explicitly validated.

- **Criterion of being Explanatory**
  Experts constructed phrases and sentences which enough to explain the nature of objects classified within it.

- **Criterion of Ease of Use**
  Experts were directly asked how easy they felt the taxonomy set is to use, in relation to the exercises completed. Most responses were positive.

- **Criterion of Limited Scope**

  The aspects included in the scope of the current version of the taxonomy largely agreed with the aspects within scope according to the experts. Only items which were very similar fell outside of the scope employed for the taxonomy. These items had been excluded in the interests of concision.

- **Criterion of Consistency**

  Consistency of terms was never explicitly validated, but was implied by the positive responses to 'ease of use' questions.

- **Criterion of being Understandable**

  Understand-ability was never explicitly validated, but the experts were able to complete all of the tasks.

All of the criterion were validated to some extent, although consistency and being understandable were not explicitly validated. Evidence was provided to validate all other criterion. Therefore, the taxonomy of video feedback is verifiable.

8.6.4 Step 11: Discuss strengths and weaknesses

The Taxonomy Of Video Feedback has been validated by an expert panel and this has been helpful in identifying the strengths and weaknesses of the taxonomy. The variety of expertise applied during this exercise adds rigour to the results. It is a particularly valuable exercise as it adds objectivity, which had not been available up to this point in the work.

The validation exercise itself was not queried in terms of understanding or relevance, during either the pilot run of the exercise, or when the exercise went live with the expert panellists.

There is relatively strong agreement that the taxonomy of video feedback is usable in practice. The ability to classify the characteristics of practice into the taxonomy has been proven feasible and even usually regarded as easy to do. It is possible to use the classified characteristics to summarily explain the context of the practice. The lack of additional suggestions for facets from experts is implicit validation of the taxonomy being *"extremely comprehensive"*, as one expert said.

There is a lot of agreement regarding the scope of the taxonomy except for the addition by experts of items which had been disregarded as unnecessary in the interests of ensuring the taxonomy is concise. The reason for these items being disregarded is either because: -

- they are common and similar in function or properties e.g.: microphone used to create videos, institution assessment returns policy,
- many facets would have to be developed to cover all eventualities, many of which would rarely be used e.g.: different types of documents related to assessments. Instead a single facet has been made available to enter the details free format rather than a facet for each type of document.

Both resolutions were employed in the interest of preventing the size of the taxonomy of video feedback from becoming overwhelming.

It was considered very important not to overwhelm experts by making the expert panel exercise too long. Therefore, two potential exercises were not implemented. For instance,to test the ease of use of the removal of a facet would mean inventing facets, which might be regarded as superficial or trivial, and likely obvious to the experts. Instead, one of the tasks was the addition of a new facet, to test the ease of use when altering the taxonomy structure. Unfortunately, since none of our experts could think of an additional facet none completed that exercise. Although this confirms the comprehensive quality of the taxonomy it does not validate the ease of future development. It is possible that the terms used, and the consistency of terms used may be queried at some point in the future since they were not explicitly validated by this exercise. However, if problems had occurred with terms it is likely that they would have been reflected in the many opportunities to comment during this exercise. In addition, since the terms used originated in literature this scenario is unlikely.

8.7 Conclusions drawn from the Expert Panel

The Expert Panel exercise was very valuable in that it brought a fresh perspective to the work. The attitude of the experts was simultaneously supportive and objective. Their opinions highlighted the strengths and weaknesses of the taxonomy. Clearly bias is created by having the same researcher design the questionnaire as has completed the development up til now, as the questions likely channel a particular way of thinking.

This bias was demonstrated when the results from one of the experts required clarification. One of the experts commented on repetition of some data in some facets. On further examination it turned out that their format of video feedback used by that expert, is to present students with model answers intended for viewing by the whole cohort. In other words, it is not individual but 'generic' in the same way as studies by Crook et al. (2010, 2012) and Gomez (2010).

The taxonomy of video feedback was validated as:-

- Concise, since experts were not overwhelmed
- Robust, since experts managed to classify examples of practice where some facets were similar
- Comprehensive, as no additional facets were required
- Explanatory, since all experts were able to write, or define, a string to describe the entity
- Easy to use, in a variety of ways
- Having limited scope

All of these criteria were generally agreed upon. This leaves the criteria of being understandable, and having consistent use of terms. Although not explicitly validated there were no comments regarding understanding, or queries from any of the panellists. Finally, despite attempting to validate the criterion of being expandable, it seems success at being comprehensive prevented its validation at this point in time.

Experts were clearly able to use the taxonomy of video feedback for the purpose for which it was intended: the classification of information regarding practice and the perceptions of stakeholders. There is every reason to believe that it can be developed in future to suit new media formats and practice scenarios.

8.8 Conclusions of Validation

The conclusions of the utilisation validation exercises suggest that the *'Willingness'* facet of the Perceptions Taxonomy may not be as useful as first thought since the only thing that has been found to classify into it are comments regarding the enthusiasm of the researcher to trial video feedback. These types of comments are likely to be common to all studies that are classified. These findings were taken into consideration with the results from the Staff Reports (see Section 7.6.3), where two members of staff had opposing opinions regarding specificity. One member of staff regarded specificity as a benefit, whilst the other regarded it as a criticism. It is possible to record both findings by duplicating points regarding specificity in to both facets. An alternative is to present both points together, (which would likely be more useful), under a facet which allows classification of points which do not fit into the *'Benefit'* and *'Criticism'* facets. Therefore, there is a requirement for a facet allowing for the classification of *'Other findings'*.

The Expert Panel findings suggest an additional facet for consideration: intended size of the audience for each feedback video. This study was originally intended to only deal with practices where feedback videos were delivered to individual students. The tendency has been therefore, to ignore other potential sizes of audiences per video. However, this limits the use and comprehensive quality of the taxonomy. Assumptions about this detail can result in strange interpretations of the classified results. This was demonstrated when the classified results of a member of the expert panel who had experience producing 'generic' video feedback (a single feedback video returned to the class or cohort), required clarification. This would have been unnecessary if the audience size had been recorded. Therefore, an additional facet will be added to the *'Distribution'* group of facets named *'Audience size'*.

The validation exercise resulted in two minor changes to the taxonomy which can be seen in Figure 8.3. These were brought about by the objective perspective of the expert panel, and the synthesisation of the findings from the utilisation exercises. These are small changes and neither alteration is likely to negatively impact the usefulness of the taxonomy.

The resources of this study are exhausted. The opinion of experts have been sought and iterations of utilisation across several academic years have taken place. This version of the taxonomy could be re-validated before release but that process could go on forever. The taxonomy has met the ending conditions for development (Nickerson et al. 2013), and must now evolve by utilisation. Nickerson et al. (2013) wisely said that they wanted to create *"useful taxonomies"* because the perfect taxonomy cannot be defined, and is likely to be a *"moving target"*, which changes over time.

Figure 8.3: Taxonomy Version 7

Chapter 9

Final Discussion and Future Work

9.1 Introduction

This research was originally motivated by the lack of engagement with feedback, by first year students studying programming on undergraduate computing degrees. The staff could see that they were writing the same comments for the same students week after week. Students have very little time where staff are focused solely on their work. The majority of that time consists of the marking of assessments and feedback provision. Feedback is an opportunity for learning, which at this time, is very much under utilised. The original idea was to motivate engagement with feedback by a move towards the media formats increasingly chosen by students for entertainment and social interaction, rather than sticking to the tradition of the written word as feedback.

Even though there has been an increase in the use of technology in classrooms, assessment feedback is still largely delivered as text, and students are expected to understand it and learn from it on their own, or to have the courage to go to staff for clarification. Therefore, despite the complaints from staff of non attendance at taught sessions the expectations are contradictory for assessments. Students are expected to behave as distance learners with no requirement to acknowledge receipt or validate understanding, when they review feedback. Only the most independent and capable of learners can thrive in such an environment. To improve student engagement staff must make learning from feedback as accessible as possible.

9.2 Addressing the research questions

The primary aim of this research was to analyse student and staff perceptions of video feedback, and use the results to inform best practice. Thus ensuring the way forward towards a positive learning experience for students. However, early on during the reading of publications regarding video feedback, the sizeable variety of contexts for practice, and the range of staff perspectives on what suited their students, was clear. Therefore, it was determined that a more useful strategy would be to provide a means of facilitating informed choices by staff.

The development of the taxonomy of video feedback would enable the documenting of system selection and its use, along with the impact of those choices on student experience. This would provide evidence on which to base decisions regarding best practice within the constraints of practice contexts. To this end, a set of discrete research questions were identified.

Q1) To what extent is it feasible to use video feedback in normal practice to provide individual feedback to normally large cohorts of students as a response to assessment?

The work began with the researcher working alone, providing feedback as audio, as had been done by others before (Cryer and Kaikumba 1987; Carless 2006; Nortcliffe and Middleton 2007; Dagen et al. 2008; King et al. 2008; Merry and Orsmond 2008; Rotheram 2008; Ekinsmyth 2010; Evans and Palacios 2010; Lunt and Curran 2010; McGarvey and Haxton 2011; Rodway-Dyer et al. 2011; Durkacz and Mowat 2012; Starbuck and Craddock 2012; Gould and Day 2013; Cann 2014; Carruthers et al. 2014a,b; Chew 2014; Hennessy and Forrester 2014; Fawcett and Oldfield 2016). At the time it was not possible to use video, because resources for providing video as feedback in the quantity required for every day practice was not feasible, in terms of both sufficient quality to record programming code on a screen and make it readable in playback, and the availability of sufficient storage space. Audio, with lower resource requirements, was a means to progress towards using video.

The marking team came on board with the idea after a number of academic years of lone researcher experimentation with video feedback for samples of students. This happened to coincide with the availability of technology which made the implementation of video feedback in practice feasible. This was facilitated through the adoption of Panopto (Panopto 2018) with storage as a cloud service. Although designed as a tool for production of learning materials, it provided partial functional integration into the Brightspace (D2L Corporation 2014) VLE feedback area.

The feasibility of video feedback for normally large cohorts of students is evidenced by several publications (Marriott and Lim Keong 2012; Borup et al. 2015; Henderson and Phillips 2015; West and Turner 2016) and the case study in Chapter 7. Video feedback was returned to all the students for several cohorts of first year computing, by the same marking team that had previously provided feedback as text, within the same time frame.

Although some staff are still concerned about the ease of use of systems it is anticipated that over time the production and distribution processes will become less cumbersome, because the technology will evolve from the piecemeal set of systems doing a job they were not designed for, to providing a more streamlined solution.

Q2) What evidence is there of how the attributes of the system used to produce and distribute video feedback, and the style of the production, impact the perceptions of students and staff?

Originally evidence came from reviewing the literature (see Chapter 3). The studies in Chapters 5, 6 and 7 both supported and progressed understanding. The synthesisation of the information available demonstrated how details of implementation impacted the perceptions of students.

It is clear that the tone and presentation style of the marker is the most influential factor on student perceptions. Staff find the introduction to video feedback a steep learning curve and the systems can be difficult to use, but they deal with it the best way they can in order to benefit students. With practice, markers need to pay less attention to how to use the system, and find it easier to focus on their presentation style. Where staff are comfortable using video feedback, they make good use of the additional means of expression. This lifts the burden of the task to a level where they can feel they are doing a good job and they prefer it (Orlando 2016), because they can more effectively express themselves in a similar way to a face to face meeting. Video content is more likely to be interpreted as intended (Gomez 2010; McDowell 2011; Séror 2012; Hyde 2013) , where as text is commonly misinterpreted in a more negative way than the marker intended (Jones et al. 2012; Brereton and Dunne 2016).

On the whole, students enjoy the personalisation (Marriott and Lim Keong 2012, p.595; Séror 2012; Turner and West 2013; Henderson and Phillips 2015; Orlando 2016; West and Turner 2016) , although it is possible to be too personal. For instance, there are arguments for and against the inclusion of the markers face on screen (Mayhew 2016).

The student interviews conducted as part of this work clarified that students are happy to see the marker on screen if, and only if, there is a good reason. For example, to enable an explanation or demonstration. However, just to see them on screen narrating the feedback as a general rule was considered too personal and potentially intimidating.

Time pressures are reduced by vocalising the narrative, rather than writing it, allowing room for supportive messages that would otherwise be omitted (Borup et al. 2015). Students recognise the improvement in the depth and detail of the learning message, also facilitated by taking less time to talk than to type (Jones et al. 2012; Hyde 2013; Brereton and Dunne 2016; Mayhew 2016)

When work is poor, staff often find ways to soften the blow (Jones et al. 2012). They can point out that they understand where and why things went wrong and encourage students to put it down to experience. Consequently, students feel their effort is appreciated, even when results are not so good. Positive spins are more likely to be used in many circumstances (Thomas et al. 2017) where the expression of such would have taken too long in text. However, staff whose tone is not positive for whatever reason, cannot hide their discomfort or displeasure. If work is unacceptable the expression of disapproval may be too strong for the student to cope with (McDowell 2012b), and therefore staff need to be aware of their tone.

The implementation details of the production and distribution system are less important than the style and mood of the presenter. There are a number of specific things to consider regarding the implementation of a system for video feedback, which will impact the presenters state of mind, such as the level of confidence with the video marking system, and ease of use of the system. However, if the presenter is comfortable and confident using the system and they take regular breaks, they are more likely to convey a positive message through video. In that way the details of implementation have a significant, albeit indirect, influence over the message conveyed to students.

Q3) Based on evidence, can a taxonomy be developed with a view to enabling informed decisions by staff about their own video feedback production and distribution systems?

The themes identified in literature during the review process through thematic analysis (Braun and Clarke 2006) (see Chapter 3), formed the basis of the taxonomy. The development method began with the selection of a faceted taxonomy structure (Kwasnik

1999). The development method was derived from a combination of methods by Nickerson et al. (2013) and Usman et al. (2017), both of which provided empirical evidence of their previous success (see Chapter2). Several iterations of development were required to transform the results of the thematic analysis in to an artefact satisfying the ending conditions of the development method (Nickerson et al. 2013) (see Chapter 4). The validation of the taxonomy provides evidence of its usefulness (see Chapter 8).

All of the aspects of systems considered significant by authors in literature, and those determined by examining the three cases studies conducted here, are included as facets of the Taxonomy of Video Feedback, developed to enable informed decisions by staff about their own video feedback production and distribution systems.

Q4) To what extent can the taxonomy developed be validated by application to video feedback in practice?

The Taxonomy of Video Feedback was then validated, by utilisation using three case studies, and an expert panel (see Chapter 8).

The results of the case studies were classified into the taxonomy and used to feedforward any essential points motivating updates from one study to the next, revising the taxonomy where necessary. At the end of the process the current version of the taxonomy was used as the basis of the expert panel exercise.

The methods used for the development of the expert panel exercise and the recruitment of panellists were derived from work by Beecham et al. (2005) and Knol et al. (2010), and is summarised in Figure 8.2. The expert panel applied the taxonomy to their own practice in a validation exercise in order to move the taxonomy from a single researcher biased opinion to an objective shared consensus. The validation was deemed complete when the success criteria (see Table 8.2) was reached.

The validation resulted in the seventh version of the Taxonomy of Video Feedback (see Figure 8.3). The next step is to disseminate the taxonomy by publication and to openly and objectively, accept and analyse any returning feedback.

There are currently two intended routes to dissemination of the Taxonomy of Video Feedback: -

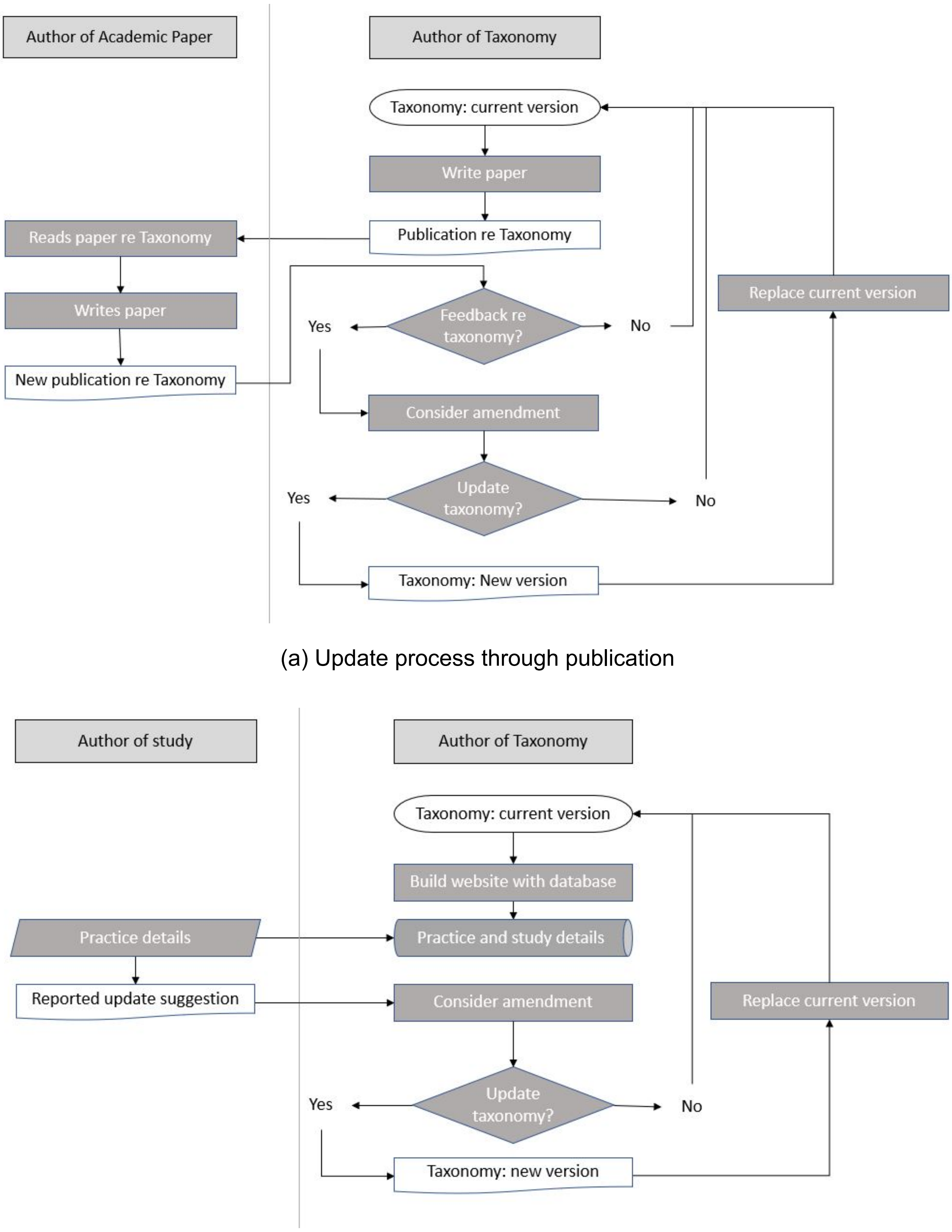
- Publication regarding the Taxonomy
- A Taxonomy of Video Feedback website

Publishing the Taxonomy of Video Feedback is discussed in Section 9.4.4, and the development of a website is discussed in Section 9.4.5. Once published the validation process must continue to maintain the taxonomy's usefulness. Therefore, in addition to direct communications to the author, there must be channels through which amendments to the taxonomy may be received for consideration, whether suggested or implied. Potential processes for suggested amendment evaluation are shown in Figures 9.1a and 9.1b.

Q5) To what extent are the reported positive perceptions of video feedback enabled by the video as a media, rather than attributes that can be found in other media formats?

The visual display of student work could be reducing the cognitive load compared to text or audio feedback, or a view of the marker alone. The student must simultaneously follow their work in a second channel to make sense of it when it is not included in the feedback. Working memory does not have to hold on to concepts whilst awaiting delivery of other information, when the work is available on screen (Mayer and Moreno 2003). When students are asked about what they found particularly useful about video as feedback many remark on the value of being able to 'see' the work on screen (Mayhew 2016). When Henderson and Phillips (2015) showed only the marker on screen, anticipating making the most of non-verbal communication, students complained about lack of reference to the work.

Sections in the two case studies regarding video as feedback (see Sections 6.3.1 and 7.6.1), refer explicitly to findings regarding the visual aspects of the video. Students appreciated being able to see another person making changes and to re-run their code so that they can see the difference. Most taught subjects use assessment submissions which are 'visual' in nature. Even music students submit compositions in musical notation and written work. Therefore, it seems natural and appropriate to respond in a similar way. For example, demonstrating programming code in response to programming code as a submission. Sharing a visual experience is reassuring in that if someone shows you what they saw, you know you are discussing the same thing. A natural and informal response to that shared experience, e.g.: talking about it, builds rapport. Where as a formal response e.g.: one that has been deliberately restructured



(a) Update process through publication

(b) Update process through report to the website

Figure 9.1: Potential processes for receiving update requests for the Taxonomy of Video Feedback following publication

from the natural response into text, does not have the same positive contribution to relationships and consequently, to student learning.

9.3 Contribution

Locally, this work has contributed significantly to the benefits of video feedback being highlighted. A teaching team was persuaded to take on the new media to make this work possible. As a result students who participated regularly reported back through the Student Forum that they like receiving video feedback. The centre for Fusion Learning, Innovation and Excellence (FLIE) at Bournemouth University, have produced a Digital Pedagogies Framework (Bournemouth University 2020), positioning video feedback as an indicator of gold standard in online and blended teaching. In addition a tutorial on how to produce video feedback, created to help the teaching team participating in this work, has been made available as part of the FLIE resources for academics.

In a wider context, this work makes a useful and robust contribution to the use of video feedback as a response to assessment feedback, in computing in particular, and to understanding assessment feedback in general. From this a tool has been developed to enable informed choices by practitioners in education around the world, and in any discipline.

The Taxonomy of Video Feedback is now in a useful state, ready for utilisation and evolution. It has been proven fit for purpose and is regarded as such by experts. The tools for its use are in a state of partial development having been created for use by the expert panel, such as the validation exercise documentation, explaining and enabling the use of the taxonomy as a means of classifying the findings of studies. Once the taxonomy is published it has the potential to inform and enable staff decisions regarding assessment feedback in any context. There is a lot of potential for the development of this work, however, it must be understood that this is only the foundation on which the future work must build for it to reach its potential.

9.4 Direct Extensions of the Study

The taxonomy of video feedback, and the process of its development, will be reworked into publications that will all be available to tell the complete story, to provide understanding of where it came from, as well as how it can be used.

9.4.1 Literature Review

The literature review (see Chapter 3) on which the taxonomy is based synthesises a wide set of experiences from practitioners who bring video feedback to the real world. There are only a small number of other literature reviews available regarding video feedback. This one may form the basis for a publication on the development of the taxonomy as well as standing alone.

9.4.2 Development of the Taxonomy of Video Feedback

The taxonomy development process was formed as a hybrid of the work of three other validated methods (see Chapter 4). The original methods were clarified by making implicit suggestions in the original works into explicit steps in this study. By combining rigorously tested methods of development, a robust method for taxonomy development was implemented, and validated by utilisation in this work, which can also be included in publications.

9.4.3 Studies of video feedback in practice

Two of the studies in this work have already been published. The study of audio feedback (see Chapter 5) has been published (Atfield-Cutts and Jeary 2013). Some of the findings regarding video feedback (see Chapter 6 and 7) were also published (Atfield-Cutts et al. 2016), but based solely on the survey findings, and before those findings were complete. This could now be augmented with additional survey findings, staff reports, student interviews, and the investigation of the statistics from the Panopto production and distribution platform (2018), for a richer report.

9.4.4 Taxonomy of Video Feedback

Potentially the most useful contribution would be to guide academics in the use of the taxonomy to enable best choices for them and for their students.

The facets of the taxonomy itself can be reformed, and used as a checklist of items to consider when implementing a system to produce and distribute video feedback. This would encourage staff to consider all aspects, particularly the less obvious ones, such as storage space for videos. Staff would be able to set up a system based on evidence of previously successful studies.

Guidance can be found in the case studies, which are examples of how a system can successfully be implemented with high student numbers. How they are conducted is available in detail for reference (see Chapters 6 and 7).

The method used to validate the taxonomy (see Chapter 8) can be disseminated. It has a robust foundation of previously tested validation methods, synthesised into a single process. The combination of different modes of validation, such as utilisation, expert panel, and case studies, gives depth and rigour to the findings.

However, in the format of published papers the taxonomy can only really guide academics towards a solution of their own based on the literature review and the studies completed here. Technology moves quicker than it used to, and in that way the information provided could age quickly and become irrelevant, causing the taxonomy to be dismissed. The taxonomy must evolve with technology and teaching practises. In publication, its development would rely entirely on the long process of other researchers referring to it in their work and making alterations as required. That is how progress is normally made in academic research after all. However, there is the potential for processing changes faster to enable the taxonomy evolution to keep pace with the real world, by implementation of a website.

9.4.5 Taxonomy of Video Feedback website

The Taxonomy of Video Feedback can only really be useful if academics have access to it. The obvious way to convey the information is through publication. However, if a tool was built to enable ease of use for academics it is more likely to help academics in the way it is intended to. Currently, the best way to make such a tool widely available is online. Academics are inundated with emails about websites and advice online and it would be only one amongst many tools available to them. However, the reason for the popularity of deployment on the internet is because it is the most accessible means of distribution, and as such, academics are used to using tools implemented in this way. A website can be updated faster than publications can be approved, published and disseminated. That means it can be updated with new results by practitioners all the time. Therefore, to make the Taxonomy of Video Feedback relevant to the research community on a daily basis, as a tool for enabling informed decision making, it would be developed as an interactive website supported by a database containing the characteristics of studies and practices.

The website should be based on a database of characteristics regarding studies and practices using video feedback. Groups of facets of the taxonomy would be implemented as tables. Individual facets would be implemented as attributes.

Envisioned website functionality

There several situations where the website functionality could provide guidance and support others in their research to promote the use of video feedback. These include: -

- Guidance to staff who are new to video feedback provision
- Enable analysis of the impact of video feedback on regularly identified groups of students
- Encourage recording of all findings regardless of significance in a single study
- Enable researchers to add their own study or practice details into the database
- Researchers suggest updates to the taxonomy as the format evolves
- Dissemination of publications and resources regarding video feedback

Guidance for staff who are new to video feedback provision

Academics who have never attempted to provide video as feedback before would be able to read the findings of others and implement their video feedback system on a sound footing, preventing repetition of mistakes.

From an academic's perspective, when considering their own practice, some of the characteristics of the taxonomy would be immutable. For example, an academic is unlikely to be able to change the subject they teach, the number of students in the cohort for the year, or the academic level of the students. If in a particular practice context, the first year students being taught number approximately 300 and are studying biology, the studies can be narrowed down by those criteria. A practitioner who wants to determine the best recording source to use can examine the recording sources used by others teaching biology in similar circumstances. They can also examine the perceptions of those students as reported in those studies, to see what they think of their feedback. It could be that reviewing the perceptions in other studies and practices reveals that although the majority of practitioners are using screencasts, students also responded positively to the use of a camera to explain anatomy using a 3D model. Therefore, a practitioner new to video feedback can choose their preferred recording source and method of delivery with confidence.

There are other facets where the characteristics might be limited by resources or circumstance. Therefore, academics are likely to want to see the findings of studies where those characteristics match their own. To fulfil this need there would be a means of selecting the characteristics of each of the facets in the Context taxonomy. This would then filter the complete list of studies and practices down to a short list. It would then also be possible to: -

- View the other facets of the Context taxonomy for each study or practice
- View the related Perceptions Taxonomy content for each study or practice
- Link through to the original publications

By enabling such functionality academics can view the perceptions of study participants and by comparing the context and related perceptions they can make informed decisions about what would work best for their teaching team and their students.

Enable analysis of the impact of video feedback on regularly identified groups of students

Some of the regularly identified groups of students include those with additional learning needs, foreign students who are not fluent in the native language, and mature students. Video feedback may help or hinder students, and other student groups with shared attributes or circumstances. However, the numbers of students in each study who both have, and are willing to disclose these and similar attributes are normally low. By synthesising data from multiple studies we make it possible for work to commence on helping these groups specifically. The 'diversity' facet is the key to this. Searching for key words on the characteristics it contains would make possible to filter out publications reporting on a particular attribute. The resulting short list of publications can be examined for student perceptions. The weight of many publications may produce strong evidence from across a global community of researchers that was previously dismissed as an insignificant number of cases in a single study, or even not reported at all.

Encourage the recording of all findings

When completing the literature review (see Chapter 3) there were examples found where information was incomplete or missing. Often this was because numbers of participants in subgroups were considered insignificant by the researcher. The presentation of all the facets considered by researchers collectively to be of some significance may encourage researchers to include the information they may otherwise exclude from publication. If they decide such information really does not belong in their publication for some reason, they still have the option of including it in an entry recording their practice into the Taxonomy of Video Feedback on the website.

Enable researchers to add their own study or practice details into the database

Any researcher or academic would be able to enter the details of their own study or practice in to the database, ensuring accuracy, and reducing the potential for misinterpretation. The process for this has already been designed. Exercise 1 of the Expert Panel Exercise (see Section 8.4 and Appendix H.1) is already available and has proven its usefulness in collecting data for this purpose. Even if papers are published exclusively elsewhere, where conditions of publication allow, the details of the study can be classified into the taxonomy facilitating immediacy for practitioners.

Researchers suggest updates to the taxonomy as the format evolves

The video format is evolving. Panopto (2018) already enables embedding of other media within it, such as the survey embedded in the video feedback in one of the case studies in this work (see Chapter 7). As things progress certain built in functionality will become common place and identifiable as advantageous to the provision of feedback. When that happens researchers should be able to suggest new facets, or the removal of unnecessary ones, to allow the taxonomy to evolve with the media. When progress is such that the current format of the taxonomy can no longer accommodate the required details any more and the need for a new version of the taxonomy is clear, a new version can be developed, validated and published, at exactly the time it is needed, maintaining its relevance to modern practice.

Dissemination of publications and resources regarding video feedback

The website may also prove useful as a place to collect examples, tutorials, suggestions and other resources to help staff producing video feedback. For instance, materials demonstrating how to set up and use a system built from various sets of components and integrated with various VLE's can be developed. During this work a video was developed demonstrating to staff how to create video as feedback in the context of a Brightspace (D2L Corporation 2014) VLE integrated with a Panopto (Panopto 2018) video recording system. Sets of similar guidance materials can be published on the website relevant to all kinds of systems. Discussions and frequently asked questions (FAQ) can also be facilitated for short queries and to direct staff to materials available elsewhere on the site.

Development of the Taxonomy of Video Feedback website

The resources required to build and maintain the Taxonomy of Video Feedback website are: -

- hosted web server
- web developer for implementation
- resources for data input and maintenance

Access to a web server would need to be acquired, and although the development of the website is something that this author already has the skills to do progress might be slow due to other commitments. However, there is also the potential for the development to form the basis of a student project, and for funding to accelerate development progress. Once validated and in a live state, maintenance is likely to consist of: -

- checking and approving forms regarding new publications and practices
- checking and approving new suggested resources
- redevelopment of database in the event of a new version of the taxonomy

The creation of video feedback is likely to become easier in future and therefore its popularity may increase. However, it has been possible for a number of years now and there has not yet been a surge in publications. The relatively low frequency of publications on the topic of video feedback makes this likely to be a low grade burden.

Validation of the Taxonomy of Video Feedback website

The validation of the website could also take place as a set of Expert Panel exercises. Authors of publications would be invited to enter the details of their studies into the website and to review the output produced to determine how it reflected their practice. Staff could take on roles of academics looking for advice on how to produce video feedback and rate their satisfaction with the guidance provided. Once live, the site would constantly require monitoring for feedback from its users to maintain its validity. To keep up with the evolution of teaching practices and media formats a program of future development would need to be maintained.

9.5 Indirect Extensions of the Study

There are a number of options for future work which are not directly related to the taxonomy, but are nonetheless related to the use of video feedback.

9.5.1 Requirements for a video feedback production and distribution system integrated into a VLE

Many academics will want to create video feedback directly from the feedback delivery area of whichever VLE they use. The vendors are moving in the right direction but still systems for recording video have limitations. The most common constraints are time limits on recordings to just a few minutes, or the recording source is limited to the web camera only with no option of a screen cast, which is not useful for recording feedback on electronic assignment submissions.

The systems used to create video feedback during the studies conducted here are far from ideal from a user perspective. For instance, having to go into the attributes of each video file and setting the permissions for viewing for every single one. It only takes a few seconds, but when those few seconds are multiplied up by hundreds of students and multiple submissions there is significant room for process streamlining. This is only one example of poor usability.

Work has begun on collecting requirements for an ideal video feedback subsystem for a VLE (see Appendix I.1), and will be continued. It would be exciting to see contributions from the research community towards such requirements for an ideal system. Publications and availability via the aforementioned website (see Section 9.4.5) would be a useful point for collecting input from academics and providing unbiased open access to those ideas for VLE vendors.

9.5.2 Towards streamlining production of Video Feedback

When recording a set of video feedback for numerous students, as you would in feedback of any format, you find yourself explaining the same things every time you come across another student who has made the same mistake, or not completely understood the same concept.

Sometimes you want to give students a personalised version of their own work with the correction. Other times you want to give an example so that students can apply it themselves and in their own way. You hope that by giving a resolution that they can grasp, students will engage with the feedback, make the correction, and learn from it.

For example in programming there are several different types of loop constructs used to implement repetition of code in execution. When a student has made a poor choice it would be good to have a clip of how to select the right type of loop for the right job, and to be able to drop that into an individual student's video feedback at the right point in the video. When working with loops for the first time many students would benefit from such advice.

In the video editing software Camtasia (Techsmith 2002), (as there may be in other video production packages) there is a panel on screen in which the producer can store video clips and drag them on screen into the video editing area. This concept would be very useful for inserting clips into video feedback. However, in the video editing software this is only available whilst editing the video. What would be ideal when producing video feedback would be to make this available during recording mode.

The process is envisioned as the following steps: -

- The marker is recording the individual student video feedback and comes to the point where they would like to insert a video clip of a common explanation.
- The marker pauses the video recording.
- The marker drags the clip to the timeline of the recording if one is visible, or marks the point of insertion in some other way. The system uses this later to insert the video clip.
- The marker resumes recording and completes production of the video feedback.
- The video production system edits the video at the point indicated and inserts a copy of the clip indicated.
- The marker makes the completed video available to the student in the usual manner.

What makes this process different to currently available functionality is that the system completes the editing process, rather than the marker.

Some video editing software still does not have full editing functionality. The most commonly excluded function is the insertion of a clip in the middle of another piece.

Assuming full editing functionality is available to staff, most would still avoid having to do it if they can. Editing is a task staff presume will take a long time, and many do not have the skills to complete it. The actual editing process does not take long to do when inserting a ready made clip. However, what can take some time is locating the insertion point after recording is completed.

Being able to mark the insertion point of a video clip makes the addition of that clip straightforward enough to see how it would be possible to automate the task in software. The function requires only two parameters: the location of the clip to be inserted and the time of the insertion point. At the time of writing the automation of such functionality is not known to be available in any of the software explored during this work.

9.5.3 Exploration of how students use video feedback

There was a sense of dissatisfaction with the results of the studies in that it had been hoped that students would find some new potential of the new media. It was always thought that as staff, our perspective was less likely to see the new ideas, and creative ways of using the videos produced, but that the students would be more open minded. Moving to using video feedback in practice seemed to make the use of video more ordinary for students, and they seemed less excited about it than they were during the trials. Had this been a more general investigation into the use of video feedback there would have been the potential for exploration of new ways students might use their feedback. This idea was deliberately excluded from this work on the basis of the lack of contribution to the taxonomy development. However, in the future such a study may prove fruitful and very interesting.

9.6 Conclusion

Video feedback has the potential to become the normal mode of feedback delivery as it is currently the preferred student choice. Change takes time, and a move in this direction will be slow, especially since the control lies with staff rather than students. The Taxonomy of Video Feedback will support staff and students by making that change easier. It provides guidance which does not dictate a correct method, but allows staff to make their own decisions. Decisions that they are comfortable with, yet still based on sound evidence. Students will be better placed to reach their potential with each piece of feedback they review, and the student experience will be a more comfortable journey. As a contribution towards making this goal possible, this work is complete. As a contribution towards change in teaching practice, this work has just begun.

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Appendices

Appendix A

Analysis of UK student numbers

A.1 Analysis of Student Numbers across the UK - (HESA 2018)

	Student Numbers			Increase since 2000 (count)			Increase since 2000 (%)		
Academic Year	Post Grad	Under Grad	Total	Post Grad	Under Grad	Total	Post Grad	Under Grad	Total
2000-2001	406,905	1,541,225	1,948,135	0	0	0	0	0	0
2001-2002	427,455	1,615,130	2,042,580	20,550	73,905	94,445	5.05	4.8	4.85
2002-2003	454,190	1,676,920	2,131,110	47,285	135,695	182,975	11.62	8.8	9.39
2003-2004	477,495	1,722,685	2,200,175	70,590	181,460	252,040	17.35	11.77	12.94
2004-2005	482,115	1,753,810	2,235,925	75,210	212,585	287,790	18.48	13.79	14.77
2005-2006	492,755	1,789,025	2,281,780	85,850	247,800	333,645	21.1	16.08	17.13
2006-2007	502,965	1,802,280	2,305,250	96,060	261,055	357,115	23.61	16.94	18.33
2007-2008	501,480	1,804,305	2,305,780	94,575	263,080	357,645	23.24	17.07	18.36
2008-2009	537,160	1,860,425	2,397,585	130,255	319,200	449,450	32.01	20.71	23.07
2009-2010	578,915	1,914,835	2,493,750	172,010	373,610	545,615	42.27	24.24	28.01
2010-2011	**589,070**	1,913,940	**2,503,010**	**182,165**	372,715	**554,875**	**44.77**	24.18	**28.48**
2011-2012	568,490	**1,928,140**	2,496,635	161,585	**386,915**	548,500	39.71	**25.1**	28.16
2012-2013	536,715	1,803,755	2,340,470	129,810	262,530	392,335	31.9	17.03	20.14
2013-2014	539,440	1,759,915	2,299,355	132,535	218,690	351,220	32.57	14.19	18.03
2014-2015	538,185	1,727,895	2,266,075	131,280	186,670	317,940	32.26	12.11	16.32
2015-2016	532,975	1,747,855	2,280,830	126,070	206,630	332,695	30.98	13.41	17.08
2016-2017	551,595	1,766,285	2,317,880	144,690	225,060	369,745	35.56	14.6	18.98

Table A.1: Analysis of Student Numbers across the UK - (HESA 2018) (peak values are highlighted)

A.2 Student numbers across academic years 2000-2001 to 2016-2017 (HESA 2018)

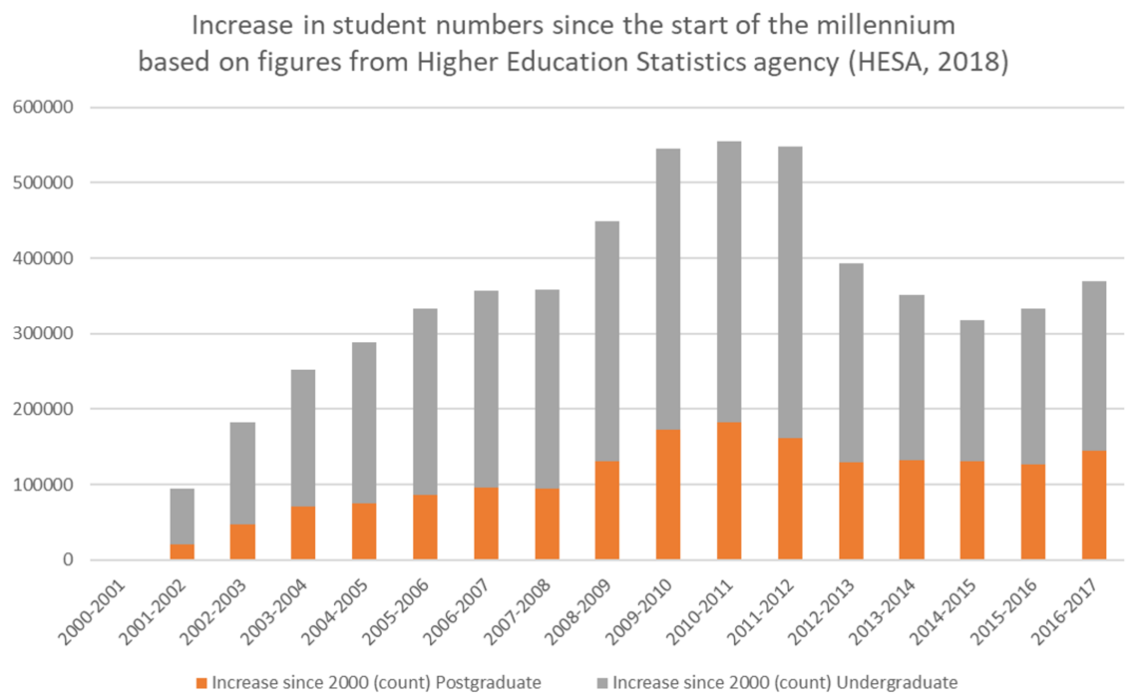

Figure A.1: Student numbers across academic years 2000-2001 to 2016-2017 (HESA 2018)

Appendix B

Literature Review

B.1 Literature returned from research databases

Research Databases	Included in EBSCOhost	Full Text ?
Education		
Academic Search Complete	yes	majority full text
Education Source	yes	majority full text
ERIC	yes	abstract only
Higher Education Empirical Research	no	full text
Research into Higher Education Abstracts	no	abstract only
PsycINFO	yes	some full text
Taylor & Francis eBooks	no	full text
Teacher Reference Center	yes	abstract only
Web of Science	yes	some full text
Computing		
Academic Search Complete	yes	majority full text
ACM Digital Library	yes	majority full text
Apress‘	yes	full text
Books 24x7	yes	full text
Business Source Complete	yes	some full text
Ebrary Academic Complete	yes	full text
Gartner	no	some full text
IEEE Xplore	no	some full text
PsycBOOKS	yes	full text
ScienceDirect	yes	some full text
Scopus	yes	some full text

Table B.1: Literature Review - Databases Searched

B.2 Assessment type and recording source

Author	Year	Subject	Assessment	Source
Cruikshank	1998	Photography	Practical art & design	Camera
Inglis	1998	Photography	Prints as hard copy	Camera
Stannard	2008	English	Written assignment	Screencast
McDowell	2011	Business	Video of presentations	Screencast
Hyde	2012	Professionalism in Diagnostic Radiology	Written assignment	Screencast
Harper et al	2012	Languages - various	Written assignment	Screencast
Hynson	2012	English language	Written assignment	Screencast
Jones et al	2012	Technology or Business Management	Database design	Screencast
Jones et al	2012	Project Management	Written assignment	Screencast
Marriott & Keung	2012	Business Finance	Managing Finance	Screencast
McDowell	2012	Statistical Analysis	Written assignment	Screencast
McDowell	2012	Textile production	Practical: a jacket	Camera
Moore & Filing	2012	Composition & Children's literature	Written assignment	Camera & Screencast
Séror	2012	Languages -written	Written assignment	Screencast
Thompson & Lee	2012	Writing	Written assignment	Screencast
Ghosn-Chelala & Al-Chibani	2013	Writing	Written assignment	Screencast

Table B.2: Study details of assessment type and recording source-part 1 of 2

Author	Year	Subject	Assessment	Source
Schilling	2013	C programming	C source code & report	Screencast
Denton	2014	Teacher training	ePortfolio: composition	Screencast
Borup et al	2015	Teacher training	ePortfolio	Screencast
Klappa	2015	Maths	Maths paper	Screencast
McCarthy	2015	Design Language in Media Arts	Graphic design poster	Screencast
Henderson & Phillips	2015	English	Written Assignment	Camera
Mayhew	2016	British Foreign Defence policy	Written assignment	Screencast
Atfield-Cutts et al	2016	Computer Programming	Java code	Screencast
Brereton & Dunne	2016	Pharmacy, Law and Ethics	Web page	Screencast
Cranny	2016	Sport Exercise and Enterprise	ePortfolio	Screencast
Sprague	2016	Languages	Written assignment	Screencast

Table B.3: Study details of assessment type and recording source-part 2 of 2

B.3 Percentage of students who prefer video feedback

Publication	Percent	Relevant quotations from literature
Gould (2011)	100%	All...would like to see video feedback used on other modules
Jones et al. (2012)	100%	The 119 students also were unanimous in choosing the new (video) over the traditional feedback method.
Schilling (2013)	92%	I prefer video feedback to traditional feedback in computer courses.
Parton (2010)	91.7%	Positive response to all four statements regarding: - 1) ease of understanding 2) beneficial to learning 3) staff concern about performance 4) rapport with staff
McCarthy (2015)	91%	When asked which feedback models they would like to be used in future courses, 91% of students responded positively towards video feedback.
Mayhew (2016)	81%	(81%) said that they would prefer video feedback than written feedback on their next essay
Crook et al. (2010)	80%	80% of the students liked the use of video as a way of receiving feedback
Marriott & Lim Keong(2012)	71.8%	Table ... shows students' preferred methods of receiving feedback from the tutor, with over 71% opting to receive screencast feedback.
Cruikshank (1998)	67%	67 percent of the students indicated that they preferred the use of video to other methods of delivering feedback
West & Turner (2016)	60%+	Over 60% of participants expressed a preference for receiving video feedback, with some students suggesting that its use should be more widespread.

Table B.4: Student preference for video feedback as expressed in literature - the complete table

B.4 Testing Search Strings in EBSCOhost

Search	Search string	English Lang	Peer Rev'd	Full text	No of Articles
Feedback and media type	(assessment feedback OR feedback OR feedforward) AND (screencast* OR video OR *media OR audio OR blended)	no	no	no	85,717
		yes	yes	yes	22,984
Feedback and media and HE	(assessment feedback OR feedback OR feedforward) AND (screencast* OR video OR *media OR audio OR blended) AND HE OR Higher Education OR H.E. OR Universit* OR Undergraduate	no	no	no	29,206
		no	yes	no	24,615
		no	no	yes	24,615
		no	yes	yes	18,846
		yes	no	no	19,695
		yes	no	yes	17,512
		yes	yes	no	14,780
		yes	yes	yes	13,522
Feedback and media and HE and computing	(assessment feedback OR feedback OR feedforward) AND (screencast* OR video OR *media OR audio OR blended) AND (HE OR Higher Education OR H.E. OR Universit*) OR Undergraduate AND Comput*	yes	yes	yes	6,196
	(assessment feedback OR feedback OR feedforward) AND (TI(screencast* OR video OR *media OR audio OR blended))AND (HE OR Higher Education OR H.E. OR Universit*) OR Undergraduate	yes	yes	yes	2,374
Feedback and media in title with HE	TI (assessment feedback OR feedback OR feedforward) AND TI (screencast* OR video OR *media OR audio OR blended) AND (HE OR Higher Education OR H.E.OR Universit* OR Undergraduate)	no	no	no	1,477
		no	no	yes	1,256
		no	yes	no	1,120
		yes	no	no	920
		yes	yes	no	839
		no	yes	yes	1,027
		yes	yes	yes	671
	TI (assessment feedback OR feedback OR feedforward) AND TI (screencast* OR video OR *media OR audio OR blended) AND (HE OR Higher Education OR H.E.OR Universit* OR Undergraduate) With duplicates automatically removed by Ebsco	yes	yes	yes	439

Table B.5: Results of testing search strings in EBSCO Industries, Inc. (2019)

Appendix C

Development of a Taxonomy of Video Feedback

C.1 Maps of classification points between versions of the Taxonomy

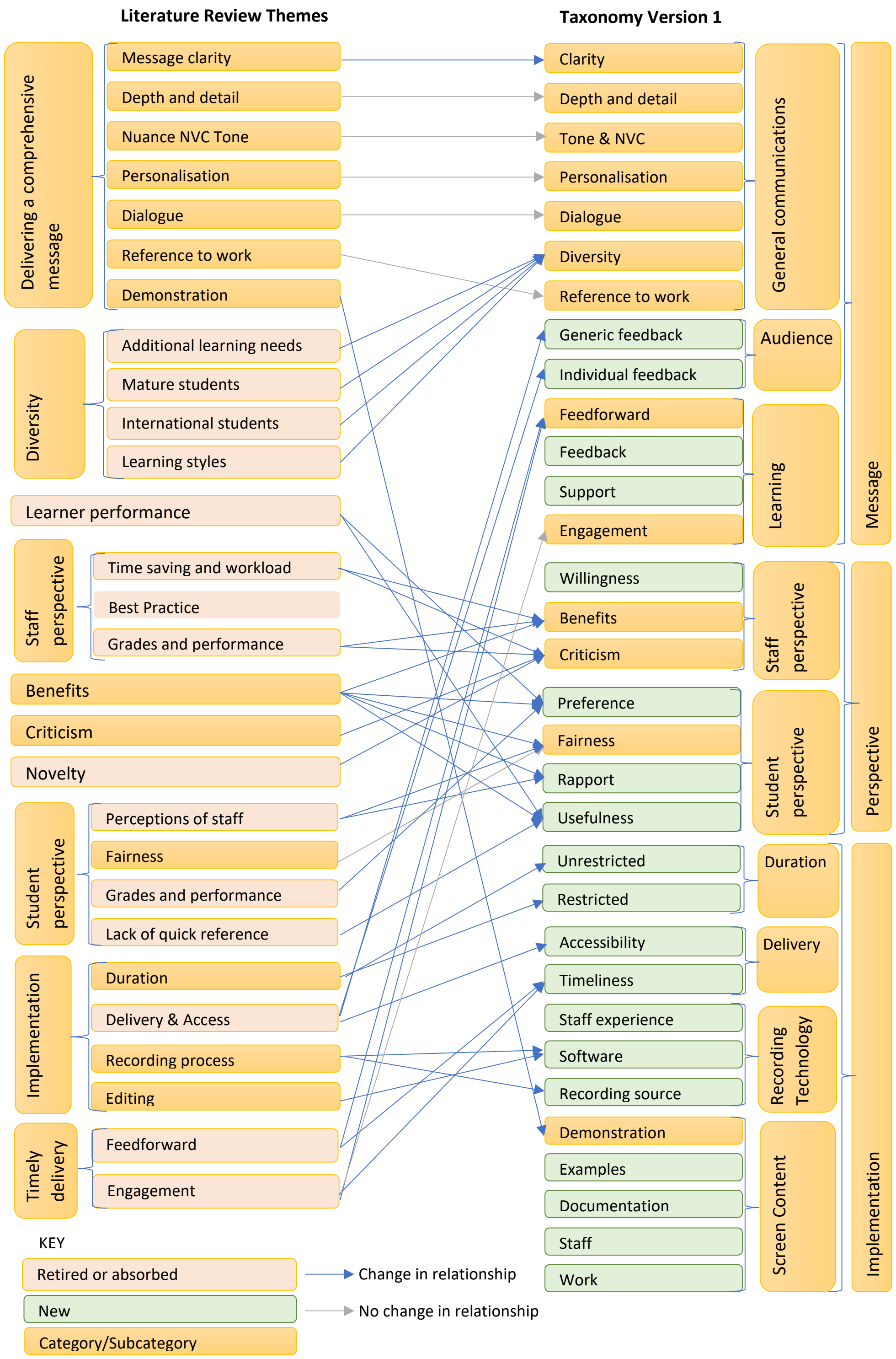

Figure C.1: Mapping of themes from the Literature review to the facets of the first version of the Taxonomy of Video Feedback (version 1)

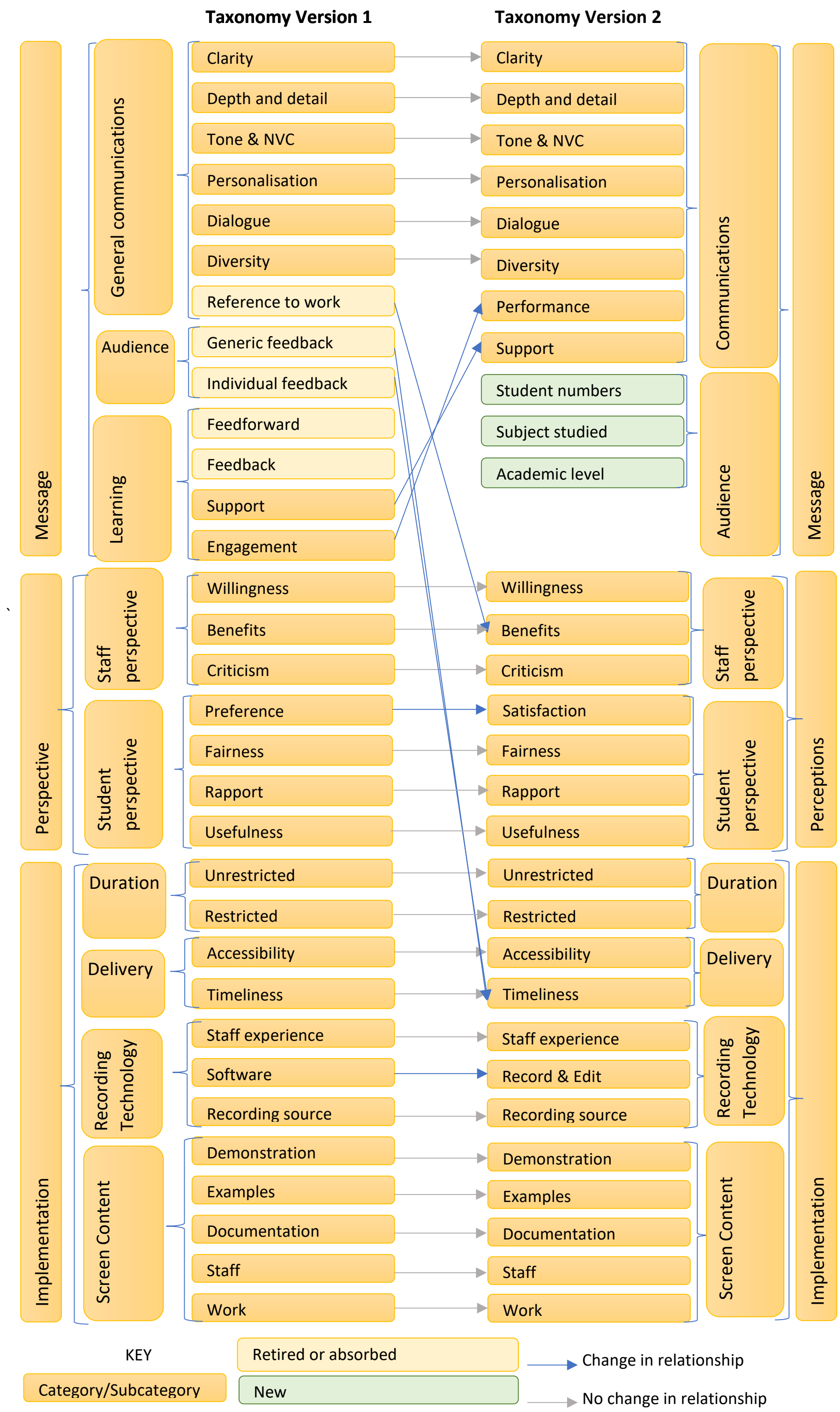

Figure C.2: Mapping of facets from the Taxonomy of Video Feedback version 1 to version 2

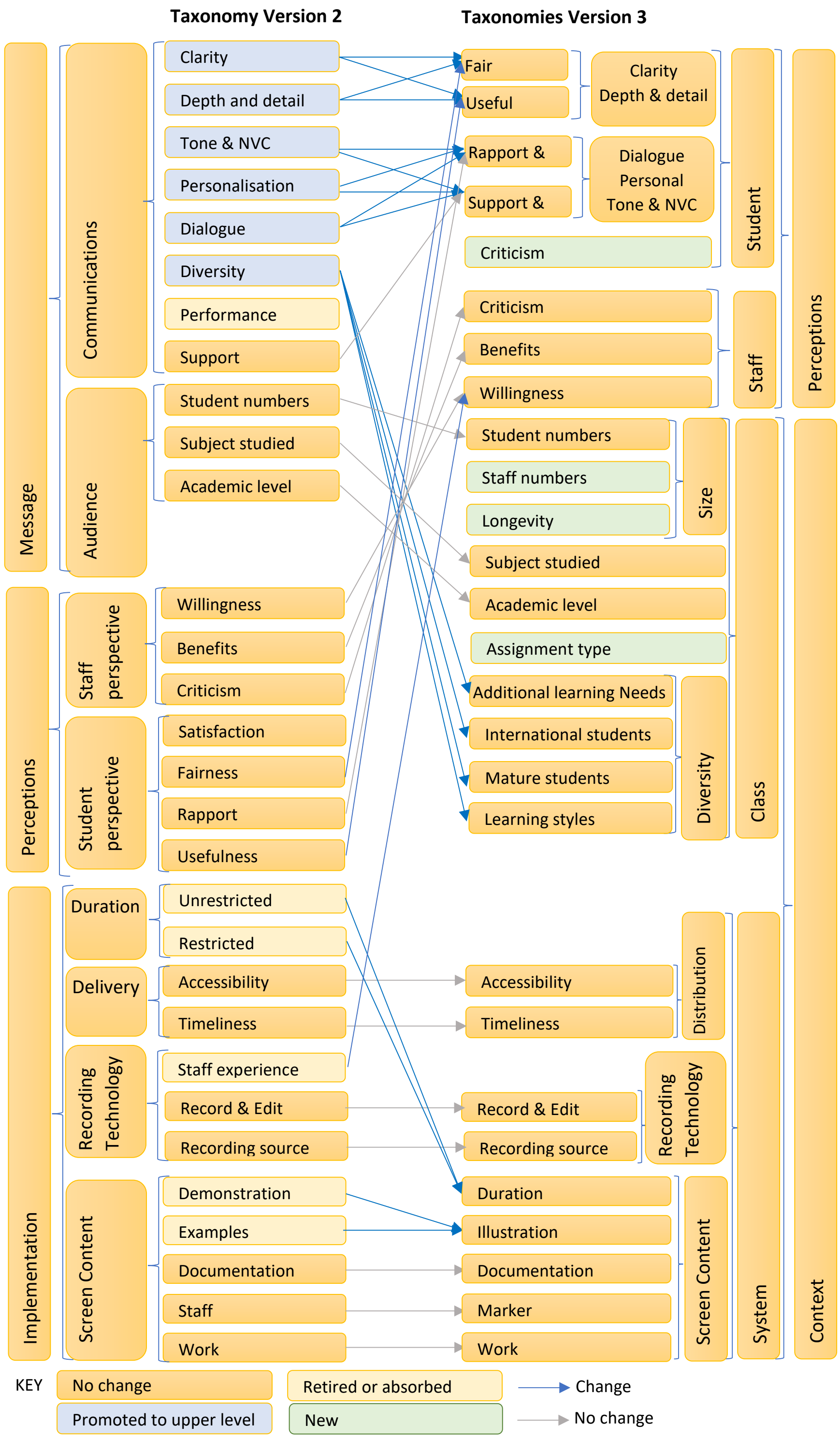

Figure C.3: Mapping of facets from Taxonomy of Video Feedback version 2 to version 3

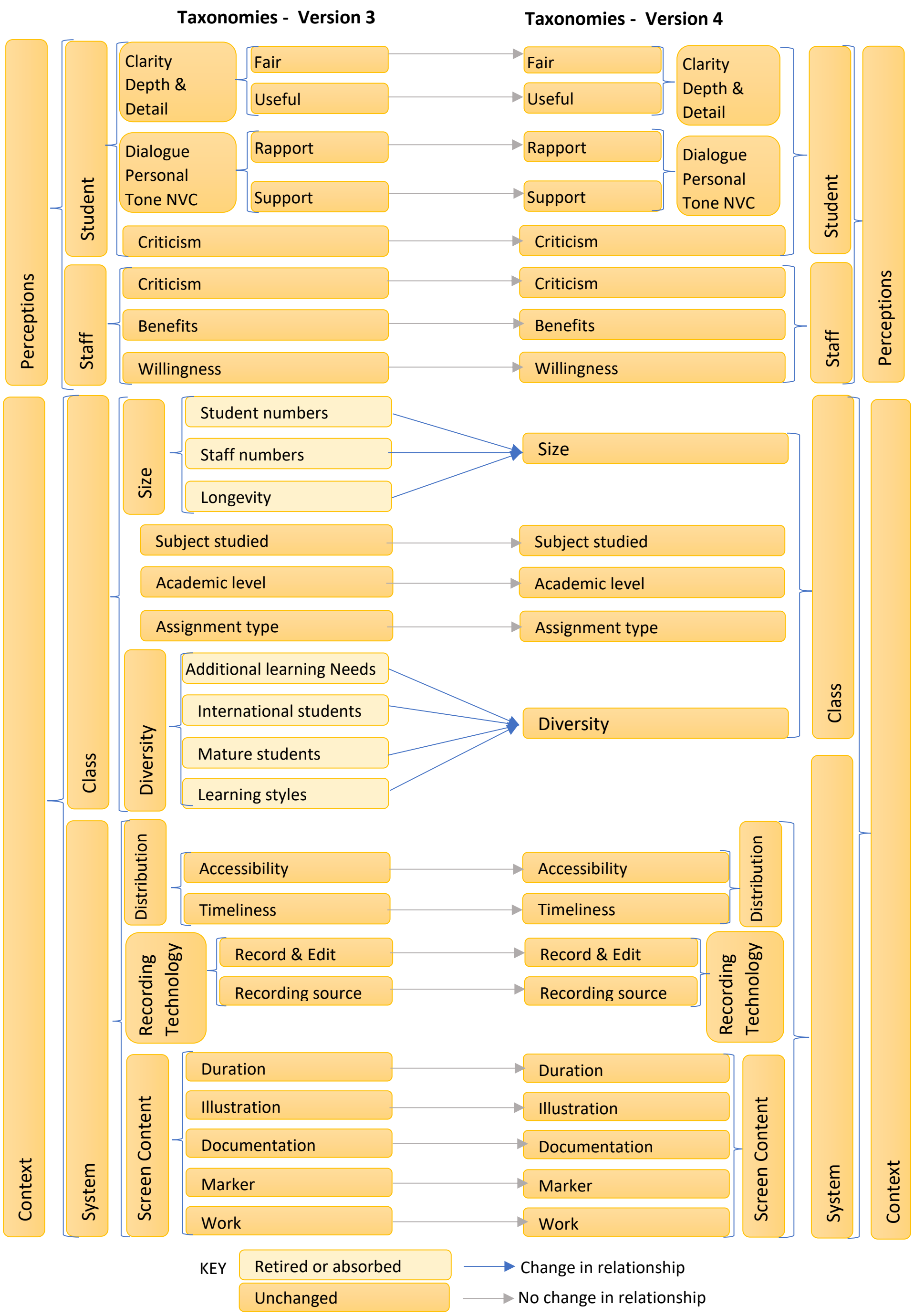

Figure C.4: Mapping of facets from Taxonomies of Video Feedback version 3 to version 4

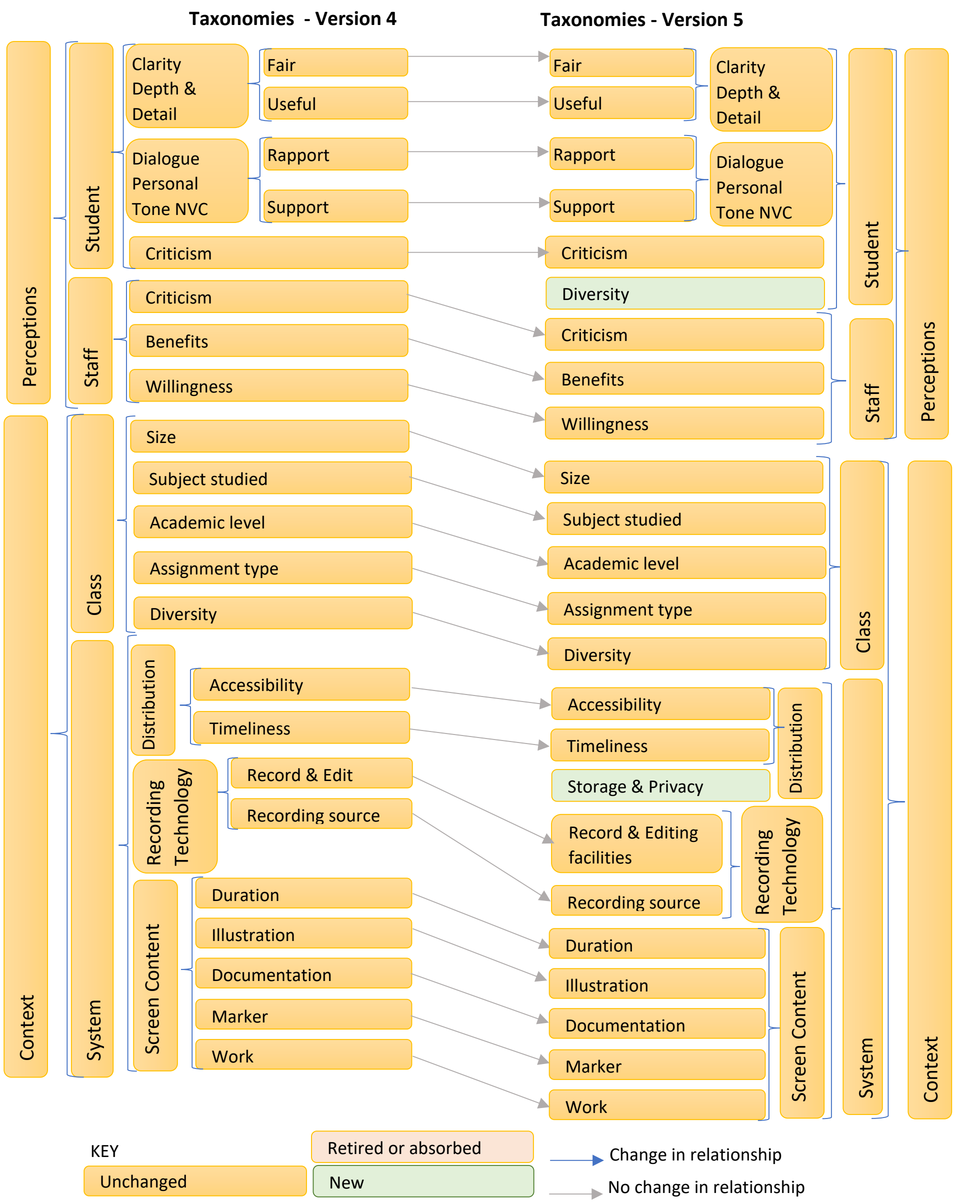

Figure C.5: Mapping of facets from Taxonomies of Video Feedback version 4 to version 5

C.2 Taxonomies - Development versions

Figure C.6: Taxonomy of Video Feedback version 1

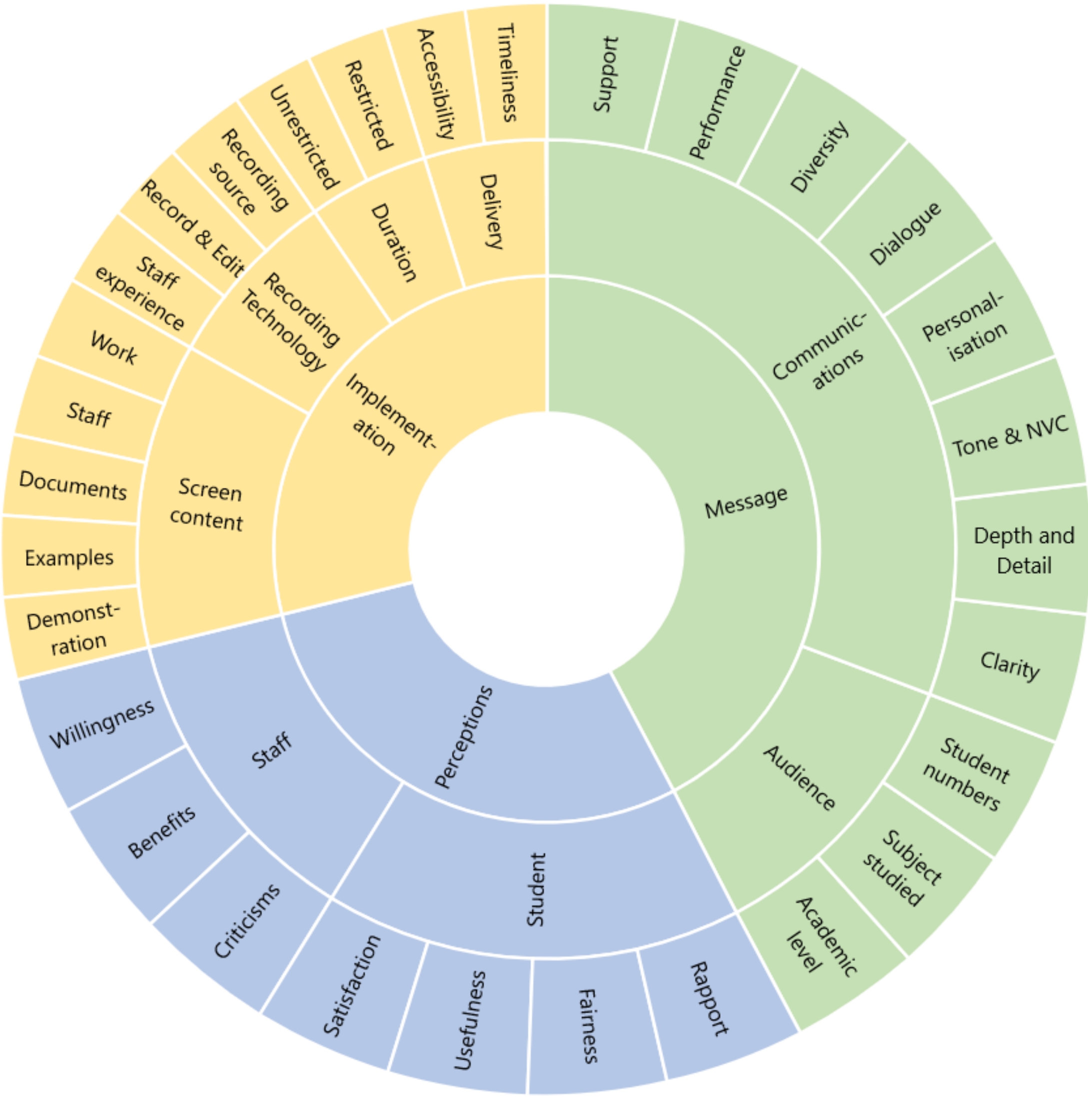

Figure C.7: Taxonomy of Video Feedback version 2

Figure C.8: Taxonomies of Video Feedback version 3

Figure C.9: Taxonomies of Video Feedback version 4

Figure C.10: Taxonomies of Video Feedback version 5

Figure C.11: Taxonomies of Video Feedback version 6

Figure C.12: Taxonomies of Video Feedback version 7

Appendix D

Pilot Study: Audio Feedback on Trial

D.1 Audio feedback on trial: Pre-study survey questions

This survey was first released to students prior to the trial of audio feedback, and again, prior to the first trial of video feedback.

BU Computing - Level C - Programming Unit Assignment Feedback

1. How do you feel about your progress on the programming unit?

Too slow	Getting there	Keeping pace	Racing ahead
○	○	○	○

2. This survey is anonymous so we dont have your grades available. How do you feel about your grades on the Programming unit?

Bad	Not good	OK	Good
○	○	○	○

3. How do you feel about the Programming unit?

Love it!	Like it	Put up with it	Dislike it
○	○	○	○

Comments

4. How useful do you find the feedback you receive on myBU?

Pointless	Some use	Helpful	Very Helpful
○	○	○	○

5. How often do you read any part of the feedback?

Never	Sometimes	Often	Always
○	○	○	○

6. How much of the feedback do you read?

Grade only	Some	Most	All in detail
○	○	○	○

7. Do you feel you learn from the feedback?

Always	Often	Sometimes	Never
○	○	○	○

8. Do you apply what you learn from the feedback to your future work?

Never	Sometimes	Often	Always
○	○	○	○

9. If you could change anything, what would you change about the feedback?

D.2 Audio feedback on trial: Post-study survey questions - Audio player

Post-study survey questions for students receiving feedback by audio player.

BU Computing - Level C Post Audio Feedback Survey

This survey is to find out how you felt about the feedback for your most recently marked programming upload assignment. I intend to further this work into other media later but to ensure depth of study I would like to hear what you think about receiving your feedback as audio. I appreciate any comments you have.

Thank you. Suzy

1. Did you find the audio version of your feedback easily?

- ○ Yes
- ○ No

Comments

2. Did you manage to listen to your feedback?

- ○ No
- ○ Yes

3. Did you have any technical issues which prevented listening to your feedback or affected the quality?

- ○ No
- ○ Yes - Please include whether you were accessing the audio from a device internal or external to the University and describe the issue you had.

4. Do you think you would like audio feedback on assignments in future?

- ○ Yes
- ○ No

Comments

5. Could the audio version ever replace the written feedback do you think?

- ◯ Yes, just the audio would be fine
- ◯ I would prefer both options
- ◯ I only need written feedback
- ◯ I prefer a different media altogether (please explain below)

Comments

6. Do you think receiving the feedback as audio will improve the chances of you reviewing the feedback any more thoroughly than before?

- ◯ Yes
- ◯ No

Comments

7. Do you think receiving the feedback as audio will improve the chances of you applying changes reccomended in the feedback the next time you submit a piece of work?

- ◯ No
- ◯ Yes

Comments

D.3 Audio feedback on trial: Post-study survey questions - Avatar

Post-study survey questions for students receiving feedback by Voki avatar (Oddcast Inc 2013).

BU Computing - Level C Post Avatar Feedback Survey

This survey is to find out how you felt about the feedback for your most recently marked programming upload assignment. I intend to further this work into other media later but to ensure depth of study I would like to hear what you think about receiving your feedback as audio spoken by an avatar. I appreciate any comments you have.

Thank you. Suzy

1. Did you find your feedback spoken by an avatar easily?

- ◯ Yes
- ◯ No

Comments

2. Did you manage to listen to your feedback with the avatar?

- ◯ No
- ◯ Yes

3. Did you have any technical issues which prevented listening to your feedback, with the playback of the avatar, or affected the quality of the avatar or audio?

- ◯ No
- ◯ Yes - Please include whether you were accessing the audio from a device internal or external to the University and describe the issue you had.

4. Do you think you would like audio feedback by an avatar on assignments in future?

- ◯ Yes
- ◯ No

Comments

5. Could the avatar ever replace the written feedback do you think?

- ◯ Yes, just the avatar would be fine
- ◯ I would prefer both options
- ◯ I only need written feedback
- ◯ I prefer a different media altogether (please explain below)

Comments

6. Do you think receiving the feedback by avatar will improve the chances of you reviewing the feedback any more thoroughly than before?

- ◯ Yes
- ◯ No

Comments

7. Do you think receiving the feedback from an avatar will improve the chances of you applying changes reccomended in the feedback the next time you submit a piece of work?

- ◯ No
- ◯ Yes

Comments

8. The avatar was chosen by your marking tutor and was generated using Voki.com. Would you like to choose your own avatar?

- ◯ No
- ◯ Yes
- ◯ Yes and I have been to Voki.com, chosen one and included the link here.

Appendix E

Video Feedback on Trial

E.1 Video feedback on trial: Post-study survey questions

BU Computing - Level C Post Video Feedback Survey 2014.1

You were chosen at random to receive your feedback by video screen capture (as well as in writing) for your most recently marked programming upload. This survey is to find out how you felt about the experience of reviewing that feedback. I have already done studies on the use of audio as feedback so this is the next step.To ensure depth of study I would like to hear what you think about receiving your feedback as video screen capture whilst I mark your work, and would appreciate any constructive comments you would like to make.
Thank you. Suzy

1. Did you manage to view your feedback by video successfully?

- Yes
- No

Please share any technical issues which prevented you from reviewing your feedback, with the playback of the video, or the quality of the audio.

2. Please specify the platform used for accessing your video screen capture feedback.

Type of device (desktop, laptop, tablet, phone etc)

Make of device

Model of device

Operating system on device

Browser used

Where accessed from (uni, accommodation, home, bus etc)

3. How easy is it to engage with your video feedback, compared to traditional written feedback?

	Much easier	Easier	neutral	harder	much more difficult
To understand					
To identify errors					
To revise from					
To watch (v reading)					
To identify future improvements					
To understand errors					
To revisit					
To learn from					

Comments

4. Have you ever received feedback by video screen capture before?

	Never	Once	Twice	Three times	Regularly
At BU					
At previous school/college					

Comments

5. Do you think you would like video screen capture feedback on assignments in future?

- Yes
- No

Comments

6. Could video ever replace the written feedback do you think?

- ◯ Yes, just the video screen capture would be fine
- ◯ I would prefer both options
- ◯ I only need written feedback
- ◯ I prefer a different media altogether (please explain below)

Comments

7. Do you think receiving the feedback by video screen capture will improve the chances of you reviewing the feedback any more thoroughly than before?

- ◯ Yes
- ◯ No

Comments

8. Do you think receiving the feedback from video screen capture will improve the chances of you applying changes recommended in the feedback the next time you submit a piece of work?

- ◯ No
- ◯ Yes

Comments

9. How did you feel about your video feedback, compared the traditional written feedback?

	vastly improved	improved	no different	not as good	much worse
Encouraging	◯	◯	◯	◯	◯
Time consuming	◯	◯	◯	◯	◯
Personal	◯	◯	◯	◯	◯
Friendly	◯	◯	◯	◯	◯
Enjoyable	◯	◯	◯	◯	◯
Useful	◯	◯	◯	◯	◯
Engaging	◯	◯	◯	◯	◯
Clarity	◯	◯	◯	◯	◯
Entertaining	◯	◯	◯	◯	◯
Fair	◯	◯	◯	◯	◯
Helpful	◯	◯	◯	◯	◯

Comment

E.2 Video feedback on trial: Pre-study survey - correlation (Spearman 1904) of all ordinal data

Pre study survey - Video Feedback on Trial - Correlations (Spearman, 1904) of ordinal data

			Q1 How do you feel about your progress on the progrmaming unit?	Q2 How do you feel about your grades on the programming unit?	Q3 How do you feel about the programming unit?	Q4 How useful do you find the feedback on programming	Q5 How often do youo read any part of your feedback?	Q6 How much of your feedback do you read?	Q7 Do you feel you learn from your programming feedback?	Q8 Do you apply what you learn from the feedback to future programming work?
Spearman's rho	Q1 How do you feel about your progress on the progrmaming unit?	Correlation Coefficient	1.000	.220	.765**	-.026	.289	.054	-.038	.224
		Sig. (2-tailed)	.	.219	.000	.887	.102	.767	.836	.210
		N	33	33	33	33	33	33	33	33
	Q2 How do you feel about your grades on the programming unit?	Correlation Coefficient	.220	1.000	.235	.487**	.474**	.420*	.449**	.304
		Sig. (2-tailed)	.219	.	.188	.004	.005	.015	.009	.086
		N	33	33	33	33	33	33	33	33
	Q3 How do you feel about the programming unit?	Correlation Coefficient	.765**	.235	1.000	.143	.433*	.289	.034	.479**
		Sig. (2-tailed)	.000	.188	.	.428	.012	.103	.850	.005
		N	33	33	33	33	33	33	33	33
	Q4 How useful do you find the feedback on programming	Correlation Coefficient	-.026	.487**	.143	1.000	.312	.173	.591**	.359*
		Sig. (2-tailed)	.887	.004	.428	.	.077	.335	.000	.040
		N	33	33	33	33	33	33	33	33
	Q5 How often do youo read any part of your feedback?	Correlation Coefficient	.289	.474**	.433*	.312	1.000	.521**	.391*	.412*
		Sig. (2-tailed)	.102	.005	.012	.077	.	.002	.024	.017
		N	33	33	33	33	33	33	33	33
	Q6 How much of your feedback do you read?	Correlation Coefficient	.054	.420*	.289	.173	.521**	1.000	.266	.329
		Sig. (2-tailed)	.767	.015	.103	.335	.002	.	.134	.061
		N	33	33	33	33	33	33	33	33
	Q7 Do you feel you learn from your programming feedback?	Correlation Coefficient	-.038	.449**	.034	.591**	.391*	.266	1.000	.376*
		Sig. (2-tailed)	.836	.009	.850	.000	.024	.134	.	.031
		N	33	33	33	33	33	33	33	33
	Q8 Do you apply what you learn from the feedback to future programming work?	Correlation Coefficient	.224	.304	.479**	.359*	.412*	.329	.376*	1.000
		Sig. (2-tailed)	.210	.086	.005	.040	.017	.061	.031	.
		N	33	33	33	33	33	33	33	33

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Figure E.1: Pre Study Survey - Correlations (Spearman 1904) of all ordinal data. Output by SPSS (IBM 1999)

E.3 Video feedback on trial: Principle Component Analysis - 'Ease of use' questions

```
GET
  FILE='D:\Documents\AAA PHD\A6-STATS\Post Video Feedback Survey TRIALS COMBINED.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
FACTOR
  /VARIABLES Q3_Easy_Understand Q3_Easy_IdentifyErrors Q3_Easy_ReviseFrom Q3_Easy_ToWatch
    Q3_Easy_IdentifyFutureImprovements Q3_Easy_UnderstandErrors Q3_Easy_Revisit Q3_Easy_ToLearnFrom
  /MISSING LISTWISE
  /ANALYSIS Q3_Easy_Understand Q3_Easy_IdentifyErrors Q3_Easy_ReviseFrom Q3_Easy_ToWatch
    Q3_Easy_IdentifyFutureImprovements Q3_Easy_UnderstandErrors Q3_Easy_Revisit Q3_Easy_ToLearnFrom
  /PRINT INITIAL CORRELATION SIG KMO REPR AIC EXTRACTION ROTATION
  /FORMAT SORT BLANK(.3)
  /PLOT EIGEN ROTATION
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PC
  /CRITERIA ITERATE(25)
  /ROTATION VARIMAX
  /SAVE REG(ALL)
  /METHOD=CORRELATION.

 - - - - - - - - - - - - - - - - - - - - - - -   F A C T O R   A N A L Y S I S   - - - - - - - - -
```

Figure E.2: PCA Ease of use questions - Output from SPSS (IBM 1999) - Settings

Correlation Matrix

		Q3) How easy - to understand	Q3) How easy - identify errors	Q3) How easy - to revide from	Q3) How easy - to watch (v reading)	Q3) How easy - to identify future improvements	Q3) How easy - to understand errors	Q3) How easy - to revisit	Q3) How easy - to learn from
Correlation	Q3) How easy - to understand	1.000	.538	.564	.567	.784	.733	.548	.607
	Q3) How easy - identify errors	.538	1.000	.680	.661	.486	.729	.574	.689
	Q3) How easy - to revide from	.564	.680	1.000	.802	.602	.781	.657	.623
	Q3) How easy - to watch (v reading)	.567	.661	.802	1.000	.629	.716	.605	.661
	Q3) How easy - to identify future improvements	.784	.486	.602	.629	1.000	.703	.761	.803
	Q3) How easy - to understand errors	.733	.729	.781	.716	.703	1.000	.666	.791
	Q3) How easy - to revisit	.548	.574	.657	.605	.761	.666	1.000	.868
	Q3) How easy - to learn from	.607	.689	.623	.661	.803	.791	.868	1.000
Sig. (1-tailed)	Q3) How easy - to understand		.000	.000	.000	.000	.000	.000	.000
	Q3) How easy - identify errors	.000		.000	.000	.000	.000	.000	.000
	Q3) How easy - to revide from	.000	.000		.000	.000	.000	.000	.000
	Q3) How easy - to watch (v reading)	.000	.000	.000		.000	.000	.000	.000
	Q3) How easy - to identify future improvements	.000	.000	.000	.000		.000	.000	.000
	Q3) How easy - to understand errors	.000	.000	.000	.000	.000		.000	.000
	Q3) How easy - to revisit	.000	.000	.000	.000	.000	.000		.000
	Q3) How easy - to learn from	.000	.000	.000	.000	.000	.000	.000	

Figure E.3: PCA Ease of use questions - Output from SPSS (IBM 1999) - Correlation matrix

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.794
Bartlett's Test of Sphericity	Approx. Chi-Square	343.538
	df	28
	Sig.	.000

Figure E.4: PCA Ease of use questions - Output from SPSS (IBM 1999) - KMO and Bartletts Test

Anti-image Matrices

		Q3) How easy - to understand	Q3) How easy - identify errors	Q3) How easy - to revide from	Q3) How easy - to watch (v reading)	Q3) How easy - to identify future improvements	Q3) How easy - to understand errors	Q3) How easy - to revisit	Q3) How easy - to learn from
Anti-image Covariance	Q3) How easy - to understand	.253	-.075	.042	-.005	-.134	-.092	-.007	.057
	Q3) How easy - identify errors	-.075	.328	-.063	-.040	.091	-.010	.026	-.073
	Q3) How easy - to revide from	.042	-.063	.197	-.125	-.025	-.090	-.084	.065
	Q3) How easy - to watch (v reading)	-.005	-.040	-.125	.294	-.025	.014	.039	-.029
	Q3) How easy - to identify future improvements	-.134	.091	-.025	-.025	.164	.028	-.019	-.058
	Q3) How easy - to understand errors	-.092	-.010	-.090	.014	.028	.160	.051	-.067
	Q3) How easy - to revisit	-.007	.026	-.084	.039	-.019	.051	.185	-.087
	Q3) How easy - to learn from	.057	-.073	.065	-.029	-.058	-.067	-.087	.099
Anti-image Correlation	Q3) How easy - to understand	.758[a]	-.262	.190	-.019	-.658	-.456	-.034	.359
	Q3) How easy - identify errors	-.262	.853[a]	-.248	-.130	.393	-.046	.105	-.403
	Q3) How easy - to revide from	.190	-.248	.752[a]	-.520	-.141	-.510	-.441	.465
	Q3) How easy - to watch (v reading)	-.019	-.130	-.520	.896[a]	-.116	.063	.165	-.169
	Q3) How easy - to identify future improvements	-.658	.393	-.141	-.116	.792[a]	.176	-.111	-.457
	Q3) How easy - to understand errors	-.456	-.046	-.510	.063	.176	.811[a]	.296	-.530
	Q3) How easy - to revisit	-.034	.105	-.441	.165	-.111	.296	.810[a]	-.646
	Q3) How easy - to learn from	.359	-.403	.465	-.169	-.457	-.530	-.646	.719[a]

a. Measures of Sampling Adequacy(MSA)

Figure E.5: PCA Ease of use questions - Output from SPSS (IBM 1999) - Anti image Matrices

Communalities

	Initial	Extraction
Q3) How easy - to understand	1.000	.620
Q3) How easy - identify errors	1.000	.624
Q3) How easy - to revide from	1.000	.713
Q3) How easy - to watch (v reading)	1.000	.695
Q3) How easy - to identify future improvements	1.000	.730
Q3) How easy - to understand errors	1.000	.823
Q3) How easy - to revisit	1.000	.710
Q3) How easy - to learn from	1.000	.805

Extraction Method: Principal Component Analysis.

Figure E.6: PCA Ease of use questions - Output from SPSS (IBM 1999) - Communalities

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.719	71.492	71.492	5.719	71.492	71.492
2	.725	9.068	80.560			
3	.546	6.823	87.383			
4	.412	5.156	92.539			
5	.237	2.963	95.502			
6	.191	2.390	97.893			
7	.118	1.470	99.362			
8	.051	.638	100.000			

Extraction Method: Principal Component Analysis.

Figure E.7: PCA Ease of use questions - Output from SPSS (IBM 1999) - Total variance

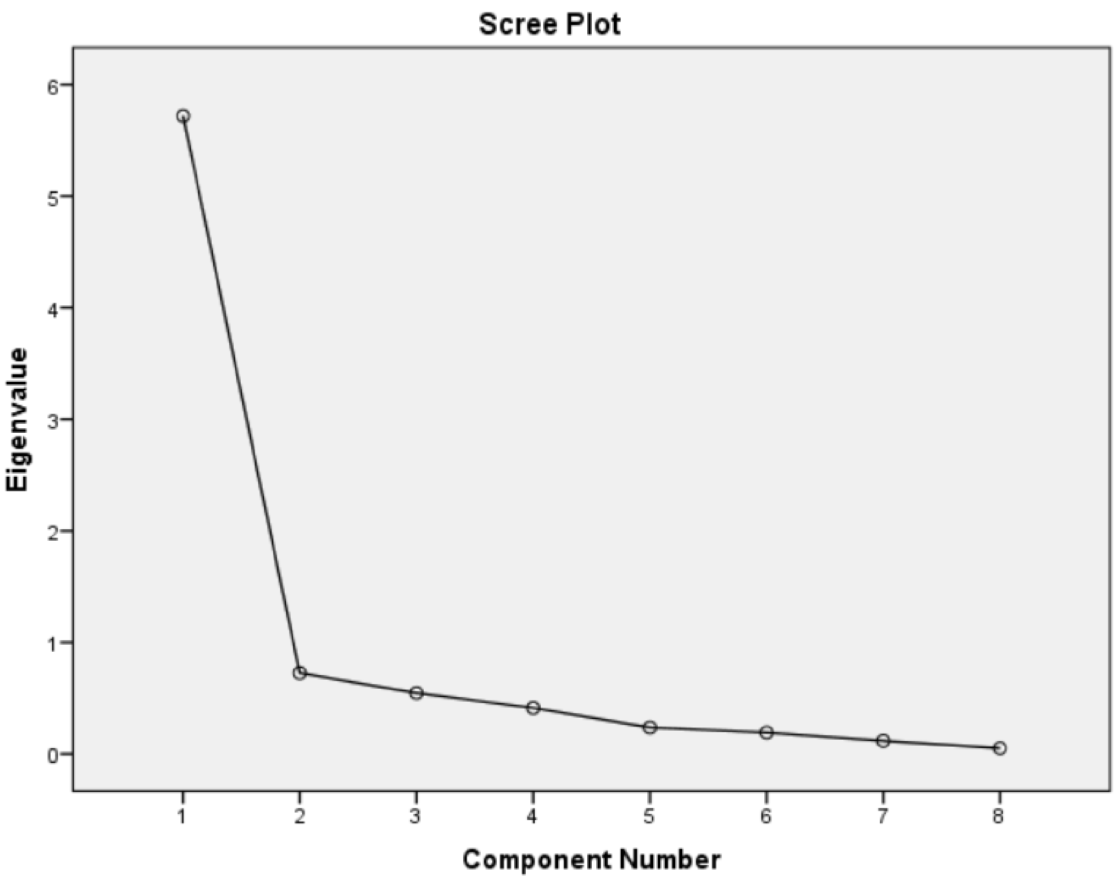

Figure E.8: PCA Ease of use questions - Output from SPSS (IBM 1999) - Scree Plot

Component Matrix[a]

	Component
	1
Q3) How easy - to understand errors	.907
Q3) How easy - to learn from	.897
Q3) How easy - to identify future improvements	.854
Q3) How easy - to revide from	.844
Q3) How easy - to revisit	.843
Q3) How easy - to watch (v reading)	.834
Q3) How easy - identify errors	.790
Q3) How easy - to understand	.787

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Figure E.9: PCA Ease of use questions - Output from SPSS (IBM 1999) - Component Matrix

Reproduced Correlations

		Q3) How easy - to understand	Q3) How easy - identify errors	Q3) How easy - to revide from	Q3) How easy - to watch (v reading)	Q3) How easy - to identify future improvements	Q3) How easy - to understand errors	Q3) How easy - to revisit	Q3) How easy - to learn from
Reproduced Correlation	Q3) How easy - to understand	.620[a]	.622	.665	.656	.673	.714	.663	.706
	Q3) How easy - identify errors	.622	.624[a]	.667	.659	.675	.717	.666	.709
	Q3) How easy - to revide from	.665	.667	.713[a]	.704	.721	.766	.711	.757
	Q3) How easy - to watch (v reading)	.656	.659	.704	.695[a]	.713	.756	.703	.748
	Q3) How easy - to identify future improvements	.673	.675	.721	.713	.730[a]	.775	.720	.766
	Q3) How easy - to understand errors	.714	.717	.766	.756	.775	.823[a]	.764	.814
	Q3) How easy - to revisit	.663	.666	.711	.703	.720	.764	.710[a]	.756
	Q3) How easy - to learn from	.706	.709	.757	.748	.766	.814	.756	.805[a]
Residual[b]	Q3) How easy - to understand		-.084	-.100	-.089	.111	.019	-.116	-.099
	Q3) How easy - identify errors	-.084		.013	.002	-.189	.013	-.091	-.019
	Q3) How easy - to revide from	-.100	.013		.098	-.120	.015	-.055	-.135
	Q3) How easy - to watch (v reading)	-.089	.002	.098		-.084	-.040	-.098	-.087
	Q3) How easy - to identify future improvements	.111	-.189	-.120	-.084		-.072	.041	.036
	Q3) How easy - to understand errors	.019	.013	.015	-.040	-.072		-.099	-.023
	Q3) How easy - to revisit	-.116	-.091	-.055	-.098	.041	-.099		.112
	Q3) How easy - to learn from	-.099	-.019	-.135	-.087	.036	-.023	.112	

Extraction Method: Principal Component Analysis.

a. Reproduced communalities

b. Residuals are computed between observed and reproduced correlations. There are 18 (64.0%) nonredundant residuals with absolute values greater than 0.05.

Figure E.10: PCA Ease of use questions - Output from SPSS (IBM 1999) - Reproduced correlations

E.4 Video feedback on trial: Principle Component Analysis - 'How do you feel...?' questions

```
FACTOR
  /VARIABLES Q9_HowDidYouFeel_Encouraging Q9_HowDIdYouFeel_TimeConsuming Q9_HowDidYouFeel_Personal
    Q9_HowDidYouFeel_Friendly Q9_HowDidYouFeel_Enjoyable Q9_HowDidYouFeel_Useful
    Q9_HowDidYouFeel_Engaging Q9_HowDidYouFeel_Clarity Q9_HowDidYouFeel_Entertaining
    Q9_HowDidYouFeel_Fair Q9_HowDidYouFeel_Helpful
  /MISSING LISTWISE
  /ANALYSIS Q9_HowDidYouFeel_Encouraging Q9_HowDIdYouFeel_TimeConsuming Q9_HowDidYouFeel_Personal
    Q9_HowDidYouFeel_Friendly Q9_HowDidYouFeel_Enjoyable Q9_HowDidYouFeel_Useful
    Q9_HowDidYouFeel_Engaging Q9_HowDidYouFeel_Clarity Q9_HowDidYouFeel_Entertaining
    Q9_HowDidYouFeel_Fair Q9_HowDidYouFeel_Helpful
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  /FORMAT SORT BLANK(.3)
  /PLOT EIGEN ROTATION
  /CRITERIA FACTORS(2) ITERATE(25)
  /EXTRACTION PC
  /CRITERIA ITERATE(25) DELTA(0)
  /ROTATION OBLIMIN
  /SAVE REG(ALL)
  /METHOD=CORRELATION.
```

Figure E.11: PCA 'How do you feel...?' questions - Settings output from SPSS (IBM 1999)

Correlation Matrix

		Q9) How did you feel about your video feedback?: Encouraging	Q9) How did you feel about your video feedback?: Time consuming	Q9) How did you feel about your video feedback?: Personal	Q9) How did you feel about your video feedback?: Friendly	Q9) How did you feel about your video feedback?: Enjoyable	Q9) How did you feel about your video feedback?: Useful	Q9) How did you feel about your video feedback?: Engaging	Q9) How did you feel about your video feedback?: Clarity	Q9) How did you feel about your video feedback?: Entertaining	Q9) How did you feel about your video feedback?: Fair	Q9) How did you feel about your video feedback?: Helpful
Correlation	Q9) How did you feel about your video feedback?: Encouraging	1.000	.501	.492	.691	.521	.590	.476	.460	.449	.533	.566
	Q9) How did you feel about your video feedback?: Time consuming	.501	1.000	.283	.351	.332	.397	.289	.264	.393	.379	.369
	Q9) How did you feel about your video feedback?: Personal	.492	.283	1.000	.617	.280	.416	.452	.401	.309	.352	.448
	Q9) How did you feel about your video feedback?: Friendly	.691	.351	.617	1.000	.665	.767	.746	.650	.545	.551	.726
	Q9) How did you feel about your video feedback?: Enjoyable	.521	.332	.280	.665	1.000	.529	.637	.524	.620	.389	.515
	Q9) How did you feel about your video feedback?: Useful	.590	.397	.416	.767	.529	1.000	.758	.664	.453	.491	.886
	Q9) How did you feel about your video feedback?: Engaging	.476	.289	.452	.746	.637	.758	1.000	.646	.437	.474	.711
	Q9) How did you feel about your video feedback?: Clarity	.460	.264	.401	.650	.524	.664	.646	1.000	.427	.527	.699
	Q9) How did you feel about your video feedback?: Entertaining	.449	.393	.309	.545	.620	.453	.437	.427	1.000	.427	.453
	Q9) How did you feel about your video feedback?: Fair	.533	.379	.352	.551	.389	.491	.474	.527	.427	1.000	.537
	Q9) How did you feel about your video feedback?: Helpful	.566	.369	.448	.726	.515	.886	.711	.699	.453	.537	1.000

Figure E.12: PCA ’How do you feel...?’ questions - Correlation matrix output from SPSS (IBM 1999)

Correlation Matrix

		Q9) How did you feel about your video feedback?: Encouraging	Q9) How did you feel about your video feedback?: Time consuming	Q9) How did you feel about your video feedback?: Personal	Q9) How did you feel about your video feedback?: Friendly	Q9) How did you feel about your video feedback?: Enjoyable	Q9) How did you feel about your video feedback?: Useful	Q9) How did you feel about your video feedback?: Engaging	Q9) How did you feel about your video feedback?: Clarity	Q9) How did you feel about your video feedback?: Entertaining	Q9) How did you feel about your video feedback?: Fair	Q9) How did you feel about your video feedback?: Helpful
Sig. (1-tailed)	Q9) How did you feel about your video feedback?: Encouraging		.000	.000	.000	.000	.000	.000	.001	.001	.000	.000
	Q9) How did you feel about your video feedback?: Time consuming	.000		.030	.009	.013	.003	.027	.040	.004	.005	.006
	Q9) How did you feel about your video feedback?: Personal	.000	.030		.000	.031	.002	.001	.003	.019	.009	.001
	Q9) How did you feel about your video feedback?: Friendly	.000	.009	.000		.000	.000	.000	.000	.000	.000	.000
	Q9) How did you feel about your video feedback?: Enjoyable	.000	.013	.031	.000		.000	.000	.000	.000	.004	.000
	Q9) How did you feel about your video feedback?: Useful	.000	.003	.002	.000	.000		.000	.000	.001	.000	.000
	Q9) How did you feel about your video feedback?: Engaging	.000	.027	.001	.000	.000	.000		.000	.001	.001	.000
	Q9) How did you feel about your video feedback?: Clarity	.001	.040	.003	.000	.000	.000	.000		.002	.000	.000
	Q9) How did you feel about your video feedback?: Entertaining	.001	.004	.019	.000	.000	.001	.001	.002		.002	.001
	Q9) How did you feel about your video feedback?: Fair	.000	.005	.009	.000	.004	.000	.001	.000	.002		.000
	Q9) How did you feel about your video feedback?: Helpful	.000	.006	.001	.000	.000	.000	.000	.000	.001	.000	

Figure E.13: PCA 'How do you feel...?' questions - Significance matrix output from SPSS (IBM 1999)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.880
Bartlett's Test of Sphericity	Approx. Chi-Square	308.759
	df	55
	Sig.	.000

Figure E.14: PCA 'How do you feel...?' questions - KMO and Bartletts Test output from SPSS (IBM 1999)

Anti-image Matrices

		Q9) How did you feel about your video feedback?: Encouraging	Q9) How did you feel about your video feedback?: Time consuming	Q9) How did you feel about your video feedback?: Personal	Q9) How did you feel about your video feedback?: Friendly	Q9) How did you feel about your video feedback?: Enjoyable	Q9) How did you feel about your video feedback?: Useful	Q9) How did you feel about your video feedback?: Engaging	Q9) How did you feel about your video feedback?: Clarity	Q9) How did you feel about your video feedback?: Entertaining	Q9) How did you feel about your video feedback?: Fair	Q9) How did you feel about your video feedback?: Helpful
Anti-image Covariance	Q9) How did you feel about your video feedback?: Encouraging	.402	-.147	-.069	-.078	-.066	-.029	.071	.025	.025	-.099	-.002
	Q9) How did you feel about your video feedback?: Time consuming	-.147	.667	-.065	.065	-.033	-.049	.016	.037	-.104	-.084	.008
	Q9) How did you feel about your video feedback?: Personal	-.069	-.065	.535	-.137	.127	.068	-.057	-.022	-.025	.040	-.038
	Q9) How did you feel about your video feedback?: Friendly	-.078	.065	-.137	.191	-.076	-.050	-.041	-.019	-.030	-.038	.008
	Q9) How did you feel about your video feedback?: Enjoyable	-.066	-.033	.127	-.076	.370	.041	-.113	-.044	-.177	.062	-.005
	Q9) How did you feel about your video feedback?: Useful	-.029	-.049	.068	-.050	.041	.154	-.066	-.008	-.006	.044	-.112
	Q9) How did you feel about your video feedback?: Engaging	.071	.016	-.057	-.041	-.113	-.066	.296	-.042	.046	-.039	-.002
	Q9) How did you feel about your video feedback?: Clarity	.025	.037	-.022	-.019	-.044	-.008	-.042	.427	-.008	-.098	-.065
	Q9) How did you feel about your video feedback?: Entertaining	.025	-.104	-.025	-.030	-.177	-.006	.046	-.008	.536	-.076	-.008
	Q9) How did you feel about your video feedback?: Fair	-.099	-.084	.040	-.038	.062	.044	-.039	-.098	-.076	.559	-.048
	Q9) How did you feel about your video feedback?: Helpful	-.002	.008	-.038	.008	-.005	-.112	-.002	-.065	-.008	-.048	.185

Figure E.15: PCA ’How do you feel...?’ questions - Anti image covariance Matrices output from SPSS (IBM 1999)

Anti-image Matrices

		Q9) How did you feel about your video feedback?: Encouraging	Q9) How did you feel about your video feedback?: Time consuming	Q9) How did you feel about your video feedback?: Personal	Q9) How did you feel about your video feedback?: Friendly	Q9) How did you feel about your video feedback?: Enjoyable	Q9) How did you feel about your video feedback?: Useful	Q9) How did you feel about your video feedback?: Engaging	Q9) How did you feel about your video feedback?: Clarity	Q9) How did you feel about your video feedback?: Fair	Q9) How did you feel about your video feedback?: Helpful
Anti-image Correlation	Q9) How did you feel about your video feedback?: Encouraging	.900[a]	-.283	-.148	-.283	-.170	-.115	.205	.060	-.208	-.006
	Q9) How did you feel about your video feedback?: Time consuming	-.283	.862[a]	-.108	.183	-.066	-.154	.035	.070	-.137	.023
	Q9) How did you feel about your video feedback?: Personal	-.148	-.108	.814[a]	-.429	.284	.236	-.143	-.047	.072	-.120
	Q9) How did you feel about your video feedback?: Friendly	-.283	.183	-.429	.888[a]	-.285	-.290	-.171	-.066	-.116	.045
	Q9) How did you feel about your video feedback?: Enjoyable	-.170	-.066	.284	-.285	.834[a]	.174	-.342	-.111	.137	-.019
	Q9) How did you feel about your video feedback?: Useful	-.115	-.154	.236	-.290	.174	.831[a]	-.311	-.031	.149	-.667
	Q9) How did you feel about your video feedback?: Engaging	.205	.035	-.143	-.171	-.342	-.311	.908[a]	-.118	-.097	-.007
	Q9) How did you feel about your video feedback?: Clarity	.060	.070	-.047	-.066	-.111	-.031	-.118	.955[a]	-.201	-.233
	Q9) How did you feel about your video feedback?: Entertaining	.053	-.173	-.046	-.094	-.398	-.020	.114	-.016	-.138	-.024
	Q9) How did you feel about your video feedback?: Fair	-.208	-.137	.072	-.116	.137	.149	-.097	-.201	.913[a]	-.149
	Q9) How did you feel about your video feedback?: Helpful	-.006	.023	-.120	.045	-.019	-.667	-.007	-.233	-.149	.874[a]

Figure E.16: PCA 'How do you feel...?' questions - Anti image correlation matrices output from SPSS (IBM 1999)

Communalities

	Initial	Extraction
Q9) How did you feel about your video feedback?: Encouraging	1.000	.672
Q9) How did you feel about your video feedback?: Time consuming	1.000	.735
Q9) How did you feel about your video feedback?: Personal	1.000	.365
Q9) How did you feel about your video feedback?: Friendly	1.000	.821
Q9) How did you feel about your video feedback?: Enjoyable	1.000	.543
Q9) How did you feel about your video feedback?: Useful	1.000	.798
Q9) How did you feel about your video feedback?: Engaging	1.000	.772
Q9) How did you feel about your video feedback?: Clarity	1.000	.685
Q9) How did you feel about your video feedback?: Entertaining	1.000	.535
Q9) How did you feel about your video feedback?: Fair	1.000	.491
Q9) How did you feel about your video feedback?: Helpful	1.000	.793

Extraction Method: Principal Component Analysis.

Figure E.17: PCA 'How do you feel...?' questions - Communalities output from SPSS (IBM 1999)

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.225	56.592	56.592	6.225	56.592	56.592	4.578	41.620	41.620
2	.984	8.948	65.540	.984	8.948	65.540	2.631	23.919	65.540
3	.848	7.705	73.245						
4	.700	6.360	79.605						
5	.594	5.396	85.001						
6	.456	4.150	89.150						
7	.386	3.506	92.657						
8	.350	3.183	95.840						
9	.202	1.833	97.673						
10	.165	1.497	99.170						
11	.091	.830	100.000						

Extraction Method: Principal Component Analysis.

Figure E.18: PCA 'How do you feel...?' questions - Total variance output from SPSS (IBM 1999)

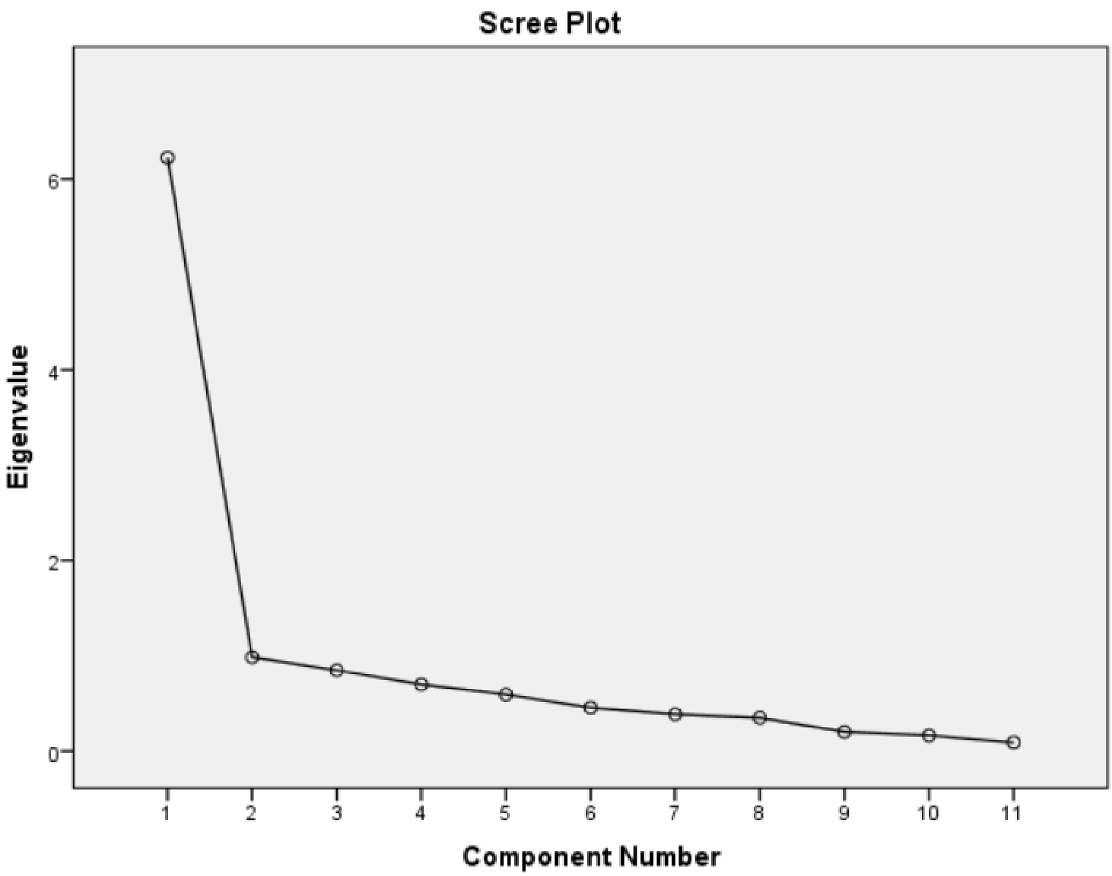


Figure E.19: PCA 'How do you feel...?' questions - Scree Plot output from SPSS (IBM 1999)

Component Matrix[a]

	Component 1	Component 2
Q9) How did you feel about your video feedback?: Friendly	.901	
Q9) How did you feel about your video feedback?: Useful	.865	
Q9) How did you feel about your video feedback?: Helpful	.858	
Q9) How did you feel about your video feedback?: Engaging	.823	-.307
Q9) How did you feel about your video feedback?: Clarity	.774	
Q9) How did you feel about your video feedback?: Encouraging	.759	.309
Q9) How did you feel about your video feedback?: Enjoyable	.735	
Q9) How did you feel about your video feedback?: Fair	.682	
Q9) How did you feel about your video feedback?: Entertaining	.659	.318
Q9) How did you feel about your video feedback?: Personal	.603	
Q9) How did you feel about your video feedback?: Time consuming	.523	.680

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Figure E.20: PCA 'How do you feel...?' questions - Component Matrix output from SPSS (IBM 1999)

Reproduced Correlations

		Q9) How did you feel about your video feedback?: Encouraging	Q9) How did you feel about your video feedback?: Time consuming	Q9) How did you feel about your video feedback?: Personal	Q9) How did you feel about your video feedback?: Friendly	Q9) How did you feel about your video feedback?: Enjoyable	Q9) How did you feel about your video feedback?: Useful	Q9) How did you feel about your video feedback?: Engaging	Q9) How did you feel about your video feedback?: Clarity	Q9) How did you feel about your video feedback?: Entertaining	Q9) How did you feel about your video feedback?: Fair	Q9) How did you feel about your video feedback?: Helpful
Reproduced Correlation	Q9) How did you feel about your video feedback?: Encouraging	.672[a]	.607	.465	.654	.575	.587	.530	.497	.599	.568	.578
	Q9) How did you feel about your video feedback?: Time consuming	.607	.735[a]	.331	.406	.422	.299	.222	.206	.561	.466	.287
	Q9) How did you feel about your video feedback?: Personal	.465	.331	.365[a]	.542	.445	.517	.490	.461	.405	.415	.512
	Q9) How did you feel about your video feedback?: Friendly	.654	.406	.542	.821[a]	.657	.801	.771	.726	.563	.599	.796
	Q9) How did you feel about your video feedback?: Enjoyable	.575	.422	.445	.657	.543[a]	.623	.588	.553	.502	.510	.617
	Q9) How did you feel about your video feedback?: Useful	.587	.299	.517	.801	.623	.798[a]	.781	.735	.498	.553	.795
	Q9) How did you feel about your video feedback?: Engaging	.530	.222	.490	.771	.588	.781	.772[a]	.727	.445	.512	.779
	Q9) How did you feel about your video feedback?: Clarity	.497	.206	.461	.726	.553	.735	.727	.685[a]	.417	.480	.734
	Q9) How did you feel about your video feedback?: Entertaining	.599	.561	.405	.563	.502	.498	.445	.417	.535[a]	.501	.490
	Q9) How did you feel about your video feedback?: Fair	.568	.466	.415	.599	.510	.553	.512	.480	.501	.491[a]	.547
	Q9) How did you feel about your video feedback?: Helpful	.578	.287	.512	.796	.617	.795	.779	.734	.490	.547	.793[a]

Extraction Method: Principal Component Analysis.

a. Reproduced communalities

b. Residuals are computed between observed and reproduced correlations. There are 31 (56.0%) nonredundant residuals with absolute values greater than 0.05.

Figure E.21: PCA 'How do you feel...?' questions - Reproduced correlations output from SPSS (IBM 1999)

Reproduced Correlations

		Q9) How did you feel about your video feedback?: Encouraging	Q9) How did you feel about your video feedback?: Time consuming	Q9) How did you feel about your video feedback?: Personal	Q9) How did you feel about your video feedback?: Friendly	Q9) How did you feel about your video feedback?: Enjoyable	Q9) How did you feel about your video feedback?: Useful	Q9) How did you feel about your video feedback?: Engaging	Q9) How did you feel about your video feedback?: Clarity	Q9) How did you feel about your video feedback?: Entertaining	Q9) How did you feel about your video feedback?: Fair	Q9) How did you feel about your video feedback?: Helpful
Residual[b]	Q9) How did you feel about your video feedback?: Encouraging		-.106	.027	.037	-.054	.003	-.054	-.037	-.150	-.034	-.012
	Q9) How did you feel about your video feedback?: Time consuming	-.106		-.048	-.055	-.090	.098	.067	.058	-.168	-.087	.082
	Q9) How did you feel about your video feedback?: Personal	.027	-.048		.076	-.165	-.101	-.038	-.060	-.095	-.063	-.064
	Q9) How did you feel about your video feedback?: Friendly	.037	-.055	.076		.008	-.034	-.025	-.076	-.017	-.048	-.070
	Q9) How did you feel about your video feedback?: Enjoyable	-.054	-.090	-.165	.008		-.094	.049	-.029	.119	-.121	-.102
	Q9) How did you feel about your video feedback?: Useful	.003	.098	-.101	-.034	-.094		-.023	-.071	-.045	-.062	.091
	Q9) How did you feel about your video feedback?: Engaging	-.054	.067	-.038	-.025	.049	-.023		-.081	-.007	-.038	-.068
	Q9) How did you feel about your video feedback?: Clarity	-.037	.058	-.060	-.076	-.029	-.071	-.081		.010	.046	-.035
	Q9) How did you feel about your video feedback?: Entertaining	-.150	-.168	-.095	-.017	.119	-.045	-.007	.010		-.074	-.037
	Q9) How did you feel about your video feedback?: Fair	-.034	-.087	-.063	-.048	-.121	-.062	-.038	.046	-.074		-.009
	Q9) How did you feel about your video feedback?: Helpful	-.012	.082	-.064	-.070	-.102	.091	-.068	-.035	-.037	-.009	

Extraction Method: Principal Component Analysis.

a. Reproduced communalities

b. Residuals are computed between observed and reproduced correlations. There are 31 (56.0%) nonredundant residuals with absolute values greater than 0.05.

Figure E.22: PCA 'How do you feel...?' questions - Reproduced correlations residuals output from SPSS (IBM 1999)

Pattern Matrix[a]

	Component 1	Component 2
Q9) How did you feel about your video feedback?: Engaging	.936	
Q9) How did you feel about your video feedback?: Helpful	.907	
Q9) How did you feel about your video feedback?: Useful	.902	
Q9) How did you feel about your video feedback?: Clarity	.883	
Q9) How did you feel about your video feedback?: Friendly	.825	
Q9) How did you feel about your video feedback?: Enjoyable	.562	
Q9) How did you feel about your video feedback?: Personal	.481	
Q9) How did you feel about your video feedback?: Fair	.430	.373
Q9) How did you feel about your video feedback?: Time consuming		.918
Q9) How did you feel about your video feedback?: Encouraging	.372	.562
Q9) How did you feel about your video feedback?: Entertaining		.545

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 7 iterations.

Figure E.23: PCA 'How do you feel...?' questions - Pattern matrix output from SPSS (IBM 1999)

Structure Matrix

	Component	
	1	2
Q9) How did you feel about your video feedback?: Friendly	.898	.569
Q9) How did you feel about your video feedback?: Useful	.893	.453
Q9) How did you feel about your video feedback?: Helpful	.890	.439
Q9) How did you feel about your video feedback?: Engaging	.873	.365
Q9) How did you feel about your video feedback?: Clarity	.821	.341
Q9) How did you feel about your video feedback?: Enjoyable	.701	.559
Q9) How did you feel about your video feedback?: Fair	.624	.596
Q9) How did you feel about your video feedback?: Personal	.581	.443
Q9) How did you feel about your video feedback?: Time consuming	.347	.850
Q9) How did you feel about your video feedback?: Encouraging	.665	.756
Q9) How did you feel about your video feedback?: Entertaining	.565	.691

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

Figure E.24: PCA 'How do you feel...?' questions - Structure matrix output from SPSS (IBM 1999)

Component Correlation Matrix

Component	1	2
1	1.000	.520
2	.520	1.000

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

Figure E.25: PCA 'How do you feel...?' questions - Component correlation output from SPSS (IBM 1999)

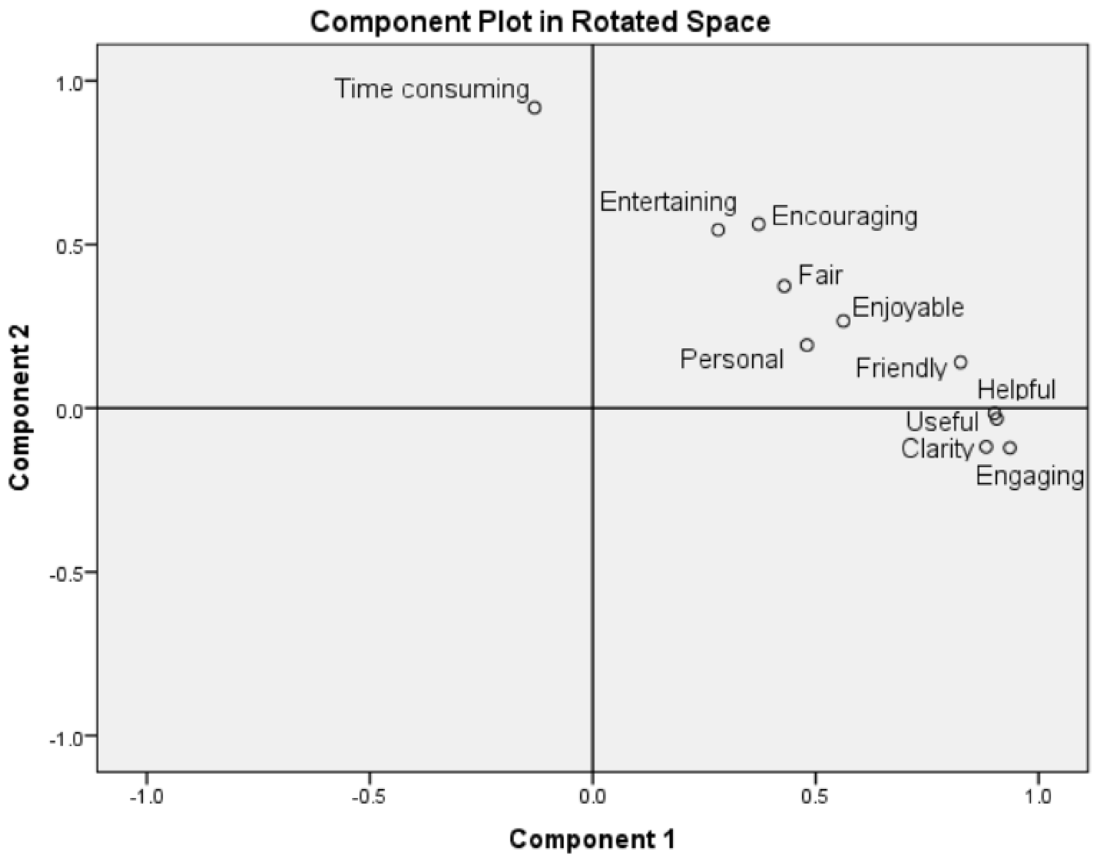


Figure E.26: PCA 'How do you feel...?' questions - Component plot in rotated space (graph) output from SPSS (IBM 1999)

Appendix F

Video feedback in practice

F.1 Survey schedule

Academic Year and Survey platform	Student numbers	Survey schedule											
2015-2016	Cohort of 298	2015 Sep	Oct	Nov	Dec	2016 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Survey monkey	35 responses				9-24 Dec								
Mentimeter	85 responses							16 March		19 May			
2016-2017	Cohort of 313	2016 Sep	Oct	Nov	Dec	2017 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Survey Monkey	29 responses				5 Dec	16 Jan							
2017-2018	Cohort of 273	2017 Sep	Oct	Nov	Dec	2018 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
JISC Online surveys	70 responses				5 Dec			16 March					

Key: Period survey was open to respondents (shaded cells)

Table F.1: Video feedback in practice: survey schedule

F.2 Video feedback in practice: Final Survey

Computing Video Feedback - 2017 Survey

Page 1: Welcome to the Computing Video Feedback Survey

Dear Computing Student,

This research project is to find out how you feel about receiving video as feedback for your assessments. The data from this questionnaire will be used to inform best practise by professionals involved in assessment feedback, and it is to be used for no other purpose. This questionnaire will take approximately 10-15 mins to complete. You may take longer if you have a lot to tell us.

Do I have to take part?

Taking part in the research is entirely voluntary. You may withdraw at any time by simply closing the browser page. No answers are saved before the final submission. If you do identify yourself, you may withdraw your results from the data up to the point of anonymisation. However, please note that once you have completed and submitted the questionnaire we are not able to remove anonymised responses from the study. Therefore, we will ask you for your name and you may choose whether to provide it.

How will my personal data be kept safe?

All personal data will be kept strictly in accordance with the Data Protection Act 1998

(DPA) and the BU Research Ethics Code of Practice (Appendix 1).

Why take part ?

It is hoped that this work will contribute to research which may improve feedback for you and students like you.

You may also be contributing to research publications produced during this project. If you would like to see copies of future publications, please let the researcher know.

Consent

By completing the questionnaire, you are consenting to take part in this research study.

To withdraw, simply close the browser window.

Questions and Concerns

If you have any questions, or would like a more detailed version of this participation information please ask the researcher –

Suzy Atfield-Cutts Phone 01202 961118 Email satfieldcutts@bournemouth.ac.uk

If you have any concerns regarding this study, please contact the Deputy Dean of Research and Professional Practice for the Faculty of Science and Technology Professor Tiantian Zhang,by email to: -researchgovernance@bournemouth.ac.uk.

Thank you for considering taking part in this research project

From

Suzy Atfield-Cutts

Demonstrator on Computing and Post Graduate Researcher

Faculty of Science and Technology at Bournemouth University

Page 2: All about you

1. Please enter your name

2. Please enter your student Student ID

3. Please select your degree title.

4. Please enter your gender

5. Please select a range that includes your age

- 18-21
- 22-30
- 31-40
- 41+

6. What is your first language?

7. Do you have any additional learning needs which you **have** registered with the university?

- Yes
- No
- I prefer not to answer

7.a. Comments

8. Do you have any additional learning needs which you **have not yet** registered with the university?

- Yes
- No
- I prefer not to answer

8.a. Comments

Page 3: All about the Programming Unit

9. How do you feel about programming as a subject?

- ☐ Love it
- ☐ Like it
- ☐ Dont mind
- ☐ Dislike it
- ☐ Strongly dislike it

9.a. Comments:

10. Please rank your units in order of current preference with favourite being 1 and least favourite being 6. Please rank no more than two subjects at the same level. We know there are some units you have not yet experienced, but go by how you feel about them as a subject.

	1	2	3	4	5	6
Business and Professional Issues	☐	☐	☐	☐	☐	☐
User Centred Web Development	☐	☐	☐	☐	☐	☐
Programming	☐	☐	☐	☐	☐	☐
Computers and Networks	☐	☐	☐	☐	☐	☐

Relational Databases	☐	☐	☐	☐	☐	☐
Systems Analysis and Design	☐	☐	☐	☐	☐	☐

Page 4: Receiving Video as Feedback

When you submit a piece of work for assessment on the Programming unit you receive feedback in the form of a video embedded into Brightspace.

11. Have you ever received video as feedback before?

	Never	Once	Twice	More than twice	Regularly
From previous school or college	☐	☐	☐	☐	☐
From another course at BU	☐	☐	☐	☐	☐

11.a. Comments:

12. In what form would you prefer to receive your individual feedback?

- ○ Audio
- ○ Video
- ○ Text
- ○ Other

12.a. If you selected Other, please specify:

Page 5: How you view your feedback

13. Please specify the main platform used for accessing your video feedback.

- ☐ Desktop
- ☐ Laptop
- ☐ Tablet
- ☐ Phone
- ☐ Other

13.a. If you selected Other, please specify:

14. Please specify the locations from which you have viewed your feedback.

- ☐ Accommodation/Home
- ☐ University lab
- ☐ While out and about
- ☐ Other

14.a. If you selected Other, please specify:

15. Did you ever watch, or show, your video feedback with/to other students?

- [ ] Yes
- [ ] No

16. Did you discuss your video feedback with other computing students ?

- [ ] Yes
- [ ] No

17. Did you review your feedback more than once?

- [ ] Yes
- [ ] No

18. Is there anything you want to tell us about how you watch your video feedback?

Page 6: How do you feel about your video feedback?

19. Do you think you will like receiving video feedback, instead of written comments, on assignments in future?

- Love it
- Like it
- Dont mind
- Dislike it
- Strongly dislike it
- Other

19.a. If you selected Other, please specify:

20. Do you think that video feedback could ever completely replace written feedback?

- Yes
- No

20.a. Please tell us about the reasons for your answer

21. Do you think receiving the feedback as video will improve the chances of you

applying recommended changes the next time you submit a piece of work?

- ○ Yes
- ○ No
- ○ Im not sure

21.a. Please tell us about the reasons for your answer

22. How easy is it to engage with your video feedback, compared to traditional written feedback?

Please don't select more than 1 answer(s) per row.

	much easier	easier	same as written feedback	difficult	much more difficult
watch your video	☐	☐	☐	☐	☐
understand your video feedback	☐	☐	☐	☐	☐
identify errors in your video feedback	☐	☐	☐	☐	☐
understand errors in your video feedback	☐	☐	☐	☐	☐
revise from your video feedback	☐	☐	☐	☐	☐
identify improvements to use in future work	☐	☐	☐	☐	☐
revisit your video feedback	☐	☐	☐	☐	☐

learn from your video feedback	☐	☐	☐	☐	☐

22.a. Comments:

23. Do you think you would like to see video feedback on other units?

- ☐ Yes. Just a video is fine
- ☐ Maybe. It depends on the assignment
- ☐ Maybe. It depends on the unit
- ☐ No. I prefer written feedback
- ☐ Other

23.a. If you selected Other, please specify:

24. Do you think receiving the feedback as video will improve the chances of you reviewing your feedback?

☐ No ☐ Yes ☐ Im not sure

24.a. Please tell us about the reasons for your answer

25. How do you feel about your video feedback, compared to traditional written feedback?

Please don't select more than 1 answer(s) per row.

	Vastly improved	Improved	Same as any other feedback	Not as good	Much worse
Encouraging	☐	☐	☐	☐	☐
Time consuming	☐	☐	☐	☐	☐
Personal	☐	☐	☐	☐	☐
Friendly	☐	☐	☐	☐	☐
Enjoyable	☐	☐	☐	☐	☐
Useful	☐	☐	☐	☐	☐
Engaging	☐	☐	☐	☐	☐
Clear	☐	☐	☐	☐	☐
Fair	☐	☐	☐	☐	☐
Entertaining	☐	☐	☐	☐	☐
Helpful	☐	☐	☐	☐	☐

25.a. Comments:

Page 7: Finally...

26. If you were marking students work using video feedback what would you do differently?

27. There is the opportunity to be involved in a focus group or an individual interview (whichever you prefer) in future. Would you be prepared to be involved in future research? If so, please enter your preferred email address here.

28. To thank you for your time you may enter a prize draw for one of ten £10 amazon vouchers. Just enter your preferred email address here.

Page 8: Thank you!

Thank you very much for your time!

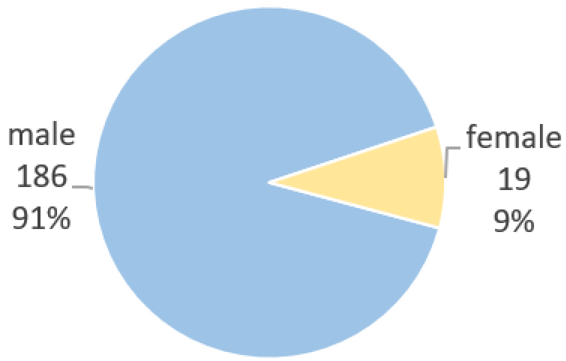
You have just contributed to making your course better for yourself and for students still to come.

Key for selection options

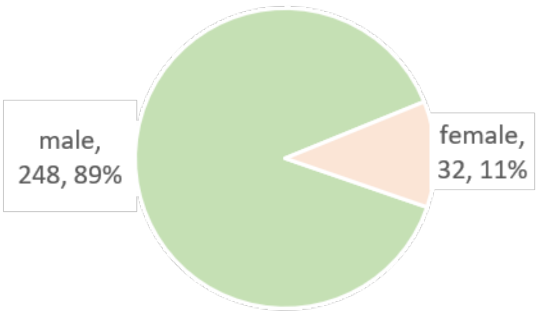
3 - Please select your degree title.

- BSc(Hons) Business Information Technology
- BSc (Hons) Computing
- BSc (Hons) Computer Networks
- BSc (Hons) Forensic Computing and Security
- BSc (Hons) Information Technology Management
- BSc (Hons) Software Engineering

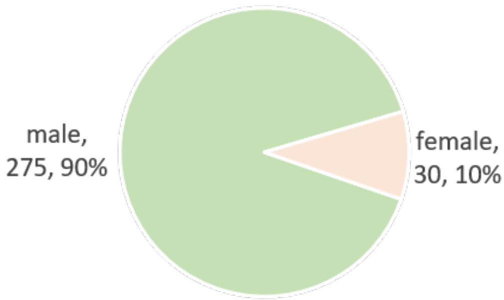
F.3 Video feedback in practice: Comparison of Gender distribution



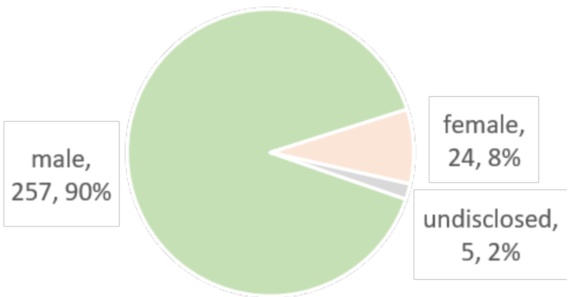
(a) Survey respondents



(b) 2015-2016



(c) 2016-2017



(d) 2017-2018

Figure F.1: Comparing gender distribution of respondents to those of the student cohort

F.4 Video feedback in practice: Principle Component Analysis of Ease of Use

```
FACTOR
  /VARIABLES Q3_Easy_ToWatch Q3_Easy_Understand Q3_Easy_IdentifyErrors Q3_Easy_UnderstandErrors
    Q3_Easy_ReviseFrom Q3_Easy_IdentifyFutureImprovements Q3_Easy_Revisit Q3_Easy_ToLearnFrom
  /MISSING LISTWISE
  /ANALYSIS Q3_Easy_ToWatch Q3_Easy_Understand Q3_Easy_IdentifyErrors Q3_Easy_UnderstandErrors
    Q3_Easy_ReviseFrom Q3_Easy_IdentifyFutureImprovements Q3_Easy_Revisit Q3_Easy_ToLearnFrom
  /PRINT INITIAL CORRELATION KMO REPR AIC EXTRACTION ROTATION
  /FORMAT SORT BLANK(.3)
  /PLOT EIGEN ROTATION
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PC
  /CRITERIA ITERATE(25)
  /ROTATION VARIMAX
  /SAVE REG(ALL)
  /METHOD=CORRELATION.
```

Figure F.2: PCA Ease of use questions - Output from SPSS (IBM 1999) - Settings

Correlation Matrix

		Q3) How easy - to watch (v reading)	Q3) How easy - to understand	Q3) How easy - identify errors	Q3) How easy - to understand errors	Q3) How easy - to revide from	Q3) How easy - to identify future improvement s	Q3) How easy - to revisit	Q3) How easy - to learn from
Correlation	Q3) How easy - to watch (v reading)	1.000	.688	.602	.597	.463	.523	.505	.574
	Q3) How easy - to understand	.688	1.000	.680	.720	.508	.694	.515	.629
	Q3) How easy - identify errors	.602	.680	1.000	.812	.438	.661	.473	.692
	Q3) How easy - to understand errors	.597	.720	.812	1.000	.532	.713	.533	.762
	Q3) How easy - to revide from	.463	.508	.438	.532	1.000	.630	.688	.570
	Q3) How easy - to identify future improvements	.523	.694	.661	.713	.630	1.000	.589	.769
	Q3) How easy - to revisit	.505	.515	.473	.533	.688	.589	1.000	.569
	Q3) How easy - to learn from	.574	.629	.692	.762	.570	.769	.569	1.000

Figure F.3: PCA Ease of use questions - Output from SPSS (IBM 1999) - Correlation matrix

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.896
Bartlett's Test of Sphericity	Approx. Chi-Square	1209.431
	df	28
	Sig.	.000

Figure F.4: PCA Ease of use questions - Output from SPSS (IBM 1999) - KMO and Bartletts Test

Anti-image Matrices

		Q3) How easy - to watch (v reading)	Q3) How easy - to understand	Q3) How easy - identify errors	Q3) How easy - to understand errors	Q3) How easy - to revide from	Q3) How easy - to identify future improvements	Q3) How easy - to revisit	Q3) How easy - to learn from
Anti-image Covariance	Q3) How easy - to watch (v reading)	.458	-.159	-.059	.005	-.027	.053	-.064	-.053
	Q3) How easy - to understand	-.159	.330	-.032	-.064	-.004	-.093	-.006	.032
	Q3) How easy - identify errors	-.059	-.032	.301	-.133	.043	-.032	-.003	-.029
	Q3) How easy - to understand errors	.005	-.064	-.133	.237	-.025	-.013	-.006	-.080
	Q3) How easy - to revide from	-.027	-.004	.043	-.025	.440	-.086	-.208	-.019
	Q3) How easy - to identify future improvements	.053	-.093	-.032	-.013	-.086	.291	-.030	-.118
	Q3) How easy - to revisit	-.064	-.006	-.003	-.006	-.208	-.030	.458	-.031
	Q3) How easy - to learn from	-.053	.032	-.029	-.080	-.019	-.118	-.031	.297
Anti-image Correlation	Q3) How easy - to watch (v reading)	.898[a]	-.408	-.159	.015	-.059	.146	-.140	-.144
	Q3) How easy - to understand	-.408	.897[a]	-.100	-.229	-.011	-.299	-.016	.101
	Q3) How easy - identify errors	-.159	-.100	.898[a]	-.498	.118	-.108	-.007	-.097
	Q3) How easy - to understand errors	.015	-.229	-.498	.889[a]	-.076	-.048	-.018	-.300
	Q3) How easy - to revide from	-.059	-.011	.118	-.076	.878[a]	-.240	-.463	-.052
	Q3) How easy - to identify future improvements	.146	-.299	-.108	-.048	-.240	.897[a]	-.081	-.400
	Q3) How easy - to revisit	-.140	-.016	-.007	-.018	-.463	-.081	.897[a]	-.084
	Q3) How easy - to learn from	-.144	.101	-.097	-.300	-.052	-.400	-.084	.910[a]

a. Measures of Sampling Adequacy(MSA)

Figure F.5: PCA Ease of use questions - Output from SPSS (IBM 1999) - Anti image Matrices

Communalities

	Initial	Extraction
Q3) How easy - to watch (v reading)	1.000	.573
Q3) How easy - to understand	1.000	.703
Q3) How easy - identify errors	1.000	.690
Q3) How easy - to understand errors	1.000	.772
Q3) How easy - to revide from	1.000	.536
Q3) How easy - to identify future improvements	1.000	.744
Q3) How easy - to revisit	1.000	.545
Q3) How easy - to learn from	1.000	.741

Extraction Method: Principal Component Analysis.

Figure F.6: PCA Ease of use questions - Output from SPSS (IBM 1999) - Communalities

Total Variance Explained

Component	Initial Eigenvalues Total	Initial Eigenvalues % of Variance	Initial Eigenvalues Cumulative %	Extraction Sums of Squared Loadings Total	Extraction Sums of Squared Loadings % of Variance	Extraction Sums of Squared Loadings Cumulative %
1	5.304	66.303	66.303	5.304	66.303	66.303
2	.824	10.298	76.600			
3	.556	6.949	83.549			
4	.354	4.422	87.971			
5	.312	3.896	91.867			
6	.291	3.642	95.509			
7	.204	2.545	98.054			
8	.156	1.946	100.000			

Extraction Method: Principal Component Analysis.

Figure F.7: PCA Ease of use questions - Output from SPSS (IBM 1999) - Total variance

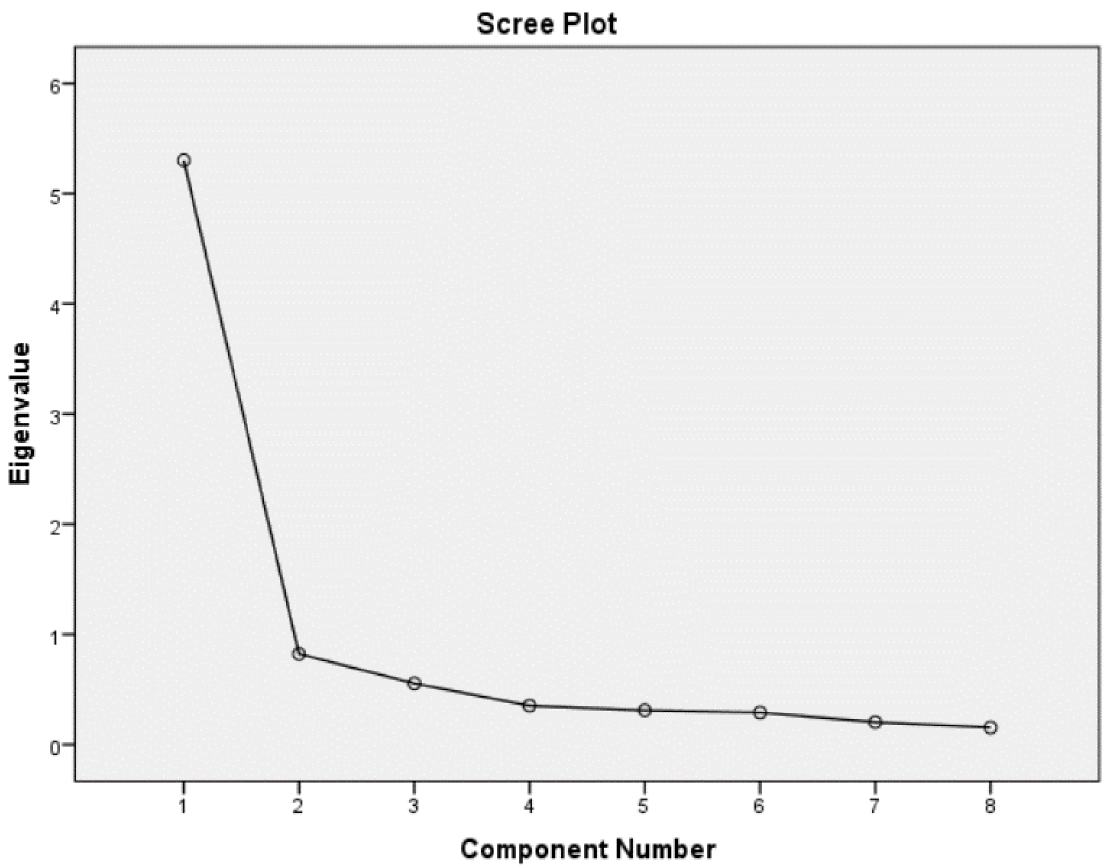


Figure F.8: PCA Ease of use questions - Output from SPSS (IBM 1999) - Scree Plot

Component Matrix[a]

	Component
	1
Q3) How easy - to understand errors	.879
Q3) How easy - to identify future improvements	.862
Q3) How easy - to learn from	.861
Q3) How easy - to understand	.839
Q3) How easy - identify errors	.831
Q3) How easy - to watch (v reading)	.757
Q3) How easy - to revisit	.738
Q3) How easy - to revide from	.732

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Figure F.9: PCA Ease of use questions - Output from SPSS (IBM 1999) - Component Matrix

Reproduced Correlations

		Q3) How easy - to watch (v reading)	Q3) How easy - to understand	Q3) How easy - identify errors	Q3) How easy - to understand errors	Q3) How easy - to revide from	Q3) How easy - to identify future improvements	Q3) How easy - to revisit	Q3) How easy - to learn from
Reproduced Correlation	Q3) How easy - to watch (v reading)	.573[a]	.635	.629	.665	.554	.653	.559	.652
	Q3) How easy - to understand	.635	.703[a]	.697	.737	.614	.723	.619	.722
	Q3) How easy - identify errors	.629	.697	.690[a]	.730	.608	.716	.613	.715
	Q3) How easy - to understand errors	.665	.737	.730	.772[a]	.643	.758	.649	.757
	Q3) How easy - to revide from	.554	.614	.608	.643	.536[a]	.631	.540	.630
	Q3) How easy - to identify future improvements	.653	.723	.716	.758	.631	.744[a]	.637	.743
	Q3) How easy - to revisit	.559	.619	.613	.649	.540	.637	.545[a]	.636
	Q3) How easy - to learn from	.652	.722	.715	.757	.630	.743	.636	.741[a]
Residual[b]	Q3) How easy - to watch (v reading)		.053	-.027	-.068	-.091	-.129	-.054	-.078
	Q3) How easy - to understand	.053		-.017	-.017	-.105	-.030	-.104	-.094
	Q3) How easy - identify errors	-.027	-.017		.082	-.169	-.055	-.140	-.023
	Q3) How easy - to understand errors	-.068	-.017	.082		-.111	-.045	-.116	.005
	Q3) How easy - to revide from	-.091	-.105	-.169	-.111		-.001	.147	-.060
	Q3) How easy - to identify future improvements	-.129	-.030	-.055	-.045	-.001		-.047	.026
	Q3) How easy - to revisit	-.054	-.104	-.140	-.116	.147	-.047		-.066
	Q3) How easy - to learn from	-.078	-.094	-.023	.005	-.060	.026	-.066	

Extraction Method: Principal Component Analysis.

a. Reproduced communalities

b. Residuals are computed between observed and reproduced correlations. There are 18 (64.0%) nonredundant residuals with absolute values greater than 0.05.

Figure F.10: PCA Ease of use questions - Output from SPSS (IBM 1999) - Reproduced correlations

F.5 Video feedback in practice: Principle Component Analysis of How you feel about...? Questions

```
FACTOR
  /VARIABLES Q9_HowDidYouFeel_Encouraging Q9_HowDIdYouFeel_TimeConsuming Q9_HowDidYouFeel_Personal
    Q9_HowDidYouFeel_Friendly Q9_HowDidYouFeel_Enjoyable Q9_HowDidYouFeel_Useful
    Q9_HowDidYouFeel_Engaging Q9_HowDidYouFeel_Clarity Q9_HowDidYouFeel_Fair
    Q9_HowDidYouFeel_Entertaining Q9_HowDidYouFeel_Helpful
  /MISSING LISTWISE
  /ANALYSIS Q9_HowDidYouFeel_Encouraging Q9_HowDIdYouFeel_TimeConsuming Q9_HowDidYouFeel_Personal
    Q9_HowDidYouFeel_Friendly Q9_HowDidYouFeel_Enjoyable Q9_HowDidYouFeel_Useful
    Q9_HowDidYouFeel_Engaging Q9_HowDidYouFeel_Clarity Q9_HowDidYouFeel_Fair
    Q9_HowDidYouFeel_Entertaining Q9_HowDidYouFeel_Helpful
  /PRINT INITIAL CORRELATION KMO REPR AIC EXTRACTION ROTATION
  /FORMAT SORT BLANK(.3)
  /PLOT EIGEN ROTATION
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PC
  /CRITERIA ITERATE(25)
  /ROTATION VARIMAX
  /SAVE REG(ALL)
  /METHOD=CORRELATION.
```

Figure F.11: PCA How do you feel about video feedback? questions - Output from SPSS (IBM 1999) - Settings

Correlation Matrix

		Q9) How did you feel about your video feedback?: Encouraging	Q9) How did you feel about your video feedback?: Time consuming	Q9) How did you feel about your video feedback?: Personal	Q9) How did you feel about your video feedback?: Friendly	Q9) How did you feel about your video feedback?: Enjoyable	Q9) How did you feel about your video feedback?: Useful	Q9) How did you feel about your video feedback?: Engaging	Q9) How did you feel about your video feedback?: Clarity	Q9) How did you feel about your video feedback?: Fair	Q9) How did you feel about your video feedback?: Entertaining	Q9) How did you feel about your video feedback?: Helpful
Correlation	Q9) How did you feel about your video feedback?: Encouraging	1.000	.539	.493	.599	.607	.671	.645	.687	.568	.620	.680
	Q9) How did you feel about your video feedback?: Time consuming	.539	1.000	.434	.467	.590	.568	.558	.466	.535	.517	.510
	Q9) How did you feel about your video feedback?: Personal	.493	.434	1.000	.740	.584	.591	.599	.613	.558	.417	.567
	Q9) How did you feel about your video feedback?: Friendly	.599	.467	.740	1.000	.657	.571	.675	.650	.669	.591	.623
	Q9) How did you feel about your video feedback?: Enjoyable	.607	.590	.584	.657	1.000	.641	.764	.617	.672	.635	.597
	Q9) How did you feel about your video feedback?: Useful	.671	.568	.591	.571	.641	1.000	.700	.747	.606	.446	.834
	Q9) How did you feel about your video feedback?: Engaging	.645	.558	.599	.675	.764	.700	1.000	.736	.632	.642	.669
	Q9) How did you feel about your video feedback?: Clarity	.687	.466	.613	.650	.617	.747	.736	1.000	.673	.526	.753
	Q9) How did you feel about your video feedback?: Fair	.568	.535	.558	.669	.672	.606	.632	.673	1.000	.566	.634
	Q9) How did you feel about your video feedback?: Entertaining	.620	.517	.417	.591	.635	.446	.642	.526	.566	1.000	.506
	Q9) How did you feel about your video feedback?: Helpful	.680	.510	.567	.623	.597	.834	.669	.753	.634	.506	1.000

Figure F.12: PCA How do you feel about video feedback? questions - Output from SPSS (IBM 1999) - Correlation matrix

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.925
Bartlett's Test of Sphericity	Approx. Chi-Square	1758.663
	df	55
	Sig.	.000

Figure F.13: PCA How do you feel about video feedback? questions - Output from SPSS (IBM 1999) - KMO and Bartletts Test

Anti-image Matrices

		Q9) How did you feel about your video feedback?: Encouraging	Q9) How did you feel about your video feedback?: Time consuming	Q9) How did you feel about your video feedback?: Personal	Q9) How did you feel about your video feedback?: Friendly	Q9) How did you feel about your video feedback?: Enjoyable	Q9) How did you feel about your video feedback?: Useful	Q9) How did you feel about your video feedback?: Engaging	Q9) How did you feel about your video feedback?: Clarity	Q9) How did you feel about your video feedback?: Fair	Q9) How did you feel about your video feedback?: Entertaining	Q9) How did you feel about your video feedback?: Helpful
Anti-image Covariance	Q9) How did you feel about your video feedback?: Encouraging	.374	-.056	.028	-.035	-.012	-.042	.006	-.069	.024	-.111	-.036
	Q9) How did you feel about your video feedback?: Time consuming	-.056	.538	-.024	.023	-.055	-.066	-.021	.054	-.067	-.072	.010
	Q9) How did you feel about your video feedback?: Personal	.028	-.024	.392	-.174	-.030	-.042	-.007	-.041	.007	.048	.012
	Q9) How did you feel about your video feedback?: Friendly	-.035	.023	-.174	.296	-.024	.038	-.031	-.006	-.072	-.056	-.036
	Q9) How did you feel about your video feedback?: Enjoyable	-.012	-.055	-.030	-.024	.310	-.036	-.103	.029	-.079	-.063	.022
	Q9) How did you feel about your video feedback?: Useful	-.042	-.066	-.042	.038	-.036	.219	-.036	-.041	.002	.067	-.127
	Q9) How did you feel about your video feedback?: Engaging	.006	-.021	-.007	-.031	-.103	-.036	.267	-.077	.025	-.072	.003
	Q9) How did you feel about your video feedback?: Clarity	-.069	.054	-.041	-.006	.029	-.041	-.077	.274	-.078	.006	-.046
	Q9) How did you feel about your video feedback?: Fair	.024	-.067	.007	-.072	-.079	.002	.025	-.078	.385	-.039	-.032
	Q9) How did you feel about your video feedback?: Entertaining	-.111	-.072	.048	-.056	-.063	.067	-.072	.006	-.039	.427	-.023
	Q9) How did you feel about your video feedback?: Helpful	-.036	.010	.012	-.036	.022	-.127	.003	-.046	-.032	-.023	.243

Figure F.14: PCA How do you feel about video feedback? questions - Output from SPSS (IBM 1999) - Anti image covariance matrix

Anti-image Matrices

		Q9) How did you feel about your video feedback?: Encouraging	Q9) How did you feel about your video feedback?: Time consuming	Q9) How did you feel about your video feedback?: Personal	Q9) How did you feel about your video feedback?: Friendly	Q9) How did you feel about your video feedback?: Enjoyable	Q9) How did you feel about your video feedback?: Useful	Q9) How did you feel about your video feedback?: Engaging	Q9) How did you feel about your video feedback?: Clarity	Q9) How did you feel about your video feedback?: Fair	Q9) How did you feel about your video feedback?: Entertaining	Q9) How did you feel about your video feedback?: Helpful
Anti-image Correlation	Q9) How did you feel about your video feedback?: Encouraging	.950[a]	-.125	.073	-.106	-.036	-.145	.020	-.215	.064	-.279	-.118
	Q9) How did you feel about your video feedback?: Time consuming	-.125	.949[a]	-.052	.057	-.135	-.193	-.057	.139	-.148	-.150	.027
	Q9) How did you feel about your video feedback?: Personal	.073	-.052	.907[a]	-.510	-.085	-.145	-.022	-.124	.019	.118	.039
	Q9) How did you feel about your video feedback?: Friendly	-.106	.057	-.510	.907[a]	-.078	.150	-.111	-.023	-.214	-.157	-.135
	Q9) How did you feel about your video feedback?: Enjoyable	-.036	-.135	-.085	-.078	.936[a]	-.139	-.358	.099	-.227	-.173	.081
	Q9) How did you feel about your video feedback?: Useful	-.145	-.193	-.145	.150	-.139	.888[a]	-.150	-.169	.008	.221	-.552
	Q9) How did you feel about your video feedback?: Engaging	.020	-.057	-.022	-.111	-.358	-.150	.936[a]	-.286	.076	-.214	.010
	Q9) How did you feel about your video feedback?: Clarity	-.215	.139	-.124	-.023	.099	-.169	-.286	.936[a]	-.239	.017	-.178
	Q9) How did you feel about your video feedback?: Fair	.064	-.148	.019	-.214	-.227	.008	.076	-.239	.948[a]	-.096	-.105
	Q9) How did you feel about your video feedback?: Entertaining	-.279	-.150	.118	-.157	-.173	.221	-.214	.017	-.096	.916[a]	-.070
	Q9) How did you feel about your video feedback?: Helpful	-.118	.027	.039	-.135	.081	-.552	.010	-.178	-.105	-.070	.914[a]

a. Measures of Sampling Adequacy(MSA)

Figure F.15: PCA How do you feel about video feedback? questions - Output from SPSS (IBM 1999) - Anti image correlation matrix

Communalities

	Initial	Extraction
Q9) How did you feel about your video feedback?: Encouraging	1.000	.649
Q9) How did you feel about your video feedback?: Time consuming	1.000	.478
Q9) How did you feel about your video feedback?: Personal	1.000	.556
Q9) How did you feel about your video feedback?: Friendly	1.000	.673
Q9) How did you feel about your video feedback?: Enjoyable	1.000	.696
Q9) How did you feel about your video feedback?: Useful	1.000	.705
Q9) How did you feel about your video feedback?: Engaging	1.000	.750
Q9) How did you feel about your video feedback?: Clarity	1.000	.724
Q9) How did you feel about your video feedback?: Fair	1.000	.649
Q9) How did you feel about your video feedback?: Entertaining	1.000	.528
Q9) How did you feel about your video feedback?: Helpful	1.000	.705

Extraction Method: Principal Component Analysis.

Figure F.16: PCA How do you feel about video feedback? questions - Output from SPSS (IBM 1999) - Communalities

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.112	64.659	64.659	7.112	64.659	64.659
2	.764	6.942	71.600			
3	.692	6.292	77.892			
4	.543	4.941	82.833			
5	.419	3.806	86.639			
6	.393	3.576	90.214			
7	.281	2.559	92.773			
8	.269	2.443	95.216			
9	.220	1.998	97.214			
10	.170	1.543	98.757			
11	.137	1.243	100.000			

Extraction Method: Principal Component Analysis.

Figure F.17: PCA How do you feel about video feedback? questions - Output from SPSS (IBM 1999) - Total variance

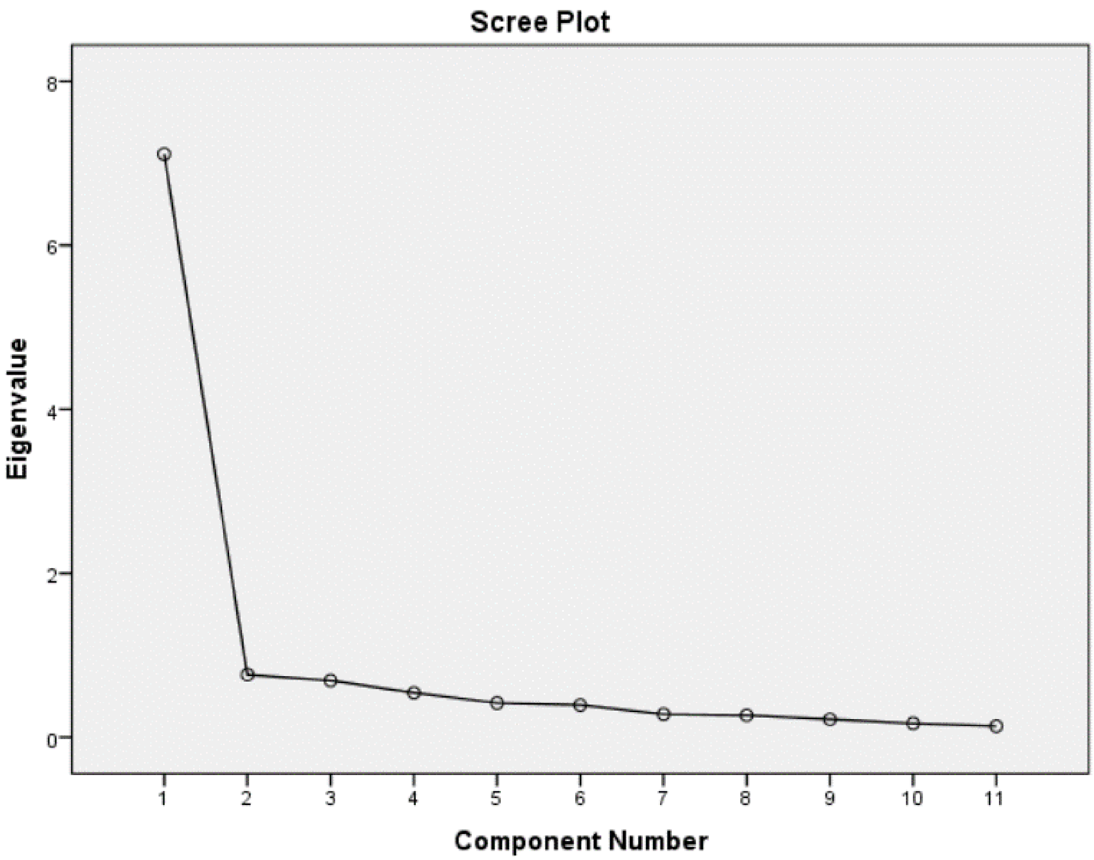


Figure F.18: PCA How do you feel about video feedback? questions - Output from SPSS (IBM 1999) - Scree Plot

Component Matrix[a]

	Component 1
Q9) How did you feel about your video feedback?: Engaging	.866
Q9) How did you feel about your video feedback?: Clarity	.851
Q9) How did you feel about your video feedback?: Helpful	.840
Q9) How did you feel about your video feedback?: Useful	.840
Q9) How did you feel about your video feedback?: Enjoyable	.834
Q9) How did you feel about your video feedback?: Friendly	.820
Q9) How did you feel about your video feedback?: Fair	.806
Q9) How did you feel about your video feedback?: Encouraging	.806
Q9) How did you feel about your video feedback?: Personal	.745
Q9) How did you feel about your video feedback?: Entertaining	.726
Q9) How did you feel about your video feedback?: Time consuming	.691

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Figure F.19: PCA How do you feel about video feedback? questions - Output from SPSS (IBM 1999) - Component Matrix

Reproduced Correlations

		Q9) How did you feel about your video feedback?: Encouraging	Q9) How did you feel about your video feedback?: Time consuming	Q9) How did you feel about your video feedback?: Personal	Q9) How did you feel about your video feedback?: Friendly	Q9) How did you feel about your video feedback?: Enjoyable	Q9) How did you feel about your video feedback?: Useful	Q9) How did you feel about your video feedback?: Engaging	Q9) How did you feel about your video feedback?: Clarity	Q9) How did you feel about your video feedback?: Fair	Q9) How did you feel about your video feedback?: Entertaining	Q9) How did you feel about your video feedback?: Helpful
Reproduced Correlation	Q9) How did you feel about your video feedback?: Encouraging	.649[a]	.557	.601	.661	.672	.676	.698	.686	.649	.585	.676
	Q9) How did you feel about your video feedback?: Time consuming	.557	.478[a]	.515	.567	.577	.580	.599	.588	.557	.502	.580
	Q9) How did you feel about your video feedback?: Personal	.601	.515	.556[a]	.611	.622	.626	.646	.634	.601	.542	.626
	Q9) How did you feel about your video feedback?: Friendly	.661	.567	.611	.673[a]	.684	.689	.710	.698	.661	.596	.689
	Q9) How did you feel about your video feedback?: Enjoyable	.672	.577	.622	.684	.696[a]	.701	.723	.710	.672	.606	.701
	Q9) How did you feel about your video feedback?: Useful	.676	.580	.626	.689	.701	.705[a]	.727	.715	.677	.610	.705
	Q9) How did you feel about your video feedback?: Engaging	.698	.599	.646	.710	.723	.727	.750[a]	.737	.698	.629	.727
	Q9) How did you feel about your video feedback?: Clarity	.686	.588	.634	.698	.710	.715	.737	.724[a]	.686	.618	.715
	Q9) How did you feel about your video feedback?: Fair	.649	.557	.601	.661	.672	.677	.698	.686	.649[a]	.585	.677
	Q9) How did you feel about your video feedback?: Entertaining	.585	.502	.542	.596	.606	.610	.629	.618	.585	.528[a]	.610
	Q9) How did you feel about your video feedback?: Helpful	.676	.580	.626	.689	.701	.705	.727	.715	.677	.610	.705[a]

Figure F.20: PCA How do you feel about video feedback? questions - Output from SPSS (IBM 1999) - Reproduced correlations

Reproduced Correlations

		Q9) How did you feel about your video feedback?: Encouraging	Q9) How did you feel about your video feedback?: Time consuming	Q9) How did you feel about your video feedback?: Personal	Q9) How did you feel about your video feedback?: Friendly	Q9) How did you feel about your video feedback?: Enjoyable	Q9) How did you feel about your video feedback?: Useful	Q9) How did you feel about your video feedback?: Engaging	Q9) How did you feel about your video feedback?: Clarity	Q9) How did you feel about your video feedback?: Fair	Q9) How did you feel about your video feedback?: Entertaining	Q9) How did you feel about your video feedback?: Helpful
Residual[b]	Q9) How did you feel about your video feedback?: Encouraging		-.018	-.107	-.061	-.066	-.005	-.053	.001	-.081	.035	.004
	Q9) How did you feel about your video feedback?: Time consuming	-.018		-.081	-.100	.013	-.012	-.041	-.122	-.022	.015	-.070
	Q9) How did you feel about your video feedback?: Personal	-.107	-.081		.129	-.038	-.035	-.046	-.022	-.043	-.125	-.059
	Q9) How did you feel about your video feedback?: Friendly	-.061	-.100	.129		-.028	-.118	-.036	-.048	.008	-.005	-.065
	Q9) How did you feel about your video feedback?: Enjoyable	-.066	.013	-.038	-.028		-.059	.042	-.093	-5.043E-5	.029	-.103
	Q9) How did you feel about your video feedback?: Useful	-.005	-.012	-.035	-.118	-.059		-.027	.032	-.070	-.164	.129
	Q9) How did you feel about your video feedback?: Engaging	-.053	-.041	-.046	-.036	.042	-.027		-.001	-.066	.012	-.058
	Q9) How did you feel about your video feedback?: Clarity	.001	-.122	-.022	-.048	-.093	.032	-.001		-.013	-.092	.038
	Q9) How did you feel about your video feedback?: Fair	-.081	-.022	-.043	.008	-5.043E-5	-.070	-.066	-.013		-.020	-.042
	Q9) How did you feel about your video feedback?: Entertaining	.035	.015	-.125	-.005	.029	-.164	.012	-.092	-.020		-.104
	Q9) How did you feel about your video feedback?: Helpful	.004	-.070	-.059	-.065	-.103	.129	-.058	.038	-.042	-.104	

Extraction Method: Principal Component Analysis.

a. Reproduced communalities

b. Residuals are computed between observed and reproduced correlations. There are 24 (43.0%) nonredundant residuals with absolute values greater than 0.05.

Figure F.21: PCA How do you feel about video feedback? questions - Output from SPSS (IBM 1999) - Reproduced correlations residuals

Appendix G

Summarising Case Study participants and instruments of data collection

Case study Year	Date	Total Markers	Markers using audio/video	Sample	Responses		Instrument	Delivery
					count	rate		
Pre study surveys								
2012-2013	Feb 2013	4	1	200*	52	26.00%	survey	email
2013-2014	Nov 2013	4	1	231*	33	14.29%	survey	email
Pilot: Audio Feedback								
2012-2013	Mar 2013	4	1	31	9	29.03%	survey	VLE
Video Feedback on trial								
2013-2014	Dec 2013	4	1	57	14	24.56%	survey	VLE
2014-2015	Jan 2014	4	1	63	9	14.29%	survey	VLE
Video Feedback in practice								
2015-2016	Dec 2015	4	4	298*	35	11.74%	survey	email
	Mar 2016	4	4	298*	85	28.52%	survey	VLE
2016-2017	Dec 2016	4	4	313*	29	9.27%	survey	email
2017-2018	Dec 2017	4	4	273*	70	25.64%	survey	feedback video and VLE
2018-2019	Jan 2019	3-6**	3-6**	258*	15	5.81%	Interview	In person

*Student numbers enrolled within a month of the start of the year - submissions will vary by exercise submitted.

*Availability varies with time of year

Table G.1: Student Surveys - summary of participant numbers and instrument

Academic Year	Date	Sample	Responses		instrument	Delivery
			count	rate		
Marking Staff Comments						
2015-2016	Jun 2016	5	5	100%	request for comment	email
Expert Panel						
2018-2019	Jun 2019	20	6	30%	survey	email

Table G.2: Non student surveys - summary of participant numbers and instruments

Appendix H

Validation of the Taxonomy of Video Feedback

H.1 Expert Panel Online Exercise

Taxonomy of Video Feedback Expert Panel Validation Exercise

Welcome to the Validation Exercise of the Taxonomy of Video Feedback

The title of the research project

Development and validation of a taxonomy to guide practitioners in the use of video feedback

Invitation to take part

You are being invited to take part in a research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Please take your time to decide whether or not you wish to take part.

What is the purpose of the project?

This research is designed to produce evidence-based guidance towards best practice for academics who use video as assessment feedback. The foundation and mechanism for forming that advice is a taxonomy. It enables the classification of context details of practice and the perceptions of staff and students regarding the practice. You are invited to participate in the validation of the taxonomy. This validation exercise is anticipated to take approximately one month overall. .

Why have I been chosen?

Individual academics will be invited to participate in the Expert Panel, chosen because of their specific skills and experience in the study domain. Up to 20 experts will be invited.

Do I have to take part?

It is up to you to decide whether or not to take part. You can withdraw from participation during the validation exercise at any time and without giving a reason, by simply closing the browser window. If you decide to withdraw we will usually remove any data collected about you from the study. Once the validation exercise has finished you can may still withdraw your data up to the point where the data is analysed and incorporated into the research findings or outputs. At this point your data will become anonymous, so your identity cannot be determined, and it may not be possible to identify your data within the anonymous dataset. Withdrawing your data at this point may also adversely affect the validity and integrity of the research. Deciding to take part or not will not impact upon any education or studies at BU.

What would taking part involve?

This exercise involves completing a set of exercises designed to validate the taxonomy of video feedback.This is an online exercise involving reading about the taxonomy, some writing, and some multiple-choice questions. It is anticipated that this exercise will take between 30 mins and 1 hour.

What are the advantages and possible disadvantages or risks of taking part?

Whilst there are no immediate benefits for those people participating in the project, it is hoped that this work will benefit academics who wish to use, or are currently using, video as feedback by forming the foundation of guidance for best practice.

What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?

Your opinions and thoughts regarding your experiences when using the taxonomy of video feedback to complete the written exercises. It is anticipated that the findings from this exercise will validate the taxonomy to ensure its usefulness.

Will I be recorded, and how will the recorded media be used?

No recordings of audio or video will be made during this validation exercise.

How will my information be kept?

All the information we collect about you during the research will be kept strictly in accordance with current data protection legislation. Research is a task that we perform in the public interest, as part of our core function as a university. Bournemouth University (BU) is a Data Controller of your information which means that we are responsible for looking after your information and using it appropriately. BU's Research Participant Privacy Notice sets out more information about how we fulfil our responsibilities as a data controller and about your rights as an individual under the data protection legislation. We ask you to read this Notice so that you can fully understand the basis on which we will process your information.

Publication

The research results will appear in publications. You will not be able to be identified in any external reports or publications about the research without your specific consent. Otherwise your information will only be included in these materials in an anonymous form, i.e. you will not be identifiable.

Security and access controls

BU will hold the information we collect about you in hard copy in a secure location and on a BU password protected secure network where held electronically.

Except where it has been anonymised your personal information will be accessed and used only by appropriate, authorised individuals and when this is necessary for the purposes of the research or another purpose identified in the Privacy Notice. This may include giving access to BU staff or others responsible for monitoring and/or audit of the study, who need to ensure that the research is complying with applicable regulations.

Retention of your data

All personal data collected for the purposes of this study will be held for 5 years after the award of the degree. Although published research outputs are anonymised, we need to retain underlying data collected for the study in a non-anonymised form for a certain period to enable the research to be audited and/or to enable the research findings to be verified.

Contact for further information

If you have any questions or would like further information, please contact one of the project supervisors: -

Dr Sherry Jeary
Senior Lecturer in Computing,
Faculty of Science and Technology
Email: sjeary@bournemouth.ac.uk

Dr Angelos Stefanidis
Head of Computing and Informatics & Associate Dean Global Engagement,
Faculty of Science and Technology
Email: astefanidis@bournemouth.ac.uk

In case of complaints

Any concerns about the study should be directed to Deputy Dean for Research & Professional Practice, Professor Tiantian Zhang, Faculty of Science and Technology, Bournemouth University by email to researchgovernance@bournemouth.ac.uk.

Finally

Thank you for considering taking part in this research project.

All about you

Please enter the following details about you

Title

Name

Affiliated institution

Contact details you are happy to be used for a follow up query if required.

Please describe your expertise, which you perceive as most relevant to this research

Do you have experience of creating video as feedback for summative assessment for students? ✱ *Required*

- Yes
- No

Exercise 1: Evaluation of Concision and Validity - Classification using the Context Taxonomy

The following scenario, is formed by amalgamating the details of various real practices from literature into one, to create a fictional, but realistic practice scenario. This exercise asks you to classify details of the practice as described in the scenario into the Taxonomy of Video Feedback.

*NOTE: The scenario will be repeated **beneath each question** so that you do not have to return to this page between each question. The scenario will remain identical throughout.*

Practice Scenario

Paper: Video feedback on electronic portfolios for students studying sport (2016)

Author: Alex Bobbins & Chris Jones

This work seeks to evaluate screencasting as a means of enhancing the formative assessment process for students. The research was undertaken with students in the second year of the BA in Sport and Exercise. The assessment for the 'Team Leadership' module is assessed on the creation of an e-portfolio using Mahara, which details their experiences of leading a team in semester 1 2015-2016.

The group is comprised of 29 students, 8 female and 21 males. All students are over the age of 18. Three students have additional learning needs. All students speak English as their native language, with the exception of 1 from Germany and 2 from Nigeria. Seventeen responded to the survey.

Students create a series of e-portfolio pages. Students upload their e-portfolios to the assignment submission section of the Moodle VLE secured by the student login credentials.

- Lecturer logs onto the staff assessment interface to the VLE, views the student work, records the feedback using screen capture software called Screencast-o-matic.
- The video is linked to the VLE. These links are embedded in a video player so the videos appear to play directly from the page, even though they are actually stored at the Screencast-O-Matic website.
- The lecturer records between 3-10 minutes of feedback. The students usually see the work on screen but occasionally, to clarify misunderstandings, the assignment brief including the marking scheme, is also brought into view. A smaller window showing the marker is also included in key sections of the video when a physical demonstration of an action is required.
- When the marks are released the students receive a notification email to inform them that they have feedback on their work.

This exercise asks you to classify the details of your practice in which you use video feedback, into the Taxonomy of Video Feedback.

Understanding the Taxonomy of Video Feedback

The video feedback taxonomy is in fact, a pair of overlapping taxonomies which describe two key sets of details about video feedback in practice. As such they can be used as a classification system for studies of video feedback in practice (see Figure 1).

On The left is the taxonomy that classifies attributes of the video feedback practice context, known as the ‘context taxonomy’. On the right is the taxonomy which classifies the findings, known as the ‘perceptions taxonomy’. In the centre is the section of the taxonomy set known as the ‘Study’, which is where the two halves overlap. Each half of the taxonomy set may appear separately if the other is not required, however, the centre section should always appear even when only one half is in use as it is the section which identifies the study.

Both taxonomies are multi-faceted. The facets are shown in the outer layer of each taxonomy. Facets are grouped together under hierarchical inner layers, which serve as a means of locating a facet by grouping related facets together. Some facets require multiple attributes to fully describe them and these are explained in the descriptions of each facet which follow.

Figure 1 - A visualisation of the Taxonomy of Video Feedback

Study Section of the Taxonomies

The Context and Perceptions Taxonomies may appear separately, since both are not always required. The Study section should always appear with each of the two taxonomies, even when they appear separately, to identify the study to which the details belong.

Figure 2 - A visualisation of the Study section from the Taxonomy of Video Feedback

Author(s)

Description:	Author(s) of papers about the practice studied, or if the practice is not published, the practitioner(s) involved in the practice scenario.
Purpose:	Identification of the practice studied.
Format:	As referenced on academic papers.
Examples:	Cranny, D. Atfield-Cutts, S. et al Henderson, M. & Phillips, M.

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Author(s):

Practice Scenario

Paper: Video feedback on electronic portfolios for students studying sport (2016)

Author: Alex Bobbins & Chris Jones

This work seeks to evaluate screencasting as a means of enhancing the formative assessment process for students. The research was undertaken with students in the second year of the BA in Sport and Exercise. The assessment for the ‘Team Leadership’ module is assessed on the creation of an e-portfolio using Mahara, which details their experiences of leading a team in semester 1 2015-2016.

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- The lecturer records between 3-10 minutes of feedback. The students usually see the work on screen but occasionally, to clarify misunderstandings, the assignment brief including the marking scheme, is also brought into view. A smaller window showing the marker is also included in key sections of the video when a physical demonstration of an action is required.
- When the marks are released the students receive a notification email to inform them that they have feedback on their work.

Study Section of the Taxonomies

Year

Description:	Author(s) of papers about the practice studied, or if the practice is not published, the practitioner(s) involved in the practice scenario.
Purpose:	Identification of the practice studied.
Format:	Year as four digits.
Examples:	1996 2019

Instructions

Please read the description of the facet. Enter the value from the practice scenario which you would classify into the facet.

NOTE: The scenario is repeated beneath every question

Year of Study:

Your answer should be no more than 4 characters long.

Practice Scenario

Paper: Video feedback on electronic portfolios for students studying sport (2016)

Author: Alex Bobbins & Chris Jones

This work seeks to evaluate screencasting as a means of enhancing the formative assessment process for students. The research was undertaken with students in the second year of the BA in Sport and Exercise. The assessment for the ‘Team Leadership’ module is assessed on the creation of an e-portfolio using Mahara, which details their experiences of leading a team in semester 1 2015-2016.

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- When the marks are released the students receive a notification email to inform them that they have feedback on their work.

Study Section of the Taxonomies

Title

Description:	Title of publication, if there is a publication which can be examined for more details of the study, or practice, concerned. If the study is not a publication, details of where the practice being studied takes place can be used as a title.
Purpose:	Identification of the practice studied.
Format:	Title of the publication. If there is no publication this field should describe the location of where the studied practice takes place.
Examples:	Published: Video Feedback for individual students is the norm, on an undergraduate computer programming unit Unpublished: Computer programming unit , level 4, Bournemouth University, UK Details such as subject and academic level are optional as they will be entered as facets of the taxonomy in any case.

Instructions

Please read the description of the facet. Enter the value from the practice scenario which you would classify into the facet.

NOTE: The scenario is repeated beneath every question

Study title:

Practice Scenario

Paper: Video feedback on electronic portfolios for students studying sport (2016)

Author: Alex Bobbins & Chris Jones

This work seeks to evaluate screencasting as a means of enhancing the formative assessment process for students. The research was undertaken with students in the second year of the BA in Sport and Exercise. The assessment for the ‘Team Leadership’ module is assessed on the creation of an e-portfolio using Mahara, which details their experiences of leading a team in semester 1 2015-2016.

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- When the marks are released the students receive a notification email to inform them that they have feedback on their work.

Study Section of the Taxonomies

Group:

Description:	From one group to the next there may be variations in the context details. It could be that one group study a different subject, receive feedback in a different format, or a different media format. This is a common scenario where different groups are trialled in different contexts for comparison.
Purpose:	To identify different sets of context details to be recorded for the same study.
Format:	A brief description of what makes a group different to others in the study. May be left blank
Examples:	*Comparing format:* Group 1: Received video feedback Group 2: Received audio feedback *Comparing subjects:* Group 1: Maths unit Group 2: History unit *Comparing academic levels:* Group 1: Freshers Group 2: Level 5 Group 3: Level 6 Group 4: Masters

Instructions

Please read the description of the facet. Enter the value from the practice scenario which you would classify into the facet.

NOTE: The scenario is repeated beneath every question

Please list any groups you would split the scenario study into:

Practice Scenario

Paper: Video feedback on electronic portfolios for students studying sport (2016)

Author: Alex Bobbins & Chris Jones

This work seeks to evaluate screencasting as a means of enhancing the formative assessment process for students. The research was undertaken with students in the second year of the BA in Sport and Exercise. The assessment for the 'Team Leadership' module is assessed on the creation of an e-portfolio using Mahara, which details their experiences of leading a team in semester 1 2015-2016.

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- When the marks are released the students receive a notification email to inform them that they have feedback on their work.

Understanding the Context Taxonomy

This taxonomy describes the context of the practice being studied.

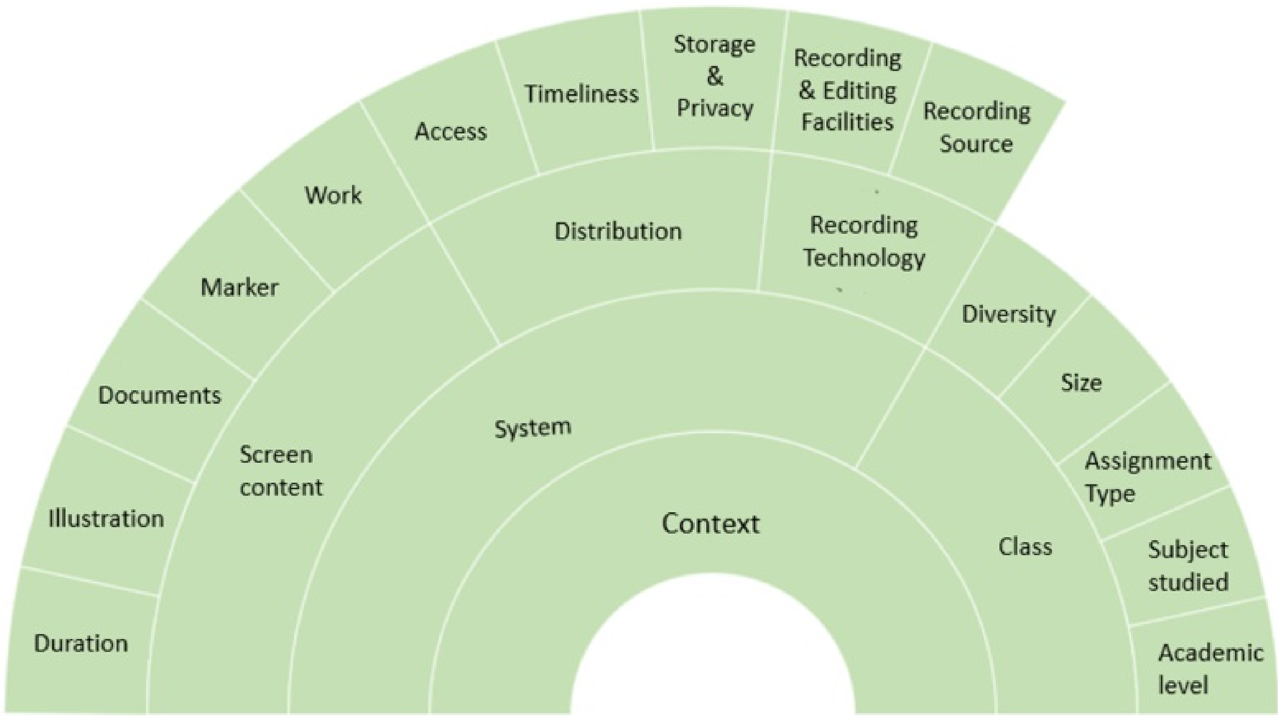

Figure 3 - A visualisation of the Context Taxonomy

The Context Taxonomy is split into two sections: -

System

This section brings together the facets which describe the system implemented to enable the production and distribution of the video feedback. Within the system section facets are grouped by the function they perform. They may classify attributes of the recording technology, the distribution system, or the content of the video.

Class

The term class does not refer to the attendees of a series of taught sessions, but instead is used to loosely describe the students in receipt of video feedback. Attributes include key demographic information about the students, and the academic level and field they are working in. There is the potential to split data into separate ‘classes’ which can be differentiated by the ‘group’ attribute in the Study section. For instance, you may wish to split results from eg: different cohorts, units, academic levels, particularly if the separation give the opportunity to identify trends in perceptions.

Context Taxonomy - System

Recording Technology

A group of facets which describe the details of the system implemented for video production.

Recording Source

Description:	General and concise high-level description of the recording source.
Rationale:	Selecting an appropriate source for the type of work to be assessed.
Purpose:	Indicator of feasibility regarding the assignment type.
Guidance:	In general: - • Physical submissions require the use of a camera. • Electronic work can be examined by screencast. Current options are the use of a camera or screen casting. These options may change in the future as media formats evolve.
Literature:	Literature suggests that the selection of the recording source is significantly impacted by the media of the submission (see the table 1 below).
Format:	Brief description of the recording source.
Examples:	Screencast Camera

Table 1- Study details of assessment type and recording source (ordered by date)

Author	Subject	Assessment Type	Recording source
Cruikshank (1998)	Photography	Practical art & design	Camera
Inglis (1998)	Photography	Prints as hard copy	Camera
Stannard (2008)	English	Written assignment	Screencast
McDowell (2012a)	Business	Video of presentations	Screencast
Hyde (2013)	Professionalism in Diagnostic Radiology	Written assignment	Screencast
Harper et al. (2012)	Languages - various	Written assignment	Screencast
Hynson (2012)	English language	Written assignment	Screencast
Jones et al. (2012)	Technology or Business Management	Database design	Screencast
	Project Management	Written assignment	Screencast
Marriott and Teoh (2012)	Business Finance	Managing Finance	Screencast
McDowell (2012b)	Statistical Analysis	Written assignment	Screencast
	Textile production	Practical: a jacket	Camera
Moore and Filling (2012)	Composition & Children's literature	Written assignment	Camera & Screencast
Séror (2012)	Languages - written	Written assignment	Screencast
Thompson and Lee (2012)	Writing	Written assignment	Screencast
Ghosn-Chelala and Al-Chibani (2013)	Writing	Written assignment	Screencast

Instructions

Please read the description of the facet. Enter the value from the practice scenario which you would classify into the facet.

NOTE: The scenario is repeated beneath every question

Recording source:

- Screencast
- Camera
- Other

If you selected Other, please specify:

Practice Scenario

Paper: Video feedback on electronic portfolios for students studying sport (2016)

Author: Alex Bobbins & Chris Jones

This work seeks to evaluate screencasting as a means of enhancing the formative assessment process for students. The research was undertaken with students in the second year of the BA in Sport and Exercise. The assessment for the ‘Team Leadership’ module is assessed on the creation of an e-portfolio using Mahara, which details their experiences of leading a team in semester 1 2015-2016.

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- The lecturer records between 3-10 minutes of feedback. The students usually see the work on screen but occasionally, to clarify misunderstandings, the assignment brief including the marking scheme, is also brought into view. A smaller window showing the marker is also included in key sections of the video when a physical demonstration of an action is required.
- When the marks are released the students receive a notification email to inform them that they have feedback on their work.

Context Taxonomy - System - Recording Technology

Recording & Editing Facilities

Description:	The software or the cloud facility used for video production is recorded here. If different services or software are required for different functions then each need to be listed, with the functions fulfilled.
Rationale:	Check exactly what is meant when software claims to have eg: editing facilities. Some recording systems have limited facilities or none at all. One example from literature found the lack of a pause button on a camera caused difficulties.
Purpose:	Indicator of ease of system use.
Guidance:	This information informs decisions regarding how much to spend, and what services or software to spend it on. • See the comments from literature below. • Examine the Perceptions Taxonomy of studies who use the same system you intend to use. Look for comments by staff regarding strengths and weaknesses of the system. • Examine resources you have and practice. It may be all you need. If not, you may find out what is essential to you.
Literature:	One study needed a full set of editing facilities (McDowell 2011), but this is rare. In most cases editing facilities may appear essential at first, but actually never get used. Some staff have dismissed the possibility of editing as too time consuming to be feasible (Gould 2011; Henderson and Phillips 2015). Others prefer a realistic conversational style and have given up trying to be perfect in favour of a manageable workload and timely delivery (Borup et al. 2015; Henderson and Phillips 2015; Orlando 2016). They either follow up mistakes with a correction (Orlando 2016) or opt for re-recording instead (Jones et al. 2012; Borup et al. 2015)
Format:	Name of the platform or software used for production. Version numbers may be added if deemed relevant.
Examples:	Recording: Panopto Editing: Camtasia Recording: Screencast-o-matic Editing: none

Instructions

Please read the description of the facet. Enter the value from the practice scenario which you would classify into the facet.

NOTE: The scenario is repeated beneath every question

Recording system:

Editing system (if different from recording system):

Practice Scenario

Paper: Video feedback on electronic portfolios for students studying sport (2016)

Author: Alex Bobbins & Chris Jones

This work seeks to evaluate screencasting as a means of enhancing the formative assessment process for students. The research was undertaken with students in the second year of the BA in Sport and Exercise. The assessment for the 'Team Leadership' module is assessed on the creation of an e-portfolio using Mahara, which details their experiences of leading a team in semester 1 2015-2016.

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- The lecturer records between 3-10 minutes of feedback. The students usually see the work on screen but occasionally, to clarify misunderstandings, the assignment brief including the marking scheme, is also brought into view. A smaller window showing the marker is also included in key sections of the video when a physical demonstration of an action is required.
- When the marks are released the students receive a notification email to inform them that they have feedback on their work.

Storage & Privacy

Description:	The platform used for storing videos, and how access is limited to an individual student.
Rationale:	Storage must explicitly be considered and checked for limitations on capacity. It is easily assumed that capacity is infinite, especially when hidden behind other systems, such as recording cloud services. Limitations cause staff frustration, and breaches of privacy will impact student perceptions.
Purpose:	Indicator of reliability
Guidance:	Check capacity, or limits on individual video duration, particularly where services are free. To prevent duration limits driving how your feedback is delivered be aware there is the possibility of recording more than one video if necessary. Be aware of the risks of a breach, especially where no contract or service level agreement is in place. This information informs decisions regarding how much to spend and on what systems. Examine the Perceptions Taxonomy of studies who use the same system you intend to use. Look for comments by staff regarding strengths and weaknesses of the system
Literature:	Limited duration is a common means of restricting storage used on cloud platforms. For instance, Jing (Techsmith) limits users to 5 minutes putting pressure on staff, where Screencast-O-Matic (Screencast-O-Matic) allows for 15 minutes, which can be longer with payment. This means that staff need to be mindful of the danger of technology driving pedagogy. Privacy is an important consideration for storage of feedback on an external server or cloud service (Marriott and Teoh 2012; Klappa 2015; West and Turner 2016) although there are no cases so far, of private accounts being breached in the literature examined for this work. Service level agreements regarding privacy must be examined carefully (Thompson and Lee 2012).

Format:	Name of the platform/software used for storage, and arrangements to maintain privacy.
Examples:	YouTube under a hidden listing. Link emailed to student uni account. Recorded direct to VLE inside student account Pantopto cloud service with individual permissions set per video.

Instructions

Please read the description of the facet. Enter the value from the practice scenario which you would classify into the facet.

NOTE: The scenario is repeated beneath every question

Storage platform:

Privacy arrangements:

Practice Scenario

Paper: Video feedback on electronic portfolios for students studying sport (2016)

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- The video is linked to the VLE. These links are embedded in a video player so the videos appear to play directly from the page, even though they are actually stored at the Screencast-O-Matic website.
- The lecturer records between 3-10 minutes of feedback. The students usually see the work on screen but occasionally, to clarify misunderstandings, the assignment brief including the marking scheme, is also brought into view. A smaller window showing the marker is also included in key sections of the video when a physical demonstration of an action is required.
- When the marks are released the students receive a notification email to inform them that they have feedback on their work.

Timeliness

Description:	The time it takes to turn around the video feedback for the whole class.
Rationale:	The turn-around time for the class is normally limited by institution policy and impacts the opportunities for students to feedforward learning if related work follows. This information informs decisions regarding how many members of staff are required to complete the feedback for all students taking an assessment within time restrictions. Timeliness maybe considered a Indicator of feasibility.
Purpose:	Indicator of feasibility
Guidance:	Examine the Perceptions Taxonomy of studies, especially where the numbers of students in the class and the type of assessment are similar. Look for comments by staff regarding the impact on workload of using video as feedback in similar practice contexts to your own. This must be considered in conjunction with attributes of the Size of the Class facet. in terms of student numbers and the size of the marking team.

Literature:

Staff often correctly anticipate it taking longer to complete the marking load due to their lack of familiarity with the process (Haxton and McGarvey 2011; Hyde 2013) and incorrectly anticipate that the process will be difficult to master (Orlando 2016). Once the production of video feedback is practised time savings can be made (McDowell 2012a; Thompson and Lee 2012; Hyde 2013 ; Denton 2014), potentially halving the time taken (Henderson and Phillips 2015). Although there are studies suggesting the time taken is not improved (Jones et al. 2012), this may be dependent on the amount of practise by staff before the duration is measured. In addition, the determination of improvement depends on previous experience. Delay in feedback delivery is not necessarily detrimental to effectiveness, but it will slow down learning (Inglis 1998).

Some studies have been done into the use of ‘generic’ feedback to solve timely delivery issues (Crook et al. 2010; Gomez 2010; Crook et al. 2012), where the same artefact is returned for review to entire cohorts or classes of students without reference to individual student work. Students who do not like generic feedback say it de-personalises the experience for them (Crook et al. 2012; Klappa 2015). A compromise might be to use it as a precursor to individual feedback (Stannard 2008).

Format:

Length of time taken to complete the assessment of the class. Normally expressed in weeks or days.

Examples:

3 weeks

10 working days

Instructions

Please read the description of the facet. Enter the value from the practice scenario which you would classify into the facet.

NOTE: The scenario is repeated beneath every question

Timeliness:

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Context Taxonomy - System - Distribution

Access

Description:	The system used by a student to access their video feedback
Rationale:	The means of access to the work may determine if, how and when a student accesses their feedback.
Purpose:	Indicator of ease of use
Guidance:	Examine the Perceptions Taxonomy of studies, especially regarding ease of use by both staff and students. Specifically look for comments by staff regarding the ease of setting up links and permissions for access (also see storage and privacy facet).
Literature:	Ideally delivery of feedback by video would be through the feedback area of VLE if that is where students expect to find their feedback (Hyde 2013). Inglis (1998) established the feasibility of delivery via email, and although size issues are reduced, expectations of quality and duration have increased (Stannard 2008). Students find that media files fill up their inbox (Hennessy and Forrester 2014; Klappa 2015) and so it is more practical to send a link to a video file stored elsewhere (Marriott and Teoh 2012). The location of stored videos has to be considered separately (see Storage and Privacy facet).
Format:	Platform and how the point of access appears to the user
Examples:	Video player embedded in VLE Link pasted into VLE feedback area Link to video on Jing emailed to students YouTube video with player appears in Moodle

Instructions

Please read the description of the facet. Enter the value from the practice scenario which you would classify into the facet.

NOTE: The scenario is repeated beneath every question

Platform used to access video feedback:

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Screen Content

A group of facets regarding potential materials to use as screen content in the video feedback.

Work

Description:	Indicates whether or not student work being assessed will be shown in the video.
Rationale:	For some staff being able to go through the work is the motivation for using video, and therefore the work is on the screen. For others, it is the facility to express themselves in the style of a face to face meeting, which includes non-verbal communication not possible in text. Therefore, the screen content only shows the lecturer talking to the camera.
Purpose:	Indicator of benefit anticipated by staff
Guidance:	Text on screen can appear smaller than anticipated. Review the video to check text is readable. Not all screencast systems record the cursor by default. You may need to find a setting to switch that on or some other means of ‘pointing’ to relevant screen sections.
Literature:	Screencast video as feedback brings together the student work and staff commentary in a way that audio and text feedback cannot (Ribchester et al. 2007; Cranny 2016, p.29116). The facility to point out, or highlight areas of work with the cursor, as they are being explained, is very valuable (Marriott and Teoh 2012; Hyde 2013 ; Orlando 2016). To communicate structural issues; how conclusions match up to points made in the introduction; or to connect other separated sections across the work; only a screencast video can move between points of interest at a similar speed to the explanation (Rodway-Dyer et al. 2011; Crook et al. 2012).
Format:	Yes or no with an optional concise description

Examples:	Yes No Yes, after Ive explained how it will work.

Instructions

Please read the description of the facet. Enter the value from the practice scenario which you would classify into the facet.

NOTE: The scenario is repeated beneath every question

Does work appear on screen in practice?

- ☐ Yes
- ☐ No
- ☐ Other - please describe below

If you selected Other, please specify:

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Context Taxonomy - System - Screen content

Marker

Description:	Indicates whether or not the person marking the video (marker) will appear in the video.
Rationale:	For some staff the facility to express themselves in a style of communication similar to a face to face meeting is important, and therefore the screen content includes the lecturer talking to the camera.
Purpose:	Indicator of anticipated benefit
Guidance:	Examine the Perceptions Taxonomy of studies where the marker has appeared on screen and look for comments from students. They may comment explicitly on the marker being on screen, or opinion may be implied in comments regarding non-verbal communication.
Literature:	Henderson and Phillips (2015) reviewed English essays in videos where the screen content was of themselves talking and looking directly at the camera. Students comments pointed out the difficulty of simultaneously following what was said whilst looking at the work. One alternative is to place the marker on screen in a smaller window alongside the work (Mayhew 2016). Some students found having their marker on screen intimidating (Henderson and Phillips 2015; Mayhew 2016) particularly where work was poor. On the whole students still preferred video feedback to written feedback (Henderson and Phillips 2015; Mayhew 2016) .
Format:	Yes or no
Examples:	Yes No Yes, at the start to explain what I'm doing and then switch to the work Yes, alongside work Yes. Head and shoulders Only during the physical demo. Not the rest of the time.

Instructions

Please read the description of the facet. Enter the value from the practice scenario which you would classify into the facet.

NOTE: The scenario is repeated beneath every question

Does the marker appear on screen in practice?

- Yes
- No
- Other - please describe below

If you selected Other, please specify:

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Context Taxonomy - System - Screen content

Documents

Description:	Indicates whether assessment documentation will appear in the video.
Rationale:	Showing students the exact wording of the assignment can help them understand where they went wrong. Showing them the rubric can help them understand why they have received the mark that they have.
Purpose:	Indicator of anticipated benefit
Guidance:	Examine the Perceptions Taxonomy of studies, especially regarding fairness of the marks or understanding of the mark received.
Literature:	In the studies reviewed for this work, the use of assessment documentation on screen, such as rubrics and marking schemes, have been used in synchronisation with the work (Thompson and Lee 2012; Turner and West 2013; Denton 2014; West and Turner 2016). It can illustrate the gap between what was expected and what has been delivered. Screencasting makes it easy to have both documents open (work and documentation) and to click between the two. It can also be used to reiterate the exact wording of the assignment question when students have glossed over, or missed out, important points.
Format:	Name of documents used or no.
Examples:	No Assignment brief Rubric Case study and marking scheme

Instructions

Please read the description of the facet. Enter the value from the practice scenario which you would classify into the facet.

NOTE: The scenario is repeated beneath every question

Which assessment documentation often appears on screen during the video feedback?

- ☐ Assignment brief/specification
- ☐ Marking scheme
- ☐ Rubric
- ☐ Other

If you selected Other, please specify:

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Context Taxonomy - System - Screen content

Illustration

Description:	Indicates whether examples, models, simulations, model solutions, and other means of illustrating learning points will appear in the video. This may include materials other than the students own work or reworking of parts of student work.
Rationale:	Showing students how things could be improved may help with both learning and understanding of marks awarded.
Purpose:	Indicator of anticipated benefit
Guidance:	Examine the student section of the Perceptions Taxonomy of studies, especially regarding better understanding of how to improve.
Literature:	Examples and demonstrations can be pulled into view at appropriate times (Jones et al. 2012). They illustrate gaps between actual and desired performance, or demonstrate the effects of change by showing how the students own work can be altered, and the improved result. Video is a useful tool for conveying points of learning to feedforward into other work. Rather than simply identifying what is wrong, it can be made to provide guidance about how to improve the work and demonstrates the results of change. It might be to execute programming code before and after debugging code (Schilling 2013) to demonstrate alternative solutions, or to hear staff reading original and amended versions of written work (Jones et al. 2012). Students appreciate being able to follow the markers thought process, to watch the corrections happening, and see the results of amendments. Learning takes place when, as a consequence, students comprehend the reason why a change is an improvement (Ghosn-Chelala and Al-Chibani 2013).
Format:	Concise description
Examples:	Programming code: Executing programming code following bug fixes or improvements. Design exercise: Comparing the design to a model answer Essay: Reading section out loud, rewording and re reading.

Instructions

Please read the description of the facet. Enter the value from the practice scenario which you would classify into the facet.

NOTE: The scenario is repeated beneath every question

Describe any materials used for the purposes of illustrating learning points:

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Context Taxonomy - System - Screen content

Duration

Description:	Average duration, (and other pertinant measurements of duration) of the videos created.
Rationale:	To explore potential impact on student engagement and workload.
Purpose:	Indicator of feasibility and student engagement.
Guidance:	Examine the student section of the Perceptions Taxonomy of studies, especially for comments regarding length of video and comprehensiveness of coverage.
Literature:	The video has to cover all the points of learning, whilst not being so long in duration that students disengage. Students comment on durations as ideally being no longer than 5 minutes (McDowell 2011; Moore and Filling 2012). In the study by (Moore and Filling 2012) students said that 15 to 20 minute videos created by one instructor were too long. However, duration may be restricted by the capabilities of the system. At this time, it is not wise to assume that just because you have a system that can store video files, that there is enough capacity to hold videos for the entire cohort, especially for a number of submissions (see storage and privacy).
Format:	Concise description
Examples:	5mins 22secs Marker 1: 4mins 16secs Marker 2: 8mins 31secs Marker 3: 12mins 52secs Fails: avg 00:11:26 Passes: avg 00:06:44 Average of all videos: 00:09:05 Avgerage:7m 15s Longest: 12m 03s Shortest: 3m 51s

Instructions

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How long are the videos produced?

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Context Taxonomy

Class

A group of facets which describe the class of students in receipt of video feedback.

NOTE: Class describes the whole group of students and not only those attending a single taught session.

Academic Level

Description:	Normally refers to the year of an undergraduate degree, or the level and type of post graduate degree.
Rationale:	To describe the expected maturity of approach of the students in the class. May also be an indicator of an average age in some contexts.
Purpose:	Indicator of perceptions/attitude/academic maturity/approach
Guidance:	Examine the student section of the Perceptions Taxonomy of studies, for comments by students involved in studies working at a similar academic level. In addition, review the Diversity facet for indicators of age e.g.: unusually high numbers of mature students, and so on.
Literature:	The research demonstrates feasibility of video feedback on taught courses from foundation stage (McDowell 2011) and freshers (McDowell 2011; Harper et al. 2012; McDowell 2012a; Ghosn-Chelala and Al-Chibani 2013; West and Turner 2016) to post graduate level (Parton et al. 2010; Gould 2011; Jones et al. 2012; Henderson and Phillips 2015). Descriptions are sometimes inaccurate in so much as the language used in education is not precise. Terms referring to undergraduate 'final years' may mean year 3 or 4, depending on the course. Postgraduates may be masters level or undertaking taught sections of a PhD. Even though it is usually reported, education level is not examined anywhere and do not include multiple levels offering no comparisons to discuss. Others cover several levels (Crook et al. 2012; Jones et al. 2012) and discuss them as one large group leaving no means to identify any differences.
Format:	Concise description at the granularity of the year of study. For post graduate degrees include indication of the study format.

	Freshers/Level 4
	Masters – part time, first semester
Examples:	UG Level 5
	PhD – full time, 2nd year
	EdD – Taught doctorate part time, first year

Instructions

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Academic level of students:

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Context Taxonomy - Class

Subject studied

Description:	The degree title and the unit of study play a part in this description.
Rationale:	Imagine a single unit titled 'Technology Integration'. That unit title implies different things when taught on a teacher training course compared to a computing degree. Perceptions of video feedback from computing students studying a highly technical and practical unit are likely to be different from teacher candidates studying applications of technology in teaching with an interest in how the video feedback works. Therefore, both the degree title and the unit title are required for a complete picture.
Purpose:	Indicator of student perspective
Guidance:	Examine the student section of the Perceptions Taxonomy of studies, for comments by students studying similar subjects.
Literature:	The subject studied by the class is an indicator of the types of assignments that are likely to be relevant. These often determine the selected source of the recording (see Recording Source facet). Subjects with the highest representation among the research are: - • Those with an acute interest in the purpose e.g.: education or teacher training (Tochon 2001; Parton et al. 2010; Turner and West 2013; Borup et al. 2015; West and Turner 2016). • Those with an overlap with digital video as a media e.g.: media and arts, or computing (Cruikshank 1998; Inglis 1998; Stannard 2008; Gould 2011; McDowell 2011, 2012a; Schilling 2013; McCarthy 2015) • Those with an interest in the audio explicitly e.g.: languages (Tochon 2001; Harper et al. 2012; Séror 2012; Sprague 2016).
Format:	Subject/unit and degree title
Examples:	BA English and Film Studies, Introduction to Photography Genetics and Immunology on MSc Microbiology Finance on BA Sport Exercise and Enterprise

Instructions

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Subject Studied:

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- Lecturer logs onto the staff assessment interface to the VLE, views the student work, records the feedback using screen capture software called Screencast-o-matic.
- The video is linked to the VLE. These links are embedded in a video player so the videos appear to play directly from the page, even though they are actually stored at the Screencast-O-Matic website.
- The lecturer records between 3-10 minutes of feedback. The students usually see the work on screen but occasionally, to clarify misunderstandings, the assignment brief including the marking scheme, is also brought into view. A smaller window showing the marker is also included in key sections of the video when a physical demonstration of an action is required.
- When the marks are released the students receive a notification email to inform them that they have feedback on their work.

Context Taxonomy - Class

Assignment Type

Description:	This refers to the type of submission which is the subject of review by video feedback.
Rationale:	Video feedback may work well for some types of submission and not for others. This can only be determined if the type is known.
Purpose:	Indicator of appropriate recording source
Guidance:	Examine the student section of the Perceptions Taxonomy of studies, for comments by students who have submitted assignments of a similar type.
Literature:	Assignment type impacts decisions regarding recording source. See Table 2 (below) for examples from literature.
Format:	Concise description
Examples:	Essay on national defence policy E-portfolio for presentation at a job interview Music video Sculpture in clay of local celebrity Maths paper

Table 2 - Study details of assessment type and recording source (ordered by date)

Author	Subject	Assessment Type	Recording source
Cruikshank (1998)	Photography	Practical art & design	Camera
Inglis (1998)	Photography	Prints as hard copy	Camera
Stannard (2008)	English	Written assignment	Screencast
McDowell (2012a)	Business	Video of presentations	Screencast
Hyde (2013)	Professionalism in Diagnostic Radiology	Written assignment	Screencast
Harper et al. (2012)	Languages - various	Written assignment	Screencast
Hynson (2012)	English language	Written assignment	Screencast
Jones et al. (2012)	Technology or Business Management	Database design	Screencast
	Project Management	Written assignment	Screencast
Marriott and Teoh (2012)	Business Finance	Managing Finance	Screencast
McDowell (2012b)	Statistical Analysis	Written assignment	Screencast
	Textile production	Practical: a jacket	Camera
Moore and Filling (2012)	Composition & Children's literature	Written assignment	Camera & Screencast
Séror (2012)	Languages - written	Written assignment	Screencast
Thompson and Lee (2012)	Writing	Written assignment	Screencast
Ghosn-Chelala and Al-Chibani (2013)	Writing	Written assignment	Screencast

Instructions

Please read the description of the facet. Enter the value from the practice scenario which you would classify into the facet.

NOTE: The scenario is repeated beneath every question

Assignment type:

Practice Scenario

Paper: Video feedback on electronic portfolios for students studying sport (2016)

Author: Alex Bobbins & Chris Jones

This work seeks to evaluate screencasting as a means of enhancing the formative assessment process for students. The research was undertaken with students in the second year of the BA in Sport and Exercise. The assessment for the 'Team Leadership' module is assessed on the creation of an e-portfolio using Mahara, which details their experiences of leading a team in semester 1 2015-2016.

The group is comprised of 29 students, 8 female and 21 males. All students are over the age of 18. Three students have additional learning needs. All students speak English as their native language, with the exception of 1 from Germany and 2 from Nigeria. Seventeen responded to the survey.

Students create a series of e-portfolio pages. Students upload their e-portfolios to the assignment submission section of the Moodle VLE secured by the student login credentials.

- Lecturer logs onto the staff assessment interface to the VLE, views the student work, records the feedback using screen capture software called Screencast-o-matic.
- The video is linked to the VLE. These links are embedded in a video player so the videos appear to play directly from the page, even though they are actually stored at the Screencast-O-Matic website.
- The lecturer records between 3-10 minutes of feedback. The students usually see the work on screen but occasionally, to clarify misunderstandings, the assignment brief including the marking scheme, is also brought into view. A smaller window showing the marker is also included in key sections of the video when a physical demonstration of an action is required.
- When the marks are released the students receive a notification email to inform them that they have feedback on their work.

Context Taxonomy - Class

Size

Description:	This refers to the size of the class as a measurement of workload. Therefore, it is not as simple as the number of students. The class size is an indicator of workload, which is one of the main concerns expressed by staff regarding video feedback. For a true sense of the work required, and therefore, the relevance of study findings, three measures regarding the size of a class are required. • Number of students, or submissions if work is completed by a group. • Number of marking staff • Time period of use
Rationale:	The number of students may be high, but if the marking load is distributed across a team of markers the feasibility improves. In addition, it may be possible to maintain a high workload for a short duration where it could not be maintained indefinitely, such as where studies are completed over a single assignment. If a study is in place as normal practice over e.g.: the last three years, then it is likely feasible to replicate in another practice with similar numbers of students and marking staff.
Purpose:	Indicator of feasibility
Guidance:	Examine the student section of the Perceptions Taxonomy of studies, for comments by students who have submitted assignments of a similar type. Group work submissions may need special consideration of how this is expressed as a value if there are several elements to review.

Literature:	Some researchers acknowledge conclusions are based on on small samples. Most studies returning individual video feedback involve between 15 and 50 students Brereton (Gould 2011; Moore and Filling 2012; Denton 2014; Brereton and Dunne 2016; Cranny 2016; Mayhew 2016; Sprague 2016). A few have successfully responded to over a hundred students with video feedback Marriott (Marriott and Teoh 2012; Henderson and Phillips 2015). The numbers of staff involved indicate the numbers required to make the workload feasible in practice yet is rarely explicitly reported. No one reports requiring additional team members to meet deadlines. Studies are, in the main, short term eg: a single semester (Brereton and Dunne 2016) or assignment (Jones et al. 2012; Henderson and Phillips 2015), and therefore, it is unclear whether the momentum can be kept up long term. This maybe the result of a desire to publish soon after the first attempt to trial video feedback in practice.
Format:	Student/Submission numbers: number No in marking team: number Longevity of study: concise description
Examples:	Students: 322 Marking team: 4 Longevity: One semester Submissions: 52 group submissions No in marking team: 2 Longevity: 2 years Students: 122-137 across 3 submissions Marking team: 3 or 4 Longevity: One academic year so far.

Instructions

Please read the description of the facet. Enter the value from the practice scenario which you would classify into the facet.

NOTE: The scenario is repeated beneath every question

Number of students/submissions:

No in marking team:

Longevity of use of video feedback:

Practice Scenario

Paper: Video feedback on electronic portfolios for students studying sport (2016)

Author: Alex Bobbins & Chris Jones

This work seeks to evaluate screencasting as a means of enhancing the formative assessment process for students. The research was undertaken with students in the second year of the BA in Sport and Exercise. The assessment for the ‘Team Leadership’ module is assessed on the creation of an e-portfolio using Mahara, which details their experiences of leading a team in semester 1 2015-2016.

The group is comprised of 29 students, 8 female and 21 males. All students are over the age of 18. Three students have additional learning needs. All students speak English as their native language, with the exception of 1 from Germany and 2 from Nigeria. Seventeen responded to the survey.

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- When the marks are released the students receive a notification email to inform them that they have feedback on their work.

Context - Class

Diversity

Description:	There are various demographic groups within any class of students with a shared attitude or need that varies from other groups.
	As a group in a single practice context, the numbers may be low, and the results appear insignificant. However, looking at the same trends for several studies may add significance to the impact of video feedback for a specific group of students.
Rationale:	Common groups to consider are: - • International students who are non-native speakers • Mature students • Students with additional learning needs • Students with specific learning styles
Purpose:	Indicator of impact
Guidance:	Examine the student section of the Perceptions Taxonomy of studies, for comments by staff about students from specific groups. See if any other studies have similar findings to yours for a group identified in a similar way.
Literature:	Comparative studies rarely break the results into age groups. For instance, (Orlando 2016) complains about the generic use of the term ‘postgraduate’ without indication of age. Where studies do identify age groups, it is noticeable that mature students often prefer text as feedback, and younger students prefer video feedback. Numbers preferring text are usually very low and often not commented upon specifically. However, viewed as a whole across the literature it is clear that those preferring text are often mature students (Orlando 2016).
Format:	There may be several statements classified here.

Examples:	Note: The total number of students will already be classified under the Size facet. 82% non-native speaking students 14 students have dyslexia 33/232 students are aged over 25 1 student is partially sighted and 2 are hearing impaired

Instructions

Please read the description of the facet. Enter the value from the practice scenario which you would classify into the facet.

NOTE: The scenario is repeated beneath every question

Groups identified:

Practice Scenario

Paper: Video feedback on electronic portfolios for students studying sport (2016)

Author: Alex Bobbins & Chris Jones

This work seeks to evaluate screencasting as a means of enhancing the formative assessment process for students. The research was undertaken with students in the second year of the BA in Sport and Exercise. The assessment for the 'Team Leadership' module is assessed on the creation of an e-portfolio using Mahara, which details their experiences of leading a team in semester 1 2015-2016.

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into view. A smaller window showing the marker is also included in key sections of the video when a physical demonstration of an action is required.

- When the marks are released the students receive a notification email to inform them that they have feedback on their work.

Exercise 1: Evaluation of Concision and Validity - Classification using the Context Taxonomy

This exercise asks you to classify the details of your practice in which you use video feedback, into the Taxonomy of Video Feedback.

The following pages describe the high level structure of the taxonomy down to descriptions of each facet, under which data can be classified.

- Please read the following description of the taxonomy.
- Read the descriptions of each facet.
- There are spaces at the end of each description for you to enter the values you would classify from your practice context into each facet.

Understanding the Taxonomy of Video Feedback

The video feedback taxonomy is in fact, a pair of overlapping taxonomies which describe two key sets of details about video feedback in practice. As such they can be used as a classification system for studies of video feedback in practice (see Figure 1).

On The left is the taxonomy that classifies attributes of the video feedback practice context, known as the ‘context taxonomy’. On the right is the taxonomy which classifies the findings, known as the ‘perceptions taxonomy’. In the centre is the section of the taxonomy set known as the ‘Study’, which is where the two halves overlap. Each half of the taxonomy set may appear separately if the other is not required, however, the centre section should always appear even when only one half is in use as it is the section which identifies the study.

Both taxonomies are multi-faceted. The facets are shown in the outer layer of each taxonomy. Facets are grouped together under hierarchical inner layers, which serve as a means of locating a facet by grouping related facets together. Some facets require multiple attributes to fully describe them and these are explained in the descriptions of each facet which follow.

Figure 1 - A visualisation of the Taxonomy of Video Feedback

Study Section of the Taxonomies

The Context and Perceptions Taxonomies may appear separately, since both are not always required. The Study section should always appear with each of the two taxonomies, even when they appear separately, to identify the study to which the details belong.

Figure 2 - A visualisation of the Study section from the Taxonomy of Video Feedback

Author(s)

Description:	Author(s) of papers about the practice studied, or if the practice is not published, the practitioner(s) involved in the practice scenario.
Purpose:	Identification of the practice studied.
Format:	As referenced on academic papers.
Examples:	Cranny, D. Atfield-Cutts, S. et al Henderson, M. & Phillips, M.

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Author(s):

Study Section of the Taxonomies

Year

Description:	Author(s) of papers about the practice studied, or if the practice is not published, the practitioner(s) involved in the practice scenario.
Purpose:	Identification of the practice studied.
Format:	Year as four digits.
Examples:	1996 2019

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Year of Study:

Your answer should be no more than 4 characters long.

Study Section of the Taxonomies

Title

Description:	Title of publication, if there is a publication which can be examined for more details of the study, or practice, concerned. If the study is not a publication, details of where the practice being studied takes place can be used as a title.
Purpose:	Identification of the practice studied.
Format:	Title of the publication. If there is no publication this field should describe the location of where the studied practice takes place.
Examples:	Published: Video Feedback for individual students is the norm, on an undergraduate computer programming unit Unpublished: Computer programming unit , level 4, Bournemouth University, UK Details such as subject and academic level are optional as they will be entered as facets of the taxonomy in any case.

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Study title:

Study Section of the Taxonomies

Group:

Description:	From one group to the next there may be variations in the context details. It could be that one group study a different subject, receive feedback in a different format, or a different media format. This is a common scenario where different groups are trialled in different contexts for comparison.
Purpose:	To identify different sets of context details to be recorded for the same study.
Format:	A brief description of what makes a group different to others in the study. May be left blank
Examples:	*Comparing format:* Group 1: Received video feedback Group 2: Received audio feedback *Comparing subjects:* Group 1: Maths unit Group 2: History unit *Comparing academic levels:* Group 1: Freshers Group 2: Level 5 Group 3: Level 6 Group 4: Masters

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Please list any groups you would split the scenario study into:

Understanding the Context Taxonomy

This taxonomy describes the context of the practice being studied.

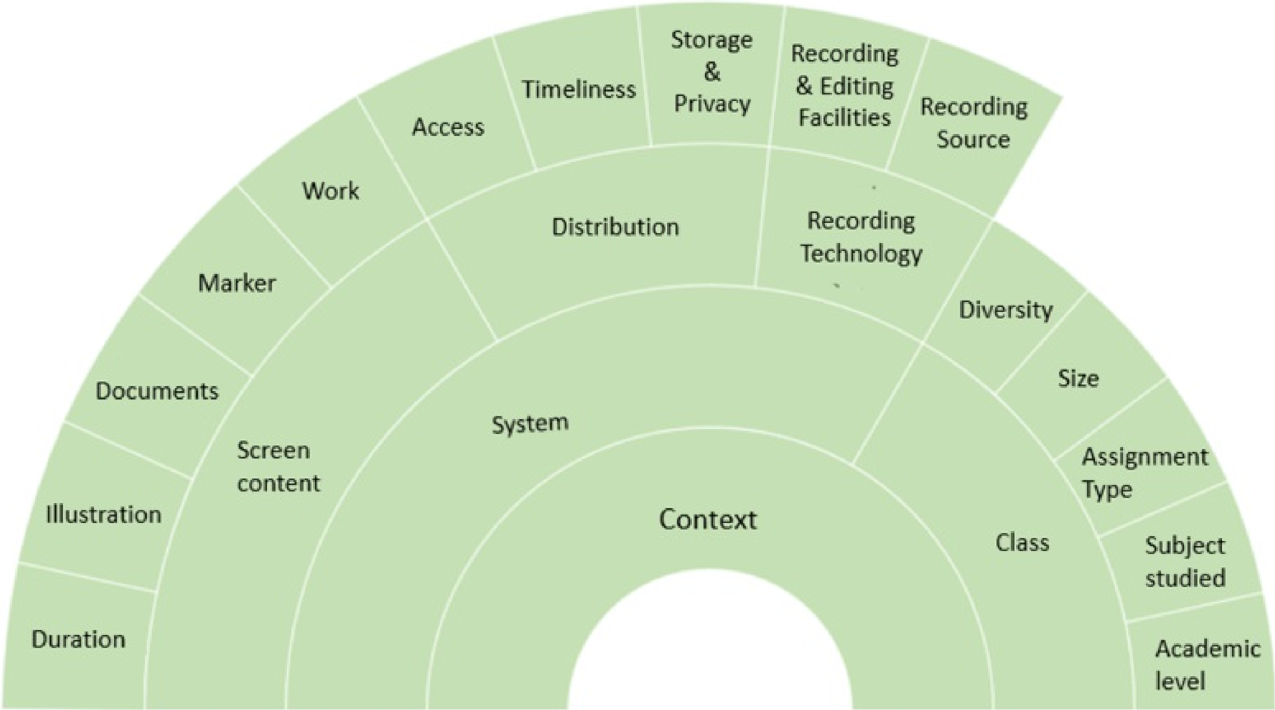

Figure 3 - A visualisation of the Context Taxonomy

The Context Taxonomy is split into two sections: -

System

This section brings together the facets which describe the system implemented to enable the production and distribution of the video feedback. Within the system section facets are grouped by the function they perform. They may classify attributes of the recording technology, the distribution system, or the content of the video.

Class

The term class does not refer to the attendees of a series of taught sessions, but instead is used to loosely describe the students in receipt of video feedback. Attributes include key demographic information about the students, and the academic level and field they are working in. There is the potential to split data into separate ‘classes’ which can be differentiated by the ‘group’ attribute in the Study section. For instance, you may wish to split results from eg: different cohorts, units, academic levels, particularly if the separation give the opportunity to identify trends in perceptions.

Context Taxonomy - System

Recording Technology

A group of facets which describe the details of the system implemented for video production.

Recording Source

Description:	General and concise high-level description of the recording source.
Rationale:	Selecting an appropriate source for the type of work to be assessed.
Purpose:	Indicator of feasibility regarding the assignment type.
Guidance:	In general: - • Physical submissions require the use of a camera. • Electronic work can be examined by screencast. Current options are the use of a camera or screen casting. These options may change in the future as media formats evolve.
Literature:	Literature suggests that the selection of the recording source is significantly impacted by the media of the submission (see the table 1 below).
Format:	Brief description of the recording source.
Examples:	Screencast Camera

Table 1- Study details of assessment type and recording source (ordered by date)

Author	Subject	Assessment Type	Recording source
Cruikshank (1998)	Photography	Practical art & design	Camera
Inglis (1998)	Photography	Prints as hard copy	Camera
Stannard (2008)	English	Written assignment	Screencast
McDowell (2012a)	Business	Video of presentations	Screencast
Hyde (2013)	Professionalism in Diagnostic Radiology	Written assignment	Screencast
Harper et al. (2012)	Languages - various	Written assignment	Screencast
Hynson (2012)	English language	Written assignment	Screencast
Jones et al. (2012)	Technology or Business Management	Database design	Screencast
	Project Management	Written assignment	Screencast
Marriott and Teoh (2012)	Business Finance	Managing Finance	Screencast
McDowell (2012b)	Statistical Analysis	Written assignment	Screencast
	Textile production	Practical: a jacket	Camera
Moore and Filling (2012)	Composition & Children's literature	Written assignment	Camera & Screencast
Séror (2012)	Languages - written	Written assignment	Screencast
Thompson and Lee (2012)	Writing	Written assignment	Screencast
Ghosn-Chelala and Al-Chibani (2013)	Writing	Written assignment	Screencast

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Recording source:

- Screencast
- Camera
- Other

If you selected Other, please specify:

Recording & Editing Facilities

Description:	The software or the cloud facility used for video production is recorded here. If different services or software are required for different functions then each need to be listed, with the functions fulfilled.
Rationale:	Check exactly what is meant when software claims to have eg: editing facilities. Some recording systems have limited facilities or none at all. One example from literature found the lack of a pause button on a camera caused difficulties.
Purpose:	Indicator of ease of system use.
Guidance:	This information informs decisions regarding how much to spend, and what services or software to spend it on. • See the comments from literature below. • Examine the Perceptions Taxonomy of studies who use the same system you intend to use. Look for comments by staff regarding strengths and weaknesses of the system. • Examine resources you have and practice. It may be all you need. If not, you may find out what is essential to you.
Literature:	One study needed a full set of editing facilities (McDowell 2011), but this is rare. In most cases editing facilities may appear essential at first, but actually never get used. Some staff have dismissed the possibility of editing as too time consuming to be feasible (Gould 2011; Henderson and Phillips 2015). Others prefer a realistic conversational style and have given up trying to be perfect in favour of a manageable workload and timely delivery (Borup et al. 2015; Henderson and Phillips 2015; Orlando 2016). They either follow up mistakes with a correction (Orlando 2016) or opt for re-recording instead (Jones et al. 2012; Borup et al. 2015)
Format:	Name of the platform or software used for production. Version numbers may be added if deemed relevant.
Examples:	Recording: Panopto Editing: Camtasia Recording: Screencast-o-matic Editing: none

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Recording system:

Editing system (if different from recording system):

Context Taxonomy - System - Distribution

Storage & Privacy

Description:	The platform used for storing videos, and how access is limited to an individual student.
Rationale:	Storage must explicitly be considered and checked for limitations on capacity. It is easily assumed that capacity is infinite, especially when hidden behind other systems, such as recording cloud services. Limitations cause staff frustration, and breaches of privacy will impact student perceptions.
Purpose:	Indicator of reliability
Guidance:	Check capacity, or limits on individual video duration, particularly where services are free. To prevent duration limits driving how your feedback is delivered be aware there is the possibility of recording more than one video if necessary. Be aware of the risks of a breach, especially where no contract or service level agreement is in place. This information informs decisions regarding how much to spend and on what systems. Examine the Perceptions Taxonomy of studies who use the same system you intend to use. Look for comments by staff regarding strengths and weaknesses of the system
Literature:	Limited duration is a common means of restricting storage used on cloud platforms. For instance, Jing (Techsmith) limits users to 5 minutes putting pressure on staff, where Screencast-O-Matic (Screencast-O-Matic) allows for 15 minutes, which can be longer with payment. This means that staff need to be mindful of the danger of technology driving pedagogy. Privacy is an important consideration for storage of feedback on an external server or cloud service (Marriott and Teoh 2012; Klappa 2015; West and Turner 2016) although there are no cases so far, of private accounts being breached in the literature examined for this work. Service level agreements regarding privacy must be examined carefully (Thompson and Lee 2012).

Format:	Name of the platform/software used for storage, and arrangements to maintain privacy.
Examples:	YouTube under a hidden listing. Link emailed to student uni account. Recorded direct to VLE inside student account Pantopto cloud service with individual permissions set per video.

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Storage platform:

Privacy arrangements:

Timeliness

Description:	The time it takes to turn around the video feedback for the whole class.
Rationale:	The turn-around time for the class is normally limited by institution policy and impacts the opportunities for students to feedforward learning if related work follows. This information informs decisions regarding how many members of staff are required to complete the feedback for all students taking an assessment within time restrictions. Timeliness maybe considered a Indicator of feasibility.
Purpose:	Indicator of feasibility
Guidance:	Examine the Perceptions Taxonomy of studies, especially where the numbers of students in the class and the type of assessment are similar. Look for comments by staff regarding the impact on workload of using video as feedback in similar practice contexts to your own. This must be considered in conjunction with attributes of the Size of the Class facet. in terms of student numbers and the size of the marking team.

Literature:	Staff often correctly anticipate it taking longer to complete the marking load due to their lack of familiarity with the process (Haxton and McGarvey 2011; Hyde 2013) and incorrectly anticipate that the process will be difficult to master (Orlando 2016). Once the production of video feedback is practised time savings can be made (McDowell 2012a; Thompson and Lee 2012; Hyde 2013 ; Denton 2014), potentially halving the time taken (Henderson and Phillips 2015). Although there are studies suggesting the time taken is not improved (Jones et al. 2012), this may be dependent on the amount of practise by staff before the duration is measured. In addition, the determination of improvement depends on previous experience. Delay in feedback delivery is not necessarily detrimental to effectiveness, but it will slow down learning (Inglis 1998). Some studies have been done into the use of 'generic' feedback to solve timely delivery issues (Crook et al. 2010; Gomez 2010; Crook et al. 2012), where the same artefact is returned for review to entire cohorts or classes of students without reference to individual student work. Students who do not like generic feedback say it de-personalises the experience for them (Crook et al. 2012; Klappa 2015). A compromise might be to use it as a precursor to individual feedback (Stannard 2008).
Format:	Length of time taken to complete the assessment of the class. Normally expressed in weeks or days.
Examples:	3 weeks 10 working days

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Timeliness:

Context Taxonomy - System - Distribution

Access

Description:	The system used by a student to access their video feedback
Rationale:	The means of access to the work may determine if, how and when a student accesses their feedback.
Purpose:	Indicator of ease of use
Guidance:	Examine the Perceptions Taxonomy of studies, especially regarding ease of use by both staff and students. Specifically look for comments by staff regarding the ease of setting up links and permissions for access (also see storage and privacy facet).
Literature:	Ideally delivery of feedback by video would be through the feedback area of VLE if that is where students expect to find their feedback (Hyde 2013). Inglis (1998) established the feasibility of delivery via email, and although size issues are reduced, expectations of quality and duration have increased (Stannard 2008). Students find that media files fill up their inbox (Hennessy and Forrester 2014; Klappa 2015) and so it is more practical to send a link to a video file stored elsewhere (Marriott and Teoh 2012). The location of stored videos has to be considered separately (see Storage and Privacy facet).
Format:	Platform and how the point of access appears to the user
Examples:	Video player embedded in VLE Link pasted into VLE feedback area Link to video on Jing emailed to students YouTube video with player appears in Moodle

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Platform used to access video feedback:

Context Taxonomy - System

Screen Content

A group of facets regarding potential materials to use as screen content in the video feedback.

Work

Description:	Indicates whether or not student work being assessed will be shown in the video.
Rationale:	For some staff being able to go through the work is the motivation for using video, and therefore the work is on the screen. For others, it is the facility to express themselves in the style of a face to face meeting, which includes non-verbal communication not possible in text. Therefore, the screen content only shows the lecturer talking to the camera.
Purpose:	Indicator of benefit anticipated by staff
Guidance:	Text on screen can appear smaller than anticipated. Review the video to check text is readable. Not all screencast systems record the cursor by default. You may need to find a setting to switch that on or some other means of ‘pointing’ to relevant screen sections.
Literature:	Screencast video as feedback brings together the student work and staff commentary in a way that audio and text feedback cannot (Ribchester et al. 2007; Cranny 2016, p.29116). The facility to point out, or highlight areas of work with the cursor, as they are being explained, is very valuable (Marriott and Teoh 2012; Hyde 2013 ; Orlando 2016). To communicate structural issues; how conclusions match up to points made in the introduction; or to connect other separated sections across the work; only a screencast video can move between points of interest at a similar speed to the explanation (Rodway-Dyer et al. 2011; Crook et al. 2012).
Format:	Yes or no with an optional concise description

	Yes
Examples:	No
	Yes, after Ive explained how it will work.

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Does work appear on screen in practice?

- ☐ Yes
- ☐ No
- ☐ Other - please describe below

If you selected Other, please specify:

Context Taxonomy - System - Screen content

Marker

Description:	Indicates whether or not the person marking the video (marker) will appear in the video.
Rationale:	For some staff the facility to express themselves in a style of communication similar to a face to face meeting is important, and therefore the screen content includes the lecturer talking to the camera.
Purpose:	Indicator of anticipated benefit
Guidance:	Examine the Perceptions Taxonomy of studies where the marker has appeared on screen and look for comments from students. They may comment explicitly on the marker being on screen, or opinion may be implied in comments regarding non-verbal communication.
Literature:	Henderson and Phillips (2015) reviewed English essays in videos where the screen content was of themselves talking and looking directly at the camera. Students comments pointed out the difficulty of simultaneously following what was said whilst looking at the work. One alternative is to place the marker on screen in a smaller window alongside the work (Mayhew 2016). Some students found having their marker on screen intimidating (Henderson and Phillips 2015; Mayhew 2016) particularly where work was poor. On the whole students still preferred video feedback to written feedback (Henderson and Phillips 2015; Mayhew 2016) .
Format:	Yes or no
Examples:	Yes No Yes, at the start to explain what I'm doing and then switch to the work Yes, alongside work Yes. Head and shoulders Only during the physical demo. Not the rest of the time.

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Does the marker appear on screen in practice?

- ○ Yes
- ○ No
- ○ Other - please describe below

If you selected Other, please specify:

Context Taxonomy - System - Screen content

Documents

Description:	Indicates whether assessment documentation will appear in the video.
Rationale:	Showing students the exact wording of the assignment can help them understand where they went wrong. Showing them the rubric can help them understand why they have received the mark that they have.
Purpose:	Indicator of anticipated benefit
Guidance:	Examine the Perceptions Taxonomy of studies, especially regarding fairness of the marks or understanding of the mark received.
Literature:	In the studies reviewed for this work, the use of assessment documentation on screen, such as rubrics and marking schemes, have been used in synchronisation with the work (Thompson and Lee 2012; Turner and West 2013; Denton 2014; West and Turner 2016). It can illustrate the gap between what was expected and what has been delivered. Screencasting makes it easy to have both documents open (work and documentation) and to click between the two. It can also be used to reiterate the exact wording of the assignment question when students have glossed over, or missed out, important points.
Format:	Name of documents used or no.
Examples:	No Assignment brief Rubric Case study and marking scheme

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Which assessment documentation often appears on screen during the video feedback?

- ☐ Assignment brief/specification
- ☐ Marking scheme
- ☐ Rubric
- ☐ Other

If you selected Other, please specify:

Context Taxonomy - System - Screen content

Illustration

Description:	Indicates whether examples, models, simulations, model solutions, and other means of illustrating learning points will appear in the video. This may include materials other than the students own work or reworking of parts of student work.
Rationale:	Showing students how things could be improved may help with both learning and understanding of marks awarded.
Purpose:	Indicator of anticipated benefit
Guidance:	Examine the student section of the Perceptions Taxonomy of studies, especially regarding better understanding of how to improve.
Literature:	Examples and demonstrations can be pulled into view at appropriate times (Jones et al. 2012). They illustrate gaps between actual and desired performance, or demonstrate the effects of change by showing how the students own work can be altered, and the improved result. Video is a useful tool for conveying points of learning to feedforward into other work. Rather than simply identifying what is wrong, it can be made to provide guidance about how to improve the work and demonstrates the results of change. It might be to execute programming code before and after debugging code (Schilling 2013) to demonstrate alternative solutions, or to hear staff reading original and amended versions of written work (Jones et al. 2012). Students appreciate being able to follow the markers thought process, to watch the corrections happening, and see the results of amendments. Learning takes place when, as a consequence, students comprehend the reason why a change is an improvement (Ghosn-Chelala and Al-Chibani 2013).
Format:	Concise description
Examples:	Programming code: Executing programming code following bug fixes or improvements. Design exercise: Comparing the design to a model answer Essay: Reading section out loud, rewording and re reading.

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Describe any materials used for the purposes of illustrating learning points:

Context Taxonomy - System - Screen content

Duration

Description:	Average duration, (and other pertinant measurements of duration) of the videos created.
Rationale:	To explore potential impact on student engagement and workload.
Purpose:	Indicator of feasibility and student engagement.
Guidance:	Examine the student section of the Perceptions Taxonomy of studies, especially for comments regarding length of video and comprehensiveness of coverage.
Literature:	The video has to cover all the points of learning, whilst not being so long in duration that students disengage. Students comment on durations as ideally being no longer than 5 minutes (McDowell 2011; Moore and Filling 2012). In the study by (Moore and Filling 2012) students said that 15 to 20 minute videos created by one instructor were too long. However, duration may be restricted by the capabilities of the system. At this time, it is not wise to assume that just because you have a system that can store video files, that there is enough capacity to hold videos for the entire cohort, especially for a number of submissions (see storage and privacy).
Format:	Concise description
Examples:	5mins 22secs Marker 1: 4mins 16secs Marker 2: 8mins 31secs Marker 3: 12mins 52secs Fails: avg 00:11:26 Passes: avg 00:06:44 Average of all videos: 00:09:05 Avgerage:7m 15s Longest: 12m 03s Shortest: 3m 51s

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

How long are the videos produced?

Context Taxonomy

Class

A group of facets which describe the class of students in receipt of video feedback.

NOTE: Class describes the whole group of students and not only those attending a single taught session.

Academic Level

Description:	Normally refers to the year of an undergraduate degree, or the level and type of post graduate degree.
Rationale:	To describe the expected maturity of approach of the students in the class. May also be an indicator of an average age in some contexts.
Purpose:	Indicator of perceptions/attitude/academic maturity/approach
Guidance:	Examine the student section of the Perceptions Taxonomy of studies, for comments by students involved in studies working at a similar academic level. In addition, review the Diversity facet for indicators of age e.g.: unusually high numbers of mature students, and so on.
Literature:	The research demonstrates feasibility of video feedback on taught courses from foundation stage (McDowell 2011) and freshers (McDowell 2011; Harper et al. 2012; McDowell 2012a; Ghosn-Chelala and Al-Chibani 2013; West and Turner 2016) to post graduate level (Parton et al. 2010; Gould 2011; Jones et al. 2012; Henderson and Phillips 2015). Descriptions are sometimes inaccurate in so much as the language used in education is not precise. Terms referring to undergraduate 'final years' may mean year 3 or 4, depending on the course. Postgraduates may be masters level or undertaking taught sections of a PhD. Even though it is usually reported, education level is not examined anywhere and do not include multiple levels offering no comparisons to discuss. Others cover several levels (Crook et al. 2012; Jones et al. 2012) and discuss them as one large group leaving no means to identify any differences.
Format:	Concise description at the granularity of the year of study. For post graduate degrees include indication of the study format.

	Freshers/Level 4
	Masters – part time, first semester
Examples:	UG Level 5
	PhD – full time, 2nd year
	EdD – Taught doctorate part time, first year

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Academic level of students:

Context Taxonomy - Class

Subject studied

Description:	The degree title and the unit of study play a part in this description.
Rationale:	Imagine a single unit titled ‘Technology Integration’. That unit title implies different things when taught on a teacher training course compared to a computing degree. Perceptions of video feedback from computing students studying a highly technical and practical unit are likely to be different from teacher candidates studying applications of technology in teaching with an interest in how the video feedback works. Therefore, both the degree title and the unit title are required for a complete picture.
Purpose:	Indicator of student perspective
Guidance:	Examine the student section of the Perceptions Taxonomy of studies, for comments by students studying similar subjects.
Literature:	The subject studied by the class is an indicator of the types of assignments that are likely to be relevant. These often determine the selected source of the recording (see Recording Source facet). Subjects with the highest representation among the research are: - • Those with an acute interest in the purpose e.g.: education or teacher training (Tochon 2001; Parton et al. 2010; Turner and West 2013; Borup et al. 2015; West and Turner 2016). • Those with an overlap with digital video as a media e.g.: media and arts, or computing (Cruikshank 1998; Inglis 1998; Stannard 2008; Gould 2011; McDowell 2011, 2012a; Schilling 2013; McCarthy 2015) • Those with an interest in the audio explicitly e.g.: languages (Tochon 2001; Harper et al. 2012; Séror 2012; Sprague 2016).
Format:	Subject/unit and degree title
Examples:	BA English and Film Studies, Introduction to Photography Genetics and Immunology on MSc Microbiology Finance on BA Sport Exercise and Enterprise

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Subject Studied:

Context Taxonomy - Class

Assignment Type

Description:	This refers to the type of submission which is the subject of review by video feedback.
Rationale:	Video feedback may work well for some types of submission and not for others. This can only be determined if the type is known.
Purpose:	Indicator of appropriate recording source
Guidance:	Examine the student section of the Perceptions Taxonomy of studies, for comments by students who have submitted assignments of a similar type.
Literature:	Assignment type impacts decisions regarding recording source. See Table 2 (below) for examples from literature.
Format:	Concise description
Examples:	Essay on national defence policy E-portfolio for presentation at a job interview Music video Sculpture in clay of local celebrity Maths paper

Table 2 - Study details of assessment type and recording source (ordered by date)

Author	Subject	Assessment Type	Recording source
Cruikshank (1998)	Photography	Practical art & design	Camera
Inglis (1998)	Photography	Prints as hard copy	Camera
Stannard (2008)	English	Written assignment	Screencast
McDowell (2012a)	Business	Video of presentations	Screencast
Hyde (2013)	Professionalism in Diagnostic Radiology	Written assignment	Screencast
Harper et al. (2012)	Languages - various	Written assignment	Screencast
Hynson (2012)	English language	Written assignment	Screencast
Jones et al. (2012)	Technology or Business Management	Database design	Screencast
	Project Management	Written assignment	Screencast
Marriott and Teoh (2012)	Business Finance	Managing Finance	Screencast
McDowell (2012b)	Statistical Analysis	Written assignment	Screencast
	Textile production	Practical: a jacket	Camera
Moore and Filling (2012)	Composition & Children's literature	Written assignment	Camera & Screencast
Séror (2012)	Languages - written	Written assignment	Screencast
Thompson and Lee (2012)	Writing	Written assignment	Screencast
Ghosn-Chelala and Al-Chibani (2013)	Writing	Written assignment	Screencast

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Assignment type:

Context Taxonomy - Class

Size

Description:	This refers to the size of the class as a measurement of workload. Therefore, it is not as simple as the number of students. The class size is an indicator of workload, which is one of the main concerns expressed by staff regarding video feedback. For a true sense of the work required, and therefore, the relevance of study findings, three measures regarding the size of a class are required. • Number of students, or submissions if work is completed by a group. • Number of marking staff • Time period of use
Rationale:	The number of students may be high, but if the marking load is distributed across a team of markers the feasibility improves. In addition, it may be possible to maintain a high workload for a short duration where it could not be maintained indefinitely, such as where studies are completed over a single assignment. If a study is in place as normal practice over e.g.: the last three years, then it is likely feasible to replicate in another practice with similar numbers of students and marking staff.
Purpose:	Indicator of feasibility
Guidance:	Examine the student section of the Perceptions Taxonomy of studies, for comments by students who have submitted assignments of a similar type. Group work submissions may need special consideration of how this is expressed as a value if there are several elements to review.

Literature:

Some researchers acknowledge conclusions are based on on small samples. Most studies returning individual video feedback involve between 15 and 50 students Brereton (Gould 2011; Moore and Filling 2012; Denton 2014; Brereton and Dunne 2016; Cranny 2016; Mayhew 2016; Sprague 2016). A few have successfully responded to over a hundred students with video feedback Marriott (Marriott and Teoh 2012; Henderson and Phillips 2015).

The numbers of staff involved indicate the numbers required to make the workload feasible in practice yet is rarely explicitly reported. No one reports requiring additional team members to meet deadlines.

Studies are, in the main, short term eg: a single semester (Brereton and Dunne 2016) or assignment (Jones et al. 2012; Henderson and Phillips 2015), and therefore, it is unclear whether the momentum can be kept up long term. This maybe the result of a desire to publish soon after the first attempt to trial video feedback in practice.

Format:

Student/Submission numbers: number

No in marking team: number

Longevity of study: concise description

Examples:

Students: 322 Marking team: 4 Longevity: One semester

Submissions: 52 group submissions No in marking team: 2
Longevity: 2 years

Students: 122-137 across 3 submissions Marking team: 3 or 4
Longevity: One academic year so far.

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Number of students/submissions:

No in marking team:

Longevity of use of video feedback:

Diversity

Description:	There are various demographic groups within any class of students with a shared attitude or need that varies from other groups.
Rationale:	As a group in a single practice context, the numbers may be low, and the results appear insignificant. However, looking at the same trends for several studies may add significance to the impact of video feedback for a specific group of students. Common groups to consider are: - • International students who are non-native speakers • Mature students • Students with additional learning needs • Students with specific learning styles
Purpose:	Indicator of impact
Guidance:	Examine the student section of the Perceptions Taxonomy of studies, for comments by staff about students from specific groups. See if any other studies have similar findings to yours for a group identified in a similar way.
Literature:	Comparative studies rarely break the results into age groups. For instance, (Orlando 2016) complains about the generic use of the term 'postgraduate' without indication of age. Where studies do identify age groups, it is noticeable that mature students often prefer text as feedback, and younger students prefer video feedback. Numbers preferring text are usually very low and often not commented upon specifically. However, viewed as a whole across the literature it is clear that those preferring text are often mature students (Orlando 2016).
Format:	There may be several statements classified here.

Note: The total number of students will already be classified under the Size facet.

Examples:	82% non-native speaking students 14 students have dyslexia 33/232 students are aged over 25 1 student is partially sighted and 2 are hearing impaired

Instructions

Please read the description of the facet. Enter the value from your practice which you would classify into the facet.

Groups identified:

Exercise 2: Evaluation of Concision and Validity - Classification using the Perceptions Taxonomy

This exercise is to teat the feasibility of classification under the Perceptions Taxonomy.

Please classify the following extracts from literature containing findings, or perceptions, under a facet. To do this enter the letter associated with the text into the blank line below the description of the relevant face.

NOTE: *The table of perceptions for classification shown below will appear beneath each facet description so that you do not need to keep returning to this page.*

A

'Tutors were unanimous in finding that Jing® enabled them to provide feedback at a greater depth than traditional written comments. They also believed that Jing® would have more impact on students, for a variety of reasons. The first of these was the clarity of the explanation provided by combining an animated visual with an audio presentation.'

(Harper et al. 2012)

B

'(a) this medium has advantages over traditional methods of communicating feedback, (b) that students enjoy this new form of feedback, and (c) that this encourages them to engage with and learn from the tutor assessment of answers, rather than concentrating only on obtaining marks. It seems that this generation of students find the medium a close fit with other forms of communication they are used to in their technology enriched lives.'

(Jones et al. 2012)

C

'"I like the way the arrow kept on moving and highlighting the bits he was talking about because [...] you know if it's written then it's not always like next to what you've done wrong and you can't quite understand it, but because he highlights every bit as it goes, as he's talking, it's more understandable".'

(Marriott and Teoh 2012)

D

'For example, students reported that the degree of individualised comments combined with the richness of video-based feedback "makes you feel valued as a student," "makes me feel like I'm an individual and not just a name on the enrolment list", and in the case of off-campus students, "feel like part of the class."'

(Henderson and Phillips 2015)

E

'The negative comments all related to problems accessing the feedback on placement. ….. One student also commented that they “had to listen all the way through the feedback to get their grade”.'

(Hyde 2013)

F

'Some self-identified as a particular type of learner and as such felt that they particularly benefitted from the visual input "I am much more of a visual learner than audio …".'

(Mayhew 2016)

G

'Of the 22 students interviewed, 17 stated that their instructors were able to provide more affective support in video than they could in text.'

(Borup et al. 2015)

H

'Finding a quiet location to record the feedback was reported as a difficulty for some tutors,...'

(Cranny 2016)

Understanding the Perceptions Taxonomy

The Perceptions Taxonomy is for the classification of the opinions of stakeholders and findings of the study. Examining the perceptions of feedback created in the context of a particular practice can inform decisions about future implementations in practice or may reveal points for improvement in current practice. By approaching the context as the cause, and the perceptions as the effects, the taxonomies can contribute to informed decision making and move towards best practice.

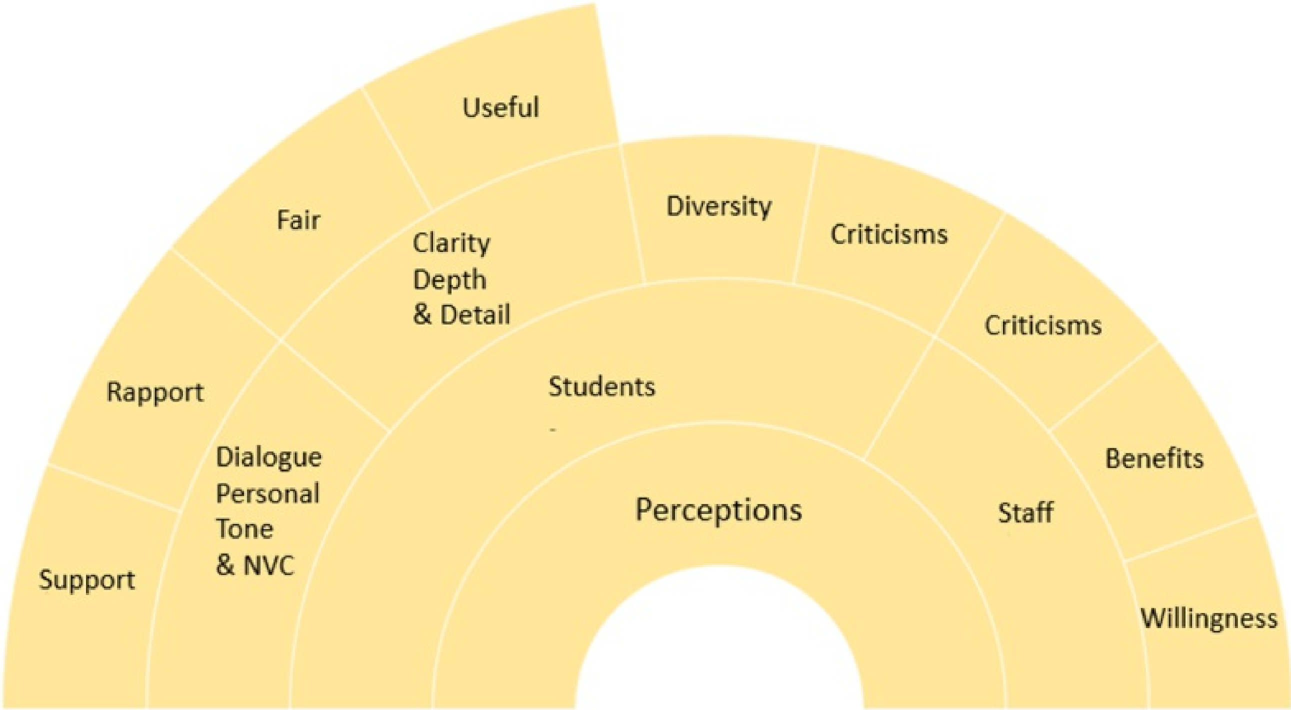

Figure 4 - Visualisation of the Percptions Taxonomy

Format of entries

All entries classified in the Perceptions Taxonomy are anticipated to be text. They may be anything from a single sentence to a paragraph in length.

Structure

The Perceptions Taxonomy is split into two key areas representing the two stakeholders impacted by feedback: students and staff.

Student

This group of facets is intended to collect the perceptions of video feedback from students who receive it, and who are intended to engage with it. As such, it is the expression of the impact of video feedback on students.

The benefits according to student reported in literature far out-weigh the criticisms. Due to the high volume, the benefits are divided between two conceptual areas - the learning message, and the message of support. These facets are currently named using terms commonly used by students. It is thought that this makes them easier to identify.

Perceptions - Students

Dialogue, Personal, Tone and Non-verbal communication

This group of facets is for the classification of a subset of positive perceptions. The name reflects terms reported as used by students in literature to make them easier to identify. Perceptions using these terms are usually describing either the message of support, or a feeling of rapport with staff, that students receive from video feedback. These are separated into two facets to make them easier to search due to the high numbers of comments common in each area.

Support

Description:	Levels of support perceived by students from video feedback.
Rationale:	To capture the level to which students feel supported and encouraged by their video feedback.
Purpose:	Indicator of student satisfaction
Guidance:	Messages classified here can be indicators of the tone of the marker. If students report a lack of support perceived from feedback, examine the Perceptions Taxonomy, Dialogue, Personal, Tone and Non-verbal communication group of facets, for positive perceptions from other studies. Then examine the context facets of those studies. They may provide ideas for changes which may improve student satisfaction
Literature:	When writing text, remarks regarding individuals e.g.: “I noticed you were struggling with that in the lab last week”, or directing students to other agencies such as e.g.: well being for those known to suffer from exam anxiety (Klappa 2015), are the sorts of supportive messages that get omitted from text content (Borup et al. 2015) due to time pressure. However, when creating video feedback these are easy to include and make video feedback a much more personal experience (Hyde 2013).

Instructions

Please read the description of the facet. If you think any of the perceptions for classification should be entered under the facet enter the corresponding letter here.

NOTE: The perceptions for classification are repeated beneath this question

Enter letter(s) corresponding to perceptions to be classified under Support (if any):

Perceptions for classification

A

'Tutors were unanimous in finding that Jing® enabled them to provide feedback at a greater depth than traditional written comments. They also believed that Jing® would have more impact on students, for a variety of reasons. The first of these was the clarity of the explanation provided by combining an animated visual with an audio presentation.'

(Harper et al. 2012)

B

'(a) this medium has advantages over traditional methods of communicating feedback, (b) that students enjoy this new form of feedback, and (c) that this encourages them to engage with and learn from the tutor assessment of answers, rather than concentrating only on obtaining marks. It seems that this generation of students find the medium a close fit with other forms of communication they are used to in their technology enriched lives.'

(Jones et al. 2012)

C

'"I like the way the arrow kept on moving and highlighting the bits he was talking about because [...] you know if it's written then it's not always like next to what you've done wrong and you can't quite understand it, but because he highlights every bit as it goes, as he's talking, it's more understandable".'

(Marriott and Teoh 2012)

D

'For example, students reported that the degree of individualised comments combined with the richness of video-based feedback "makes you feel valued as a student," "makes me feel like I'm an individual and not just a name on the enrolment list", and in the case of off-campus students, "feel like part of the class."'

(Henderson and Phillips 2015)

E

'The negative comments all related to problems accessing the feedback on placement. ….. One student also commented that they “had to listen all the way through the feedback to get their grade”.'

(Hyde 2013)

F

'Some self-identified as a particular type of learner and as such felt that they particularly benefitted from the visual input "I am much more of a visual learner than audio …".'

(Mayhew 2016)

G

'Of the 22 students interviewed, 17 stated that their instructors were able to provide more affective support in video than they could in text.'

(Borup et al. 2015)

H

'Finding a quiet location to record the feedback was reported as a difficulty for some tutors,...'

(Cranny 2016)

Perceptions - Students - Dialogue, Personal, Tone and Non-verbal communication

Rapport

Description: Indicators of relationship perceived by students from video feedback

Rationale: To capture the student perceptions of the relationship between the student and marking staff.

Purpose: Indicator of student satisfaction

Guidance: Messages classified here can be indicators of

Literature:

Just hearing a member of staff say a student's name makes feedback feel much more personal (Getzlaf et al. 2009; Klappa 2015). However, when creating video feedback these are easy to include and make video feedback a much more personal experience (Hyde 2013). This emotional connection can improve student-staff relationships for the future.

The contribution made towards building rapport between staff and student is usually framed as a benefit to the student. Staff can offer personalised pointers for feeding forward to future work and make an emotional connection with the student from their perspective, just as if the student was in the room with them(Jones et al. 2012; Klappa 2015).

Instructions

Please read the description of the facet. If you think any of the perceptions for classification should be entered under the facet enter the corresponding letter here.

NOTE: The perceptions for classification are repeated beneath this question

Enter letter(s) corresponding to perceptions to be classified under Rapport (if any):

Perceptions for classification

A

'Tutors were unanimous in finding that Jing® enabled them to provide feedback at a greater depth than traditional written comments. They also believed that Jing® would have more impact on students, for a variety of reasons. The first of these was the clarity of the explanation provided by combining an animated visual with an audio presentation.'

(Harper et al. 2012)

B

'(a) this medium has advantages over traditional methods of communicating feedback, (b) that students enjoy this new form of feedback, and (c) that this encourages them to engage with and learn from the tutor assessment of answers, rather than concentrating only on obtaining marks. It seems that this generation of students find the medium a close fit with other forms of communication they are used to in their technology enriched lives.'

(Jones et al. 2012)

C

'"I like the way the arrow kept on moving and highlighting the bits he was talking about because [...] you know if it's written then it's not always like next to what you've done wrong and you can't quite understand it, but because he highlights every bit as it goes, as he's talking, it's more understandable".'

(Marriott and Teoh 2012)

D

'For example, students reported that the degree of individualised comments combined with the richness of video-based feedback "makes you feel valued as a student," "makes me feel like I'm an individual and not just a name on the enrolment list", and in the case of off-campus students, "feel like part of the class."'

(Henderson and Phillips 2015)

E

'The negative comments all related to problems accessing the feedback on placement. ….. One student also commented that they "had to listen all the way through the feedback to get their grade".'

(Hyde 2013)

F

'Some self-identified as a particular type of learner and as such felt that they particularly benefitted from the visual input "I am much more of a visual learner than audio …".'

(Mayhew 2016)

G

'Of the 22 students interviewed, 17 stated that their instructors were able to provide more affective support in video than they could in text.'

(Borup et al. 2015)

H

'Finding a quiet location to record the feedback was reported as a difficulty for some tutors,...'

(Cranny 2016)

Perceptions - Students

Clarity Depth and Detail

This group of facets is for the classification of a subset of positive perceptions. The name reflects a subset of terms reported as used by students in literature to make them easier to identify. Perceptions using these terms are usually describing either the qualities of the learning message that students find beneficial in video feedback. These are separated into two facets to make them easier to search due to the high numbers of comments common in each area. These are describing the fairness of marking classified under ‘fair’, and the usefulness of video feedback classified under ‘useful’.

Fair

Description:	To classify comments expressing the degree to which students feel marking is fair
Rationale:	To capture the student perceptions of the fairness of the marking
Purpose:	Indicator of student satisfaction
Guidance:	If students perceive unfairness in the marking of feedback, examine the Perceptions Taxonomy, Clarity Depth and Detail group of facets, for positive perceptions from other studies. Then examine the context facets of those studies. They may provide ideas for changes which may improve student satisfaction. Illustrating points regarding marking by bringing assignment briefs, marking schemes, or rubrics on screen might improve the clarity of understanding.
Literature:	By following the marking process students learn about how staff think about their work students may be able to apply some of those processes themselves to future work. It is this insight into the process of marking that provides students with understanding of how they obtained the mark given (West and Turner 2016) and contributes to a sense of fairness

Instructions

Please read the description of the facet. If you think any of the perceptions for classification should be entered under the facet enter the corresponding letter here.

NOTE: The perceptions for classification are repeated beneath this question

Enter letter(s) corresponding to perceptions to be classified under Fair (if any):

Perceptions for classification

A

'Tutors were unanimous in finding that Jing® enabled them to provide feedback at a greater depth than traditional written comments. They also believed that Jing® would have more impact on students, for a variety of reasons. The first of these was the clarity of the explanation provided by combining an animated visual with an audio presentation.'

(Harper et al. 2012)

B

'(a) this medium has advantages over traditional methods of communicating feedback, (b) that students enjoy this new form of feedback, and (c) that this encourages them to engage with and learn from the tutor assessment of answers, rather than concentrating only on obtaining marks. It seems that this generation of students find the medium a close fit with other forms of communication they are used to in their technology enriched lives.'

(Jones et al. 2012)

C

'"I like the way the arrow kept on moving and highlighting the bits he was talking about because [...] you know if it's written then it's not always like next to what you've done wrong and you can't quite understand it, but because he highlights every bit as it goes, as he's talking, it's more understandable".'

(Marriott and Teoh 2012)

D

'For example, students reported that the degree of individualised comments combined with the richness of video-based feedback "makes you feel valued as a student," "makes me feel like I'm an individual and not just a name on the enrolment list", and in the case of off-campus students, "feel like part of the class."'

(Henderson and Phillips 2015)

E

'The negative comments all related to problems accessing the feedback on placement. ….. One student also commented that they "had to listen all the way through the feedback to get their grade".'

(Hyde 2013)

F

'Some self-identified as a particular type of learner and as such felt that they particularly benefitted from the visual input "I am much more of a visual learner than audio …".'

(Mayhew 2016)

G

'Of the 22 students interviewed, 17 stated that their instructors were able to provide more affective support in video than they could in text.'

(Borup et al. 2015)

H

'Finding a quiet location to record the feedback was reported as a difficulty for some tutors,...'

(Cranny 2016)

Perceptions - Students - Clarity depth and detail

Useful

Description:	To classify comments expressing the degree to which students feel the video is useful.
Rationale:	To capture the student perceptions of how useful video feedback is, normally expressed in comparison to the previously used format.
Purpose:	Indicator of student satisfaction
Guidance:	If students suggest the usefulness of the feedback is less than satisfactory examine the Perceptions Taxonomy, Clarity Depth and Detail group of facets, for positive perceptions from other studies. Then examine the context facets of those studies. They may provide ideas for changes which may improve student satisfaction.
Literature:	For students to be willing to engage with feedback they must perceive it as useful (Brereton and Dunne 2016). Therefore, student engagement is an indicator of usefulness. Students engage with feedback in a number of ways. Videos may be watched multiple times, pausing and rewinding if required. Initially at least, the majority of students like to review video feedback in private on their own (Gould 2011). Students then discuss them with friends and peers (Crook et al. 2010) even family (Hynson 2012).

Instructions

Please read the description of the facet. If you think any of the perceptions for classification should be entered under the facet enter the corresponding letter here.

NOTE: The perceptions for classification are repeated beneath this question

Enter letter(s) of any corresponding perceptions to be classified under Useful (if any):

Perceptions for classification

A

'Tutors were unanimous in finding that Jing® enabled them to provide feedback at a greater depth than traditional written comments. They also believed that Jing® would have more impact on students, for a variety of reasons. The first of these was the clarity of the explanation provided by combining an animated visual with an audio presentation.'

(Harper et al. 2012)

B

'(a) this medium has advantages over traditional methods of communicating feedback, (b) that students enjoy this new form of feedback, and (c) that this encourages them to engage with and learn from the tutor assessment of answers, rather than concentrating only on obtaining marks. It seems that this generation of students find the medium a close fit with other forms of communication they are used to in their technology enriched lives.'

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'Some self-identified as a particular type of learner and as such felt that they particularly benefitted from the visual input "I am much more of a visual learner than audio …".'

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(Borup et al. 2015)

H

'Finding a quiet location to record the feedback was reported as a difficulty for some tutors,...'

(Cranny 2016)

Perceptions - Students

Criticism (Students)

This facet is for the classification of any perceptions from students which are negative about video feedback.

Description:	To classify comments expressing any criticisms perceived by students about their video feedback.
Rationale:	To capture the student criticisms of video feedback to inform decisions regarding future best practice.
Purpose:	Indicator of student satisfaction
Guidance:	If students suggest a particular criticism an improvement may be found by examining related facets in the Context taxonomy. They may provide ideas for changes which may improve student satisfaction.
Examples:	One aspect that is not so popular with students is the lack of a macro view of the feedback. Without a text version it cannot be skimmed as whole and essential bits picked out. Students who prefer text as feedback complain about this because they must listen to the whole piece in a linear fashion to find comments on particular points. Some students recognise the value of making their own notes whilst watching the video (Moore and Filling 2012; Mayhew 2016), whilst others dislike the inconvenience and request a transcript of the video audio (Moore and Filling 2012; Hyde 2013).

Instructions

Please read the description of the facet. If you think any of the perceptions for classification should be entered under the facet enter the corresponding letter here.

NOTE: The perceptions for classification are repeated beneath this question

Enter letter(s) of any corresponding perceptions to be classified under Criticism from students (if any):

Perceptions for classification

A

'Tutors were unanimous in finding that Jing® enabled them to provide feedback at a greater depth than traditional written comments. They also believed that Jing® would have more impact on students, for a variety of reasons. The first of these was the clarity of the explanation provided by combining an animated visual with an audio presentation.'

(Harper et al. 2012)

B

'(a) this medium has advantages over traditional methods of communicating feedback, (b) that students enjoy this new form of feedback, and (c) that this encourages them to engage with and learn from the tutor assessment of answers, rather than concentrating only on obtaining marks. It seems that this generation of students find the medium a close fit with other forms of communication they are used to in their technology enriched lives.'

(Jones et al. 2012)

C

'"I like the way the arrow kept on moving and highlighting the bits he was talking about because [...] you know if it's written then it's not always like next to what you've done wrong and you can't quite understand it, but because he highlights every bit as it goes, as he's talking, it's more understandable".'

(Marriott and Teoh 2012)

D

'For example, students reported that the degree of individualised comments combined with the richness of video-based feedback "makes you feel valued as a student," "makes me feel like I'm an individual and not just a name on the enrolment list", and in the case of off-campus students, "feel like part of the class."'

(Henderson and Phillips 2015)

E

'The negative comments all related to problems accessing the feedback on placement. ….. One student also commented that they "had to listen all the way through the feedback to get their grade".'

(Hyde 2013)

F

'Some self-identified as a particular type of learner and as such felt that they particularly benefitted from the visual input "I am much more of a visual learner than audio …".'

(Mayhew 2016)

G

'Of the 22 students interviewed, 17 stated that their instructors were able to provide more affective support in video than they could in text.'

(Borup et al. 2015)

H

'Finding a quiet location to record the feedback was reported as a difficulty for some tutors,...'

(Cranny 2016)

Perceptions - Students

Diversity

Description:	This facet is for the classification of any perceptions or findings regarding the impact of video feedback on any specific groups of students, such as mature students, international students, students with additional learning needs, or students reporting to have specific learning styles.
Rationale:	To capture the student perceptions regarding the impact of video feedback on specific points of diversity.
Purpose:	Indicator of student satisfaction *Note the purpose of the Diversity facet in the Context Taxonomy is to record numbers of students from specific groups. This facet is to record the comments by students about the impact of video feedback regarding diversity.*
Guidance:	If students suggest a particular effect of video feedback on a specific point of diversity an improvement may be found by examining related facets in the Context taxonomy. They may provide ideas for changes which may improve student satisfaction. Students may be developing new learning strategies all the time to suit their style as technology evolves. It is important we monitor for changes and ensure the feedback continues to be suitable (Schilling 2013).

In the study by Jones (Jones et al. 2012) the student population was 75\% Indian, learning in Wales, UK; being taught in English (rather than Welsh). Sometimes these students did not want to admit when they did not understand something, and they appreciated the option to re access the video to work it out for themselves. (Sprague 2016) concluded that students prefer video as feedback regardless of first language. Students make use of additional non-verbal cues to derive meaning from their feedback, which are not available in the hand-written comments they were used to.

Literature: Since the nature of dyslexia is a difficulty when processing text it is not surprising that some studies have reported some students preferring video feedback over text (McDowell 2011; Marriott and Teoh 2012; McDowell 2012b),

It is accepted in modern education that students have preferences for learning styles which enable effective learning (Schilling 2013). Students who describe themselves as visual learners (Jones et al. 2012) auditory learners (Moore and Filling 2012)and indeed, auditory and visual learners (Turner and West 2013)claim video feedback appealed to their learning style more than written comments.

Instructions

Please read the description of the facet. If you think any of the perceptions for classification should be entered under the facet enter the corresponding letter here.

NOTE: The perceptions for classification are repeated beneath this question

Enter letter(s) of any corresponding perceptions to be classified under students comments on Diversity issues (if any):

Perceptions for classification

A

'Tutors were unanimous in finding that Jing® enabled them to provide feedback at a greater depth than traditional written comments. They also believed that Jing® would have more impact on students, for a variety of reasons. The first of these was the clarity of the explanation provided by combining an animated visual with an audio presentation.'

(Harper et al. 2012)

B

'(a) this medium has advantages over traditional methods of communicating feedback, (b) that students enjoy this new form of feedback, and (c) that this encourages them to engage with and learn from the tutor assessment of answers, rather than concentrating only on obtaining marks. It seems that this generation of students find the medium a close fit with other forms of communication they are used to in their technology enriched lives.'

(Jones et al. 2012)

C

'"I like the way the arrow kept on moving and highlighting the bits he was talking about because [...] you know if it's written then it's not always like next to what you've done wrong and you can't quite understand it, but because he highlights every bit as it goes, as he's talking, it's more understandable".'

(Marriott and Teoh 2012)

D

'For example, students reported that the degree of individualised comments combined with the richness of video-based feedback "makes you feel valued as a student," "makes me feel like I'm an individual and not just a name on the enrolment list", and in the case of off-campus students, "feel like part of the class."'

(Henderson and Phillips 2015)

E

'The negative comments all related to problems accessing the feedback on placement. ….. One student also commented that they "had to listen all the way through the feedback to get their grade".'

(Hyde 2013)

F

'Some self-identified as a particular type of learner and as such felt that they particularly benefitted from the visual input "I am much more of a visual learner than audio …".'

(Mayhew 2016)

G

'Of the 22 students interviewed, 17 stated that their instructors were able to provide more affective support in video than they could in text.'

(Borup et al. 2015)

H

'Finding a quiet location to record the feedback was reported as a difficulty for some tutors,...'

(Cranny 2016)

Perceptions

Staff

This group of facets are used to classify the perceptions of staff who create video feedback in response to student work.

Criticisms (Staff)

Description:	To classify perceptions by staff which are critical of the use of video feedback
Rationale:	To capture staff perceptions regarding the negative impact of producing video feedback or on students in receipt of it.
Purpose:	Indicator of staff satisfaction
Guidance:	Staff may suggest a particular negative effect of video feedback on staff or students. An improvement may be found by examining related facets in the Context taxonomy. They may provide ideas for changes which may improve staff or student satisfaction.
Examples from Literature:	Staff must be mindful of their state of mind when marking to ensure a positive tone. The last student must receive the same level of enthusiasm and positivity as the first (Jones et al. 2012). Tiredness or frustration is difficult to hide in the narrative and will put students off listening if detected (McDowell 2012b). Staff understand there is a potential increase in their workload initially, as learning to use the system to produce videos normally entails a small investment of time up front (Gomez 2010) Finding a quiet location to record the feedback was reported as a difficulty for some staff (Borup et al. 2014; Cranny 2016).

Instructions

Please read the description of the facet. If you think any of the perceptions for classification should be entered under the facet enter the corresponding letter here.

NOTE: The perceptions for classification are repeated beneath this question

Enter letter(s) of any corresponding perceptions to be classified under Staff Criticisms (if any):

Perceptions for classification

A

'Tutors were unanimous in finding that Jing® enabled them to provide feedback at a greater depth than traditional written comments. They also believed that Jing® would have more impact on students, for a variety of reasons. The first of these was the clarity of the explanation provided by combining an animated visual with an audio presentation.'

(Harper et al. 2012)

B

'(a) this medium has advantages over traditional methods of communicating feedback, (b) that students enjoy this new form of feedback, and (c) that this encourages them to engage with and learn from the tutor assessment of answers, rather than concentrating only on obtaining marks. It seems that this generation of students find the medium a close fit with other forms of communication they are used to in their technology enriched lives.'

(Jones et al. 2012)

C

'"I like the way the arrow kept on moving and highlighting the bits he was talking about because [...] you know if it's written then it's not always like next to what you've done wrong and you can't quite understand it, but because he highlights every bit as it goes, as he's talking, it's more understandable".'

(Marriott and Teoh 2012)

D

'For example, students reported that the degree of individualised comments combined with the richness of video-based feedback "makes you feel valued as a student," "makes me feel like I'm an individual and not just a name on the enrolment list", and in the case of off-campus students, "feel like part of the class."'

(Henderson and Phillips 2015)

E

'The negative comments all related to problems accessing the feedback on placement. ….. One student also commented that they "had to listen all the way through the feedback to get their grade".'

(Hyde 2013)

F

'Some self-identified as a particular type of learner and as such felt that they particularly benefitted from the visual input "I am much more of a visual learner than audio …".'

(Mayhew 2016)

G

'Of the 22 students interviewed, 17 stated that their instructors were able to provide more affective support in video than they could in text.'

(Borup et al. 2015)

H

'Finding a quiet location to record the feedback was reported as a difficulty for some tutors,...'

(Cranny 2016)

Perceptions

Benefits

Description:	To classify positive perceptions by staff of the use of video feedback
Rationale:	To capture staff perceptions regarding the positive impact of producing video feedback or on students in receipt of it.
Purpose:	Indicator of staff satisfaction
Guidance:	Staff may suggest a particular positive effect of video feedback on staff or students. Even thought the comment is positive it may still guide further improvements, or indicate why an improvement occurs. This can then be noted to ensure future change does not unintentionally reduce the positive impact.
Examples from Literature:	Staff can use the video as a means of hearing themselves discussing student work with the student and/or groups. Assigning a mark can be taken to a separate process using the video as a tool for review (Cruikshank 1998) potentially overcoming scheduling issues with more than one marker, or enabling quality assurance strategies. It could be used among academics to ensure consistency of marking and reviewed by external markers (McDowell 2012a). Once staff begin to experiment with video feedback they may find the constrictive limitations of using text are lifted, allowing staff to say things they have always wanted to say, and to illustrate and demonstrate things they have been unable to do so before. Marking becomes less of a burden allowing greater freedom of expression (Borup et al. 2014; Borup et al. 2015), and satisfaction from a job well done.

Instructions

Please read the description of the facet. If you think any of the perceptions for classification should be entered under the facet enter the corresponding letter here.

NOTE: The perceptions for classification are repeated beneath this question

Enter letter(s) of any corresponding perceptions to be classified under Benefits (if any):

Perceptions for classification

A

'Tutors were unanimous in finding that Jing® enabled them to provide feedback at a greater depth than traditional written comments. They also believed that Jing® would have more impact on students, for a variety of reasons. The first of these was the clarity of the explanation provided by combining an animated visual with an audio presentation.'

(Harper et al. 2012)

B

'(a) this medium has advantages over traditional methods of communicating feedback, (b) that students enjoy this new form of feedback, and (c) that this encourages them to engage with and learn from the tutor assessment of answers, rather than concentrating only on obtaining marks. It seems that this generation of students find the medium a close fit with other forms of communication they are used to in their technology enriched lives.'

(Jones et al. 2012)

C

'"I like the way the arrow kept on moving and highlighting the bits he was talking about because [...] you know if it's written then it's not always like next to what you've done wrong and you can't quite understand it, but because he highlights every bit as it goes, as he's talking, it's more understandable".'

(Marriott and Teoh 2012)

D

'For example, students reported that the degree of individualised comments combined with the richness of video-based feedback "makes you feel valued as a student," "makes me feel like I'm an individual and not just a name on the enrolment list", and in the case of off-campus students, "feel like part of the class."'

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E

'The negative comments all related to problems accessing the feedback on placement. ….. One student also commented that they "had to listen all the way through the feedback to get their grade".'

(Hyde 2013)

F

'Some self-identified as a particular type of learner and as such felt that they particularly benefitted from the visual input "I am much more of a visual learner than audio …".'

(Mayhew 2016)

G

'Of the 22 students interviewed, 17 stated that their instructors were able to provide more affective support in video than they could in text.'

(Borup et al. 2015)

H

'Finding a quiet location to record the feedback was reported as a difficulty for some tutors,...'

(Cranny 2016)

Perceptions - Staff

Willingness

Description:	Perceptions by staff of their own, or colleagues, willingness to change to, or to produce, video feedback. It is anticipated that this will be expressed together with the impact this may have on the production of video feedback or on the perceptions of students in receipt of it.
Rationale:	To understand the impact on staff regarding changing the assessment feedback method they use, or producing video feedback.
Purpose:	Indicator of staff satisfaction
Guidance:	Staff may suggest a particular impact of video feedback on themselves or colleagues. An improvement may be found by examining related facets in the Context Taxonomy. They may provide ideas for changes to help staff which may improve staff satisfaction and willingness.
Examples from Literature:	The natural resistance to change in many of us means that often staff can be sceptical when suggesting a move to video as feedback (Jones et al. 2012), (McDowell 2012a), yet in the end many prefer it (Orlando 2016). For staff to be willing to try something new, after years of something familiar, and good enough, there must be clear benefits. It is difficult to persuade colleagues of the need to change from what they perceive as 'working' in the past, and to invest valuable time and effort in experimentation(Ekinsmyth 2010).

Instructions

Please read the description of the facet. If you think any of the perceptions for classification should be entered under the facet enter the corresponding letter here.

NOTE: The perceptions for classification are repeated beneath this question

Enter letter(s) of any corresponding perceptions to be classified under Willingness (if any):

Perceptions for classification

A

'Tutors were unanimous in finding that Jing® enabled them to provide feedback at a greater depth than traditional written comments. They also believed that Jing® would have more impact on students, for a variety of reasons. The first of these was the clarity of the explanation provided by combining an animated visual with an audio presentation.'

(Harper et al. 2012)

B

'(a) this medium has advantages over traditional methods of communicating feedback, (b) that students enjoy this new form of feedback, and (c) that this encourages them to engage with and learn from the tutor assessment of answers, rather than concentrating only on obtaining marks. It seems that this generation of students find the medium a close fit with other forms of communication they are used to in their technology enriched lives.'

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D

'For example, students reported that the degree of individualised comments combined with the richness of video-based feedback "makes you feel valued as a student," "makes me feel like I'm an individual and not just a name on the enrolment list", and in the case of off-campus students, "feel like part of the class."'

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'The negative comments all related to problems accessing the feedback on placement. ….. One student also commented that they "had to listen all the way through the feedback to get their grade".'

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F

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(Mayhew 2016)

G

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(Borup et al. 2015)

H

'Finding a quiet location to record the feedback was reported as a difficulty for some tutors,...'

(Cranny 2016)

Exercise 3

Evaluation of Explanatory quality - Analysing an entity from classified values

Kwasnik (1999, p.40) demonstrates the mutli facetted taxonomy as an explanatory tool using the example of objects. The table of example data is recreated here.

Example of faceted Analvsis of Artifacts (Kwasnik 1999, p.39).

Period/Style	Place	Process	Material	Object
19th century arts and crafts	Japanese American	raku	ceramic oak	vase desk

In a multi-faceted taxonomy analysis is done by choosing the values classified for an entity to form a string. In the example provided by Kwasnik (1999) the classification string for the vase is “19‘”Century Japanese raku ceramic vase.” and the string for the second object is “Arts & Crafts American oak desk.”

Please form an explanatory string from the example values used here from the Context Taxonomy.

System					
Recording technology	Screen content				
Recording source	Work	Marker	Illustration	Documentation	Duration
Screencast	✓	✗	Execute programming code	Assignment brief Marking scheme	5-12 mins Average 8m44s

Class			
Subject	Size	Academic Level	Assignment Type
Programming	321 students 4 markers 5 years	Level 4 First year	Java programming code

Please enter your explanatory string here.

Exercise 4

Evaluation of Comprehensiveness - Additional attributes for classification

Please list and describe any attributes of the context or perceptions, which you felt should be recorded but had no place to be classified. Please explain why you think it would be useful to record them.

Please enter names of additional attributes, with their purpose and a description, here:

Exercise 5

Evaluation of the facility to Expand- Restructuring around a new facet

Please suggest where one or more of the following new facets might fit into to structure of the taxonomy set. A diagram is provided for reference.

Facet a) Any new attributes you think it is useful to classify into a new facet.

Facet b) 3D – could be a yes\no or a format description

Facet c) Advice – suggestions, top tips and advice from staff

Figure 5 - A visualisation of the Taxonomy of Video Feedback

Please enter names of additional attributes, with their purpose and a description, here:

Please enter the details of the new facet(s) which might classify the values of additional attribute(s) here. Please give a name and describe the position within the taxonomy.

Exercise 6

Limited scope evaluation – defining the boundary

Do you perceive the following to be inside or outside the scope of the taxonomy of video feedback?

	Inside	Outside	Not sure
The students submitted work	☐	☐	☐
The home page of the VLE	☐	☐	☐
Recording software	☐	☐	☐
Editing software	☐	☐	☐
Storage platform for storing videos	☐	☐	☐
The feedback review page for a specific student	☐	☐	☐
Hyperlink to the video	☐	☐	☐
Video player embedded in page	☐	☐	☐
Permissions on video feedback files	☐	☐	☐
Device student watches feedback on	☐	☐	☐
Quality of the feedback video recording	☐	☐	☐
Section of VLE where student reviews marks	☐	☐	☐
PC or other device staff use to record the video	☐	☐	☐
Microphone used to record the video	☐	☐	☐
Camera used to record the video	☐	☐	☐
Headset used when recording the video	☐	☐	☐
Software used to demonstrate/simulate learning points	☐	☐	☐
Software used to view student work	☐	☐	☐
Assessment rubric	☐	☐	☐
Assessment marking scheme	☐	☐	☐
Assignment brief/specification	☐	☐	☐
Staff	☐	☐	☐
Students	☐	☐	☐
The time taken to record the videos	☐	☐	☐
The number of students in the class	☐	☐	☐
The title of the course	☐	☐	☐
The title of the unit/module	☐	☐	☐
Assessment feedback turnaround policy of the institution	☐	☐	☐

Exercise 7

Ease of use evaluation

How easy did you find each of the exercises to complete?

Please don't select more than 1 answer(s) per row.

	very easy	easy	neutral	difficult	very difficult
1: Evaluation of Concision and Validity - Classification using the Context Taxonomy	☐	☐	☐	☐	☐
2: Evaluation of Concision and Validity - Classification using the Perceptions Taxonomy	☐	☐	☐	☐	☐
3: Evaluation of Explanatory quality - Analysing an entity from classified values	☐	☐	☐	☐	☐
4: Evaluation of Comprehensiveness - Additional attributes for classification	☐	☐	☐	☐	☐
5: Evaluation of facility to Expand - Restructuring around a new facet	☐	☐	☐	☐	☐
6: Limited scope evaluation – defining the boundary	☐	☐	☐	☐	☐

Please add any comments you have about the ease of use of the taxonomy of video feedback:

Thank you for taking part

Thank you very much

for participating in the validation of the

Taxonomy of Video Feedback

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Appendix I

Final Discussion and Future Work

I.1 Towards requirements for a video feedback subsystem of a VLE

Requirements of the video feedback integrated subsystem for a VLE

1 Glossary of terms

1.1 **The boundary of specific functionality** is the first point at which the work flow of the VLE becomes specialised to the task of creating video feedback, such as a button called 'create video feedback'.

1.2 **The user** is expected to be a member of staff tasked with creating feedback in response to student work.

1.3 **The VLE** is the proprietary Virtual Learning Environment system.

2 Boundary of specific functionality

2.1 Specific functionality must be accessible from the point in the VLE interface where any feedback is entered. At that point there must be the option to select video as the media for feedback

3 Video Feedback Interface

3.1 Source selection

3.1.1 The User must be able to select the source of the video from:-

3.1.1.1 The computer file system

3.1.1.1.1 When selected, a video must be copied to the VLE file system storage (as specified below) through an upload mechanism,

3.1.1.2 Previously recorded video feedback for the relevant unit, and assignment.

3.1.1.2.1 A search facility must be provided to facilitate the location of the relevant video.

3.1.1.3 The user interface should allow for the selection of relevant video or videos. Eg: check box.

3.1.1.4 Creation of a new recording

3.2 Video Storage

3.2.1 The system identifies a suitable digital storage location based on the settings for the unit or assignment eg: allocates a folder where video feedback for that assignment will be stored. Eg: …../Programming/assignment1/

3.2.2 Access Permissions

3.2.2.1 Permissions for creation of videos stored in the allocated folder will be limited to the instructors on that unit.

3.2.2.2 Permissions for review of videos will be limited to instructors on the unit and the student whose feedback area recording is initialised from.

3.2.2.3 In both cases, permissions will be extracted from the VLE.

3.2.2.4 The option for an administrator the amend permissions may be available, however the default should be those described above.

3.2.3 Video Identification

3.2.3.1 Identifiers (file name) for each video must be made visible to the user wherever the video is accessible.

3.2.3.2 A visual representation of the video must be made visible, or available by user selection, to the user wherever the video is accessible. Eg: An thumbnail image representing the first frame of the video.

3.2.3.3 Identifiers (file name) should be based on a unique student id, which is expected to be the student id in normal use throughout the institute. Note the applicable assessment will be identifiable by the folder in which the recording is located. Eg: …../Programming/assignment1/Fred Bloggs s555654321

3.2.3.4 These should have an initial value which may have details appended eg: "Fred Bloggs s555654321 Code", "Fred Bloggs s555654321 Design" or "Fred Bloggs s555654321 Take 2"

3.3 Setting up the video recording

During the setting up process the User is expected to be the instructor who is marking the student work.

Prior to commencement of recording the User must be able to :-

3.3.1 Select audio input

3.3.1.1 The user must be able to select between more than one microphone if such exists.

3.3.1.2 The user must be able to select inclusion of system audio in the recording.

3.3.1.3 The user must be able to monitor audio recording volume by means of a graphical level indicator which monitors live input in real time.

3.3.1.4 The user must be able to alter audio in real time.

3.3.2 Select video input

3.3.2.1 The user must be able to select the source for the main visual content as camera or screencast.

3.3.2.2 When Camera is selected: -

3.3.2.2.1 The user must be able to select between all cameras that exist on the user's system.

3.3.2.3 The user must be able to monitor visual input by means of a graphical representation of what will record with real time live updates.

3.3.3 Anticipation of operator control

3.3.3.1 The operator controls for record, pause, edit and stop must be visible prior to commencement of recording.

3.3.3.2 The operator controls for record must be enabled prior to commencement of recording.

3.3.3.3 The operator controls for pause, edit and stop must be disabled prior to commencement of recording.

3.3.3.4 The option for the user to view or hide a visual representation of the recording timeline during recording must be available.

3.3.4 Operator Controls during the recording process

3.3.4.1 Record

3.3.4.1.1 Recording of selected sources at selected settings commences on click of the record button

3.3.4.1.2 The record button is disabled

3.3.4.1.3 The pause button is enabled

3.3.4.1.4 The stop button is enabled

3.3.4.1.5 The edit button remains disabled

3.3.4.1.6 The visual representation of the recording timeline is available and is visible if enabled, and is animated to illustrate passing time.

3.3.4.2 Pause

3.3.5 Recording is paused on click of the pause button

3.3.5.1 The record button is enabled

3.3.5.2 The pause button is disabled

3.3.5.3 The stop button is enabled

3.3.5.4 The edit button is enabled

3.3.5.5 The visual representation of the recording timeline is available and is visible if enabled and illustrates the non progression of time whilst recording is paused.

3.3.5.6 A visual icon/ symbol must be visible during the paused period to ensure the user can tell recording has ceased even if the recording timeline is hidden.

3.3.6 Recording is finalised on click of the stop button

3.3.6.1 The pause / record button

3.3.6.2 The stop button is disabled

3.3.6.3 The edit button is enabled

3.3.6.4 The play button is enabled

3.3.6.5 The User is shown the name of the file, its final duration, and the location and file name under which it will be stored on the system.

3.3.6.6 The User is given the option to Delete and re record, or to save the recording.

3.3.6.6.1 On opting to save the recording the User is shown the feedback area of the VLE for the student and the same visual placeholder that will appear when the student views the feedback area will be shown to the User.

3.3.6.6.2 On opting to rerecord the video the system returns to the state following selection of the audio and video sources.

3.3.6.7 Editing

3.3.6.8 The edit button is available when recording has

a) not yet commenced
b) is paused
c) has been stopped

3.3.6.9 Clicking the edit button makes visible

a) the visual representation of the recording timeline
b) The current position marker on the timeline
c) The play button is enabled if recording has ceased but not enabled if paused.
d) The list of pre loaded clips available for inclusion into the main recording

3.3.6.10 Editing allows for the following functions to be performed:-

3.3.6.10.1 Insertion of pre loaded clips specific to the unit or assignment

3.3.6.10.1.1 Whilst recording is paused or has ceased preloaded clips may be dragged on to the current position marker for insertion at that point. It is clear from the visualisation where the clip is inserted and its duration.

3.3.6.10.2 Insertion of clips from client file system

3.3.6.10.2.1 Whilst recording is paused or has ceased clips may be selected from a file selection dialogue and will be inserted at the position of the current position marker for insertion at that point. It is clear from the visualisation where the clip is inserted and its duration.

3.3.6.10.2.2 The user must also choose to add the selected clip to the pre-loaded clip collection for either the the unit or assignment.

3.3.6.10.3 If paused, when recording recommences from the point in time following the inserted clip the current position marker moves to the end of the clip to indicate the new point in the timeline from which recording will continue.

3.3.6.10.4 Selection of sections of the main recording

3.3.6.10.5 Selections may be created by highlighting sections of the visual representation of the timeline.

3.3.6.10.6 Cutting out of selections from the main recording

3.3.6.10.7 Copying of selections from the main recording

3.3.6.10.8 Pasting of previously cut or copied clips from the main recording.

4 Constraints

4.1 Must be operational at all times that the VLE is available.

4.2 Must be available from the boundary point from inside the VLE

4.3 Conventions for commonly used actions eg selecting files, should be used where possible.

4.4 Conventions for specialised actions in media editing environments should be followed where possible.

5 Standard requirements

5.1 SCORM compliance is required

Atfield-Cutts, S. and Jeary, S., 2013. Blended Feedback: Delivery of feedback as digital audio on a computer programming unit. In: BCS Quality Specialist Group's Annual INSPIRE (International conference for Process Improvement, Research and Education)., 4–5 September 2013, London, UK. Atfield-Cutts, S., Ollis, G., Coles, M. and Mayes, H., 2016. Blended Feedback II: Video feedback for individual students is the norm, on an undergraduate computer programming unit. In: 27th Annual Workshop of the Psychology of Programming Interest Group - PPIG 2016, 7-10 September 2016, St. Catherine's College, University of Cambridge, UK.