Show and Tell in Higher Education: A Systematic Review of Video-based Feedback

by

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Abstract

This systematic literature review presents an overview of the research on the use of video-based feedback in higher education from 2009-2019. Sixty-seven peer-reviewed articles, selected from a systematic search of electronic databases, were organized and examined through the lenses of Diffusion of Innovation and Community of Inquiry theory. The perspectives of instructors and students on the five Diffusion of Innovation attributes and three Community of Inquiry constructs were analyzed and synthesized. In addition, the results of the analysis of feedback artifacts and learning outcomes from several studies were summarized. Video-based feedback was found to have a relative advantage over text-based feedback and to be simple for instructors and students to use. Video-based feedback also has a positive influence on perceptions of cognitive and social presence for both instructors and students. Finally, learning outcomes were found to be improved when video-based feedback was received. Opportunities for future research on video-based feedback include increasing rigour in methods used, focussing more on teachers and secondary education, and examining the actual quality of feedback provided.

Keywords: video feedback; screencast feedback; assessment; higher education; systematic review

Contents

1. Introduction

1.1. Overview

Show and tell is an activity commonly used with young children in North American schools. A student brings an object they have selected to class and then describes it to their classmates. The combination of visual and verbal representation in a social environment has created memorable learning experiences. Providing feedback using a video format is like the show-and-tell process. An instructor can give verbal commentary while displaying the student's submission. This paper, then, provides a review of the literature on the use of video-based show-and-tell feedback in higher education.

Feedback is an integral component of learning and involves communication about a gap between actual performance and desired outcomes (Carless, 2006). Narrowly construed, feedback provides a justification for an assigned grade, in which case student engagement with the comments becomes perfunctory (Price, Handley, Millar, & O'Donovan, 2010; Rae & Cochrane, 2008). However, a broader conception is that feedback facilitates the enhancement of understanding and future performance through dialogue among participants in learning communities (Evans, 2013). As such, the provision of feedback that facilitates high-quality dialogue is one of the primary roles of instructors in higher education (Evans, 2013).

Research has confirmed the importance of feedback. A synthesis of over 500 meta-analyses identified feedback as one of the most critical factors in improving student achievement (Hattie & Timperley, 2007). However, the study also found that feedback had a high degree of variance in the effect size, indicating that not all feedback had the

same effect on learning (Hattie & Timperley, 2007). Furthermore, some feedback interventions were found to have a negative effect (Kluger & DeNisi, 1996). This fact highlights the need for educators to think carefully about the quality and format of feedback.

Just as one-on-one tutorial instruction has been considered to be the "gold standard" of education (Bloom, 1984), face-to-face conferences are thought to be one of the best methods to provide feedback (Anson, Dannels, Laboy, & Carneiro, 2016; Ryan, Henderson, & Phillips, 2019) and a necessary method to clarify written feedback (Sommers, 1989). A survey of 194 students and 26 instructors indicated that both groups considered individual face-to-face conferences to be the most effective method of feedback (Mulliner & Tucker, 2017). That same study found that many students (46%) preferred meeting with their instructor to receive feedback over typed or written feedback (Mulliner & Tucker, 2017).

However, a one-to-one approach is impractical in large higher education classes; consequently, text-based feedback is the norm. Before the use of computers, feedback was provided as handwritten comments and codes on students' written submissions (Sommers, 1982). The practice of writing extensive corrections and comments with a red pen has led to disappointment and discouragement (Semke, 1984). The association of red ink with negative emotions led to the recommendation that instructors use a neutral colour of ink for marking (Dukes & Albanesi, 2013). However, the limitations of handwritten markup went beyond the colour of the ink. Students found much of the feedback they received to be unhelpful because the comments were not specific, lacked

guidance, focused on the negative, or did not align with the goals for the assessment (Glover & Brown, 2006; Weaver, 2006).

With the advent of digital submissions, feedback shifted from a handwritten to a digital format with text typed in the digital margins (Parkin, Hepplestone, Holden, Irwin, & Thorpe, 2012; Ryan et al., 2019). This change to digital markup helped students overcome the challenge of deciphering illegible scratches (Glover, Parkin, Hepplestone, Irwin, & Rodger, 2015; Hepplestone, Holden, Irwin, Parkin, & Thorpe, 2011; Price et al., 2010). However, other problems remained including the lack of detail (Pitt & Norton, 2017), the absence of pedagogical training for instructors (Richards, Bell, & Dwyer, 2017), the difficulty students encountered making connections between grades, feedback, and assessment criteria (Glover et al., 2015), and the negative emotional responses that feedback can elicit (Shields, 2015).

Students expect feedback that is timely, personal, explicable, criteria-referenced, objective, and useful for improvement in future work, according to a review of 37 empirical studies on assessment feedback in higher education (Li & De Luca, 2014). While some of these expectations could be met with higher quality text-based feedback, large class sizes and the media constraints of text make it challenging to produce feedback that meets students' expectations.

The problems experienced in text-based feedback can be accentuated in online learning environments. For example, in text-based asynchronous courses, students may have never seen or heard the instructor. Opportunities for unmediated face-to-face or even synchronous video communication are often limited (Bawa, 2016). Although online education has progressed from postal correspondence to Internet-delivered courses,

developing a community can be difficult, especially in asynchronous environments (Rovai & Wighting, 2005). In online learning environments, the relationship quality experienced by participants, referred to as psychological distance (Dockter, 2016), introduces challenges for how feedback is received (Gikandi, Morrow, & Davis, 2011). Just as instructional methods change when teaching online, so does the process of providing feedback (Dennen, Aubteen Darabi, & Smith, 2007).

Technology use has the potential to facilitate feedback dialogue and enhance student engagement (Hepplestone et al., 2011). Communications technology has progressed rapidly since the advent of text-based discussion forums transmitted by analog modems. Widespread internet access, pervasive video capture devices, and the ascendancy of streaming video services have dramatically altered media consumption (Henderson & Phillips, 2015). Questions have been raised about how the increasing ease of including and producing rich media, such as video, might affect the operationalization of teaching presence (Garrison & Arbaugh, 2007), particularly the provision of feedback. Moore (1993) theorized that changing communications media in education could increase dialogue and decrease distance. Despite the changes in media production and consumption and the questions about the effect of that shift on teaching and learning, Hepplestone et al.'s (2011) review of the literature on student engagement with feedback focused almost exclusively on text-based feedback, with limited references to audio feedback and no research examining video-based feedback.

Therefore, given the importance of feedback, the limitations of text-based feedback, the continued evolution of educational paradigms, and the increase in online

learning, rethinking feedback methods is warranted. Specifically, the affordances of video-based feedback as compared to text-based feedback are worthy of consideration.

1.2. Definitions

1.2.1. Text-Based Feedback

In this literature review, *text-based feedback* is operationally defined as a method of providing guidance, commentary, support, and assessment to students using handwritten or typed text. Traditionally, symbols, codes, and comments were handwritten by an instructor using a red pen (Semke, 1984). This method is referred to in this review as *handwritten markup* feedback. *Digital markup* is defined similarly but with the feedback provided in digital form. The use of Microsoft Word or Google Docs comments and the "track changes" feature is a common method used to create digital markup (Chang, Cunningham, Satar, & Strobl, 2018). Rubrics (and other assessment tools like marking guides) are a variant of text-based feedback. Rubrics provide the instructor and the student with a pre-set number of criteria and indicators against which the student's submission is assessed and feedback provided, sometimes with additional comments. Rubrics are sometimes used as supplements to other types of feedback (Ryan et al., 2019).

1.2.2. Video-Based Feedback

Video-based feedback is operationally defined in this review as an approach to providing feedback using moving images, usually accompanied by audio. In this method, video replaces or supplements text in the feedback process. The term *video feedback* has been used in a categorical sense (Henderson & Phillips, 2015; Mahoney, Macfarlane, & Ajjawi, 2018); however, this wording obscures a distinction between the method of

capturing the content and the medium of delivery. That is, the moving images provided to students can be captured from a video camera or a computer screen, but both capture methods result in a video file. For the purposes of this review, *video-based feedback* is used as a categorical term that describes the medium, while terms like *video feedback* and *screencast feedback* describe the type of images provided to the student.

Four types of video-based feedback were observed in this review: video, screencast, pencast, and VoiceThread. *Video feedback* is operationally defined as a type of video-based feedback consisting of a video of an instructor talking that has been recorded with a camera. Typically, the camera frames the head and shoulders of the instructor (Henderson & Phillips, 2015), thereby leading to an alternative label of a "talking head" video (Mahoney et al., 2018). Cameras are now usually built into laptops, tablets, and phones; however, early experiments involved the use of stand-alone cameras with built-in storage such as the Flip (Crook et al., 2012; Parton, Crain-Dorough, & Hancock, 2010).

Screencast feedback is comprised of a recording of a computer screen while an instructor narrates and performs actions such as highlighting, formatting, text insertions, and deletions (Chang et al., 2018). One of the first uses of the term *screencast* described it as a narrated movie of software in action and discussed the potential to demonstrate product features, tips, and techniques (Udell, 2005). That same year, two brief articles discussed the potential uses of screencasts in education, particularly in libraries (Notess, 2005; Roberts, 2005). Shortly after, one of the first research articles on using screencasts to teach students to navigate a digital edition of the Dewey decimal system was published (Peterson, 2007).

Pencast feedback is similar to screencast feedback, but rather than typing, drawing and writing are recorded using a graphics tablet (e.g., Wacom or Bamboo) and digital pen (e.g., Livescribe) while the instructor talks. Pencasts are commonly used in problem-solving scenarios such as those seen in Khan Academy instructional videos. A similar approach has been used to provide generic feedback for quiz questions (Flood, Hayden, Bourke, Gallagher, & Maher, 2017; M. Robinson, Loch, & Croft, 2015) or individualized feedback on assignment submissions (O'Malley, 2011). Pencast feedback on quiz questions is a form of instructional video but set in the context of assessment.

Finally, *VoiceThread feedback* provides video-based feedback using the VoiceThread platform. VoiceThread is a cloud application that allows users to upload media files (e.g., documents, presentations, and images) and other users to comment on these media files using text, audio, or video. While VoiceThread could be used to provide only digital markup, it also offers the possibility of delivering audio and video feedback by attaching clips to specific pieces of text.

1.3. Previous Literature Reviews

Three literature reviews have been located that examined the existing research on video-based feedback (Chang et al., 2018; Killingback, Ahmed, & Williams, 2019; Mahoney et al., 2018). Chang et al.'s (2018) review focused on electronic feedback provided on second-language writing, explicitly seeking to synthesize the research on multimodal feedback. Their search began with articles published after 2006. The review did not specify the inclusion criteria, the number of articles considered, or the number of articles. Since the focus of their review was feedback on second-language writing more than video-based feedback, studies were included that investigated various modalities of

providing electronic feedback, from asynchronous written feedback to synchronous audio-visual feedback. Chang et al. (2018) acknowledged that studies of asynchronous written feedback predominated and studies of other modes were needed.

Killingback et al. (2019) conducted a systematic but narrowly-focused review of research on alternative feedback involving video, audio, screencasts, and podcasts. Searching began with articles published after 2010. The reviewers included articles if they reported qualitative data on student perceptions on alternative feedback and excluded articles where the participants were English as a second language (ESL) students. These tightly defined criteria resulted in only ten articles included in their literature review, with six reporting on audio feedback, two on video feedback, and one on screencast feedback. Although Killingback et al. (2019) focused on student perceptions of video-based feedback, they recognized that other factors needed to be investigated including student performance, feedback content, and the amount of time required to produce feedback using alternative modes.

The most comprehensive literature review I was able to locate was conducted by Mahoney et al. (2018). This review investigated the state of research on video-based feedback, considering articles published between 2005 and 2017. Their inclusion criteria allowed for both conference proceedings and peer-reviewed articles on video and screencast assessment feedback in higher education. The review was comprised of 37 resources, including 33 peer-reviewed journal articles. However, nearly half (n = 16, 48%) of the articles were from 2013 or earlier. While the search strategy described was adequate, the results were described as being less than exhaustive. This search strategy leaves open the probability that some pertinent research was not examined. The relatively

small number of articles and the inclusion of grey literature led the reviewers to not report on the quality of the articles. While that decision is understandable, it also highlights the need for a more detailed review of the literature that considers the quality of research articles reviewed. Mahoney et al. (2018) synthesized the results by summarizing the advantages and challenges of using video-based feedback for faculty and students. While this approach is adequate, studying video-based feedback through a more theoretical perspective could help to advance understanding of the method.

1.4. Purpose

Consequently, in a field that is evolving rapidly (Mahoney et al., 2018), the following systematic literature review addresses limitations and gaps in previous literature reviews and includes a comprehensive list of peer-reviewed articles. The purpose of this study is to provide a systematic review of the literature on video-based feedback through a theoretical lens. Specifically, Rogers' (2003) Diffusion of Innovation and Garrison et al.'s (2000) Community of Inquiry (CoI) frameworks were used to explore the benefits and challenges of video-based feedback for assessment in higher education. Two questions were addressed in this review of the literature:

1. What were the key characteristics of video-based feedback studies?
2. What recurring themes emerged from previous research on video-based feedback?

2. Method

This systematic review of the literature on video-based feedback was conducted based on principles drawn from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework in an attempt to minimize researcher bias and to provide a balanced analysis and synthesis of existing research (Liberati et al., 2009). A systematic review is a process of identifying, screening, analyzing, and synthesizing primary research sources to provide a reproducible, comprehensive, and reliable overview of a topic (Gough & Thomas, 2016). The identification and initial screening phases are conducted iteratively and include establishing basic selection criteria, testing search terms and using those terms to search targeted databases, extending the search to high-quality educational journals, and scanning the reference lists of articles that met eligibility requirements. Prospective articles were retrieved for full-text review and confirmation of eligibility. Articles meeting the eligibility criteria were analyzed by careful reading, extracting characteristics, coding emergent themes, and describing methodologies. Synthesis of review results includes aggregating quantitative data about the articles and configuring qualitative results from the articles (Gough & Thomas, 2016).

2.1. Eligibility Criteria

No existing eligibility criteria or method of analysis has been specified and documented for a systematic review on video-based feedback. As a result, I established the following eligibility criteria: studies that investigated the use of an audio-visual medium for the provision of assessment feedback in education, studies where participants were studying or teaching in higher education, and studies that involved original research, reported on in an English-language, peer-reviewed journal from 2009 to 2019.

Conference papers, dissertations, and book chapters were excluded from this review, as were studies focusing on video-feedback for the purpose of improving a skill (e.g., golf swing, surgical technique, or teaching ability).

2.2. Information Sources

I identified articles by searching electronic databases, targeting educational journals, and reviewing reference lists of articles published in English-language scholarly, peer-reviewed journals from 2009 to 2019. I searched the following electronic databases: ProQuest's The Summon Service, Education Source via EBSCOhost, ERIC via EBSCOhost, LearnTechLib, PsycINFO, Academic Search Premier, and Scholar Portal Journals, restricted to the discipline of education. The search was limited to these databases based on the university research librarian's recommendation that they are significant for educational research. I also searched 11 top educational journals. Journals were selected based on h5-index and h5-median metrics for education, educational technology, or online education as calculated by Google Scholar. The following journals were selected based on these criteria: *Computers & Education*, *British Journal of Educational Technology*, *Journal of Computer Assisted Learning*, *Turkish Online Journal of Distance Education*, *Australasian Journal of Education Technology*, *The Internet and Higher Education*, *Canadian Journal of Learning and Technology*, *Computers in Human Behavior*, *Journal of Educational Computing Research*, *Journal of Educational Technology and Society*, and *Assessment & Evaluation in Higher Education*. Finally, I searched Google Scholar and ResearchGate to locate recently published or in-press articles and to reveal articles missed using other sources.

2.3. Search Strategy

I developed a search strategy for articles using The Summon Service by ProQuest. My initial search used the keywords *screencast feedback AND assessment* and was limited to scholarly, peer-reviewed journal articles focused on education which were published in English after 2008. The initial search yielded six articles. Expanding the search by adding the keyword *video feedback*, as in (*screencast feedback OR video feedback) AND "assessment"*, increased the number of results to 346. Scanning the title and abstract excerpts of a convenience sample of the first 10 articles sorted by relevance revealed six articles that were not relevant to this review. These irrelevant articles helped to refine the search terms, leading to the exclusion of the keywords *coaching*, *autism*, *intervention*, *medical education*, and *video analysis*. This refinement process resulted in the search request *(("screencast feedback" OR "video feedback") AND "assessment") NOT ("coaching" OR "autism" OR "intervention" OR "medical education" OR "video analysis")*. This search strategy was adapted for the other databases.

The search strategy for Google Scholar and ResearchGate was similar to the original search; however, separate strategies were devised for the keywords *screencast feedback* and *video feedback* because of limitations in the use of Boolean operators for these two sources. For the term *screencast feedback,* no further refinement was necessary because the term is used in only a few contexts. Conversely, the term *video feedback* is used in several disciplines, and the same keyword exclusions as those previously noted were employed.

The search strategy for top-rated education journals was broader than for the general information sources. The search term used for these journals was *("screencast*

feedback" OR "video feedback"). This strategy created the possibility of finding articles that were previously unidentified. Scanning the results of the broad search was possible because of the relatively narrow focus of these journals.

Finally, a snowball strategy (Greenhalgh & Peacock, 2005) was also employed. In previous research, this method has been demonstrated to have a high yield for uncovering articles that were missed by the search protocol (Greenhalgh & Peacock, 2005). For articles already identified, I scanned new and relevant articles noted in the literature review, discussion, and reference sections.

2.4. Article Selection

I selected articles from the search procedures by scanning titles, abstracts, and, when available, keywords and abstract excerpts. For articles that seemed potentially relevant, I scanned the contents of the full article based on established eligibility criteria to determine whether the article should be included in the review.

2.5. Data Collection Process

A data collection table was developed and pilot-tested on 10 randomly selected articles and subsequently adapted and refined for this review (see Appendix B – Table of Coded Articles, part 1 and Appendix C Appendix B – Table of Coded Articles, part 2 for the final version of the table). A '+' symbol was used to separate multiple values for one item. Data were collected only from the articles as published. None of the authors were contacted for clarification of ambiguous or missing information or verification of data collected. Occasionally data was inferred from comments made in the article. In cases where the inference could not be made with certainty, the value was noted with a question mark.

Discerning theoretical frameworks for articles primarily involved a close reading of the article's literature review and discussion sections, scanning references in those sections, and searching the articles for the words *theory, theoretical*, *model*, and *framework*.

Identifying the emerging themes from the included articles was done by closely reading the results and discussions sections and noting key findings. Open coding was conducted on a convenience sample of five articles that were identified early in the analysis process. As further articles were coded, a constant comparative method (Corbin & Strauss, 2008) was used to review codes for consistency and alignment with emerging themes.

2.6. Data Items

The following 23 data items were collected from the articles (when applicable and available): authors, year of publication, country, academic level, academic discipline, instructional mode, assessment type, feedback provider, feedback recipient, feedback media compared, feedback length, capture method, research method, discussion of reliability, validity, and qualitative analysis checks, student sample size, instructor sample size, level of sample description; and, theoretical framework(s) considered. Data items are described in Appendix A – Coding of Studies.

2.7. Data Analysis

Descriptive frequency statistics were calculated to answer the first research question, "What were the key characteristics of the video-based feedback studies?". Inferences were assumed to be certain where there was reasonable cause to infer the information to simplify frequency analysis. For example, the instructional mode of

Edwards, Dujardin, and Williams (2012) was inferred to be asynchronous online based on a statement in the article that the student had never heard the voice of the tutor before receiving video-based feedback. This inference was assumed to be correct to simplify analysis.

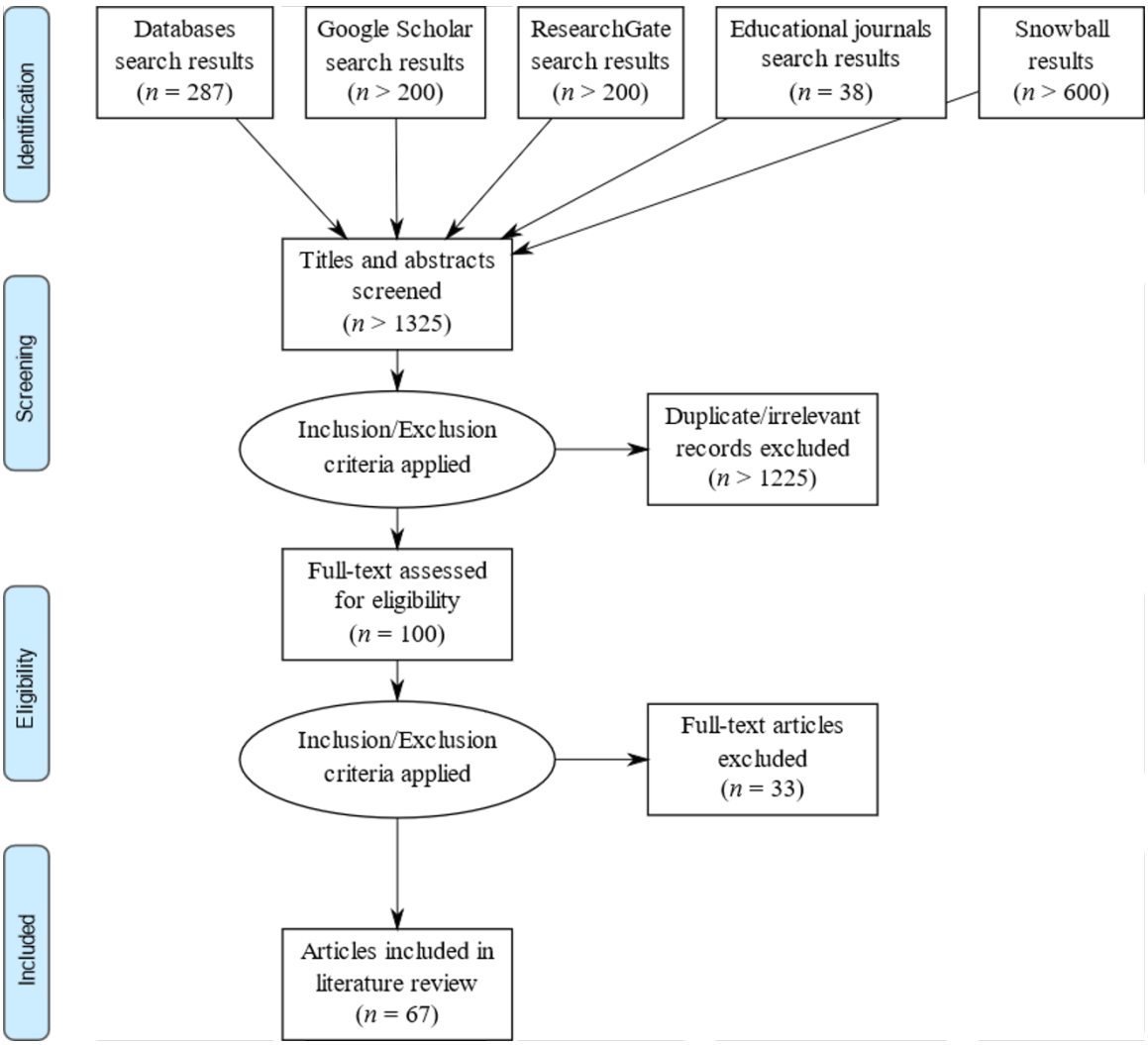
To answer the second research question, “What recurring themes emerge?”, codes were analyzed for coherence and developed into analytical themes in a configurative approach (Gough, Thomas, & Oliver, 2012). A top-down configuration uses extant theories to organize findings from research conducted using mixed methods to reveal connections between studies (Sandelowski, Voils, Leeman, & Crandell, 2012). Early in the analysis, descriptive themes emerged from the CoI framework, primarily the construct of social presence (Garrison et al., 2000). Where appropriate, analytical themes were derived from the CoI framework. Not all the codes matched the CoI framework; consequently, other theories included in the literature were considered as possible matches. Analytical themes drawn from Rogers (2003) Diffusion of Innovation theory were considered a suitable fit for the remaining codes.

3. Results

3.1. Search Results

This literature review includes an analysis of 67 journal articles. The initial search was conducted in September 2018 and updated in June 2019. Figure 1 illustrates the process of identifying, screening, assessing, and including eligible articles.

Figure 1. Diagram of the Search Process.



3.1.1. Identification

I consulted and identified research articles form five sources: digital databases from the library, Google Scholar, Research Gate, a direct search of key education and technology journals, and the references sections of selected articles. Over 1325 articles were identified in the initial search (Figure 1).

3.1.2. Screening

The initial search of digital library databases, including ProQuest's The Summon Service, Academic Search Premier, Education Source, ERIC, LearnTechLib, PsycINFO, and Scholar Portal Journals, returned 287 articles. I screened duplicate and irrelevant articles. For example, articles on the instructional use of screencasts and using recorded video in sign language education were removed by scanning titles, abstracts, and keywords. This screening process resulted in 76 articles remaining for closer review.

Searches were also conducted on Google Scholar and ResearchGate. On Google Scholar, the search terms *screencast feedback* and *"video feedback" -coaching -autism -intervention -medicine -surgery -therapy* returned 4,377 results. Since Google Scholar does not provide robust filtering capabilities, assessment of the search results was limited to approximately 200 results. After scanning the title, abstract, and publication name to exclude irrelevant and duplicate articles, six articles were retrieved for closer review. The "Sort by date" option that limits results to the past year was used to look for recently published articles. No additional articles were identified for in-depth review.

On ResearchGate, the titles and abstracts of approximately 200 results for the search terms *screencast feedback* and *video feedback* were scanned. Nine articles not previously identified were retrieved for full-text review.

Searches were also conducted on 11 top-rated education journals using the search term *screencast feedback OR video feedback*. These searches returned 38 results across the 11 journals. Scanning the titles, abstracts, and keywords against the inclusion criteria resulted in one additional article being retrieved for closer review.

Prospective articles were also identified using the snowball method from the literature review, discussion, and reference sections of previously identified articles. Over 600 titles were screened by considering their title, publication, and year. This process resulted in eight additional articles being retrieved for full-text review.

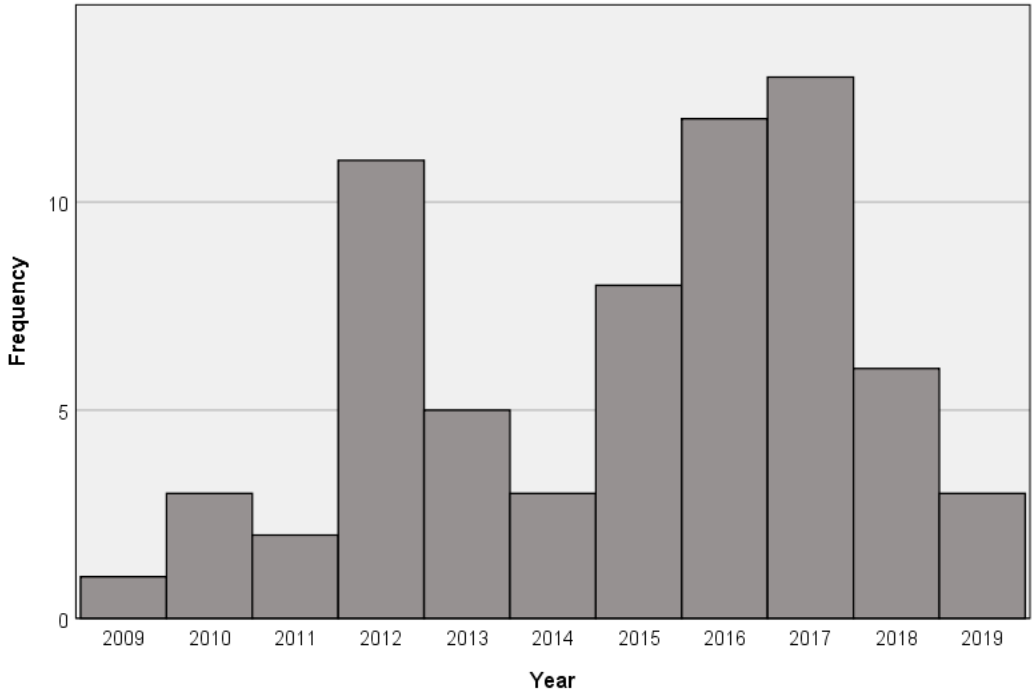
3.1.3. Eligibility

Of the 100 articles retrieved for full-text review, 33 did not match the eligibility criteria or matched the exclusion criteria. For example, articles were excluded when they did not involve video-based feedback (n = 24), did not conduct research (n = 5), consisted of literature reviews (n = 3), or did not focus on higher education (n = 1). The search process resulted in 67 articles for a full review.

3.2. Characteristics

This section provides a detailed analysis of the characteristics of the 67 studies included in this review. The significant characteristics of each article that were collected were authorship, year of publication, country, academic level, academic discipline, instructional mode, assessment type, feedback provider, feedback recipient, feedback media, feedback multimodality, feedback length, capture method, research method, trustworthiness, size and description of the student and instructor samples, and the use of theoretical frameworks. These characteristics were selected to frame an understanding of the context of video-based feedback use.

Figure 1. Frequency of Video-Based Research Articles Published by Year.



3.2.1. Authorship

There were 109 unique authors named in the included 67 articles. The majority of authors (*n* = 95, 87%) participated in only one article. Borup (Borup, West, & Graham, 2012, 2013; Borup, West, & Thomas, 2015; Borup, West, Thomas, & Graham, 2014; Thomas, West, & Borup, 2017), Graham (Borup et al., 2012, 2013, 2014; Griffiths & Graham, 2009, 2010) and West (Borup et al., 2012, 2013, 2015, 2014; Thomas et al., 2017) each co-authored five articles. Cunningham (2017, 2019b, 2019a) and Thomas (Borup et al., 2015, 2014; Thomas et al., 2017) authored three articles, and nine authors wrote two articles.

3.2.2. Year of Publication

The maximum number of articles published in a year occurred in 2017 (*n* = 13, 19%) (Figure 1). Two-thirds (*n* = 45, 67%) of the articles included were published since 2014. Only a few (*n* = 6, 9%) relevant articles were found in years 2009-2011. There was

a sharp decrease in published research from 2017 to 2018. The data for 2019 is for a partial year.

3.2.3. Country

Most of the video-based research studies were conducted in the United States (*n* = 31, 46%), followed by the United Kingdom (*n* = 16, 24%) and Australia (*n* = 5). More than one study was performed in Ireland (*n* = 3) and Turkey (*n* = 2). One study was conducted in each of ten countries, including Canada, Colombia, Egypt, Germany, Iran, Lebanon, Norway, South Korea, Spain, and Taiwan.

3.2.4. Academic Level

The majority of video-based research articles focused on undergraduate students and higher education faculty (*n* = 50, 75%). Nine studies (13%) included graduate populations exclusively, while eight articles (*n* = 8, 12%) focused on pre-service teachers.

3.2.5. Academic Discipline

Video-based feedback research was conducted in a variety of academic disciplines. The majority of the research (*n* = 61, 92%) focused on a single discipline. Research was concentrated in the disciplines of education (*n* = 15, 22%), language learning such as ESL, English as a foreign language (EFL), French as a second language (FSL), Spanish as a foreign language (SFL) (*n* = 14, 21%), and the humanities (*n* = 10, 15%). Studies were also conducted in business (*n* = 6, 9%), science, technology, engineering and/or math (STEM) (*n* = 6, 9%), social sciences (*n* = 4, 6%), and various forms of health care (*n* = 6, 9%). There were several (*n* = 5, 8%) extensive multidisciplinary studies.

3.2.6. Instructional Mode

In cases where the instructional mode could be determined (*n* = 66), some form of physical presence occurred between the feedback provider and recipient in a majority of studies (*n* = 54, 82%), either in a typical classroom setting (*n* = 43, 65%) or in a blended learning environment (*n* = 11, 17%). In two studies (3%), video-based feedback was used in synchronous online courses, where real-time presence was mediated in a virtual classroom. Asynchronous online courses, presumed to be without any form of physical or real-time virtual presence, were the context of 12 studies (18%), with 10 studies (15%) that examined video-based feedback in that context exclusively.

3.2.7. Assessment Type

In cases where the type of assessment could be determined (*n* = 59), two-thirds (*n* = 40, 68%) of studies examined formative assessments. Formative assessments focus on improving quality over time, typically permit or require multiple drafts or attempts, and may not have been graded or had a grade that can be improved by resubmission. On the other hand, summative assessments focus on assessing quality at a point in time, typically permit only one submission, and are assigned an unchangeable grade. Summative assessments were the focus of 40% of the studies reviewed (*n* = 24). Several researchers (*n* = 5, 8%) provided video-based feedback for both formative and summative assessment.

3.2.8. Feedback Provider

The feedback provider in almost all the studies was an instructor (*n* = 65, 97%). In the context of this review, the term *instructor* is used generically to refer to a subject-

matter expert and includes tutors and researchers as well as faculty members. Two studies (3%) investigated the provision of video-based feedback by a peer.

3.2.9. Feedback Recipient

The feedback recipient in almost all the studies was an individual student (*n* = 60, 90%). Several studies (*n* = 5, 7%) investigated feedback received by a group of students, sometimes as generic feedback on a quiz and occasionally as specific feedback on a group assignment. Two studies (3%) included feedback provided on different assignments to both individual students and groups of students.

3.2.10. Feedback Media

Of 64 studies that used a feedback media intervention, screencast feedback was studied most frequently (*n* = 46, 72%), followed by video (*n* = 11, 17%), pencast (*n* = 4, 6%), and VoiceThread (*n* = 3, 5%) feedback. Of 36 studies that included a control condition, the control used most often was digital markup (*n* = 21, 58%), followed by handwritten markup (*n* = 6, 17%), screencast (*n* = 3, 8%), video (*n* = 2, 6%), audio (*n* = 2, 6%), and knowledge of correct response (*n* = 2, 6%).

3.2.11. Feedback Multimodality

Feedback multimodality in this context describes whether students received multiple feedback modes (e.g., a screencast plus digital markup) for a single submission. The multimodality of the feedback design of the studies is worth considering because students who received multiple forms of feedback on a given assignment had different perceptions of the feedback than those who received only one form (Ryan et al., 2019).

In the majority of studies, one form of feedback media was provided to students (*n* = 43, 67%); however, in one-third of the studies, students received two (*n* = 20, 31%)

or three (*n* = 1, 2%) forms of feedback. Of the 21 studies that reported providing multiple modes of feedback, the most common combination reported was screencast with digital markup (*n* = 11, 52%), followed by screencast with a rubric (*n* = 6, 29%), screencast with embedded video (*n* = 2, 10%), pencast with embedded video (*n* = 1, 5%), and screencast with digital markup and a rubric (*n* = 1, 5%).

Of the 21 studies that reported providing multiple modes of feedback for the experimental condition, ten studies reported using a single mode for a control condition. Of those 10 studies, the most common comparison was between screencast feedback plus digital markup and digital markup alone. Only one of the 21 studies reported using multiple modes as a control condition (Edwards et al., 2012).

Of the 43 studies that provided a single mode for the experimental condition, 22 reported that they used a single mode of feedback for the control condition. Three included multiple modes in control conditions, while the remainder (*n* = 18) did not compare feedback modes.

Knowing that in some cases multimodal feedback was compared to single-mode feedback clarifies the context of the studies; however, it is difficult to determine how this methodological decision might have influenced these studies. The details on additional feedback modes (such as, whether students received a rubric) in many reports were sparse. Inferences about what feedback was received by students may be incorrect. Apart from Ryan et al.'s (2019) study which expressly studied the effect of multimodality, the primary consideration of most studies was whether providing more than one feedback mode for a given assignment would be an extra burden on instructors (Soden, 2017).

3.2.12. Feedback Length

Three-quarters of the studies (*n* = 51, 76%) reported the length of video-based feedback. In some cases, an average value was computed. In other cases, the length was reported as a range or was inferred from the type of video software (e.g., Jing which has a maximum video length of 5 minutes) used. The average video length was 7 minutes (*SD* = 3.6 minutes) and ranged from two to 26 minutes. Some of the shortest videos were peer-produced at two minutes long. The longest videos were instructor-produced feedback on group assignments at 26 minutes long.

3.2.13. Capture Method

The feedback capture method could be determined in 56 studies (84%). The most common tool for recording video-based feedback was Jing (*n* = 20, 36%). That was followed by the various versions of Camtasia (including Camtasia, Camtasia Studio, and Camtasia Relay) (*n* = 9, 16%) and Screencast-O-Matic (*n* = 7, 13%). Overall, there were 19 different methods used for capturing feedback.

3.2.14. Research Method

The use of questionnaires was most common (*n* = 52, 78%) research method, followed by qualitative methods such as interviews and focus groups (*n* = 28, 42%) and observation methods such as analyzing log files or feedback artifacts (*n* = 21, 31%). Mixed methods were used in 29 studies (43%), with 24 (36%) using two types, and five (7%) using three types of research methodologies. Of the 64 studies that intervened by using a different feedback media, 28 (44%) of them did not have an explicit control condition. The other 36 studies (56%) included a control condition.

3.2.15. Trustworthiness

Of the articles that included some form of quantitative analysis (*n* = 58, 87%), 28% (*n* = 16) provided a measure of reliability and 22%% (*n* = 13) offered validity estimates. Of the articles that included some form of qualitative analysis (*n* = 65, 97%), nearly three-quarters (*n* = 47, 72%) contained no discussion of checks on the analysis. A quarter of the articles (*n* = 15, 23%) described some qualitative check, while three articles (5%) described multiple qualitative checks. Techniques such as triangulation of data sources, multiple raters, and participant checks of data indicated the trustworthiness of qualitative analysis.

3.2.16. Sample Size and Description

The student sample size was reported for 63 of the studies (94%). One outlier with a sample size of 4,514 was excluded from the following analysis since the study did not involve an intervention and sought student perceptions on feedback received generally. For the remaining studies, the mean student sample size was 68 (*SD* = 66, min 4, max 314). However, in a few studies, the video-based feedback provided was not individualized. If only studies where an instructor provided individualized video-based feedback are included, the mean student sample size was 64 (*SD* = 59, min 4, max 299).

The instructor sample size was reported on for 25 studies (37%). The mean instructor sample size was 5 (*SD* = 6, min 1, max 27). Most of the studies (64%) involved one (*n* = 11, 44%), two (*n* = 3, 12%), or three (*n* = 2, 8%) faculty members.

One-sixth of the studies (*n* = 12, 18%) had complete or nearly complete sample descriptions. A complete sample description included a detailed picture of the participants with such details as age, gender, location, year, and selection method. Half of the studies

(*n* = 34, 50%) had partially complete sample descriptions. The remaining one-third (*n* = 22, 32%) had an incomplete or missing description.

3.2.17. Theoretical Frameworks

A discernible theoretical framework could not be identified for half (*n* = 35, 52%) of the articles. Perhaps this absence is explained by the exploratory nature of some of the studies. For example, Henderson and Phillips (2015) noted their use of video-based feedback began as a teaching strategy and became a research project. Additionally, several of the studies were described by their authors as action research (Alvira, 2016; Edwards et al., 2012; Griffiths & Graham, 2009; Mathieson, 2012; Soden, 2016), which focuses on solving problems rather than on theorizing.

The other half of the articles analyzed (*n* = 32, 48%) were informed by or referenced a diversity of theoretical frameworks. Thirty-one different theories were referred to in the articles. In some cases, the theories were foundational or significantly influenced the study, sometimes as evidenced in the title of the article. In other cases, an oblique comment was made about a theory but no citation or reference was provided, or the theory did not appear to have significantly influenced the study.

The theoretical frameworks referenced most often were Garrison et al.'s (2000) CoI framework (*n* = 7) and Mayer's (1997) Cognitive Theory of Multimedia Learning (*n* = 7). Both theories are related to other frameworks referenced in the literature. The research on social presence by Short, Williams, and Christie (1976), referenced by two articles, was a precursor to Garrison et al.'s (2000) CoI framework. Also, Mayer's (1997) Cognitive Theory of Multimedia Learning built on the dual coding theory developed by Paivio (1990), referenced by one article. The majority of frameworks (*n* = 22) were

referred to just once, with the remaining frameworks (n = 7) referred to two or three times.

3.3. Themes

3.3.1. Overview

The first theoretical lens used to synthesize themes arising from the literature on video-based feedback is the Diffusion of Innovation theory. Rogers (2003) identified five attributes to help explain the rate of adoption for innovations: relative advantage, complexity, observability, trialability, and compatibility. A summary of these attributes appears in **Error! Reference source not found.**. The use of this theoretical lens is warranted, given the theory has been used to investigate a variety of educational innovations (Rogers, 2003). For example, Killoran (2013) applied this theory to a review of research on audio feedback. Further, Soden (2017) used these attributes to guide research on barriers to the use of video-based feedback by instructors.

Table 1. Themes derived from the Diffusion of Innovation attributes.

Theme	Description
Relative advantage	The degree to which video-based feedback is thought of as better than text-based feedback.
Complexity	The degree to which video-based feedback is considered to be complicated to use.
Observability	The degree to which the effects of video-based feedback are visible to instructors, students, and others.
Trialability	The degree to which video-based feedback can be used on a limited basis.
Compatibility	The degree to which video-based feedback is consistent with values and needs about teaching and learning.

The second theoretical lens used to synthesize themes is the CoI framework. The framework was developed based on computer-mediated communication in asynchronous online courses (Anderson, Rourke, Garrison, & Archer, 2001; Garrison et al., 2000). Researchers theorized that, even with a lack of physical presence, effective learning could occur with appropriate levels of social presence, teaching presence, and cognitive presence (Garrison et al., 2000). A summary of these constructs appears in **Error! Reference source not found.**. The use of this theoretical lens is justified, given the framework has been used to investigate the educational use of many digital tools (Anderson, 2017). Furthermore, the framework was the most often cited (n = 7) theoretical framework among the articles in this review. Also, other articles in the review (n = 7) mentioned the CoI component of social presence. While the CoI framework is most often applied to online or blended learning contexts, the constructs are equally applicable to any learning environment that seeks to foster a community of learners (Cheung, Ng, Kiang, & Chan, 2018; Hosler & Arend, 2012; Warner, 2016). Given that video-based feedback has been used in online and face-to-face classroom contexts, the use of this theoretical lens seems appropriate.

Table 2. Themes derived from the CoI framework.

Theme	Description
Social presence	The degree to which video-based feedback enables students to feel connected to a community, to communicate openly, and to know other participants and be known by them.
Teaching presence	The degree to which video-based feedback enables instructors to identify needs and provide necessary information to students.
Cognitive presence	The degree to which video-based feedback enables students to engage in the process of reflective inquiry.

3.3.2. Relative Advantage

Innovations are adopted because they are thought to be an improvement over what preceded them. Rogers (2003) refers to this attribute as a relative advantage. This section on the relative advantage of video-based feedback considers the perspective of the instructors and the students.

Instructor Perspective

Instructor perceptions of the relative advantages of video-based feedback were mixed. The preferences, continuation of use, and perceptions of efficiency, quantity, quality, and challenges are discussed in the following section.

Preference. The data on the preference of written versus video versus face-to-face provided by instructors and peers is limited and therefore inconclusive. In a study of six instructors in an online graduate program, four preferred providing video-based feedback to voice and text feedback (Orlando, 2016). In another study, one dyslexic tutor indicated in an interview that he preferred giving video-based feedback over text-based feedback because it released him from the anxiety of misspelling words while under the pressure of grading (Jones, Georghiades, & Gunson, 2012). On the other hand, undergraduate students who provided video-based feedback to peers on English compositions preferred giving face-to-face or written feedback rather than video-based feedback (Walker, 2017).

Continuation of use. An instructor's willingness to continue using video-based feedback is an indirect measure of relative advantage. The research on the continuance of video-based feedback use is sparse and mixed. In one study of nine foreign-language faculty members, a follow-up survey indicated that three of five responding faculty continued to provide video-based feedback one year after the intervention (Harper,

Green, & Fernandez-Toro, 2015). On the other hand, Soden (2017) reported that four out of six instructors interviewed tried using video-based feedback in the previous two years but had not continued using it. Interview data indicated that a significant barrier to the continued use of screencast feedback was failing to perceive its relative advantage (Soden, 2017). Since instructors had difficulty identifying the benefits of video-based feedback and students seemed unable to help them do so, most instructors reverted to the familiar pattern of text-based feedback (Soden, 2017)

Efficiency. The most common concern for instructors about providing video-based feedback was time efficiency. Would they be able to provide more and better quality feedback in less time? A majority of studies indicated that providing video-based feedback was equally or more efficient than providing text-based feedback. Before trying video-based feedback, the perception among 20 instructors in one study was that it would take longer and create little benefit (Jones et al., 2012). While the results were mixed, the evidence suggested that providing video-based feedback was faster and resulted in more and better-quality feedback than using text. In three studies, observational data indicated that video-based feedback was faster than written feedback (Cunningham, 2019b; Edwards et al., 2012; Hope, 2011). Edwards et al. (2012) found the most significant time savings at, on average, 20 minutes less per submission. Hope (2011) reported an average savings of 16 minutes and five minutes on two different submissions. Cunningham (2019b) noted time savings of five minutes per submission. A number of studies reported that providing video-based feedback took less time (Denton, 2014; Gonzalez & Moore, 2018; Griffiths & Graham, 2010; Henderson & Phillips, 2015; Lamey, 2015; Mathisen, 2012) or the same amount of time (Crook et al., 2012; Jones et al., 2012; O'Malley, 2011;

Schilling & Estell, 2014; Vincelette & Bostic, 2013; West & Turner, 2016). However, these studies relied on instructor perceptions rather than objective observational data.

Several factors were noted that contributed to creating video-based feedback more quickly: one-take recording (Anson, 2015; Hall, Tracy, & Lamey, 2016; Lamey, 2015; Moore & Filling, 2012); speaking, which is faster than typing, especially if typing skills are underdeveloped (Borup et al., 2015); familiarity with the software (Hyde, 2013); and, a conscious effort to be concise (Lamey, 2015; Mathisen, 2012). Beyond the efficiency of creating the feedback, video-based feedback was found to make face-to-face follow-up meetings more focused and efficient (S. Robinson, Centifanti, Brewer, & Holyoak, 2015). The rich content of the screencasts students received encouraged them to think of meaningful questions and thus be better prepared for in-person meetings (S. Robinson et al., 2015).

On the other hand, not all instructors found video-based feedback to be more efficient. First, interview data from nine instructors indicated that they considered video-based feedback to be less efficient because it required a separate recording for each submission. With text-based feedback, they copied and pasted comments to improve efficiency (Borup et al., 2015). Furthermore, observational data from one study indicated that it took more than twice as long to create screencast plus digital markup feedback (M = 23.9 minutes) as to create only digital-markup feedback (M = 11.9 minutes) (Mathieson, 2012). This result is may be attributable to comparing the use of a single feedback method with multiple feedback methods.

Quantity. Some studies indicated that instructors provided more feedback with video compared to text. For example, analysis of feedback artifacts in four studies

showed that twice (Thomas et al., 2017), three times (Borup et al., 2015; Elola & Oskoz, 2016), and five times (Henderson & Phillips, 2015) as many words were provided in video-based feedback compared to text-based feedback. Five other studies provided interview and focus-group data that supported the conclusion that video-based feedback was more plentiful in terms of words provided (Hyde, 2013; Jones et al., 2012; Moore & Filling, 2012; Orlando, 2016; West & Turner, 2016). In one other study, instructors reported that speaking was faster than writing and that they would not take the time to write out the comments they provided in their videos (Vincelette & Bostic, 2013).

Quality. Research on the quality of video-based feedback was mixed. On the one hand, some instructors perceived that the quality of the video-based feedback to be more detailed (Hyde, 2013) and in-depth (Harper et al., 2015; Hung, 2016). The multimedia nature of screencast feedback was also considered to improve the quality of the feedback because instructors could link their comments to on-screen visuals (Harper et al., 2015) including course documents and external resources (Séror, 2012).

One the other hand, some instructors postulated video-based feedback was not necessarily of higher quality. For example, Thomas et al.'s (2017) analysis of feedback artifacts found that video-based feedback contained more small talk than text-based feedback. This finding led to the caution that increased word counts should not be confused with the quality of the feedback.

Disadvantages. Some instructors experienced disadvantages when using video-based methods. Some of these disadvantages included that the capture process required a quiet recording environment (Borup et al., 2015), video encouraged attention to attire, grooming, and surroundings (Lamey, 2015), and video and screencast comments were

more difficult to edit than text (Borup et al., 2015). Furthermore, interviews with instructors in three studies revealed feelings of performance anxiety when recording video-based feedback, although confidence built as the semester progressed (Parton et al., 2010; Soden, 2017; Vincelette & Bostic, 2013).

Student Perspective

The perceptions of students of the relative advantages of video-based feedback were mixed, but they generally favoured video- as opposed to text-based feedback. Overall, students preferred video-based feedback because they found it efficient and that the video-based feedback they received included more content of higher quality.

Preference. The vast majority of studies reported a widespread preference for video-based versus text-based feedback. This preference was noted among students in face-to-face classroom courses (Ali, 2016; Cranny, 2016; Crews & Wilkinson, 2010; Cunningham, 2019b; Denton, 2014; Ghosn-Chelala & Al-Chibani, 2018; Hall et al., 2016; Hope, 2011; Letón, Molanes López, Luque, & Conejo, 2018; Marriott & Teoh, 2012; McCarthy, 2015; Moore & Filling, 2012; O'Malley, 2011; Özkul & Ortaçtepe, 2017; Sommers, 2013; Turner & West, 2013; Vincelette & Bostic, 2013; West & Turner, 2016), blended courses (Gonzalez & Moore, 2018; Henderson & Phillips, 2015; Schilling & Estell, 2014), synchronous online courses (Grigoryan, 2017a), and asynchronous online courses (Alharbi, 2017; Edwards et al., 2012; Lowenthal & Dunlap, 2018; Mathieson, 2012). Generic video-based feedback addressed to a group of students was also preferred to other forms of feedback (Crook et al., 2012), as was generic pencast feedback illustrating solutions for mathematical calculations (Letón et al., 2018; M. Robinson et al., 2015). McCarthy (2015) found that male respondents and respondents

under the age of 25 were slightly more inclined to prefer video-based feedback to text-based feedback. Henderson & Phillips (2015) found no discernible relationship between variables such as gender, degree level, or ESL ability and a preference for video or text-based feedback. A few studies (n = 2) reported nuance in students' preferences, with some preferring video-based feedback for comments about higher-order concerns such as structure and text-based feedback for lower-order concerns such as grammar, spelling, and punctuation corrections (Elola & Oskoz, 2016; Silva, 2012).

Efficiency. Students in a few studies (n = 4) found that video-based feedback allowed for greater efficiency. In two studies, students found that the greater clarity in the video-based feedback increased their understanding of the feedback being communicated and reduced the need for follow-up face-to-face conferences with the instructors (Ghosn-Chelala & Al-Chibani, 2018; Gonzalez & Moore, 2018). In another of 18 students living off-campus, 78% reported that screencast feedback saved them a trip to campus to have feedback clarified by the instructor (S. Robinson et al., 2015). Observational data in another study indicated that the revision process was more efficient when using screencast feedback, with students spending 15 minutes less on average to make suggested changes to their assignment submissions (Cunningham, 2019b).

Quantity. Research on the quantity of information provided by video-based feedback is somewhat limited and mixed. Based on survey responses and open-ended comments, three studies reported that students received more feedback when video-based feedback, as opposed to a text format, was used (Sommers, 2013; Vincelette & Bostic, 2013; West & Turner, 2016). However, Grigoryan (2017a) found no statistically significant difference in students' satisfaction with the amount of feedback they received

when comparing screencast and digital-markup feedback. Additionally, students in one study preferred the conciseness of text-based feedback (Borup et al., 2015).

There was little discussion about student preference for the length of video-based feedback, perhaps because many studies included feedback of relatively short length (≤ 5 minutes). However, several studies (n = 3) found that students considered videos of more than 15 minutes too long to watch (Moore & Filling, 2012; Özkul & Ortaçtepe, 2017; Schilling & Estell, 2014). Some students noted that videos less than 10 minutes long were an appropriate length (Bissell, 2017; Schilling & Estell, 2014). However, students expressed concern that the length of videos might be dictated by technical constraints (such as file size or software limitations) rather than by the amount of feedback instructors deemed necessary (Schilling & Estell, 2014).

Quality. Multiple studies (n = 7) suggested students perceived that the quality of video-based feedback was better than (Alharbi, 2017; Mathisen, 2012; Turner & West, 2013; Vincelette & Bostic, 2013; West & Turner, 2016) or the same as (Borup et al., 2015; Grigoryan, 2017a) text-based feedback. Three factors contributed to this perception. The first factor was that students considered video-based feedback to include a higher degree of detail (Ghosn-Chelala & Al-Chibani, 2018; Hyde, 2013; Mathieson, 2012; Mayhew, 2017; McCarthy, 2015; Özkul & Ortaçtepe, 2017; Ryan et al., 2019; Sommers, 2013; Turner & West, 2013). The second factor was that students indicated that the content of video-based feedback was considered to be clearer than text-based feedback (Ali, 2016; Grigoryan, 2017a; Hall et al., 2016; Henderson & Phillips, 2015; McCarthy, 2015; Moore & Filling, 2012; Sommers, 2013). The third factor was that students appreciated the multimedia nature of video-based feedback because visuals and

audio helped them better understand the feedback (Ali, 2016; Edwards et al., 2012; Marriott & Teoh, 2012; Mathisen, 2012; Thompson & Lee, 2012). Video-based feedback accomplished this, in part, by extending the available palette to convey emphasis (Ghosn-Chelala & Al-Chibani, 2018). The visual aspect helped students understand the feedback received (Anson, 2015). For example, pharmacology students reported that the synchronization of audio and video enabled them to better understand calculations (Flood et al., 2017). Media arts students considered screencast feedback to be the most appropriate type of feedback for the predominantly visual assignments being assessed (McCarthy, 2015). Finally, the audio component of screencast feedback made parallel processing of feedback possible (Cunningham, 2019b) and also reduced the anxiety of one student with dyslexia (Bissell, 2017).

Other Advantages. Students identified four miscellaneous advantages of receiving video-based feedback. First was the ability to view video-based feedback repeatedly (Bissell, 2017; Brereton & Dunne, 2016; Crews & Wilkinson, 2010; Ghosn-Chelala & Al-Chibani, 2018; Jones et al., 2012; Mathisen, 2012; Moore & Filling, 2012; S. Robinson et al., 2015). Repeated viewing had a positive effect on understanding (Jones et al., 2012) and remembering (Mathisen, 2012) the feedback, especially when compared to face-to-face feedback sessions (Ghosn-Chelala & Al-Chibani, 2018). Second, video-based feedback did not suffer from legibility problems like handwritten markup (Armağan, Bozoğlu, Güven, & Çelik, 2016; Ghosn-Chelala & Al-Chibani, 2018; Marriott & Teoh, 2012). Third, students thought video-based feedback offered more transparency about the evaluation process by revealing more about the instructor's expectations and rationale (Anson et al., 2016; Lamey, 2015). Finally, video-based feedback was

considered more accessible than other forms of feedback because it could be viewed anywhere at any time (Crews & Wilkinson, 2010; Özkul & Ortaçtepe, 2017).

Disadvantages. Some students experienced disadvantages with video-based feedback and preferred the text-based format (Borup et al., 2015; Orlando, 2016; Walker, 2017). Negative feelings while viewing videos, the need to view video multiple times, and accessibility were the common themes.

Seven studies noted that students experienced negative feelings when receiving video-based feedback (Ali, 2016; Edwards et al., 2012; Hall et al., 2016; Henderson & Phillips, 2015; Hyde, 2013; Lamey, 2015; Sommers, 2013). Some of the studies did not detail the extent of these negative feelings; however, several studies reported that more than 20% of students identified negative feelings about video-based feedback on surveys (Ali, 2016) and in open-text responses (Hall et al., 2016; Henderson & Phillips, 2015; Lamey, 2015). Students expressed feeling anxiety (Ali, 2016; Henderson & Phillips, 2015), nervousness (Edwards et al., 2012), discomfort (Hall et al., 2016; Sommers, 2013), awkwardness (Lamey, 2015), and hesitancy to watch the feedback (Hyde, 2013). Perhaps these findings corroborate the speculation that video-based feedback can be too personal for some students (Henderson & Phillips, 2015).

Some students reported that video-based feedback required repeated viewing because of its linear nature (Ali, 2016; Borup et al., 2015; Edwards et al., 2012; Gonzalez & Moore, 2018; Schilling & Estell, 2014; Silva, 2012; Sommers, 2013; Thompson & Lee, 2012). Students noted the difficulty in skimming the feedback (Borup et al., 2015; Edwards et al., 2012; Thompson & Lee, 2012). In addition, students reported that revisions were more difficult (Silva, 2012) because repeated reviewing of the videos was

required (Gonzalez & Moore, 2018; Schilling & Estell, 2014; Sommers, 2013) or they needed to take notes to keep track of the oral feedback comments (Borup et al., 2015; Gonzalez & Moore, 2018).

Finally, some students reported that video-based feedback was not easily accessible. In one study, teacher education students preferred text-based feedback because accessing it did not require headphones or a private location (Borup et al., 2015). Radiography students on placement reported that they could not access or hear video-based feedback, because of internet restrictions or the absence of speakers or headphones (Hyde, 2013). Media arts students indicated that they appreciated text feedback because it could be printed and did not require an electronic device to review (McCarthy, 2015).

Furthermore, students who received feedback with only a video of their instructor talking reported that they found it difficult to match the instructor's comments to the appropriate location in their submission (Henderson & Phillips, 2015).

3.3.3. Complexity

For an innovation to be adopted, it must be perceived to be relatively simple to understand and use. Rogers (2003) describes this attribute of an innovation on a continuum between simple and complex. The perspectives about ease of use and access, reflecting the overall complexity of using video-based feedback, are discussed below for both instructors and students. It is worth noting that the instructor sample size in each of thee studies was small ($n < 10$), therefore the results may not be representative.

Instructor Perspective

The perspectives of instructors on the complexity of video-based feedback were mixed. Some instructors reported that creating and distributing video-based feedback was

complex (Borup et al., 2015; Soden, 2017), while other instructors indicated that providing video-feedback was relatively easy (Mathisen, 2012; Orlando, 2016; Parton et al., 2010). There appeared to be at least three factors that influenced the complexity of using video-based feedback: the type of software used, the method for distribution of videos, and the amount and kind of training received.

Software. The type of video-recording software may have influenced perceptions of complexity. Tools like Jing had no editing capabilities beyond pausing recording but rendered video in real-time, making capture and production easy provided that screencasts were captured in one take (Soden, 2016). Tools like Camtasia had extensive editing capabilities but required video capture to be rendered before distribution, making capture and editing relatively easy, but production more complex and time-consuming (Silva, 2012). Two studies reported that the need to render videos before distribution was a significant barrier to the adoption of video-based feedback (McCarthy, 2015; Soden, 2017).

Distribution. The method of distribution of the videos also contributed to the complexity experienced by instructors. Early studies reported that videos were distributed as attachments to email messages (Crews & Wilkinson, 2010; Griffiths & Graham, 2009) and video mail (Griffiths & Graham, 2010), adding additional steps and file-size restrictions. Methods of distribution have changed over time and have been influenced by technological constraints and concerns about privacy. Several studies relied on delivery through publicly accessible, although often unlisted, web pages such as YouTube (Borup et al., 2012; Brereton & Dunne, 2016; Özkul & Ortaçtepe, 2017) or screencast.com, a service of Jing's developer TechSmith (Ali, 2016; Harper et al., 2015; Séror, 2012;

Walker, 2017). Reducing the complexity of providing video-based feedback may be possible by integrating production and distribution within an institution's learning management system (LMS) (Borup et al., 2014; Soden, 2017). However, in a study of eight education faculty, interview data indicated that five of them experienced problems using the LMS's video-based feedback feature and two resorted to external video capture tools (Borup et al., 2015).

Training. The amount and type of training received by instructors were not frequently discussed in the articles reviewed. However, instructors who received training and support reported that Jing was easy to use and providing video-based feedback was intuitive (Mathisen, 2012). Interview data from the six undergraduate faculty in different disciplines indicated that they gained the most understanding from informal peer-to-peer demonstrations of the process of video-based feedback (Mathisen, 2012). The technical proficiency of instructors was rarely considered. However, the reported ease of use might have been the result of technically proficient early adopters rather than the simplicity of the process.

Student Perspective

Students' perceptions of the complexity of receiving video-based feedback may influence its effectiveness and whether they advocate for instructors to continue using the method. The results for students' perspectives on complexity were mixed. Several studies (n = 8) indicated that students found video-based feedback easy or very easy to use and reported no or minor technical difficulties (Anson, 2015; Armağan et al., 2016; Denton, 2014; Griesbaum, 2017; Jones et al., 2012; Mathisen, 2012; Parton et al., 2010; Silva, 2012). On the other hand, in other studies, students reported a variety of problems

accessing video-based feedback. Some students indicated that they experienced difficulty finding video files in an LMS (Lamey, 2015), slow downloads (McCarthy, 2015), media files that were incompatible with their device (Ali, 2016; Deeley, 2017), and poor audio quality (Ali, 2016; Hope, 2011; Lamey, 2015). However, the number of students who encountered these complications in each of these studies was relatively low. The only exception was one study that reported marked difficulties with the audio quality (69% of students) and playing Flash files (27% of students) (Ali, 2016).

3.3.4. Observability

Observability is defined as "the degree to which the results of an innovation are visible to others" (Rogers, 2003, p. 258). An innovation that spreads is typically one which is easy to observe. Rogers (2003) distinguishes between hardware and software aspects of innovations, with hardware referring to a physical object or tool and software referring to the information base or ideas about the tool. Since physical objects are more observable than software, innovations for which the software aspect is dominant tend to diffuse more slowly (Rogers, 2003). While video cameras, the hardware, have diffused rapidly, their use for video-based assessment feedback, the software, has not (Ryan et al., 2019). Observability did not emerge as a significant theme in the articles included in this literature review.

Instructor Perspective

One article discussed observability from the perspective of instructors (Soden, 2017). In that study, one instructor commented on a lack of awareness about screencast feedback, stating that it was not "on the spectrum" (Soden, 2017, p. 13). Another instructor commented that familiar patterns of text-based feedback pushed screencast

feedback from his mind, stating, “it’s only you coming here to talk about this that made me think about it” (Soden, 2017, p. 13).

Student Perspective

Students in several studies reported that they had previously received video-based feedback and were familiar with the approach (Crews & Wilkinson, 2010; Lowenthal & Dunlap, 2018; Ryan et al., 2019). However, some students resisted the novelty of video-feedback (Deeley, 2017) and preferred the familiarity of text-based feedback (McCarthy, 2015).

3.3.5. Trialability

Trialability is defined as “the degree to which an innovation may be experimented with on a limited basis” (Rogers, 2003, p. 258). This section looks at the extent to which instructors and students readily experimented with video-based feedback.

Instructor Perspective

The majority (*n* = 64, 96%) of studies reported on specific video-based feedback interventions, cases where an instructor altered their standard feedback delivery to include some form of video-based feedback. The ability to experiment with video-based feedback is enhanced by the availability of several free options for capturing video from a camera, screen, or stylus. The software used to capture video-based feedback in 61% of the studies (*n* = 34) was free. Two of the capture software used most frequently have free versions, with Jing (*n* = 20, 36%) and Screencast-O-Matic (*n* = 7, 13%) accounting for nearly half of the capture methods used.

Perhaps most germane for this theme is a study which reported on the perceptions of feedback providers who had used or were considering using video-based feedback

(Soden, 2017). Of the six faculty members interviewed, four had previously tried screencast feedback but were not using it at the time of the study, one was considering using it, and one was currently using it. The study aimed to explore the barriers to adopting screencast feedback through the lens of the Diffusion of Innovation theory (Rogers, 2003) and the Barriers to Technology-enhanced Innovation framework (Schneckenberg, 2009). Schneckenberg (2009) posited that two tensions inhibit innovation in higher education. The first is the tension between the importance of research for career development and the quality assurance of study programs. The second is between instructor autonomy and organization-led innovation. The emphasis on research for faculty advancement would seem to reduce the likelihood of experimenting with new pedagogical methods because of the inherent cost in time involved in adopting an innovation. However, instructor autonomy would seem to increase the possibility of trying video-based feedback. The intrinsic freedom instructors have in higher education to choose pedagogical methods makes for a decentralized diffusion system that may be more prone to experimentation (Rogers, 2003).

One study exemplified trialability by involving several innovative assessment and feedback practices (Deeley, 2017). Digital portfolios were used by students to capture weekly critical reflections allowing the instructor to provide timely, personalized formative feedback; Google Glass smart glasses were used to record student presentations because the conference room recording system was unavailable during one session; and, Camtasia was used to record summative screencast feedback. Deeley (2017) recommended that faculty should consider conducting small experiments with technology to revitalize feedback and make it more effective.

Student Perspective

Trialability did not emerge as a theme from the perspective of students. This absence could be as a result of the minimal input that students have into the type of feedback they receive. Instructors only occasionally seek input from students before using new feedback methods (Bissell, 2017).

3.3.6. Compatibility

The fifth and final attribute of innovations that diffuse is compatibility. For an innovation to be perceived as compatible, it must align with "the existing values, past experiences, and needs of potential adopters" (Rogers, 2003). In the case of video-based feedback, an evaluation could be made about whether the approach is consistent with the roles of instructors and students, particularly in the assessment process. Research on the compatibility of video-based feedback from the perspective of instructors and students was relatively limited in the articles considered in this review.

Instructor Perspective

In Soden's (2017) study of the barriers to the use of video-based feedback, instructors' perceptions of their roles were identified as a significant obstacle. One instructor in that study commented that they were less likely to adopt screencast feedback because the dominant culture of their research-based university valued research performance above their teaching performance. Instructors were less able or willing to spend time and effort attempting to improve formative feedback because they were being judged by other criteria. As a result, the most significant barrier to the adoption of video-based feedback was the incompatibility between how instructors perceived their roles and the need to change feedback practices, not the technology or the method itself.

Student Perspective

One study explored students' perceptions about the role of instructors providing screencast feedback (Anson et al., 2016). Interview data indicated that students viewed their instructors in a variety of roles, including an affective guide, a personal trainer, and a relational partner. These perceptions led to the conclusion that screencast feedback fostered an interpersonal relationship, and it reduced the perceived power distance between the student and the instructor. The study did not compare student perceptions to those who had received text-based feedback, and it did not assess compatibility with students' understanding of what instructor and student roles should be.

3.3.7. Social Presence

The concept of social presence, from the CoI framework, refers to the perception of another individual as a real person in mediated online communication (Garrison & Arbaugh, 2007). Social presence consists of affective expression, group cohesion, and interaction (Garrison, Anderson, & Archer, 2010). These aspects of social presence were evident in the perspectives of both instructors and students.

Instructor Perspective

Many instructors who were surveyed or interviewed indicated a sense of social presence when using video-based feedback. This sense was evident in the perception that video-based feedback was personal and, in particular, that it enabled affective expression, group cohesion, and interaction.

Personal. Instructors perceived video-based feedback to be more personal than text-based feedback (Borup et al., 2014; Jones et al., 2012; Mathisen, 2012; Orlando, 2016; Séror, 2012).

Affective expression. Instructors thought that their ability to express emotion was improved because students were able to hear the tone of their voice (Borup et al., 2014; Harper et al., 2015; Parton et al., 2010; Séror, 2012). Instructors in two of those studies noted that the inflection of their voices communicated encouragement, praise, and confusion more clearly when using video-based feedback (Parton et al., 2010; Séror, 2012). On the other hand, one study reported that instructors felt that a private recording location was necessary to permit open affective expression because of the spoken nature of video-based feedback (Borup et al., 2014).

Group cohesion. Instructors felt a greater connection to students when using video-based feedback (Borup et al., 2014; Mathisen, 2012). Perhaps the sense of cohesion was the result of deliberate strategies such as addressing students by name and acknowledging their personalities (Borup et al., 2014).

Interaction. Instructors considered video-based feedback to be more interactive than text-based feedback (Borup et al., 2014; Jones et al., 2012; Séror, 2012). Two studies indicated that instructors reported that video-based feedback felt conversational (Borup et al., 2014; Séror, 2012) or that providing screencast feedback felt like the student was sitting beside the instructor while they assessed the submission (Jones et al., 2012).

Student Perspective

Students also reported experiencing a sense of social presence with video-based feedback in nearly two-thirds of studies (n = 43, 64%). Students experienced this perception of social presence in classrooms (n = 25), blended learning environments (n = 9), and synchronous (n = 1) and asynchronous (n = 9) online contexts regardless of whether there was any physical presence. Many of the articles reported that students

perceived video-based feedback was personal in a general sense (n = 29), while some reported positive perceptions of affective (n = 14), cohesive (n = 15), and interactive (n = 11) expression.

On the other hand, the results of a small number of studies stand in contrast to the many studies that found positive perceptions of social presence in video-based feedback. Borup et al. (2014) found no significant difference in the perception of social presence between students who received video feedback and those who received digital markup. Besides, Borup et al. (2015) found no significant difference in perception of the social presence indicators of respectfulness and supportiveness between students who received video feedback and those who received digital markup. Furthermore, in one other study, students (n = 37) in asynchronous online courses rated detailed text-based feedback as significantly more effective at establishing social presence than video-based feedback (Lowenthal & Dunlap, 2018).

Personal. Generally, there was a sense that video-based feedback was personal. In many cases, this perception was directly contrasted to text-based feedback (Anson, 2015; Cranny, 2016; Edwards et al., 2012; Griffiths & Graham, 2010; Grigoryan, 2017a; Hall et al., 2016; Harper et al., 2015; Hung, 2016; Marriott & Teoh, 2012; Mathieson, 2012; Moore & Filling, 2012; Orlando, 2016; Silva, 2012; Sommers, 2013; Thompson & Lee, 2012; Turner & West, 2013). In some others, there was no specific comparison to other types of feedback (Alharbi, 2017; Borup et al., 2013; Deeley, 2017; Henderson & Phillips, 2015; Jones et al., 2012; Mayhew, 2017). A few studies (n = 3) compared multiple modes of feedback with students indicating that video-based feedback was the most personal (Crews & Wilkinson, 2010; M. Robinson et al., 2015; Ryan et al., 2019),

even more so than face-to-face feedback sessions (Ryan et al., 2019). Feedback that was not specifically addressed to a particular student, such as with worked solutions in mathematics sent to the whole class, was also perceived to be more personal (M. Robinson et al., 2015).

The perception of video-based feedback as personal was reported with various forms, including screencast (Alharbi, 2017; Anson, 2015; Cranny, 2016; Crews & Wilkinson, 2010; Deeley, 2017; Edwards et al., 2012; Grigoryan, 2017a; Harper et al., 2015; Hope, 2011; Jones et al., 2012; Marriott & Teoh, 2012; Mathieson, 2012; Mayhew, 2017; Moore & Filling, 2012; Orlando, 2016; Silva, 2012; Sommers, 2013; Thompson & Lee, 2012), video (Griffiths & Graham, 2010; Hall et al., 2016; Henderson & Phillips, 2015; Hung, 2016; Mayhew, 2017; Moore & Filling, 2012; Turner & West, 2013), pencast (Crews & Wilkinson, 2010; M. Robinson et al., 2015), and VoiceThread (Borup et al., 2013) feedback. However, no study directly compared the various video-based feedback methods to determine whether one was more personal than others. Mayhew (2017) noted that students considered screencasts with embedded video to be more personal than a screencast alone.

Affective expression. Video-based feedback was considered by students to be particularly effective at conveying affective expression. Students reported that videos revealed their instructors' emotions more accurately (Anson et al., 2016; Borup et al., 2014) and helped them judge the authenticity of the instructors' expression (Borup et al., 2014). Students often mentioned the instructor's tone of voice as an important factor in affective expression (Bissell, 2017; Brereton & Dunne, 2016; Lamey, 2015; Moore & Filling, 2012; O'Malley, 2011; Thompson & Lee, 2012). Hearing the instructor's tone of

voice helped students perceive feedback as friendly (Thompson & Lee, 2012), to understand it (Bissell, 2017; Lamey, 2015), to interpret it more positively (Brereton & Dunne, 2016), and to see it as a constructive opportunity for improvement (Moore & Filling, 2012; O'Malley, 2011).

Group cohesion. Video-based feedback was considered by students to be effective at promoting group cohesion. Students noted that this type of feedback helped them feel closer to their instructor (Anson et al., 2016; Borup et al., 2014; Crews & Wilkinson, 2010; Griffiths & Graham, 2010; Lamey, 2015; Mathieson, 2012; Mathisen, 2012; Parton et al., 2010; Thompson & Lee, 2012) and increased rapport (Thompson & Lee, 2012; West & Turner, 2016). Students also perceived instructors who used video-based feedback as more caring (Anson, 2015; Henderson & Phillips, 2015; Kim, 2018), encouraging (Anson, 2015; Henderson & Phillips, 2015; S. Robinson et al., 2015), supportive (Borup et al., 2015; Henderson & Phillips, 2015; Walker, 2017), and respectful (Griffiths & Graham, 2009).

Interaction. Video-based feedback was considered by students to be effective for inviting interaction. Students found screencast feedback to be interactive, although they recognized that communication was unidirectional (Ghosn-Chelala & Al-Chibani, 2018). Students in several studies commented that video-based feedback felt conversational (Anson et al., 2016; Borup et al., 2014; Cranny, 2016; Silva, 2012; Thompson & Lee, 2012), promoted dialogue (Gonzalez & Moore, 2018), and encouraged open communication (Vincelette & Bostic, 2013). Some students indicated that video-based feedback was very similar to a face-to-face feedback meeting with their instructor (Bissell, 2017; Gonzalez & Moore, 2018; Mathieson, 2012; Sommers, 2013). However, a

few students stated that video-based feedback created an expectation of a conversation without providing the opportunity to have one (Lamey, 2015; Mathieson, 2012). In Borup et al.'s (2015) study, students indicated that video feedback inhibited further communication with their instructor because they felt like they needed to reply with a video. Those students were less likely to respond to video feedback because they lacked the confidence and technical proficiency to record a video..

Analysis of Feedback

Analysis of feedback artifacts provides another perspective on social presence in video-based feedback. In contrast to the overwhelmingly positive perceptions of both instructors and students in many studies, two of the four studies that investigated samples of video- and text-based feedback found mixed results (Borup et al., 2015; Thomas et al., 2017), while the other two found positive results (Cunningham, 2017, 2019a). It should be noted that while these studies primarily report on aspects of social presence, they also touch on teaching and cognitive presences.

Borup et al. (2015) sought to determine how the content of video feedback differed from digital markup. At the end of the study, the comments from feedback samples of both types were collected and analyzed. Videos were transcribed, and feedback comments were coded. The codes used were loosely related to social presence categories. The average frequencies of the indicators for relationship building, praise, support, and general correction were higher for video feedback than digital markup. On the other hand, digital markup had more frequent indicators for specific correction. However, the results have limited reliability because the sample size was not indicated, and no measures of the statistical significance were included.

The same researchers investigated a similar question a few years later (Thomas et al., 2017). In this study, the comparison between video and digital markup feedback and the method of transcribing and coding feedback comments were the same. However, the researchers aligned the coding more closely to the social presence construct. This study found that video feedback contained a marginally higher occurrence of social presence indicators on average than digital markup. The frequency of the indicators for cohesive expressions of small talk and complimenting were reported to be higher in video feedback. On the other hand, indicators for interactive expressions of asking questions and referring to previous conversations were reported to be higher in digital markup feedback. Unlike the previous study, this study included the sample size (n = 422) and discussed interrater reliability. However, like the previous study, there was no indication of the statistical significance of the difference. Additionally, the authors acknowledged that coding for social presence indicators in audio and video compared frequency, not quality. As such, the analysis may not adequately account for all that the media communicates (e.g., tone of voice, visual self-disclosure).

Cunningham (2017, 2019a) also undertook two studies that analyzed the content of video-based feedback compared to text-based feedback. The first study examined a small sample (n = 32) artifacts using the Systematic Functional Linguistics framework of Appraisal, which included categories for how graduated language is, appreciation, and engagement (Cunningham, 2017). The analysis indicated that screencast feedback contained higher levels of praise and criticism and was more likely to be softened with words like “a little”; whereas, digital markup was more critical and less likely to be hedged. In addition, in the engagement category, screencast feedback was found to

contain significantly more interpersonal and conversational language as indicated by much higher frequency of expanding language (95% vs. 62% for digital markup) and much lower frequencies of imperatives (21% vs. 83%) and proclaiming/disclaiming language (5% vs. 38%).

The second study used the same method but included a much larger sample size (n = 136) and focused on the engagement category of the Appraisal framework (Cunningham, 2019a). This study reported that clauses taken from screencast feedback comments were 4.7 times more likely to use expanding language than those from digital markup ($p < .001$). The use of expanding vocabulary invites a student into a conversation and gives space for other perspectives. On the other hand, contracting language, which was significantly more prevalent in text-based feedback, diminished interpersonal aspects of communication and positioned the instructor as an authority.

3.3.8. Teaching Presence

The second construct of the CoI framework is teaching presence, which is defined as "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson et al., 2001, p. 5). Within this understanding, much of the operationalization of teaching presence happens before feedback is provided; however, a crucial aspect of teaching presence is the communication of constructive and critical assessment of learning as evidenced in submissions by students (Garrison & Arbaugh, 2007).

Instructor Perspective

The theme of teaching presence was not significant in the data gathered from instructors in this review of the literature. One article was coded for the teaching presence

theme. An interview from a study of 20 undergraduate business instructors indicated that video-based feedback was seen as an opportunity for extra teaching at a personal level. Perhaps, the cause of the minimal occurrence of this theme is a result of a perception of overlap between teaching presence and social or cognitive presences (Anderson et al., 2001).

Student Perspective

Student perspectives on teaching presence were positive and emphasized usefulness and instructional aspects of video-based feedback. Survey and free-form responses in several studies indicated that students found video-based feedback to be useful (Brereton & Dunne, 2016; Gonzalez & Moore, 2018; Griffiths & Graham, 2009; Henderson & Phillips, 2015) and helpful (Alvira, 2016; Anson, 2015; Cranny, 2016; Schilling & Estell, 2014; Walker, 2017). The terms usefulness and helpfulness were undefined in many of these studies. The terms give the general impression that students considered video-based feedback as a means for establishing a teaching presence by providing the necessary feedback. Two studies reported less positive results. Grigoryan (2017a) found no statistical difference in students' perceptions of the helpfulness of video-based feedback compared to text-based. Ryan et al.'s (2019) study of 4,000 students who received feedback using a variety of methods reported that students considered digitally-recorded feedback (including video-based) to be no more useful than other methods.

The theme of feedback as a form of instruction was found in several studies. Students agreed that video-based feedback included examples and suggestions for improvement (Ali, 2016; Cranny, 2016; S. Robinson et al., 2015) and helped them

prioritize the revision of their work (Harper et al., 2015). Pharmacology students reported that video-based feedback provided clear explanations and step-by-step instructions on the proper approach to calculations (Flood et al., 2017). Students learning new languages commented on the value of having a native speaker read parts of their submission and make comments on it (Harper et al., 2015). Other students appreciated the step-by-step instructions (Brereton & Dunne, 2016; Marriott & Teoh, 2012), the detailed explanations (Sommers, 2013), and the informative nature (Lamey, 2015) of the video-based feedback.

3.3.9. Cognitive Presence

Cognitive presence is the third construct of the CoI framework. It is defined as "the extent to which participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication" (Garrison et al., 2000, p. 89). Cognitive presence is central to the learning process (Garrison, Cleveland-Innes, & Fung, 2010), and video-based feedback was found to stimulate it from the perspectives of instructors and students. Analysis of feedback artifacts provided further evidence of the role of video-based feedback in developing cognitive presence.

Instructor Perspective

The perspectives of instructors on cognitive presence were evidenced in comments and survey data on feedback content and on faculty and student engagement with the feedback process.

Feedback content. In several studies, instructors perceived that the contents of video-based feedback addressed higher-order thinking (Henderson & Phillips, 2015; Hung, 2016; Lamey, 2015; Orlando, 2016; Vincelette & Bostic, 2013) and emphasized future development (Lamey, 2015; Orlando, 2016). Video-based feedback was considered

to focus more on big-picture ideas, which might be challenging to explain in text-based feedback (Henderson & Phillips, 2015; Orlando, 2016). As a result of this focus, in-depth content issues were thought to be addressed more frequently (Vincelette & Bostic, 2013), while less attention was paid to identifying mechanical issues such as grammar and spelling (Lamey, 2015).\

Instructor engagement. Instructors reported that they felt more engaged when providing feedback using video-based methods (Crook et al., 2012; Henderson & Phillips, 2015). Henderson and Phillips (2015) attributed the stimulating effect they experienced to the greater emphasis on concepts in their feedback.

Student engagement. From the perspective of one instructor, video-based feedback also encouraged student engagement by helping them remain active and at the center of the revision process (Séror, 2012). Another reported that it seemed that students engaged with screencast feedback by incorporating more of it into their future work (Orlando, 2016). On the other hand, in Crook et al.'s (2012) study, instructors thought that generic video-based feedback provided to groups of students did not increase student engagement.

Student Perspective

The perspectives of students of cognitive presence were also evidenced in comments and survey data on feedback content and on faculty and student engagement with the feedback process.

Feedback content. In a large number of studies (n = 24, 36%), students indicated that they found the content of video-based feedback easy to understand (Alvira, 2016; Armağan et al., 2016; Borup et al., 2015; Cranny, 2016; Crews & Wilkinson, 2010;

Crook et al., 2012; Cunningham, 2019b; Ghosn-Chelala & Al-Chibani, 2018; Griffiths & Graham, 2010; Hall et al., 2016; Kim, 2018; Lamey, 2015; Mayhew, 2017; Orlando, 2016; M. Robinson et al., 2015; Silva, 2012; Sommers, 2013; Turner & West, 2013; Walker, 2017; West & Turner, 2016) and that it consequently increased understanding (Deeley, 2017; Hung, 2016; Turner & West, 2013; West & Turner, 2016). In two studies, student understanding was linked explicitly to feedback clarity (Hall et al., 2016; Sommers, 2013). Video-based feedback was considered less prone to misunderstanding because of the addition of visual and vocal cues (Borup et al., 2015; Griffiths & Graham, 2010; Kim, 2018).

On the other hand, one study found no significant difference for ease of understanding between pencast feedback and digital markup for pharmacological students (Flood et al., 2017). Students in another study found digital markup to be more understandable than screencast feedback (Edwards et al., 2012). Furthermore, while most students found video-based feedback easy to understand, others were negatively affected by factors such as limited listening skills, especially international students and those learning a new language (Kim, 2018).

Students also reported that the video-based feedback they received addressed higher-order thinking (Edwards et al., 2012; Lamey, 2015; Silva, 2012; Sommers, 2013). Video-based feedback was found to address important issues, provide supporting explanations and examples, and help students to prioritize revisions (Edwards et al., 2012). Students reported that screencast feedback addressed problems in their thesis, research questions, organization, and supporting evidence (Silva, 2012).

In addition, students were of the opinion that the content of video-based feedback would feed-forward, resulting in improvements to their future work (Alharbi, 2017; Anson et al., 2016; Crews & Wilkinson, 2010; Deeley, 2017; Lamey, 2015; Mayhew, 2017; M. Robinson et al., 2015; Turner & West, 2013; West & Turner, 2016). However, in one study, graduate communications students indicated that they rated the usefulness of screencast and digital markup feedback equally (Edwards et al., 2012).

Instructor engagement. Although not a dominant theme across the literature, students reported feeling that their instructors were more engaged when providing video-based feedback (Anson, 2015; Hall et al., 2016). Hall et al.'s (2016) study reported that 13 students commented that their instructor seemed more deeply engaged with their submission. Survey data in Anson's (2015) study indicated that students perceived instructors who provided video-based feedback to be more engaged, although the difference was not significant.

Student engagement. The engagement of students in the feedback process is sought after in higher education (Cunningham, 2019a; Hepplestone et al., 2011; Parkin et al., 2012). When receiving video-based feedback, students indicated increased engagement with feedback and evidenced that engagement by repeatedly viewing feedback and improved learning.

Students in numerous studies (n = 18) reported feeling more engaged when receiving video-based feedback (Ali, 2016; Alvira, 2016; Borup et al., 2013; Cranny, 2016; Crook et al., 2012; Deeley, 2017; Ghosn-Chelala & Al-Chibani, 2018; Griesbaum, 2017; Hyde, 2013; Kim, 2018; Mathieson, 2012; Mathisen, 2012; Mayhew, 2017; Özkul & Ortaçtepe, 2017; M. Robinson et al., 2015; Soltanpour & Valizadeh, 2018; Thompson

& Lee, 2012; Vincelette & Bostic, 2013). Students reported that video-based feedback helped to increase their motivation (Alvira, 2016; Borup et al., 2013; Kim, 2018; Mathisen, 2012) and engagement in the revision process (Ali, 2016; Alvira, 2016; Özkul & Ortaçtepe, 2017; M. Robinson et al., 2015; S. Robinson et al., 2015). In several studies, students mentioned that the social presence they experienced motivated them to engage with the feedback (Borup et al., 2013; Mathisen, 2012; Özkul & Ortaçtepe, 2017).

Students manifested their engagement with video-based feedback in at least two ways. Students reported (Cranny, 2016; Crook et al., 2012; Harper et al., 2015; Özkul & Ortaçtepe, 2017; Parton et al., 2010; Silva, 2012; Sommers, 2013; Vincelette & Bostic, 2013) or were observed (Cunningham, 2019b) watching feedback multiple times. Students also reported spending more time reviewing feedback compared to their typical pattern with text-based feedback (Alharbi, 2017; Orlando, 2016; Turner & West, 2013; West & Turner, 2016). Students also reported talking about the feedback with their peers (Crook et al., 2012) and paying equal attention to the feedback as to the grade awarded (Hyde, 2013; Thompson & Lee, 2012).

Learning was another way in which students reported their engagement in the feedback process. In some studies, learning was evidenced by revising submissions through the application of the feedback received (Denton, 2014; Thompson & Lee, 2012; Vincelette & Bostic, 2013). Students reported that they incorporated more of the comments provided in video-based feedback than in digital markup (Vincelette & Bostic, 2013). In other studies, learning was vaguely defined, and evidence was lacking (Griesbaum, 2017; Mathieson, 2012; Mathisen, 2012). Students reported an increase in their comprehension of the topic being considered as a result of screencast feedback

(Griesbaum, 2017). Further, students perceived learning dividends from screencast feedback but could not articulate what the learning dividends were (Mathisen, 2012). Nevertheless, students reported that they learned the course material better because of video-based feedback (Mathieson, 2012).

Analysis of Feedback

As with the social presence theme, analysis of feedback artifacts provides another perspective on cognitive presence in video-based feedback. It should be noted again that the social, teaching, and cognitive presences occasionally overlap in the results of the following studies.

Henderson and Phillips (2015) reported positive results for the use of video feedback with teacher education students. Their analysis of 30 feedback artifacts indicated that video feedback emphasized conceptual engagement, growth, and relationship building. In contrast, text-based feedback was focused on textual and structural issues.

Moore and Filling (2012) reported on the use of video and screencast feedback with undergraduate students in the humanities. The feedback artifacts analyzed were found to include a majority (>68%) of comments on higher-level cognitive areas such as thesis statements and organization. Further, the analysis revealed that video-based feedback included more suggestions for improvements and more elaborations than corrections.

Elola and Oskoz (2016) examined the screencast feedback provided to four SFL students. Textual analysis of the feedback artifacts revealed that the instructor made more frequent comments on content, structure, and organization when providing screencast

feedback than with text-based feedback. On the other hand, the instructor provided a more consistent and frequent indication of errors in form when using text-based feedback. The indirect comments used in screencast feedback were less precise than the coding system used in digital markup.

3.3.10. Learning Outcomes

In addition to themes derived from the Diffusion of Innovation and CoI models, the final theme arising from the literature was the learning outcomes resulting from video-based feedback. Several studies (n = 12) analyzed the learning outcomes of video-based feedback by considering students' grades and the application of feedback in revisions. Some studies that included analysis of learning outcomes reported positive results for video-based feedback (Ali, 2016; Alvira, 2016; Denton, 2014; Kim, 2018; Moore & Filling, 2012; Özkul & Ortaçtepe, 2017; Soltanpour & Valizadeh, 2018).

Two studies reported overall positive effects on learning outcomes and also provided a component analysis (Ali, 2016; Özkul & Ortaçtepe, 2017). The first noted an increase in the successful incorporation of feedback by students who received screencast feedback (Özkul & Ortaçtepe, 2017). This study of EFL students found a significant difference in the use of feedback between students who received screencast and text-based feedback on three out of five weekly assignments. The study provided additional analysis of the kinds of feedback incorporation that contributed to the improvement in quality. Significant differences were found for students who received screencast feedback for two of three kinds of feedback considered. Students incorporated significantly more mechanical and organizational feedback into subsequent submissions than students who

received text-based feedback. Explicit feedback was the only kind for which there was no significant difference.

In the second study (Ali, 2016), analysis of writing post-tests indicated that the overall writing skill of EFL students was significantly better when receiving screencast plus text-based feedback as compared to text-based feedback. The study also showed significant gains on the content, organization, and structure of writing on post-tests for students who received screencast feedback. However, no significant difference was found for writing accuracy.

Another four studies reported increases in overall grades of submissions for video-based feedback, but without analyzing specific aspects (Alvira, 2016; Denton, 2014; Kim, 2018; Soltanpour & Valizadeh, 2018). One study reported a significant difference with a large effect size in the overall quality of the argumentative essays of students who received screencast feedback compared to those who received text-based feedback (Soltanpour & Valizadeh, 2018). The same study found that the significant difference persisted in a second post-test three weeks after the first post-test (Soltanpour & Valizadeh, 2018). A second study reported a significant difference with a large effect size in the writing performance of students who received screencast feedback as compared to their past performance and to the performance of other students who received only text-based feedback (Kim, 2018). A third reported a statistically significant difference with a medium effect size in rubric scores between initial and revised submissions after receiving formative screencast feedback (Denton, 2014). However, the study did not have a control group. A fourth study reported a significant grade increase

from 2.6 to 3.7 on a 5-point scale after receiving screencast feedback, but also did not have a control group (Alvira, 2016).

One study analyzed revisions after receiving video-based feedback using template analysis and reported finding considerable improvement in the statement of the thesis, the alignment of ideas with the thesis, the addition of evidence, and the overall organization (Moore & Filling, 2012). Independent raters in the same study found that the submissions of all but two students who received video-based feedback improved (Moore & Filling, 2012).

Conversely, a number of studies reported mixed (Grigoryan, 2017b; Letón et al., 2018) or neutral (Cunningham, 2019b; Elola & Oskoz, 2016; Mayhew, 2017) results for learning outcomes as a result of receiving video-based feedback. Grigoryan's (2017b) study noted mixed results regarding the effect of video-based feedback on learning outcomes. The analysis of final submissions of students who received screencast plus digital markup feedback indicated significantly higher scores in the categories of purpose and audience with medium-large effect sizes. However, the study only reported a marginally significant difference in overall submission quality with a medium effect size. Furthermore, the study found that the type of feedback received did not have a significant effect on the type of revisions that students made.

The other study that reported mixed results for learning outcomes found a significant difference in the test scores of engineering students who received pencast plus video feedback compared to students who were only told the correct answer (Letón et al., 2018). However, the same study did not find a significant difference when students who

received pencast plus video feedback were compared to students who received digital markup feedback (Letón et al., 2018).

Three studies reported neutral results for learning. In Mayhew's (2017) study, analysis of grades did not indicate a significant difference for students who had received video-based feedback compared to text-based feedback, although 87% of survey respondents indicated that video feedback would result in an improvement in future assignments. Textual analysis in the study of Elola and Oskoz (2016) revealed that students responded to feedback on content, structure, organization, and form, regardless of whether they received written or screencast feedback. Finally, Cunningham (2019b) also used textual analysis of revised submissions and found that both screencast and digital markup feedback resulted in successful changes at similar rates. There was a higher rate of successful global revisions when students received screencast feedback (71%) compared to digital markup (55%), but the difference was not found to be statistically significant (Cunningham, 2019b).

4. Conclusion

4.1. Summary

The purpose of this study was to investigate the literature on the use of video-based feedback in higher education. I examined the 67 eligible articles to address two questions: What were the key characteristics of video-based feedback studies? What recurring themes emerge from the literature? A summary of the findings follows.

4.1.1. Characteristics

Among the articles matching the eligibility criteria, the following characteristics were observed. Articles were written by many different authors, with the majority of authors only participating in one study. The majority of articles were published in the last five years with a peak in 2017. The studies were concentrated in the United States and the United Kingdom, with a majority involving undergraduate students and instructors. Video-based feedback was studied in a variety of academic disciplines with most studies conducted in a single discipline and concentrated in education and language learning. The majority of studies were set in the context of an instructional mode that provided some measure of physical presence. Almost all the studies involved an instructor giving feedback to individual students. Nearly three-quarters of the studies investigated the use of screencast feedback, most often comparing it to digital markup feedback. Students generally received a single mode of feedback for a submission, and most comparisons were to single modes of feedback. Feedback videos received by students were 7 minutes long, on average. While 19 different methods were used for capturing feedback, over one-third of the studies used Jing software to record feedback. The most common research method employed was student questionnaires, and over two-fifths of the studies

used mixed methods. About one-quarter of articles included a discussion of the trustworthiness of their analysis through reliability and validity statistics or descriptions of qualitative checks. The mean sample size for student participants was 68 and for instructors, five. Sample descriptions were present in two-thirds of the studies. Finally, nearly half of the studies referenced some theoretical framework.

4.1.2. Themes

The key themes that emerged from the results of the studies were organized using two theoretical frameworks. The first set of themes came from the Diffusion of Innovation (Rogers, 2003) attributes and included relative advantage, complexity, observability, trialability, and compatibility. The second set came from the CoI (Garrison et al., 2000) framework and included social presence, teaching presence, and cognitive presence. Each of these themes was considered from the perspectives of instructors and students. Additionally, analysis of feedback artifacts provided additional insight into social and cognitive presence.

Instructor Perspective

First, the perspectives of instructors on these themes will be summarized. Through the lens of the Diffusion of Innovation attributes, the results of the studies reviewed were mixed or positive, although insignificant in some cases. The perspectives on the relative advantage of video-based feedback were mixed. While instructors whose opinions were gathered preferred video-based feedback, a significant portion of those who tried using video feedback did not use it again (Harper et al., 2015; Soden, 2017). Instructors found video-based feedback to be efficient and to yield more quantity and better quality feedback. However, instructors also encountered disadvantages in using it.

The perspectives on the complexity of the process of providing video-based feedback were also mixed. While some instructors found the process to be simple because of the software, distribution method, and training received, other instructors found the process to be complicated because of the choices that were made for the implementation. The perspectives on the trialability of video-based feedback were positive. This attribute was primarily evident in the use of free software on the part of researchers to experiment with video-based feedback. The attributes of observability and compatibility were not found to be significant themes from the perspectives of instructors.

Through the lens of the CoI constructs, the results of the studies were positive, although not significant for teaching presence. Instructors perceived that they communicated social presence in video-based feedback. They considered video-based feedback to be personal and to enable affective expressions, to promote group cohesion, and to encourage interaction. Instructors also perceived that video-based feedback supported cognitive presence. They found that their communication using video-based feedback focused on higher-order thinking and that both they and their students were more engaged in the feedback process as a result.

Student Perspective

Next, the perspectives of students on these themes are summarized. Through the lens of the Diffusion of Innovation attributes, the results of the studies were mixed, although not significant in some cases. For the attribute of relative advantage, students preferred video-based feedback, indicating that they received more feedback that was more detailed, clearer, and richer. However, students also noted disadvantages to the method, such as the accessibility and linear nature of the feedback as well as the

evocation of negative emotions while watching the feedback. With regards to complexity, many students found video-based feedback easy to use and reported few or no technical problems, although some students encountered issues with the audio quality and incompatibility with their device. The attributes of observability, trialability, and compatibility did not emerge as significant themes from the perspective of students.

Through the lens of the CoI constructs, the results of the studies were positive. Students in two-thirds of the studies reported a sense of social presence, indicating that they found video-based feedback to be personal. The method also allowed them to perceive the instructor's feelings, encouraged relationship building, and felt interactive. Students also perceived a high degree of teaching presence in video-based feedback. Students found that the feedback they received functioned as a form of instruction and rated its usefulness highly. Most significantly, students indicated that video-based feedback encouraged cognitive presence. The students found the feedback they received to be understandable and that it addressed higher-order thinking and future improvement more than the simple correction of mechanical errors. As a result, students were more engaged in the feedback process, as evidenced by repeated viewing of feedback and reports of resolution of issues identified in their feedback. In a couple of studies, students also perceived that their instructors were more engaged in the feedback process when providing video-based feedback.

Analysis of Feedback

While the perspectives of instructors and students are essential to consider, the actions of instructors and students may be more revealing of the affordances and influences of video-based feedback. Analysis of the feedback artifacts provided insight

into the actions of instructors in several studies. Video-based feedback artifacts were found to contain high levels of social and cognitive presence. The language used by instructors providing video-based feedback promoted the perception of the instructor as a real person whose feedback invited dialogue and prompted student response. Additionally, the audio-visual indicators reinforced this message.

Analysis of Learning Outcomes

The final theme was derived from studies that analyzed the learning outcomes in courses where video-based feedback was used. The results of the analysis of learning outcomes were generally positive for video-based feedback, although in some cases they were mixed or neutral. Positive outcomes were noted in the overall quality of submissions and, in particular, in the quality of thesis statements, structure, and supporting evidence. The significant limitation of these analyses is that establishing causation between the learning outcomes and the feedback methods used is difficult. While a correlation between the two was found in several studies, factors other than video-based feedback may have produced a positive change in learning outcomes.

4.2. Limitations

A noteworthy limitation in this literature review is the use of two theoretical models to synthesize the research on video-based feedback. The Diffusion of Innovation attributes and the CoI framework were developed in two separate areas of research. Neither framework was designed to complement the other. As such, there is a conceptual overlap in the theories. While I theorized that the lens of the CoI framework could be used to sharpen the focus on the theme of compatibility from the Diffusion of Innovation

lens, some aspects of the discussion of social, teaching, and cognitive presences overlap with other innovation attributes, particularly that of relative advantage.

Another limitation of this literature review is the use of a top-down configurative approach. On the one hand, this methodology grounded the data analysis in existing theory and helped to uncover connections between studies through the use of common lenses. This approach also provided an organization for the analysis that went beyond advantages and disadvantages. On the other hand, few of the studies align precisely with either of the theoretical frameworks. As a result, not all of the attributes of innovations and presences of a community were found to be significant themes in the literature. This problem was most evident for the themes of observability, compatibility, and teaching presence, which few of the studies addressed.

4.3. Future Research

The literature review on the use of video-based feedback has revealed several areas lacking in the current research that may provide opportunities for future research. The opportunities fall into two general categories: methodological suggestions applicable to any future research on video-based feedback and particular areas where minimal research on the use of video-based feedback has been done.

When the existing literature was reviewed, several recurring weaknesses were identified. Remedying these weaknesses in the research method or research reporting could improve future research. First, several of the experimental studies compared different levels of feedback modalities. For example, screencast feedback plus digital markup was compared to digital markup alone. The research of Ryan et al. (2019) seems to indicate that variance in feedback modality is a variable that should be controlled for in

feedback research. Second, self-report data on the number of times a student viewed video-based feedback was common. More reliable data with less chance of self-report bias could be obtained by gathering observational data from log files. Third, the contextual data in many of the studies were lacking. This lack of information on items such as the length of the video-based feedback received makes it difficult to interpret the results of the study. Reporting a detailed description of the context in future studies could aid in the interpretation and comparison of research. Fourth, approximately half of the studies lacked reference to theory, and others made minimal reference to theory. Using a theoretical framework, such as the Diffusion of Innovation model or the CoI framework, could make studies on video-based feedback richer and provide a helpful analytical lens. Theories of functional linguistics (Cunningham, 2017, 2019a) and digitally mediated identity (Anson et al., 2016) also show promise for further studies on video-based feedback.

The analysis of the characteristics of the literature indicated several gaps in research on video-based feedback. First, studies of the perceptions of students predominated. Research on the attitudes of instructors such as that conducted by Soden (2017) could help identify the reasons that instructors adopt and perhaps discontinue use of video-based feedback. In a similar vein, studies that observe and analyze feedback artifacts and the actions of students could help to minimize acquiescence bias on the part of respondents. Second, the use of video-based methods for providing feedback to quizzes is minimal. Research in this area may help to quantify learning outcomes more accurately. Third, instructors provided video-based feedback in the majority of studies conducted; peers did so in only two studies. Investigating the use of peer video-based

feedback might provide additional insights into and uses for video feedback. Additionally, research on peer video-based feedback might unveil affordances that foster a community of inquiry among online students where the opportunities for interaction are minimal. Fourth, a significant opportunity for research exists on the use of video-based feedback in secondary education and technical colleges. In those environments, the emphasis of instructors strongly tends toward instructional methods more than subject-area research. This difference in focus may result in instructors who are more open to alternative feedback methods. Finally, the majority of the studies investigated the use of screencast feedback in comparison to digital markup. However, as video-based feedback becomes more widely used, investigating the affordances of different kinds of video streams could be helpful. Incorporating two video streams (one video capture and the other screencast) may yield better results.

4.4. Educational Implications

Providing feedback is arguably the most critical activity an instructor undertakes. One of the most striking observations from the review of 67 articles on the provision of video-based feedback is how opaque the process is. The vast majority of these articles focused attention on the medium used to create the channel for feedback to be communicated. Only a few articles investigated the content of the feedback communicated through the channel. As important as the feedback method may be, it is hard to imagine that a poorly conceived feedback message could be effectively communicated through any channel and achieve the desired results. Notwithstanding McLuhan's (McLuhan & Fiore, 1967) assertion that the medium is the message, it seems that instructors should pay careful attention to the explicit content of their feedback and

the response that it generates in students. First and foremost, instructors should have ongoing professional development opportunities on the andragogical potential of well-crafted feedback messages.

Nonetheless, there appeared to be an implicit message in the chosen medium of feedback. Choosing a video-based feedback method was found to influence the language choices of instructors when providing feedback (Cunningham, 2019a). Not only that, but even though text- and video-based feedback were found to contain a similar frequency of social presence indicators, students perceived a higher degree of social presence in video-based feedback (Thomas et al., 2017). However, video-based feedback may be more than the sum of its parts. Analyzing the constituent parts of feedback that included audio and video proved to be difficult (Thomas et al., 2017). Even if comparing such multi-faceted feedback to words on a page is possible, it may not reveal all the affordances of videos.

The mixed results of the research on video-based feedback revealed that the method is not a panacea. Not all the challenges faced concerning feedback in higher education can be solved by switching from digital markup to a new method of feedback. The results indicate that text-based feedback has affordances that should continue to be realized. The best approach perhaps is to provide different, and possibly multiple modes of feedback depending on the context of the learning environment and the desired results of the assessment. For example, where an emphasis on simple mechanical corrections is warranted, such as in learning a new language, providing handwritten or digital markup may be appropriate. When a focus on relationship building is required, such as in asynchronous online education, providing video feedback may be suitable.

Communicating meaning is difficult at the best of times. The stakes of higher education raise the significance of clear communication. However, the changing landscape of higher education is compounding the problem in feedback contexts with increasing commodification and decreasing opportunities for instructors and students to interact face-to-face. Nearly 50 years ago, the challenge of providing feedback was described using a metaphor:

> Meaning is like movies inside the head. I've got movies in my head. I want to put them inside yours. Only I can't do that because our heads are opaque. All I can do it try to be clever about sending you a sound track and hope I've done it in such a way as to make you construct the right movies in your head. What's worse, of course, is that since neither of us can see the movies in each other's head, we are apt to be mistaken about how well we are doing in trying to make the other person show himself the movie we have in mind. (Elbow, 1998, p. 152)

Technological change over the last 50 years enables instructors to go beyond trying to create an imaginary soundtrack for students when providing feedback. Pervasive audio and visual capture devices along with digital production and distribution permit instructors to provide students with video-based feedback that is a much more detailed representation of the movie inside their head. The research reviewed indicates that "show and tell" has the potential to improve feedback in higher education.

5. References

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Appendix A – Coding of Studies

Data item	Description	Values
Authors	The authors who wrote the article.	First author (and second, if there are only two). See References for additional authors.
Year	The year the article was published.	Year
Country	The country in which the study was conducted.	Three-letter country code
Population	The academic level of the population being studied.	4, Undergraduate 5, Graduate 6, Pre-service teachers 7, Professional or faculty education
Discipline	The academic discipline in which the study was conducted.	1, Business 2, Education 3, Humanities 4, Language learning 5, Multidisciplinary 6, Social sciences 7, STEM 8, Other
Instructional mode	The instructional mode of the course in which the feedback was provided.	1, Classroom 2, Blended 3, Synchronous online 4, Asynchronous online
Assessment type	The purpose of the assessment (and of the feedback provided).	1, Formative 2, Summative
Feedback provider	The type of person who provided the feedback.	1, Instructor 2, Peer
Feedback recipient	The person(s) who the feedback was directed toward. That is, how specific or generic was the feedback.	1, Individual 2, Group
Feedback media 1, 2, 3, 4	The feedback media that were explicitly studied. Feedback media 1 is the data item for the first condition. Feedback media 2, 3, 4 are the data items for any comparison conditions.	0, Face-to-face 1, Video 2, Screencast 3, Pencast 4, VoiceThread 5, Digital recording 6, Audio 7, Digital markup 8, Handwritten markup 9, Rubric 10, Knowledge of correct response
Feedback length	The length in minutes of the video-based feedback provided.	Number of minutes
Capture method	The method used to capture the feedback.	1, Adobe Connect 2, CamStudio 3, Camtasia 4, Camtasia Relay 5, Camtasia Studio 6, Canvas 7, Facebook 8, Flip

Data item	Description	Values
		9, iMovie 10, iPhone 11, Jing 12, Logitech 13, Multiple 14, Photo Booth 15, QuickTime Player 16, Screencast-O-Matic 17, SnagIt 18, VoiceThread 19, Windows Media Encoder
Research method	The research method(s) used in the study.	1, Qualitative 2, Observation 3, Questionnaire
Reliab	Whether the reliability of quantitative statistics in the study is discussed.	0, No 1, Yes
Valid	Whether the validity of quantitative statistics in the study is discussed.	0, No 1, Yes
Qual	What level of checks were used on qualitative data.	0, None 1, One 2, Multiple
Student sample	The number of students who participated in the study by completing a survey, focus group, interview, etc.	Number of students
Instructor sample	The number of instructors who participated in the study by completing a survey, focus group, interview, etc.	Number of instructors
Sample desc	The completeness of the sample description.	0, No description 1, Partial description 2, Complete description
Theoretical framework(s)	Significant theories that an article is built on or interacts with.	Theory name and proponent

Appendix B – Table of Coded Articles, part 1

Authors	Year	Country	Population	Discipline	Instructional Mode	Assessment Type	Feedback Provider	Feedback Recipient	Feedback Media 1	Feedback Media 2	Feedback Media 3	Feedback Media 4
Alharbi	2017	GBR	4	4	4 (?)	2	1	1	2 + 7 + 9			
Ali	2016	EGY	4	4	1	1	1	1	2 + 7	7		
Alvira	2016	COL	4	4	1	1	1	1	2 + 7			
Anson	2015	USA	4	6	1	1 (?)	1	1	2	7		
Anson et al.	2016	USA	4	5	1 + 4 (?)	2	1	1	2	7		
Armağan et al.	2016	TUR	4	4	1	1	1	1	2			
Bissell	2017	GBR	4	3	1	2	1	1	2			
Borup et al.	2012	USA	6	2	2 + 4	2	1	1	4			
Borup et al.	2013	USA	4	2	2	1 (?)	1	1	4 (?)			
Borup et al.	2014	USA	6	2	2	1	1	1	1	7		
Borup et al.	2015	USA	6	2	2	1 + 2	1	1	1	7		
Brereton and Dunne	2016	IRL	4	8	1	1	1	1	2			
Cranny	2016	IRL	4	8	1	1	1	1	2			
Crews and Wilkinson	2010	USA	4	1	1		1	1	3	2	7	8
Crook et al.	2012	GBR	4 + 5	5	1	1	1	2	2	1		
Cunningham	2017	USA	4	4	1	1	1	1	2	7		
Cunningham a	2019	USA	4	4	1 (?)	1	1	1	2	7		
Cunningham b	2019	USA	4	4	1	1	1	1	2	7		
Deeley	2017	GBR	4	6	2	2	1	1	2			
Denton	2014	USA	4	2	1 (?)	1	1	1	2 + 9			
Edwards et al.	2012	GBR	5	1	4	2	1	1	2 + 9	7 + 9		
Elola and Oskoz	2016	USA	4	4	1	1	1	1	2	7		
Flood et al.	2017	IRL	5	8	4	1	1	2	3	7		

Authors	Year	Country	Population	Discipline	Instructional Mode	Assessment Type	Feedback Provider	Feedback Recipient	Feedback Media 1	Feedback Media 2	Feedback Media 3	Feedback Media 4
Ghosn-Chelala and Al-Chibani	2018	LBN	4	4	1	1	1	1	2 + 9			
Gonzalez and Moore	2018	USA	5	2	2	1	1	1	4			
Griesbaum	2017	DEU	4	1	1	2	1	2	2			
Griffiths and Graham	2009	USA	6	2	4		1	1	1			
Griffiths and Graham	2010	USA	6	2	4	1	1	1	1			
Grigoryan a	2017	USA	4	3	3	1	1	1	2 + 7	7		
Grigoryan b	2017	USA	4	3	3	1	1	1	2 + 7	7		
Hall et al.	2016	USA	4	3	1	1	1	1	1	8		
Harper et al.	2015	GBR	4	4	4 (?)	2 (?)	1	1	2 + 7	7		
Henderson and Phillips	2015	AUS	4 + 5	2	2	2	1	1	1			
Hope	2011	GBR	4	7	1 (?)	2	1	1	2	7		
Hung	2016	TWN	4	4		1	2	1	1			
Hyde	2013	GBR	4	8	1	2	1	1	2			
Jones et al.	2012	GBR	4 + 5	1	1	1 (?)	1	1	2	8		
Kim	2018	KOR	4	1	1	1	1	1	2	7		
Lamey	2015	USA	4	3	1 (?)	2 (?)	1	1	1	8		
Letón et al.	2018	ESP	4	7	1	1	1	2	1 + 3	7	10	
Lowenthal and Dunlap	2018	USA	5	2	4		1	1	1	7 (?)		
Marriott and Teoh	2012	GBR	4	1	1	2	1	1	2 + 7			
Mathieson	2012	USA	5	8	4	2	1	1	2 + 7	7		
Mathisen	2012	NOR	4	5	1 (?)	1 + 2	1	1 + 2	2 + 7			
Mayhew	2017	GBR	4	6	1	2	1	1	1 + 2			
McCarthy	2015	AUS	4	3	1	2	1	1	2	6	7 + 9	
Moore and Filling	2012	USA	4	3	1	1 + 2	1	1	1 OR 2	7 (?) + 9		

Authors	Year	Country	Population	Discipline	Instructional Mode	Assessment Type	Feedback Provider	Feedback Recipient	Feedback Media 1	Feedback Media 2	Feedback Media 3	Feedback Media 4
O'Malley	2011	GBR	5	7	1 (?)	1	1	1	3			
Orlando	2016	USA	5		4 (?)		1	1	2	6	7	
Özkul and Ortaçtepe	2017	TUR	4	4	1	1	1	1	1 + 2	8		
Parton et al.	2010	USA	5	2	2	1 + 2	1	1	1	1 + 8	8	
M. Robinson et al.	2015	GBR	4	7	1	1 + 2	1	2	3	10	0	
S. Robinson et al.	2015	GBR	4	6	1	1	1	1	2 + 7	7	0	
Ryan et al.	2019	AUS	4	5	1		1	1	5	0	7	9
Schilling and Estell	2014	USA	4	7	2	2 (?)	1	1 + 2	2 + 9			
Séror	2012	CAN	4	4	1 (?)	1	1	1	2 + 9			
Silva	2012	USA	4	7	2	1	1	1	2	7		
Soden	2016	GBR	5	2	1	1	1	1	2 + 7	7		
Soden	2017	GBR	4 + 5	5	1 (?)	1	1	1	2			
Soltanpour and Valizadeh	2018	IRN	4	4	1	1	1	1	2 + 7	8		
Sommers	2013	USA	4	3	1 (?)		1	1	2			
Thomas et al.	2017	USA	6	2	2	2	1	1	1	7		
Thompson and Lee	2012	USA	4	8	4	1	1	1	2	8		
Turner and West	2013	AUS	6	2	1 (?)		1	1	2			
Vincelette and Bostic	2013	USA	4	3	1	2 (?)	1	1	2			
Walker	2017	USA	4	3	1	1	2	1	2	2	8	
West and Turner	2016	AUS	6	2	1		1	1	2 + 9			

Appendix C – Table of Coded Articles, part 2

Authors	Year	Feedback Length	Capture method	Research Method	Reliab	Valid	Qual	Student Sample	Instructor Sample	Sample Desc	Theoretical framework(s)
Alharbi	2017	4	11	3	0	0	0	85		1	
Ali	2016	5	11	2 + 3	1	1	0	63		1	
Alvira	2016	5	11	2 + 3	0	0	1	18		0	Hayes (2012) Cognitive Process Model of the Composing Process; Hartshorn (2008) Dynamic Corrective Feedback model
Anson	2015	4	11	3	0	0	0	95		0	
Anson et al.	2016	5	11	1 + 3	1	0	2	141		2	Kluger and DeNisi (1996) Feedback Intervention Theory; Brown and Levinson (1987) Politeness Theory; Mead (1967) Symbolic Interactionist Theory of Identity; Goffman (1955) Dramaturgical Model of Identity; Walther (1992, 1996) Social Information Processing Theory
Armağan et al.	2016			1			0	40	3	1	
Bissell	2017	10	16	3	0	0	0	15	1	0	
Borup et al.	2012		18	1			1	18		2	Garrison et al. (2000) Community of Inquiry framework
Borup et al.	2013		18	1			1	4		1	Garrison et al. (2000) Community of Inquiry framework
Borup et al.	2014		6	1 + 3	1	1	2	130	10	2	Garrison et al. (2000) Community of Inquiry framework
Borup et al.	2015		6	1 + 2 + 3	0	1	1	229	9	1	Daft and Lengel (1986) Media Richness Theory
Brereton and Dunne	2016	5	15	1 + 3	0	0	0	26		0	
Cranny	2016	5	16	1 + 3	0	0	1	31		1	Mayer (2003) Cognitive Theory of Multimedia Learning
Crews and Wilkinson	2010			3	0	0	0	186		1	
Crook et al.	2012	3	2 + 8	3	0	0	0	314	27	2	

Authors	Year	Feedback Length	Capture method	Research Method	Reliab	Valid	Qual	Student Sample	Instructor Sample	Sample Desc	Theoretical framework(s)
Cunningham	2017			2	1	0	2	8		1	Halliday and Matthiessen (2014) Systemic Functional Linguistics; Martin and White (2005) and White (2015) the APPRAISAL framework
Cunningham a	2019	7.5	3	2	0	0	0	60		0	Martin and White (2005) and White (2015) the APPRAISAL framework
Cunningham b	2019	4-11	17	1 + 2 + 3	0	0	0	12	1	1	
Deeley	2017		3	1			0	20		1	
Denton	2014	3.17		2 + 3	1	1		36		1	
Edwards et al.	2012	5	11	3	1	0	0	14		0	
Elola and Oskoz	2016	15	16	2 + 3	1	0	0	4		1	Vygotsky (1978, 1981) Sociocultural Theory; Vygotsky (1978) Zone of Proximal Development
Flood et al.	2017	5	11	3	0	0	0	53		1	
Ghosn-Chelala and Al-Chibani	2018	5	11	1 + 3	0	0	1	8		1	Mayer (2003) Cognitive Theory of Multimedia Learning; Hattie and Timperley (2007) Feedback Model
Gonzalez and Moore	2018		18	1			0	18		0	
Griesbaum	2017	3-26	3	3	0	0	0	36		0	Mayer (1997) Cognitive Theory of Multimedia Learning
Griffiths and Graham	2009			3	0	0	0	38	1	1	Rovai (2000, 2002) Instructor Immediacy; Garrison et al. (2000) Community of Inquiry framework
Griffiths and Graham	2010		13	2	0	0	1		3	1	Rovai (2000, 2002) Instructor Immediacy
Grigoryan a	2017	5	11	3	0	1	0	55		1	Moore (1993, 2013) Transactional Distance Theory; Garrison et al. (2000) Community of Inquiry framework
Grigoryan b	2017	5	11	2	1	0	1	50		2	Hayes (1996) Cognitive Process Model of the Composing Process; Moreno and Mayer (2002) Cognitive Theory of Multimedia Learning

Authors	Year	Feedback Length	Capture method	Research Method	Reliab	Valid	Qual	Student Sample	Instructor Sample	Sample Desc	Theoretical framework(s)
Hall et al.	2016	5	14	3	0	0	1	40		1	
Harper et al.	2015	5	11	1 + 2 + 3	0	0	1	54	9	0	
Henderson and Phillips	2015	5	10 + 12	1 + 3			0	126	2	1	
Hope	2011	5-13	11	2 + 3	0	0	0	145	1	1	
Hung	2016	2	7	3	1	1	0	60		1	Paivio (1986, 2007) Dual Coding Theory; Vygotsky (1978) Sociocultural Theory
Hyde	2013	5	11	1			0	10		0	
Jones et al.	2012	6	19	1 + 3	1	1	0	75	20	1	Laurillard (2009) Conversational Framework
Kim	2018	4-7	16	2 + 3	1	0	0	67		2	Pintrich and Schunk (1995) Motivated Strategies for Learning theory
Lamey	2015	4	14	1 + 3	0	0	0	74	1	0	Dreyfus (2009) Embodiment Thesis
Letón et al.	2018	5-10		3	1	0	0	147		1	
Lowenthal and Dunlap	2018			1 + 3	0	0	0	37		0	Garrison et al. (2000) Community of Inquiry framework
Marriott and Teoh	2012	2-3	2	1 + 3	0	1	1	124		1	
Mathieson	2012	5	11	3	0	1	0	13		1	Moore (1993) Transactional Distance Theory
Mathisen	2012	5	11	1 + 3	0	1	0	120	6	1	Mayer (2001) Cognitive Theory of Multimedia Learning
Mayhew	2017	4-10	5	1 + 2 + 3	0	0	0	50	1	1	Mayer (2014) Cognitive Theory of Multimedia Learning
McCarthy	2015	4	5	1 + 3	0	0	0	77	1	2	
Moore and Filling	2012	5-15	9 + 15	1 + 2 + 3	0	0	1	45		2	
O'Malley	2011	5-10	5	3	0	0	0		1	0	
Orlando	2016		16	3	0	0	0	30	6	0	
Özkul and Ortaçtepe	2017	2-15	16	2 + 3	0	0	0	47		0	
Parton et al.	2010	5	8	1 + 3	0	0	0	12	1	0	Short et al. (1976) Social Presence Theory
M. Robinson et al.	2015	10-24		3	0	0	0	34		1	Sadler (1989) Effective Feedback Model
S. Robinson et al.	2015	10-20	1	3	0	0	0	18	2	0	

Authors	Year	Feedback Length	Capture method	Research Method	Reliab	Valid	Qual	Student Sample	Instructor Sample	Sample Desc	Theoretical framework(s)
Ryan et al.	2019			3	1	1		4514		2	
Schilling and Estell	2014	3-22		3	0	0	0	70	2	0	Learning Styles
Séror	2012	5	11	1	0	0	0		1	0	
Silva	2012	7-14.5	3	2 + 3	0	0	0	19		2	Mayer (2009) Cognitive Theory of Multimedia Learning
Soden	2016	5-6	16	1 + 2			0	9		1	
Soden	2017	2-20	13	1			0		6	2	Rogers (2003) Diffusion of Innovation Theory; Shneckenberg (2009) Barriers to Technology-enhanced Innovation
Soltanpour and Valizadeh	2018		3	2	1	1	0	57		1	Long (1996) Interaction Hypothesis; Swain (1985, 1995) Output Hypothesis; Schmidt (1990, 1995, 2001) Noticing Hypothesis; Vygotsky (1981) Sociocultural Theory; Vygotsky (1978) Zone of Proximal Development
Sommers	2013	5	11	2 + 3	0	0	0	97	1	0	du Gay (1997) Circuit of Culture Theory; Haswell (2006) Complexities of Responding to Student Writing thesis
Thomas et al.	2017			2	1	0	1	167		1	Short et al. (1976) Social Presence Theory; Garrison et al. (2000) Community of Inquiry framework
Thompson and Lee	2012	5	11	3	0	0	0	43		0	
Turner and West	2013	6-12	4	3	0	0	0	59		1	
Vincelette and Bostic	2013	5	11	1 + 3	1	1	1	39	5	2	
Walker	2017	5	11	3	0	0	0	138		1	
West and Turner	2016	10-20	4	3	0	0	1	299		1	