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Video use in online and blended courses: a qualitative synthesis

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ABSTRACT

The use of video has become commonplace in education today. Educators are engaging students with video communication technology more frequently than ever before, given COVID-19. However, questions remain on how instructors use video as a communication and teaching tool in online and blended courses. The purpose of this literature review was to synthesize research on the use of video as a teaching tool in online and blended courses. A systematic approach was used to identify 64 peer-reviewed studies published from 2010 to 2020. A qualitative synthesis of the studies resulted in four themes: delivering video lectures, fostering discussions with video, using video assessments and feedback, and creating video check-ins. Each theme and related research are discussed in the article. Gaps in the literature are identified and recommendations are made for future research.

Video and earlier forms of motion picture have a rich history in education dating back to the turn of the 20th century (Ferster, 2016). From educational films and television programs to augmented and virtual reality, over the years educators have experimented with several different ways to use video for educational purposes (Snelson & Perkins, 2009). In fact, even before COVID-19, educators have increasingly used video as a communication and teaching tool in online and blended courses (Dinmore, 2019). As the use of video for educational purposes has increased, so has research focused on better understanding its affordances and constraints. For instance, researchers have investigated the use of video to hold video-based discussions (Clark et al., 2015); to deliver video lectures (Chen & Wu, 2015) and video announcements (G. Miller et al., 2019); to use and/or share educational videos on videostreaming websites like YouTube (Burke et al., 2009); to provide video feedback on assignments (Crook et al., 2012); and to hold synchronous video-based group discussions (Rockinson-Szapkiw & Wendt, 2015), virtual office hours (L. Li & Pitts, 2009), or lectures online (Olson, & McCracken, 2015; Skylar, 2009). Researchers have also investigated student satisfaction and acceptance of video (Donkor, 2011; Mirriahi & Alonzo, 2015; Valenti et al., 2019) as well as analytics of student video-viewing habits (Giannakos et al., 2015). And yet still other research has focused on things such as the distinctions between and affordances of asynchronous and synchronous

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video use (Clark et al., 2015; Skylar, 2009), asynchronous video feedback (West et al., 2017), and the ability of video to improve social presence and affective communication (Borup et al., 2012; Borup et al., 2014).

Thus, research of video use in education in general, and even its use in online and blended learning, is rather widespread. As such, researchers have conducted literature reviews on the educational uses of video over the years. For example, previous reviews have focused on singular uses of video (see O'Callaghan et al., 2015), on YouTube (see Snelson, 2011), on the use of video in different settings and content areas (e.g., music education, Anderson & Northcote, 2018; teacher education, Arya et al., 2016; health education, Coyne et al., 2018, distance education, Kilinc et al., 2017; nursing education, Wolf, 2018) as well as on different aspects of video (e.g., video production types, Winslett, 2014; educational benefits, Yousef et al., 2014), and the overall growth of video-based learning research (Giannakos, 2013). However, none of the reviews focused on the use of video in online and blended courses across disciplines. Thus, researchers and practitioners alike are in need of a systematic literature review to inform and guide future research and practice with this ubiquitous educational technology.

The purpose of this literature review was to synthesize research about the educational uses of video in online and blended courses. The review was guided by the following question: How is video being used as a teaching tool in online and blended courses? In the following sections, we present the results of our inquiry as well as areas for future research and implications for practice.

Method

To complete the review, we searched ERIC, Education Research Complete, Academic Search Premier, LearnTechLib, Web of Science, and Google Scholar for literature using the keywords "video," "online," and "blended." We focused our search on peer-reviewed journal articles from 2010 to 2020. Theoretical studies, reviews, editorials, non-peer-reviewed literature, conference proceedings, and grey literature were excluded from the review. In addition, studies that presented a technology (e.g., media annotation tools, lecture capture systems, virtual simulations, video analytics tools, and authoring systems) conducted outside of higher education settings or that occurred outside of an online or blended course were excluded from the review. To promote replicability and document the search, we used the preferred reporting items for systematic reviews and meta-analyses method to guide our search (PRISMA; Tricco et al., 2018), which occurred on May 13, 2020. Table 1 lists details on our search and selection.

The inclusion criteria used to qualify blended courses warrants explanation. Blended learning has been defined by Graham (2006) as learning systems that "combine face-to-face instruction with computer-mediated instruction" (p. 5). Unfortunately, a lot of research described as blended learning does not make this same distinction, which in turn creates a challenge when synthesizing research on the topic. Blended learning, as a result, is often used as an umbrella term to capture an assortment of blends or is placed on a spectrum ranging from more face-to-face instruction to more computer-mediated instruction (Graham & Robinson, 2007; Graham et al., 2013). Alammary et al. (2014) classified blended learning in terms of low-impact blends (i.e., adding extra activities to an existing course), medium-impact blends (i.e., replacing activities in an existing course),

Table 1. PRISMA flowchart items for study identification and selection.

Flowchart items	Study identification and selection
Search	Articles returned by database: Academic Search Premier, ERIC, Education Research Complete[a] ($n = 670$), LearnTechLib[b] ($n = 1,821$), Web of Science ($n = 191$), Google Scholar[c] ($n = 72,100$)
Identification	Academic Search Premier, ERIC, Education Research Complete ($n = 136$). LearnTechLib ($n = 109$). Web of Science ($n = 55$). Google Scholar ($n = 30$)
	Articles after duplicates removed ($n = 242$)
Screening	Articles screened ($n = 242$). Articles excluded ($n = 95$)
Eligibility	Full-text articles assessed for eligibility ($n = 147$)
	Full-text articles excluded ($n = 83$)
	Low-impact blend: 43
	Non-higher education setting or participants: 23
	Presented a technology: 13
	Unable to retrieve article: 4
Included	Articles included in review ($n = 64$).

Note. EBSCO automatically removed 55 exact duplicate articles of the results returned. We scanned 1,000 articles in LearnTechLib based on relevance by conducting a keyword search of "video" on the first 20 pages (50 articles/page) of the results returned. We scanned 300 articles from the first 30 pages (10 articles/page) of the results returned in Google Scholar.

or high-impact blends (i.e., building the blended course from scratch) (p. 443). Thus, for the purposes of this review, studies conducted in blended learning environments that simply supplemented face-to-face instruction with computer-mediated instruction were excluded (i.e., low-impact blends) and studies that reduced face-to-face instruction or replaced face-to-face instructional activities with computer-mediated instruction (i.e., video) were included (i.e., medium-impact blends).

After screening and excluding articles (which we briefly describe in the following paragraphs), we ended up with 64 studies that were entered into the NVivo 12 Pro software for qualitative data analysis. NVivo and Excel were used to code and analyze the data. First, each article was imported into NVivo. During the first round of coding, a combination of attribute coding (i.e., publication year, research method, content area) and open coding were conducted in NVivo to code key ideas (e.g., interesting terms or labels, technologies referenced, theoretical frameworks and instruments, video creation process, blended learning descriptions, video presentation styles). During the second round of coding, codes were compared and grouped, which helped us begin to identify repeating ideas and themes. The analysis was then moved to Excel, where each article was added to a row and then columns were created (e.g., online/blended, video "use", purpose, participants, focused finding) to simplify comparisons across articles and to further help synthesize recurring themes in the literature.

Summary data

We will briefly discuss the summary data from the literature we reviewed to provide some background of when and where the research was conducted.

Research origins

More than half of the studies reviewed were conducted in the United States of America; however, other studies originated from Australia and other countries (see Figure 1). Studies were published more frequently in 2015 than any other year, though data from
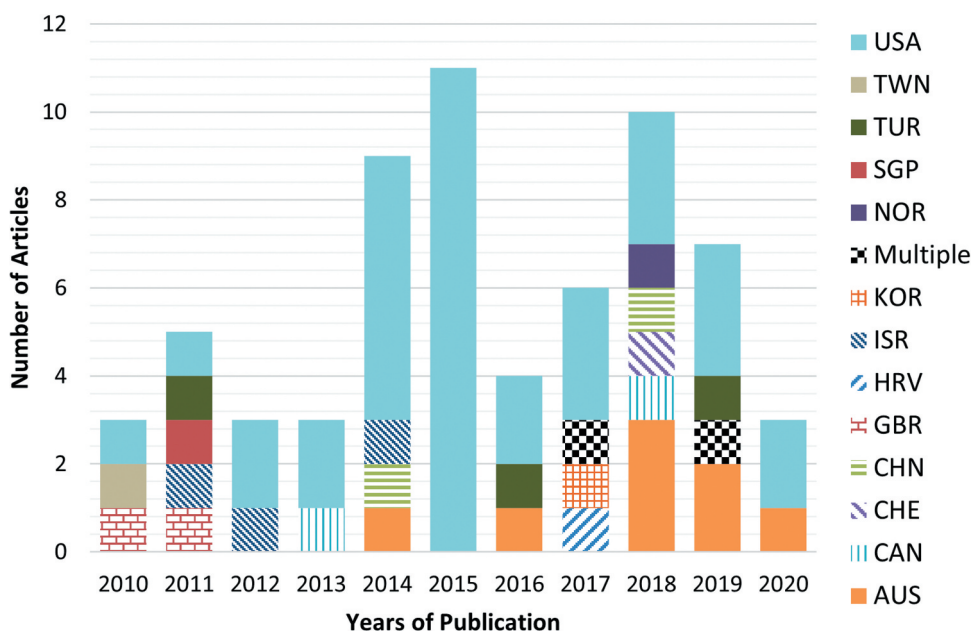
Figure 1. Publication timespan and countries of origin. *Note*. Country name abbreviations are the ISO 3166-1 alpha-3 codes published by the International Organization for Standardization with one exception: "multiple" signifies more than one country of origin.

2020 is not fully represented as the review occurred midyear in 2020. Figure 1 displays the number of studies by publication year and the country of origin.

Research methodologies

Researchers primarily used quantitative and mixed methods research methodologies. More than half of the studies reviewed occurred in blended courses. Qualitative studies were less common, especially in online courses. Figure 2 displays the number of articles by research methodology.

Content areas

Studies in this review were conducted in various disciplines. Much of it was conducted in teacher education courses, followed next by other social science courses (e.g., politics, law, social work, psychology), and then multiple disciplines (i.e., multicampus or campus-wide studies that included more than one discipline). See Figure 3 for more details.

Technologies used

Video can be used in several different ways. One common distinction is between asynchronous and synchronous video. Table 2 provides an overview of the asynchronous and synchronous communication technologies (brands, products) researchers used to record and live-stream video in online and blended courses in the studies reviewed.
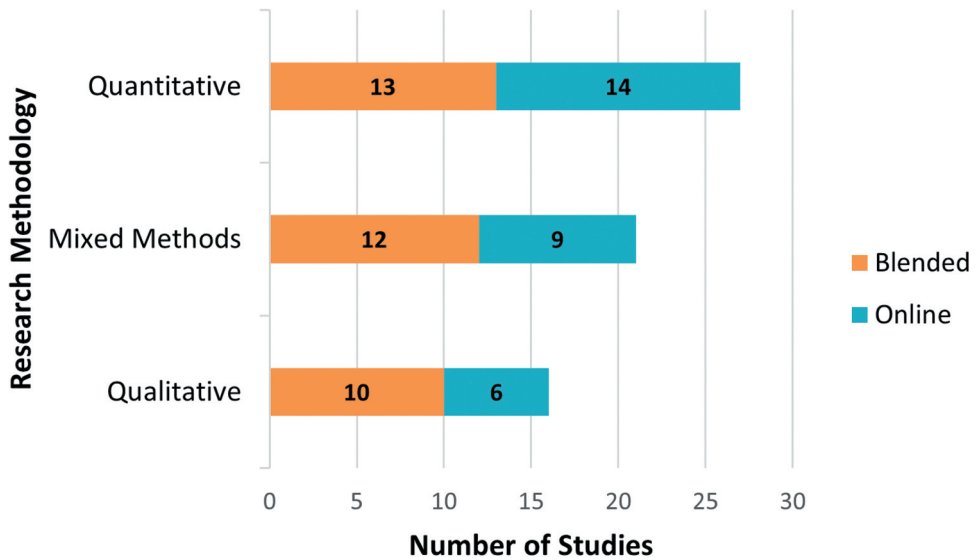
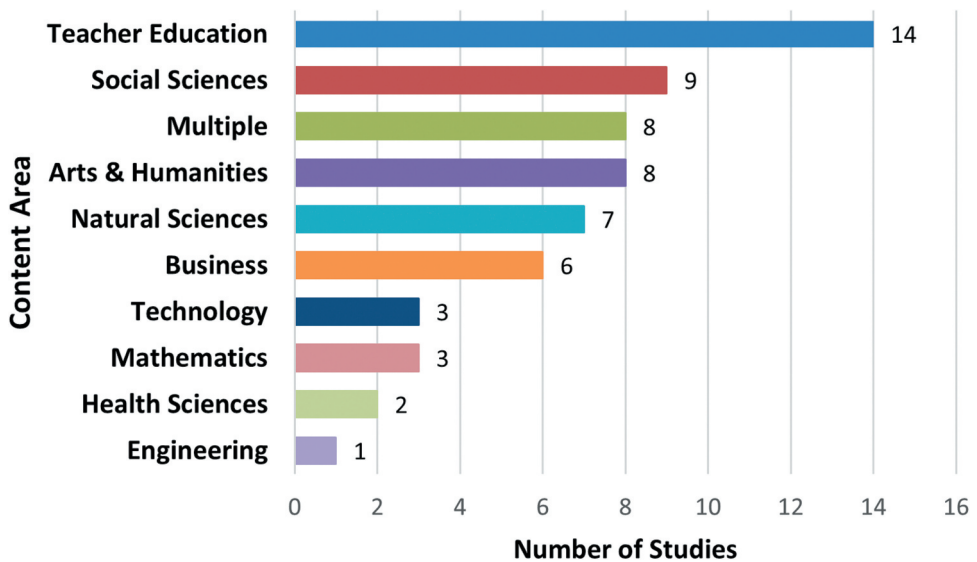**Figure 2.** Research methodology and course modality.

Figure 3. Number of studies by content area.

Results of the review

Four general themes emerged from our review of the literature:

- delivering video lectures
- fostering video discussions
- offering video assessments and video feedback
- creating video check-ins.

Table 2. Asynchronous and synchronous video communication technologies identified.

Asynchronous	Synchronous
Articulate Storyline	Adobe Connect
Bespoke	BigBlueButton
Camtasia	Cisco Webex
Edpuzzle	Collaborate
Flipgrid	Elluminate Live!
iMovie	Google Hangouts
Jing	Horizon Wimba
Khan Academy	Second Life
Lectopia	Skype
LectureScape	Vidyo
Learning management system media recorders	Zoom
Lynda videos	
Vimeo	
VoiceThread	
YouTube	

Theme 1: delivering video lectures

A common focus of the research reviewed was delivering video lectures (e.g., Chen & Wu, 2015; Costley et al., 2017; Engstrand & Hall, 2011; Geri et al., 2014; Kim & Thayne, 2015; Murphy & Stewart, 2015; Ozan & Ozarslan, 2016; Tripodi, 2018). Most of this research focused on studying video lectures as either an asynchronous video lecture (e.g., a recorded lecture shared on a videostreaming site like YouTube) or as a synchronous video lecture (e.g., a lecture delivered live in a web conferencing application like Zoom). The advantages and disadvantages of each as well as the affordances of asynchronous and synchronous video lectures that recurred throughout the literature are discussed in the following paragraphs.

Asynchronous video lectures

The following recurring themes were identified in the studies reviewed:

- advantages
- disadvantages
- video length
- interactivity.

Researchers have identified several advantages of asynchronous video lectures. For instance, researchers regularly cite student control as one major advantage (Beale et al., 2014; Chen & Wu, 2015; Hajhashemi et al., 2016; Valenti et al., 2019); students can control a video lecture using a media player's default settings (i.e., pause, play, rewind, and fast-forward), which among other things can increase student agency. Other research has suggested that video lectures can benefit at-risk students by allowing them to replay the material (C. J. Miller, 2014; Murphy & Stewart, 2015). Another advantage of asynchronous video lectures is they can help students visualize their online instructors (Hegeman, 2015), which can influence not only student learning outcomes (see Chen & Wu, 2015) but also

help students to connect to their instructors in personal, socially constructive ways (Dinmore, 2019).

Despite these advantages, research has also identified some disadvantages to using asynchronous video lectures. Many of the challenges discussed in the literature focus on recording the initial lectures. For instance, researchers have found that many faculty lack the time, resources, or technical expertise to develop quality asynchronous video lectures (Dinmore, 2019; Valenti et al., 2019). Other research has highlighted issues with ensuring that these asynchronous video lectures are accessible, both in terms of accessibility and broadband access, to all students (Dinmore, 2019). And a few studies have pointed out issues with tracking student engagement with asynchronous video lectures (Beale et al., 2014) or with video lectures almost encouraging students to put off watching the lectures in the first place (Geri et al., 2014). Two other recurring themes in the literature about asynchronous video lectures focus on video length and interactivity.

Educators and researchers alike are interested in the optimal length of asynchronous video lectures. Although research has shown that shorter video lectures influence student performance, the ideal length is unclear. In one study, Green et al. (2018) found short video clips that replace face-to-face lectures had an impact on student learning outcomes. Similarly, in another study, Ozan and Ozarslan (2016) found performance improvements among students who viewed short video lectures from beginning to end. The video lectures described in the studies reviewed ranged from 1 min in length (see Hund & Getrich, 2015) to an average of 50 min in length (see Murphy & Stewart, 2015). Some researchers have suggested students have limited time or attention spans for viewing video lectures online (see Geri, 2011, 2012). However, research also suggests that a relationship between the length of a video lecture and student achievement may not exist (see Beale et al., 2014; Murphy & Stewart, 2015). Researchers tended to consider shorter video lectures as videos under 10 min (see Ozan & Ozarslan, 2016). Research has also shown that students prefer shorter videos (Harrison, 2015; Hund & Getrich, 2015; C. J. Miller, 2014). Pechenkina et al. (2018) described the influence of short videos as providing cognitive triggers (e.g., mnemonic devices) that help students retain and recall information (p. 416). However, academic debate ensues about the ideal length of educational videos. Dinmore (2019) explains that describing an ideal length in practice "is a contentious area of advice to give lecturers producing content for their courses" (p. 3).

Traditionally, asynchronous video lectures are simply passive presentations of information. Although this is in part due to the limitations of most media players, it is also likely due to traditional conceptions of a lecture. However, increasingly researchers are investigating the benefits of adding different types of interactivity to video lectures (e.g., quizzing, polling, drag-and-drop, annotation; see Cundell & Sheepy, 2018; Donkin et al., 2019; Fish et al., 2016; Fleischmann, 2020; Goldingay & Land, 2014; Taylor et al., 2015). Research suggests that advantages of adding interactivity to asynchronous video lectures include increased student retention and engagement (Fleischmann, 2020) as well as the ability to provide learners instantaneous feedback (Donkin et al., 2019). However, some research has also found that adding too many on-screen interactions may actually deter learning (Fish et al., 2016).

Overall, though, students report wanting more interactivity in asynchronous video lectures (Hajhashemi et al., 2016; Valenti et al., 2019). Unfortunately, most instructors often do not possess the resources, skills, or time needed to add such interactivity (Donkin

et al., 2019; Fish et al., 2016). Recognizing this, publishers are increasingly including interactive lectures with their textbooks. And as useful as these publisher materials can be in terms of saving instructors' time, research has found that students perform better in classes after watching video lectures created by their own instructors (Hegeman, 2015).

A benefit of asynchronous video lectures (e.g., in comparison to synchronous video lectures) is that students are not bound to a specific time and place to view the video (Dinmore, 2019; Fleischmann, 2020; Geri, 2012; Geri et al., 2014; Hajhashemi et al., 2016; Lervik et al., 2018). In addition, asynchronous video lectures can technically be downloaded for offline access, which can help online learners with broadband or access issues.

Synchronous video lectures
The following recurring themes were identified in the studies reviewed:

- advantages
- disadvantages
- text-based chatting
- participation signals.

The combination of synchronous video lectures with blended or fully online courses can change or significantly supplement the dynamic of these courses (Hoffman, 2019; Hogan & Devi; 2019; Szeto, 2014). In these instances, both instructors and students find that the teaching strategies more closely align to face-to-face in-person instruction (Macharaschwili & Skidmore, 2013; Rockinson-Szapkiw & Wendt, 2015). In one study, instructors have reported that synchronous video lectures promote interactivity, help develop community, and provide ways to reach students at different locations (Martin & Parker, 2014). In another study, researchers have found an instructors' teaching style, knowledge and use of video-conferencing application features (e.g., polling, chat, screen sharing, and presenter rights), and visual presence support student engagement (Martin et al., 2012). Students, on the other hand, have identified how flexible and convenient synchronous video lectures can be (Wang & Huang, 2018), how they can provide similar experiences to face-to-face lectures (Francescucci & Foster, 2013; Wang & Huang, 2018), and provide a means for enhancing interaction in blended and online courses (Martin et al., 2012).

Despite advantages like these, other research has pointed out some disadvantages with using synchronous video lectures in blended and online courses. For instance, Karal et al. (2011) found students struggled with seeing their instructors as authority figures. Olson and McCracken (2015) found that the associated costs of adding synchronous video lectures to asynchronous online courses to be an unnecessary investment relative to student achievement and community building. Research also suggests that technical problems with videoconferencing applications are common (e.g., unstable Internet connection, delayed video, unclear audio) (Dahlstrom-Hakki et al., 2020; Martin et al., 2012; Olson & McCracken, 2015; Wang & Huang, 2018). Synchronous video lectures require that an instructor and students meet virtually online (e.g., in Webex or Zoom) at the same time, which can prove problematic for fully asynchronous online courses, where students might live in different time zones or have different work schedules. Two other recurring themes in the literature about synchronous video lectures focus on text-based chatting and participation signals.

Most platforms used for synchronous video lectures have some type of text-based chat tool, often used as a type of back channel or to ask questions during synchronous video lectures. Perceptions of text-based chatting during video lectures are mixed. Although some instructors see it as a nice addition (Hoffman, 2019) or even helpful during a lecture (Martin & Parker, 2014), others find it distracting (Karal et al., 2011) or even overwhelming in certain situations (Cooner, 2010). Some, though, suggest that having a teaching assistant, colleague, or even a specific student manage the chats during a lecture can make it more manageable (Cooner, 2010; Karal et al., 2011). Research also suggests that students like having the ability to chat during a lecture. For instance, Martin et al. (2012) reported how students found text-based chatting improved student-instructor and student-student communication during a lecture and provided a nice mechanism for immediate feedback (Martin et al., 2012). Despite the mixed perceptions, researchers seem to agree that a clear benefit of text-based chatting is the ability to provide immediate feedback (Macharaschwili & Skidmore, 2013; Martin & Parker, 2014; Martin et al., 2012).

Research suggests that various features of synchronous communication technology (e.g., the ability to mute oneself, to turn on or off a webcam) can influence how instructors and students participate during synchronous video lectures. For example, Martin et al. (2012) found that hand-raising and polling features organized interaction and encouraged participation. Hoffman (2019) noted how the action of unmuting oneself or turning on a webcam signaled an intention to participate. Olson and McCracken (2015) found that muting students' microphones upon entry can reduce common technical difficulties in videoconferencing (e.g., background noise and competing voices) but may also reduce impromptu conversation.

Theme 2: fostering video discussions

Much of the communication in online courses (and the distant component of blended courses) is done with text-based communication such as email or asynchronous discussion forums. Despite the benefits of text-based asynchronous communication (e.g., time for reflection, inherent transcription, and potential clarity of message), instructors and students often struggle with some inherent constraints of this type of communication. For instance, text-based asynchronous communication can create ambiguity (Rockinson-Szapkiw & Wendt, 2015), lack visual cues, and conversations can take time to develop (Fadde & Vu, 2014; Huang & Hsiao, 2012). These constraints have motivated instructors to experiment with different ways to use video to either prompt asynchronous discussion with videos or to facilitate or host synchronous video-based discussions.

Prompting asynchronous discussion with videos

Based on the literature review, there are three distinct types of videos instructors use to prompt asynchronous discussion:

- informal instructor-created videos
- formal instructor-created videos
- third-party videos.

Some instructors informally record themselves (e.g., via a webcam) or their computer screens (i.e., screencasts) to prompt asynchronous discussions with video. Advantages of this approach have been shown to increase the engagement of struggling students (Borup et al., 2013), increase the frequency of student discussions posts (Draus et al., 2014), and to increase instructor social and teaching presence (Clark et al., 2015). Conversely, informal instructor-created videos do not guarantee students will find value in the discussion (Borup et al., 2013); the videos may not lead to longer, more robust discussion postings by students (Draus et al., 2014); and students may not be comfortable recording their own videos during discussions, if asked (Clark et al., 2015).

Despite possible drawbacks like these and others, research suggests that informal instructor-created videos can create a casual and welcoming atmosphere for conversation. The relaxed, possibly impromptu, nature of these recordings may engender similarly styled responses from students in either text or video forms. Further, videos like these can set the tone of a discussion by modeling intended behaviors in their videos (see Clark et al., 2015). Borup et al. (2013) illustrated the prospective variations of student characteristics (e.g., personality, motivation, language, and culture) that can emerge when both students and instructors engage in asynchronous video communication in online discussions. Researchers can use these variations to investigate instructor-created video in greater depth as creating video recordings (i.e., acclimating to the technology) may not be the only hurdle students face when engaged in asynchronous video communication.

A different approach to prompting asynchronous discussion is through highly produced instructor-created video. Formal videos are often planned and rehearsed in greater detail with more purposeful intentions and may be less personal or casual compared to informal instructor-created videos. In these instances, instructors may use production aids (e.g., scripts and teleprompters) and staff-supported production studios or elicit help from peers to assist in the recording process (see Beale et al., 2014; Green et al., 2018; Müller et al., 2018). Green et al. (2018) used a peer-review process to develop formal instructor-created videos; they found increased views of the video and increased posts on the discussion forum had a positive influence on student learning outcomes. Some instructors recognize the inherent limitations of creating formal videos to prompt discussions (e.g., development time, shelf life, technological competency, or lack of resources). However, other instructors are apprehensive about being recorded or find little value in appearing on-screen though the familiarity effect and confirmation bias may be leading instructors astray relative to creating video content in these instances. As a result, many instructors habitually locate third-party videos to prompt asynchronous discussions.

Instructors less prone to record videos of themselves often use third-party videos to prompt asynchronous discussion. Third-party videos are any recordings that do not include the instructor-of-record (e.g., movies, YouTube clips, Khan Academy). Although the instructional practice has evolved over the years, third-party videos are common in higher education. However, this review did not identify any research studies that examined instructor use of third-party videos to prompt discussions in fully asynchronous online courses. A few studies, though, examined using third-party videos to prompt either online or face-to-face discussions in blended courses. The advantages to using third-party videos in these studies included the potential for higher-order thinking among students (Cooner, 2010) and socially constructed knowledge gains (Batarelo & Rukavina, 2017), though Batarelo and Rukavina attributed these knowledge gains to the difficulty of the

associated discussion questions as opposed to the video content. In addition, students reported positive experiences (Fleck et al., 2014) and improved learning (Akbaba & Baskan, 2017) after viewing third-party videos. However, positive perceptions of third-party videos are not surprising (Valenti et al., 2019) as they may have an entertainment value that sustains student interest and attention longer than instructor-created videos, leading to more positive perceptions.

Incorporating informal, formal, and third-party videos to prompt discussion in online and blended courses has advantages and drawbacks. Instructors interested in using these approaches might experience increased viewership, interaction, attention, and positive perceptions among students. Conversely, instructors might also experience disconnect, distraction, and technical difficulties. Instructors may have challenges creating informal or formal videos on their own, although the personal nature of these recordings may enhance the student experience by creating a welcoming and safe space for students to engage in academic discourse. Further, curated third-party videos may provide relevance to student learning beyond an individual instructor's capacity to develop video content. Using recorded videos to prompt discussions is primarily an asynchronous activity in online and blended courses, whereas videoconferencing provides opportunities to host discussions in real-time.

Facilitating or hosting synchronous video-based discussions

Blended and online instructors continue to explore ways to engage students using video communication technology (Valenti et al., 2019). Hosting synchronous video-based discussions is one way to create efficiencies with students learning at a distance in online and blended courses. However, researchers describe synchronous video-based discussions in different ways, for example, blending face-to-face instruction with asynchronous online discussions outside of in-person meeting times or blending online instruction with synchronous videoconferencing discussions. The myriad of blends presents a challenge for synthesis. Moreover, distinguishing the instructional activities taking place while videoconferencing is difficult to discern (cf. Abdous & Yoshimura, 2010; Bourdeau et al., 2018).

Researchers often describe using lecture and discussion as the same instructional activity when videoconferencing. Naturally, delivering lectures and facilitating discussions often complement one another (e.g., instructors might ask students questions to invite student participation during lecture). However, lectures and discussions can be considered separate instructional activities. The distinction is rather nuanced though an important one when it comes to designing and facilitating instruction in synchronous settings. Hoffman (2019) was one researcher who made this distinction; according to Hoffman, interactive lectures occur when instructors take the lead with minimal input from students, and student input is primarily directed toward the instructor in short audio or text snippets. Interactive discussions, on the other hand, occur when contributions among students and instructors are shared equally, with significant input from students that are either directed toward peers or the instructor in longer audio or text (p. 115). Interactive or synchronous online discussions appeared in both blended and online courses in this review.

Synchronous online discussions in blended courses. Researchers experimented with incorporating synchronous online discussions in face-to-face classrooms in different

ways. Synchronous online discussions in blended courses were shown to provide students with experiences similar to face-to-face discussions though technical issues were common (see Francescucci & Foster, 2013; Izmirli & Izmirli, 2019; Wang & Huang, 2018). This review identified three different blends of synchronous online discussions with face-to-face instruction:

- replacement of face-to-face discussions
- classroom-to-classroom discussions
- classroom-to-student discussions.

Replacing face-to-face discussions with synchronous online discussions in face-to-face classrooms affords students the opportunity to interact in both face-to-face and online settings. However, students had mixed perceptions as to whether this was a benefit or drawback to each respective interaction (Izmirli & Izmirli, 2019). Students' preferred communication style can differ in online and face-to-face settings. Mixing online interactions with face-to-face interactions may help some students transition between the two settings more seamlessly whereas other students might find the mix disruptive. Szeto (2014) described this scenario as a "dual communicative situation" that potentially limits student participation in online settings (p. 70). Multiple modes of communication create challenges for students, and preferences for one communication mode over another may not always align with increased performance. Dahlstrom-Hakki et al. (2020) found students with disabilities preferred synchronous discussions but performed slightly better after using asynchronous discussions; Dahlstrom-Hakki et al. acknowledged their findings were not generalizable given the student population though the drawbacks of synchronous online discussions identified as fast-paced, socially demanding, and attention-consuming are arguably universal to all student populations.

Connecting students from two classrooms in separate geographic locations with synchronous online discussions (i.e., classroom-to-classroom discussions) allows students to interact in ways that would not otherwise be physically possible. However, students had mixed perceptions regarding their experiences in these discussions. Students reported synchronous online discussions as providing a valuable, engaging learning experience (Akbaba & Baskan, 2017). Conversely, students also reported feelings of emotional disconnect with their distant counterparts (Pardasani et al., 2012). Although technical difficulties were reported in both the Akbaba and Baskan study and the Pardasani et al. study, these challenges did not detract from the classes' productivity (Akbaba & Baskan) or from learning the course material (Pardasani et al.).

Bringing online learners into face-to-face discussions occurring between instructors and on-campus students (i.e., classroom-to-student discussions) may benefit online learners more than on-campus students. In the studies reviewed, the advantages of bringing online learners into live classroom discussions via videoconference included increased classroom access to off-campus students (Macharaschwili & Skidmore, 2013) and varied perspectives (Stewart et al., 2011). Wang and Huang (2018) concluded that this approach "is a feasible and practical method for online students to participate in class activities in real time, and they can have equivalent learning experiences to their classmates" (p. 460). Conversely, the disadvantages included technical difficulties (Macharaschwili & Skidmore, 2013; Wang & Huang, 2018), less familiar interactions between students (Macharaschwili &

Skidmore, 2013), and technological distractions (Macharaschwili & Skidmore, 2013; Stewart et al., 2011). Technological distractions occurred when the videoconference technology diverted student and instructor attention away from the discussion. Instructors simultaneously engaged in videoconferencing and face-to-face discussion often had to adjust their approaches to include all students in the conversation (Akbaba & Baskan, 2017; Stewart et al., 2011; Wang & Huang, 2018). Further, on-campus students exerted additional effort to accommodate the videoconference technology and support online learners. Some students volunteered to support the technological needs of a virtual counterpart (see Macharaschwili & Skidmore, 2013; Stewart et al., 2011). However, the extra effort put forth by these on-campus volunteers was inequitable and seemed to benefit only the online learner.

Synchronous online discussions in online courses. Researchers examined synchronous online discussions in fully synchronous online courses and fully asynchronous online courses. Synchronous discussions in online courses provide students the opportunity to connect in real-time (Abdous & Yoshimura, 2010; Dahlstrom-Hakki et al., 2020; Hoffman, 2019; Martin & Parker, 2014). However, there are underlying concerns surrounding the appropriateness of using synchronous discussions in fully asynchronous online courses (e.g., student agency, bandwidth, or access) (Olson & McCracken, 2015). Synchronous discussions reduce student choice by requiring a set time and place to connect for conversation. This review identified two distinct uses of synchronous online discussions based on the following types of online courses:

- fully synchronous online courses
- traditionally asynchronous online courses.

Fully synchronous online courses maintain traditional classroom meeting times but replace classroom meetings entirely with synchronous communication technology. Hoffman (2019) identified two different types of student engagement during synchronous discussions as unified engagement or separate engagement. Unified engagement occurred when all students and the instructor conversed on a singular discussion topic as a group. Separate engagement occurred when more than one conversation took place simultaneously within the different features of the synchronous communication technology (e.g., audio-based conversation occurring simultaneously with a different text-based, chat conversation). Hoffman (2019) found that instructor teaching presence was of the utmost importance in synchronous discussions as the instances of unified and separate engagement often overlapped requiring sustained attention in multiple modes of communication.

Synchronous discussions in traditionally asynchronous online courses are a unique blend. Hogan and Devi (2019) defined this blend as fusion learning, where synchronous sessions are interspersed throughout traditionally asynchronous online courses. The advantages were shown to include expanding upon content in greater depth (Martin & Parker, 2014), building teaching and social presence (Clark et al., 2015; Martin et al., 2012), and reducing feelings of isolation common among online learners (Clark et al., 2015; Hogan & Devi, 2019). However, the inclusion of synchronous discussions alone does not guarantee learning communities will emerge or learning outcomes will improve (Olson & McCracken, 2015). Researchers outlined design recommendations and best practices for

instructors interested in using synchronous sessions in traditionally asynchronous online courses (see Lowenthal et al., 2017; Martin et al., 2012).

Findings on video use in asynchronous and synchronous discussions revealed that instructor social presence and teaching presence, whether recorded or streamed, is essential to academic discourse. However, research on asynchronous and synchronous video communication in online and blended courses is limited. The studies in this review provide substantive precedents for future research on prompting discussion with video and hosting discussions via videoconference.

Theme 3: offering video assessments and video feedback

Researchers explored using asynchronous video communication technology to assess students and provide feedback. Assessments and feedback in higher education primarily rely on text-based communication (e.g., writing essays and taking tests) more than other forms of communication. Asynchronous video communication technology affords students and instructors opportunities to demonstrate and guide understanding in different ways.

Video assessments

A fundamental approach to evaluate student learning is through assessments. Video assessments provide visual support to language learners (see Pardo-Ballester, 2016), support kinesthetic learning and learning from experience (see Donkin et al., 2019; Stanley & Zhang, 2018) though students may struggle with acclimating to the technology (He & Huang, 2020; Shih, 2010; Stanley & Zhang, 2018). This review identified three types of video assessments:

- video self-modeling
- video blogs
- student-created videos.

Video feedback interventions involve a student recording themselves and watching their recording (i.e., video self-modeling). The recording is then assessed by the student, their peers, their instructor, or a combination thereof. Video feedback interventions are markedly different from video feedback (i.e., recordings of instructors giving feedback). Researchers have reported mixed results on the impact of video feedback interventions on student learning in online and blended courses. Donkin et al. (2019) found a significant improvement in student grades and engagement for those who used the intervention. Conversely, Stanley and Zhang (2018) found no significant differences in learning outcomes though students exposed to the video feedback intervention performed better overall compared to the control group (i.e., significant value added). Video feedback interventions are an effective learning tool for students in kinesthetic disciplines (e.g., natural sciences, communication, art, music, and drama). Online courses inherently struggle to incorporate kinesthetic learning, and video feedback interventions may reduce feelings of isolation among online students (Goldingay & Land, 2014). Although self-assessment and peer assessments are possible, students thought that instructor assessment of their recordings was required (Donkin et al., 2019).

Video blogs have similar advantages to video self-modeling (i.e., learning from experience) though the intended purpose is different. Desjarlais and Smith (2011) posited the difference between self-reflection and self-assessment lies in the existence of predetermined criteria that differentiates the focus of self-assessment as proactive and self-reflection as reactive. Many educators contend that self-reflection is an important step in the learning process and often require students to periodically assess their own learning via journaling on a blog placed within a students' personal website or e-portfolio (see Borup et al., 2015; Borup et al., 2014; Rockinson-Szapkiw & Wendt, 2015; Tan et al., 2011; Thomas et al., 2017). Journaling on a blog is traditionally a text-based writing activity. However, researchers have explored expanding self-reflection to include student-created video entries (i.e., video blogs). Students perceived recording video entries positively (O'Connor, 2018; Shih, 2010) and reported improved public speaking skills (e.g., enunciation, articulation, facial expressions, posture, and gestures) after viewing their videos (Shih, 2010). The process of students recording video reflections "can encourage more personal ownership and responsibility, thereby supporting deeper learning and more honest communication" (O'Connor, 2018, p. 359). However, acclimating to the technologies used to record video entries took time and detracted from the intended activity (Shih, 2010). Video blogs are typically low-stakes assessments though instructors may assess student-created videos in other ways.

Student-created videos are occasionally substituted for traditional learning artifacts (e.g., submitting a video in lieu of an essay). Video artifacts differ comparatively to written and oral artifacts as the production quality is sometimes assessed in addition to the content on-screen. In the studies reviewed, video production recurred as one of many criteria within grading rubrics (see He & Huang, 2020; Stanley & Zhang, 2018). Producing quality videos requires a different, arguably more advanced, set of technological competencies that students may or may not possess. Notwithstanding the objective aim of the video production criterion to encourage quality work in general, educators less familiar with video production quality should exhibit caution when evaluating student work as inexperience may lead to more subjective assessment. Generally speaking, we contend clear communication in video recordings supersedes the additional time needed to create highly polished videos, and students may need to be made aware of standard recording practices to that end (e.g., audio quality or lighting). In the studies reviewed, student-created videos were shown to lead to increased engagement, collaboration, and skill development (i.e., technological competencies) among students (He & Huang, 2020; Stanley & Zhang, 2018). However, students also reported challenges in creating video recordings on their own and in groups (He & Huang, 2020; Stanley & Zhang, 2018). The findings of these studies illustrate the duality of technological competency in video production as both a barrier and benefit to student learning. Developing technical skills during video production in this context appears to be of ancillary benefit to student learning though not always assessed by instructors nor explicitly examined in the literature.

Video assessments are different ways for students to demonstrate their understanding; visualizing their understanding through video benefits students and instructors, especially in disciplines where kinesthetic learning is required. Although students learn from their own experiences in video assessments, students may similarly benefit from recordings of their instructors providing feedback on their work.

Video feedback

There is a growing body of research on video feedback in online and blended courses. Findings have shown video feedback can be welcoming and affective (Atwater et al., 2017; Borup et al., 2015), help establish social presence (Borup et al., 2014; Izmirli & Izmirli, 2019; Thomas et al., 2017), and has the potential to be delivered immediately in synchronous settings (Martin et al., 2012). Previous research has explored the affordances of text feedback versus video feedback in blended courses. Table 3 summarizes the key findings of these studies.

Thomas et al. (2017) noted, when discussing their findings, that the frequency of social presence indicators was measured as opposed to the quality of the indicator, suggesting differences in social presence exist despite their findings; a key element in the differentiation is media richness (i.e., visual and audio cues). When coding the video recordings, Thomas et al. added a new social presence indicator, visual self-disclosure, defined as "Visual and auditory stimuli present details of the instructor's life outside of class. Includes background visuals & background noise" (p. 66). The indicator merits further investigation as the use of synchronous and asynchronous video communication increases at home and outside of traditional face-to-face classrooms. In addition, Borup et al. (2014) noted "the need for video feedback to establish social presence was less in blended courses where students and instructors interact face-to-face" (p. 249). Thus, further research is needed to examine visual self-disclosure and the quality of video feedback in online courses relative to social presence.

In this review, studies focused on fully asynchronous online courses examining video feedback were sparse, and findings were limited to self-reported survey data with mixed results. Valenti et al. (2019) examined faculty and student perceptions of video in online courses and found greater preferences for instructional videos compared to video feedback. However, open interviews revealed student perceptions were polarized, with some wanting more video feedback, and others wanting less video feedback. Varied student perceptions may be common relative to video feedback as Martin et al. (2012) found students enjoyed the immediacy of video feedback received during synchronous video-conferencing in an online course.

There are limitations to using only self-reported survey data (e.g., the novelty effect). However, overall, these findings do suggest that video feedback, whether asynchronous or synchronous, has the potential to engage learners in a media-rich communication tool. Further, this research suggests that video feedback has the potential to help establish

Table 3. Summary of studies comparing text and video feedback.

Study	Video feedback	Text feedback	Participant preferences
Borup et al. (2014)	Emotive, conversational, and more effective in establishing social presence	Less effective in establishing social presence	No significant differences
Borup et al. (2015)	Supportive and conversational	Efficient, organized, and specific	Text feedback
Atwater et al. (2017)	Elaborate and friendly	Convenient, efficient, and concise	Video feedback
Thomas et al. (2017)	Social presence indicators present	Social presence indicators present	No significant differences

instructor social presence and form affective relationships between students and instructors that are key considerations of a social constructivist pedagogy.

Theme 4: creating video check-ins

The instructional practice of checking in on students as they progress through a course is common in higher education though actualized in very specific ways in online and blended courses, where casual hallway conversations or after-class meetings are not possible. In online settings, instructors can create informal check-ins with students using asynchronous or synchronous video communication technology. This review identified four types of video check-ins: orientation videos, video announcements, virtual office hours and impromptu meetings, and check-ins on group work.

Orientation videos

Orientation videos generally have two aims in online and blended courses as either orienting students to the technology of the classroom (i.e., technology-focused) or orienting students to the instructor (i.e., relationship-focused) though combinations of the two are possible. Technology-focused orientation videos might demonstrate where to locate the syllabus, how to submit assignments, or how to use the learning management system (see C. J. Miller, 2014). Whereas relationship-focused orientation videos might welcome students into the course by providing an instructor's bio or teaching style. In the studies reviewed, students reported orientation videos as informative and helpful (Izmirli & Izmirli, 2019; Taylor et al., 2015). More specifically, technology-focused orientation videos were shown to decrease withdrawal rates and improve learning outcomes in a pilot study targeted at students taking an online course for the first-time (see Taylor et al., 2015). In another study, relationship-focused orientation videos were shown to help establish social presence and improve student satisfaction (Izmirli & Izmirli, 2019).

Video announcements

Most learning management systems include an announcement feature that allows instructors to send course-related updates to students. A few researchers discussed their uses of video announcements in the context of their studies though video announcements were not examined as isolated interventions. For example, Draus et al. (2014) described providing orientation videos, lecture videos, video discussion posts, and video announcements as well as video instructions on instructor expectations for written assignments (i.e., prompting an assignment with video). Draus et al. posited "It is possible that by using instructor-generated video content in all aspects of the course, lectures, announcements, and discussions, greater influence of the content manifested itself" (p. 250). Weekly video announcements were common in several studies (see Clark et al., 2015; Draus et al., 2014; Goldingay & Land, 2014). Video announcements were shown to help establish instructor social presence, teaching presence, and emotional connections (Clark et al., 2015; Draus et al., 2014; Goldingay & Land, 2014).

Announcements are a common check-in between students and instructors in all course modalities. However, video announcements have the potential to create a visual cadence to asynchronous online learning in socially constructive ways. Goldingay and Land (2014) contended the passivity of students' viewing videos "is

not in keeping with a constructivist view of learning" (p. 61). Despite this inherent limitation, researchers noted that weekly instructor-generated videos were of especial benefit to online students (Goldingay & Land, 2014), provided relevance to the course content and instructor expectations (Clark et al. (2015), and, when recorded informally at home, these videos showed "a more personal side to the instructor" (Draus et al., 2014, p. 243). The descriptions from these researchers suggest that when a video announcement is recorded by instructors for online students, the personal relevance of the video to the students become constructive, both in the content of the message and in the richness of the medium. However, further research is needed to substantiate such a claim and explore the influence of video announcements in online and blended courses.

Virtual office hours and impromptu meetings

Synchronous videoconferencing technology affords instructors opportunities to hold virtual office hours and impromptu meetings with students from a distance. In this review, several studies indicated using videoconferencing for virtual office hours in online courses (see Clark et al., 2015; Martin & Parker, 2014; Martin et al., 2012) though few studies examined virtual office hours empirically. Lowenthal et al. (2017) found different strategies (e.g., reminders and incentives) helped increase student attendance at virtual office hours. Virtual office hours provide a space for students and instructors to converse without the pressures of classroom interactions. Similarly, impromptu meetings are informal ways for students and instructors to connect via videoconference. Atwater et al. (2017) found individual videoconference meetings helped students build confidence by forming a relationship with their instructor. Both virtual office hours and impromptu meetings allow casual conversations to emerge though synchronous communication in general may create a more relaxed environment compared to asynchronous video recordings. Dahlstrom-Hakki et al. (2020) found students recording videos were more nervous and critical of their performance whereas student communications during synchronous sessions were "more casual and spontaneous" (p. 8). Virtual office hours and impromptu meetings have the potential to help instructors and students build relationships in casual and beneficial ways in online courses, yet students are less likely to attend when such meetings are optional (Lowenthal et al., 2017).

Check-ins on group work

Instructors often task students to work in groups using asynchronous or synchronous communication in online and blended courses (see Cooner, 2010; Goldingay & Land, 2014; He & Huang, 2020; Wang & Huang, 2018). The instructional practice of checking in on groups to offer guidance, provide clarity, and offer help to stay on task is common in higher education. Some studies discussed the advantages of using synchronous communication technology for this specific purpose (Goldingay & Land, 2014; Izmirli & Izmirli, 2019; Lervik et al, 2018; Martin et al., 2012; Rockinson-Szapkiw & Wendt, 2015). Synchronous check-ins may help reduce feelings of isolation among online learners (Goldingay & Land, 2014) though student preferences appear to be mixed. Rockinson-Szapkiw and Wendt found students preferred synchronous communication among groups as the conversations were more personal and natural for building community. Conversely, Martin et al. found students disliked the breakout groups feature while using

synchronous communication technology. This finding suggests that instructors may benefit from individual meetings with groups as opposed to checking in on multiple groups in real time despite the availability of this feature in synchronous communication technology though further research is needed to better understand the benefits and student perceptions of using meetings in these ways.

Video check-ins help learners acclimate to their environment and their instructor in mutually beneficial ways by creating social and teaching presence. Further research is needed to investigate the influence and effects of video check-ins on student learning and to better understand how and when to use video in these ways, though there appears to be minimal downsides to their inclusion in online and blended courses.

Gaps in the literature

Research on asynchronous and synchronous video communication technology is growing. Asynchronous video use appears to have an established history in the literature compared to more recent advancements in synchronous video use. Three areas in need of further investigation are virtual backgrounds, features and uses of synchronous communication technology, and synchronous assessments and feedback.

Virtual backgrounds

Visualizing an instructor on-screen while using asynchronous or synchronous video communication technology has been shown to influence student performance and perceptions in positive ways, yet few studies have empirically examined the influence of different backgrounds and settings appearing behind an instructor. Researchers describe the location of where videos are recorded or streamed as taking place at their home or office, in the classroom, or in a recording studio. Each of these locations may have different effects on student perceptions and subsequent performance, specifically how students connect or develop a relationship with their instructor. Thomas et al. (2017) categorized this social presence indicator as "visual self-disclosure." Research suggests that streaming or recording video from home humanizes the experience as students see instructors in their personal surroundings (Borup et al., 2014; Draus et al., 2014) whereas in-classroom recordings simulate a physical classroom experience (i.e., a familiar and natural setting for teaching and learning) (see Murphy & Stewart, 2015). Formal studio recordings usually involve a greenscreen or virtual background that is not physically behind an instructor (see Dinmore, 2019; Müller et al., 2018). Moreover, synchronous communication technology affords opportunities to use virtual backgrounds in novel ways in need of further investigation. Virtual backgrounds could either create disconnect as the setting is unnatural or create connection by exhibiting personality. Thus, further research is needed to explore the emotive potential of physical and virtual backgrounds on students and instructors using asynchronous and synchronous video communication technology.

Features and uses of synchronous communication technology

The features of synchronous video communication technology (e.g., sharing screens, interactive whiteboarding, polling, breakout groups), and specifically how instructors

use video technology, were largely unexamined in the studies reviewed. Researchers discussed the availability of features, yet fewer studies examined these features empirically. Signaling participation is one aspect of synchronous communication technology that aligns with media naturalness theory (see Kock, 2005). For example, hand-raising can occur in face-to-face and synchronous communication though the experience is processed and received differently. Further, few studies investigated student behavior during synchronous video communication. Verbal and nonverbal communication may come across differently in video and the effects may have qualitative differences on student and instructor experiences.

Synchronous assessments and feedback

Very few studies in this review examined synchronous video assessments or synchronous video feedback. Synchronous video assessments could allow students to demonstrate a skill and receive feedback in real-time from a distance. The approach could build the instructor-student relationship further (i.e., instructor social presence and teaching presence) in online courses. Investigations of cultural differences would provide greater insight into the intervention as synchronous communication may create inequities among students with differing first languages or cultural backgrounds (see Gerbic, 2010; Hall & Herrington, 2010). Similarly, gender differences may reveal important findings relative to using synchronous communication technology to assess students or provide feedback.

Future research

The preponderance of instructor social presence and teaching presence in the studies reviewed (see Borup et al., 2012; Borup et al., 2014; Clark et al., 2015; Draus et al., 2014; Goldingay & Land, 2014; Hoffman, 2019; Izmirli & Izmirli, 2019; J. Li et al., 2016; Martin et al., 2012; Thomas et al., 2019) suggests there may be a relationship between instructor uses of video communication technology and building community in online and blended courses. Video communication technology, and specifically the ability to see and hear others, can help establish and improve social presence in both asynchronous and synchronous uses of video though synchronous uses of video in online and blended courses is comparatively under researched. The combination of instructor teaching presence and social presence afforded by video communication technology, whether asynchronous or synchronous, exhibits the potential for cognitive presence. Video self-modeling in particular builds cognitive presence as students can reflect critically on their learning in self-directed ways (see Donkin et al., 2019; Shih, 2010; Stanley & Zhang, 2018).

Several theories guided the research reviewed, including the community of inquiry framework (Garrison et al., 2000), the cognitive theory of multimedia learning (Mayer, 2005), and the theory of transactional distance (Moore, 1983). Researchers should exhibit caution when ascribing student age as a potential limitation to either proficiency in course modality (see Bourdeau et al., 2018) or time management skills and attention spans (see Costley et al., 2017). Future research in asynchronous and synchronous video communication technology should expand upon established theories and develop new

theories. The theories used to research and interpret data should evolve with advancements of video communication technology.

In this review, researchers defined video recordings in various ways (e.g., talking head, picture-in-picture, voice-over, screencasts, lecture capture, stylus writing.). Some definitions describe the content that appears on-screen (e.g., talking head), whereas other definitions describe the action taking place (e.g., lecture capture). Ambiguous definitions create a challenge for synthesizing research. In attempts to reduce this ambiguity, some researchers have recently put forward broad categorizations of video recordings as board-centric or speaker-centric (Santos-Espino et al., 2016) and two-dimensional taxonomies as "human embodiment" and "instructional media" (Chorianopoulos, 2018, p. 297). Using categories and taxonomies to define video recordings is a step in the right direction though there are limitations to these approaches. Researchers should review the literature prior to defining new terms.

In addition, researchers should strive to provide rich descriptions of the visuals, images, people, and settings appearing on-screen as well as the overall nature of the video in the dissemination of empirical findings. The absence of such detail hinders a collective ability to advance knowledge of this medium (Lowenthal & Cavey, 2021). Screenshots of video interventions are recommended to help other researchers visualize the technologies used to provide contextual relevance.

Future research should move away from media comparison studies and move toward examining the characteristics of asynchronous and synchronous video communication technology and the affordances that influence learning. For example, exploring visual self-disclosure in video communication technology in terms of student agency, equity, or access relative to student motivation, gender, or cultural background could advance our understanding of this educational technology in new, undiscovered ways.

Implications for practice

Educators will likely continue to engage with synchronous and asynchronous video communication technologies in online and blended courses for years to come. Based on this review, we discuss three implications for consideration in practice: developing concise videos, appearing on-screen, and tempering multiple modes of communication.

Developing concise videos

The studies reviewed affirmed the need to chunk or segment video recordings into shorter clips, yet many instructors are familiar, and some even resistant, with this practice. Dinmore (2019) provided recommendations for instructors to consider prior to developing videos (e.g., writing scripts to create efficiencies). Instructional designers can assist faculty with acclimating to technologies (see Belt & Lowenthal, 2020) as well as deconstructing video content into specific learning activities. Similarly, Beale et al. (2014) and Green et al. (2018) described engaging in peer review prior to developing videos as one way to help faculty develop concision in this medium. Some researchers concluded that videos were not capable of being stand-alone learning activities (see Hajhashemi et al., 2016; Valenti et al., 2019) and therefore require additional efforts to find effective ways to use videos as part of a larger instructional strategy. However, emphasis and attention to

instructional design prior to recording videos may create stand-alone learning activities as instructor-created videos are primary sources of information for students in online and blended courses (see Lowenthal & Cavey, 2021).

Appearing on-screen

There is a substantive amount of research outside the scope of this review that focuses specifically on the presentation style of video lectures and what appears on-screen (e.g., voice-over, talking head) (Colliot & Jamet, 2018; Fiorella & Mayer, 2018; Kizilcec et al., 2015; Thomson et al., 2014; Wilson et al., 2018). The literature generally indicates video lectures that include an instructor appearing on-screen, either talking to the camera (i.e., talking head) or writing on a whiteboard (i.e., stylus writing), are as equally effective as face-to-face lectures and more effective and engaging than other video presentation types that do not include images of an instructor's face or hands (e.g., voice-over) (see Chen & Wu, 2015; Colliot & Jamet, 2018; Guo et al., 2014). Research suggests that students engaging in video communication technologies to view lectures may benefit from instructors appearing on-screen (e.g., the dynamic drawing or gaze guidance principles) (Mayer et al., 2020). Similarly, the literature suggests appearing on-screen in other asynchronous and synchronous uses of video communication technology (e.g., video feedback and video discussions) has a positive influence on student learning and helps build social and teaching presence in online and blended courses (Borup et al., 2012; Borup et al., 2014; Clark et al., 2015; Draus et al., 2014; Goldingay & Land, 2014; Hoffman, 2019; Izmirli & Izmirli, 2019; J. Li et al., 2016; Martin et al., 2012; Thomas et al., 2017).

Tempering multiple modes of communication

Synchronous video communication technology was shown to build social and teaching presence in traditionally asynchronous online courses (Clark et al., 2015; J. Li et al., 2016; Martin et al., 2012). However, interspersing synchronous video communication in traditionally asynchronous online courses is a unique blend in need of further investigation. This finding and other findings about students' perceptions of video feedback (e.g., Borup, et al., 2015) may be influenced by the nature of the blend, especially in studies of blended courses that include elements of face-to-face instruction (see Lowenthal, 2020). The inclusion of multiple modes of communication is often considered a benefit to student learning though mixing face-to-face, online, text, and video communication might actually be disruptive to student learning, especially in terms of social presence. For example, Suler (2004) posited people behave differently online than in face-to-face settings due to the online disinhibition effect. Still, Smith and Smith (2014) provided a contrasting account of silent behaviors among online learners. Students communicating online may be in a constant state of flux relative to status assessment, norm development, and role differentiation (see Slagter van Tryon & Bishop, 2009), and students' preferred communication styles may differ online (Szeto, 2014). In other words, multiple modes of communication may create challenges for students to develop their identities and establish behaviors consistent with their preferences (Szeto, 2014) or their perceived sense of self (i.e., student social presence) in online or blended courses. Online students might be communicative or uncommunicative while

engaging with video communication technologies, which could subsequently influence their learning experience. Among others, Cundell and Sheepy (2018) noted that technology is not inherently effective or engaging; rather the design is a more appropriate measure to examine. Researchers and practitioners should consider the design of video interventions in online and blended courses relative to the intended interaction, curriculum, and blend.

Limitations of the study

This study was limited by the search parameters and inclusion criteria used to select studies for this review. Specifically, studies selected from blended courses are subject to the bias and interpretation of the researchers conducting the review. Studies that were excluded from this review may provide additional support by confirming or disputing implications from the resulting analysis. A scoping review that includes all relevant and related work on video use in online and blended courses may inform future studies more explicitly by eliminating overlap in research efforts. Further, although this study selected empirical research studies in very specific settings, a large majority of the research reports ungeneralizable findings relying heavily on self-reported survey data, which could perpetuate bias.

Conclusion

Researchers have explored video communication technology in several different ways in online and blended courses. A qualitative synthesis of the studies reviewed resulted in four themes: delivering video lectures, fostering video discussions, offering video assessments and video feedback, and creating video check-ins. In all the uses examined, instructor social presence and teaching presence were identified as essential components to the success of any video intervention. Both asynchronous and synchronous video communication technologies afford social presence to build, especially, instructor social presence (Richardson & Lowenthal, 2017). Students learning in online and blended courses benefit from visually seeing their instructors on-screen. However, synchronous video communication technology needs further investigation. Video feedback interventions (i.e., video self-modeling) are worthy of further empirical investigation in online courses as the potential for these interventions to encourage self-directed learning aligns with the autonomy required when learning online, especially in disciplines where kinesthetic learning is essential and often difficult to achieve in online settings. Synchronous use cases of video self-modeling may also provide students with real-time feedback from instructors or peers and, if recorded, students could engage in a critical reflection of their performance after live sessions.

Questions remain as to how "produced" a video recording needs to be to sustain student interest and attention. However, educators should exhibit caution when attempting to entertain versus educate in this medium (Mayer et al., 2020). There are significant technological hurdles to overcome to produce high-quality videos that may be an unnecessary investment. Similarly, videoconferencing lectures should be organized to serve an educational purpose beyond meeting (Finkelstein, 2006). Educators may benefit from reducing synchronous videoconference meetings by engaging in asynchronous learning activities in advance of synchronous sessions. Although synchronous video

lectures are possible, there may be ways to outline talking points for exploration outside of live meetings.

Students new to online learning may find the reliance on self-directed study a difficult transition. Instructors can support students with periodic videoconference discussions or video check-ins as these have been shown to build social and teaching presence. Similarly, since students are gaining more exposure to asynchronous and synchronous video communication technology in online and blended courses, video assessments might help provide a media-rich activity that supports learning course content as well as learning technology, which could have added benefits to students' professional lives. In all uses of video in online and blended courses, students' ability to perceive their instructors on-screen as real people (i.e., instructor teaching presence) is paramount to the overall success of the intervention (i.e., positive perceptions, viewership, engagement, attitudes, and performance). Video use will continue to grow in the educational landscape for years to come. Reflecting on what has been studied and using this as a foundation for future research will help guide researchers and practitioners forward with this pervasive educational technology.

Disclosure statement

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Data sharing is not applicable to this article as no new data were generated or analyzed in this study.

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