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Learning via Video in Higher Education: An Exploration of Instructor and Student Perceptions

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Abstract
The purpose of this study was to compare instructors and students perceptions regarding the use of video during instruction.Background Research exploring student opinions regarding their *perceived* gains in learning may identify learning behaviors that could be exploited by those providing instruction to increase student learning. The intention is to provide instructional designers and college professors with valuable information regarding the use of video for presenting knowledge, explaining cognitive processes, or demonstrating psychomotor skills in a higher education setting. This study used a survey design to explore perceptional differences between professors and students regarding the use and/or effectiveness of video instruction. Results supported multimedia video as a viable teaching resource to communicate course content. This study provided the impetus for further research into actual (versus self-reported) student review of video material and any positive effects on student learning outcomes based on their perceptions of the use of multimedia video presentations.

Keywords
video instruction, supplemental learning, instructional design

Learning is the transference of sensed, perceived and attended data into long-term memory (Mayer, 2009). The use of multimedia video presentations provides instructors with an opportunity to further enhance their students' transfer of knowledge by presenting information through additional mediums. Video instruction has widely been used as supplemental instruction to expand students' understanding of content (Buzzetto-More 2014) to promote observational learning (Clifton & Mann 2011; Duncan, Yarwood-Ross & Haigh 2013) and to provide additional context (Hansch et al. 2015).

Since the goal of educators and instructional designers is to maximise the process of learning, consideration for students' perceptions and ultimate attention to presented material is relevant. The purpose of this study was to examine the extent to which video instruction is used within undergraduate courses. Specifically, it addressed instructors' decisions when implementing video within their curriculum, investigated students' attitudes regarding video instruction, and identified the media devices used to view the instruction.

Use of video instruction

Video presentations can be divided into two categories: those created to deliver information for the learner to passively receive and add to their information (collective facts and comprehension of ideas) and those designed as distinct problem-solving or sequential-step "how-to" explanations. During his research into the efficiency of creating video instruction for university students, Copley (2007) found that the overwhelming majority of video instruction was created for passive, receptive viewing of lecture slides (PowerPoint). Kay (2012) similarly found that from 2002 through 2011 the majority of videos presented as part of collegiate instruction were constructed for passive, receptive viewing and contained PowerPoint slides or other still-form notations from lectures. Observational learning – learning that occurs through observing the behavior of others (also known as vicarious learning, social learning and modeling) – is fundamental to how people learn, and is a potent factor for improving retention of information in long-term memory (Bandura & McClelland 1977). Armantier (2004), in exploring the difference between experiential learning and observational learning of *cognitive* tasks, found that each of these methods of learning were viable and produced similar student outcomes. Collegiate training programs in medical education rely heavily on observational-learning videos (McKinney & Page 2009; Missildine et al. 2013). Perhaps the key factor in the use of video technology for observational learning is that it offers educators the ability to produce a scenario that depicts the flawless performance of a task, which can then be observed repeatedly (Chan 2010; Marshall & Cullen 2003).

Instructors also determine the presentation style of videos they use as learning tools. Kay (2012) assigned four distinct styles: lecture-based, enhanced, supplementary and worked examples. Lecture-based videos are also described as *replacement* or *substitutional* videos, as they are simply recordings of an instructor's entire lecture. A common use for the lecture-based style is to provide access to the lecture for students who could not attend the face-to-face presentation (Heilesen, 2010). As its name implies, enhanced video provides information to the students with additional explanation. In its simplest form, an enhanced video might be the instructor providing narrative (descriptions, discussion points, additional information) voiceover to a PowerPoint presentation (Holbrook & Dupont 2011).

Supplementary videos, which are intended to complement the core learning objectives, might include capture of a live demonstration (e.g. a lab experiment), summaries of class assignments (e.g. articles, textbook chapters) or additional information meant to deepen students'

understanding of the material (Buzzetto-More 2014; Jarvis & Dickie 2010; McGarr 2009). Problem-solving videos depicting worked examples provide explanations that students may need to reach a solution; these are often used in mathematics or science (Crippen & Earl 2007; R. Kay & Kletskin 2012).

Effectiveness of video with learning

Although the use of video is an effective instructional strategy with regards to the cognitive domain (e.g. presentation of information) (Schare et al. 1991; Schwan & Riempp 2004), few studies focus on the use of video to present cognitive *tasks*. Höffler and Leutner (2007) performed a meta-analysis of 26 studies of instruction employing video training for 76 specific applications across three types of student knowledge: declarative information, psychomotor-skill acquisition, and problem-solving. Although 45 of the 76 applications depicted problem-solving concepts, none depicted cognitive decisions. Researchers have examined the use of video in higher education for training declarative information (knowledge) (Fernandez, Simo, & Sallan 2009; McGarr 2009; McKinney & Page 2009) and psychomotor tasks (Kelly, Lyng, McGrath & Cannon 2009; Moore & Smith 2012), but very few have examined the depiction of cognitive tasks.

Liaw, Huang and Chen (2007) believe that both student and instructor attitudes regarding the use of multimedia as an educational tool are factors for effective learning. They developed a series of similar hypothesis for students and instructors regarding their attitudes about the use of multimedia as an educational tool, and implemented a questionnaire after a six-week educational session that collected self-reported demographical information, acquisition of technology skills and attitudes towards e-learning (including video instruction). The study comprised 30 instructors and 168 undergraduate students. In addition to finding a positive correlation between indicated ability to use multimedia, enjoyment of its use and its effectiveness as a learning tool, they concluded that e-learning (specifically in video form) is effective when it allows for autonomous learning, uses vivid multimedia instruction and enhances teacher-learner communication.

Student perceptions regarding video

Students' preconceptions and preferences regarding the medium used for instructional presentation affect their performance (Brecht 2012; Cennamo 1993; Fee & Budde-Sung 2014; Krendl 1986; Salomon & Leigh 1984). Given this influential factor, the current researcher considers student perception regarding the use of video instruction a viable consideration for instructional designers and instructors at higher-education institutions.

Researchers quickly began to explore the new technologies and implemented studies regarding educational effectiveness and efficiency, as well as student attitudes. Buchanan, MacFarlane and Ludwiniak (2011) researched student preference and use of online instructional video and found evidence from 22 undergraduate computer science students that video instruction should support, rather than replace, lectures, and that lecture-based videos should be provided with narrative and should match presentations given face-to-face. The students in this research were given the option of having face-to-face training sessions, viewing an online enhanced video, or being provided with the lecture material in PDF form. After undertaking a series of training modules, the students completed a knowledge check, and were provided the opportunity to complete a survey regarding their opinions on the use and content of the videos.

Fee and Budde-Sung (2014) provided questionnaires and interviewed 236 undergraduates, representing more than 10 countries, 49% of whom used English as a second language, after the

students had been in a cross-cultural management course that routinely included videos showing examples of a discussion point. Additionally, a final project required students to view an 80-minute film and analyse selected topics demonstrated within the video. The questions focused on participants' opinions on the effectiveness of the video instruction and how it could be increased. The researchers found that non-English-speaking students were almost unanimous in their opinion that video instruction increased understanding of the topics. The researchers compared their findings with Mayer's multimedia principles (Mayer 2009) to develop a heuristic for use of video instruction, particularly in a cross-cultural environment.

Kelly et al. (2009), working exclusively with undergraduate nursing students, developed a study to compare learning outcomes between traditional face-to-face lectures and enhanced video lectures, and to ascertain student opinion regarding the use of the enhanced videos. Through 134 questionnaires (that had both Likert-scale responses and open-ended questions) provided at the end of the semester, the researchers found that the majority of nursing students reported enjoying video instruction – especially being able to repeat viewing clinical interactions – but indicated that the videos should complement, not replace, the face-to-face demonstration or lecture.

Kemp, Myers, Campbell and Pratt (2010) surveyed 50 undergraduate nursing students who had been provided access to podcasts of the lectures throughout the semester and who were not penalised for not attending face-to-face sessions. The associated presentation materials, handouts and PowerPoint slides were also available to the students after initial delivery. The researchers were surprised to find that there was a slightly negative correlation between the number of podcast hours viewed and academic outcome, but there was no ability to determine if those students had attended the face-to-face sessions in addition to viewing the podcasts. Unsurprisingly, anecdotal evidence indicated that students overwhelmingly supported the use of podcasts, and perceived them as especially helpful when reviewing for exams.

Students in three separate studies designed to determine attitudes towards the use of video instruction overwhelmingly indicated that on-demand availability of video instruction was a positive advantage for learning (Moore & Smith 2012; Parson, Reddy, Wood & Senior 2009; Smith & Morris 2014). Moore and Smith (2012) researched the use of video presentations of both psychomotor-skill training and clinical-diagnosis techniques to undergraduate physical-therapy students and found that the majority liked the reproducibility of the videos. Additionally, the students indicated that the availability of viewing at their convenience was a large benefit, although they also indicated that one thing they missed from live lectures was the ability to ask questions as they came up and have immediate feedback. Moore and Smith evaluated their questionnaire responses and concluded that a potential solution for the feedback issue associated with viewing video instruction might be an online repository for questions (e.g. Twitter), but that more research would be necessary. Although their project included interactive diagnostic discussion, Moore and Smith (2012) also concluded that future studies should be developed that included a focus on cognitive skills separately from psychomotor skills and that compiled student attitudes regarding learning problem-solving skills from videos.

Purpose of study

There is limited literature that explores the rationale behind the selection of video for a curriculum, the desired educational impact and the students' responses to the video. With students so connected to information from the internet (and other students), instructors wishing to have successful and meaningful lectures must learn to combine their presentation style and content-

related activities (e.g. videos) in ways that appeal to their students. This study's findings will provide additional guidance to educators during the instructional-planning process. This study was guided by the following research questions:

1) How do instructors' opinions compare with students' opinions when choosing between streaming and downloadable video?
2) How do instructors' opinions compare with students' opinions regarding the effectiveness of specified video instruction delivery categories?
3) How do instructors' opinions compare to students' opinions regarding the use of video instruction in higher education?

Methods

Research design

This study used a qualitative design to explore perceptional differences between instructors and students regarding the use and or effectiveness of video instruction. Using a grounded-theory approach (Creswell, 2002), qualitative data, in the form of survey responses to Likert-scale statements and open-ended questions, was solicited from participants and evaluated to identify similarities and differences between student and instructor perceptions and the potential for further, more-specific, research. Grounded-theory research is characterised by two principles: the ongoing (constant) comparison of collected data and the theoretical sampling of groups to further clarify similarities and differences (Creswell, 2013). The relationship between higher-education students' perceived value of how a training medium best aids their learning and how those perceptions are regarded by instructors is abstract and includes multiple variables.

Setting and participants

The research study was conducted at a large mid-Atlantic university in the United States. Participants in the study were instructors and undergraduate students from courses within the university's Honors College curriculum. Instructors within the Honors College are selected for their commitment to their topic and ability to provide individualised instruction for honours students. The program has eligibility requirements and places an emphasis on a deeper comprehension of course material.

Students who took courses on campus or from a distance (e.g. live internet course attendance or satellite campus) were included in the study as long as they reported attending at least 75% of the scheduled classes. Students repeating a class or those who had dropped out were excluded from the study. Participant demographics are outlined in Table 1.

Table 1. Student demographic data (n = 35)

Measure and items	Frequency	Percentage
Gender		
Female	24	68.6
Male	11	31.4

Age		
18 to 20	25	71.4
21 to 24	6	17.1
25 to 29	--	
30 to 34	2	5.7
35 to 39	1	2.9
40 to 45	--	
45 to 49	1	2.9

Instruments and procedure

Questionnaires were administered to students and instructors upon approval from the university's human subjects committee. The questionnaires were divided into five sections. The first section gathered demographic information. The second section collected ranked responses for class-related actions (e.g. pacing, study time required). The third section collected information regarding the use of various delivery mechanisms. The fourth section had 26 ranked response items that dealt with perceptions regarding various types of video use within the curriculum. The last section addressed the use of various types of videos within the curriculum through eight open-ended questions intended to elicit unrestricted responses.

Results

Sixteen instructors and 37 students responded to the survey. Two students were disqualified from the survey for self-reported data of less than 25% class attendance. Also, as indicated in Table 2, many students either owned or had access to one or more technological means to access the internet and view multimedia video presentations whether from a streaming source or downloading for later viewing.

Table 2. Student responses to used and prioritised viewing devices (n=35)

Questionnaire items and answers	Percentage response		
	Males	Females	All
What device(s) did you use to watch videos associated with your class?			
Laptop	72.8	95.8	88.6
Smartphone (Android or iPhone)	63.6	66.7	65.7
Desktop (PC or Mac)	63.6	16.7	28.6
Tablet (Android, iPad, others)	27.3	33.3	31.4
Game console (PS4, Xbox)	--	--	--
Smart TV (or TV with smartbox such as Roku, Apple TV, others)	--	4.2	2.9
If you had to choose only one device to watch videos associated with your class, which device you would choose?			
Laptop	72.7	70.8	71.4
Smartphone (Android or iPhone)	18.2	4.2	8.6
Desktop (PC or Mac)	9.1	4.2	5.7
Tablet (Android, iPad, others)	--	16.7	11.4
Game console (PS4, Xbox)	--	--	--
Smart TV (or TV with smartbox such as Roku, Apple TV, others)	--	4.2	2.9

Note 1: Students: Males (n=11), Females (n=24)

Table 3 provides a comparison between the students' and instructors' responses.

Table 3. Comparison of responses between instructors and students regarding class interest, application, and expended study effort

Questionnaire items and selected responses	Percentage response	
	Student	Instructor
What level of interest do most students have regarding this course's topic?		
Little, if any	--	6.3
Low	8.6	12.5
Some	45.7	62.5
Extreme	45.7	18.8
Does this course have a practical application for students?		
Probably not - the course is more theoretical or introductory	20.0	--
Maybe - It depends on what I choose to do	14.3	12.5
Yes, some portions are relevant - but not all	34.3	12.5
Absolutely, almost all of the content is directly relevant to what is encountered in the work force	31.4	75.0
The average number of hours per week that students should be spending associated with this class?		
Less than 2 hours	17.1	6.3
2 to 4 hours	45.7	12.5
4 to 6 hours	25.7	50.0
6 to 8 hours	--	25.0
More than 8 hours	11.4	6.3

Table 4 provides consolidated test results comparing student and instructor responses to the Likert statements.

Table 4. Results of the Mann Whitney U test to compare the groups

Questionnaire item	Groups	n	Score median	Sum of ranks	U	z	*p* (2 tail)	sig (<.05)
(Q1) ...prefer to learn from a face-to-face lecture rather than from video.	All Instructors	16	3	307	171	2.59	.009	yes
	All Students	35	4	1019				
(Q2) Video instruction can be an effective replacement for face-to-face instruction for some classes.	All Instructors	16	2.5	380.5	244.5	.741	.458	no
	All Students	35	3	945.5				
(Q3) Videos make learning easier.	All Instructors	16	3	452	244	.771	.441	no
	All Students	35	3	874				
(Q4) A specially designed lecture – with slides, diagrams, and instructor narration – is the best use of video instruction.	All Instructors	16	2	2745	138.5	3.00	.003	yes
	All Students	35	3	1051.5				
(Q5) Supplemental videos – those that go beyond the lecture – are something I use to better understand a topic.	All Instructors	16	3	426	270	.204	.838	no
	All Students	35	3	900				
Q6) …learn via a variety of access platforms (i.e. phone, tablet, laptop, desktop).	All Instructors	16	3.5	356.5	220.5	1.40	.163	no
	All Students	35	4	969.5				
(Q7) Video instruction is good for reviewing topics before an exam.	All Instructors	16	3	373.5	237.5	.923	.356	no
	All Students	35	3	952.5				
(Q8) A physical task (e.g. how to setup a lab experiment) can be learned from a video.	All Instructors	16	3	441.5	254.5	.540	.589	no
	All Students	35	3	884.5				
(Q9) Cognitive tasks can be learned from a video.	All Instructors	16	3	350	214	1.42	.154	no
	All Students	35	3	976				
(Q10) Both physical tasks and cognitive tasks can equally be trained via video-based instruction.	All Instructors	16	2	360.5	224.5	1.19	.236	no
	All Students	35	2	965.5				
(Q11) I have previously learned how to do a physical task from a video (e.g. from YouTube, as part of a class, etc.).	All Instructors	16	3	387.5	251.5	.608	.543	no
	All Students	35	3	938.5				
(Q12) I have previously learned how to perform a cognitive task from a video (e.g. from YouTube, as part of a class, etc.).	All Instructors	16	3	357.5	221.5	1.29	.197	no
	All Students	35	3	968.5				
(Q13) Watching a video of someone performing a task in a video is equally as helpful as watching them perform the task in person	All Instructors	16	2.5	408.5	272.5	.149	.881	no

	All Students	35	2	917.5				
(Q14) Videos depicting various decision-making processes and actions associated with this topic would be a helpful tool for me.	All Instructors	16	3	388.5	252.5	.597	.551	no
	All Students	35	3	937.5				
(Q15) I will rewatch a helpful training video more than once to ensure I've learned the information in the video.	All Instructors	16	3	316	180	2.17	.029	yes
	All Students	35	4	1010				
(Q16) I download instructional videos for later viewing.	All Instructors	16	2	415.5	279.5	0	1	no
	All Students	35	2	910.5				
(Q17) Learning from videos is boring.	All Instructors	16	2	436.5	259.5	.442	.658	no
	All Students	35	2	889.5				
(Q18) Video-based instruction is appealing because I can learn in my own time, location and pace.	All Instructors	16	3	426.5	269.5	.220	.825	no
	All Students	35	3	899.5				
(Q19) I review the material more if it is provided via video.	All Instructors	16	2	324	188	1.98	.047	yes
	All Students	35	2	1002				
(Q20) Video-based learning is easy to provide.	All Instructors	16	2.5	313.5	177.5	2.23	.025	yes
	All Students	35	3	1012.5				
(Q21) Video-based learning is easy to use.	All Instructors	16	3	367.5	231.5	1.09	.275	no
	All Students	35	3	958.5				
(Q22) Video-based learning motivates me to study more.	All Instructors	16	2	312	176	2.27	.023	yes
	All Students	35	2	1014				
(Q23) Learning is reduced when I have no immediate interaction with the instructor.	All Instructors	16	3	408	272	.162	.871	no
	All Students	35	3	918				
(Q24) My education is lessened when I am not able to interact with other students while we are learning.	All Instructors	16	3	430.5	265.5	.303	.762	no
	All Students	35	3	895.5				
(Q25) Viewing a lecture that was captured on video is just as informational as if I had attended the lecture.	All Instructors	16	2	283.5	147.5	2.83	.005	yes
	All Students	35	3	1042.5				
(Q26) Being able to watch videos "on the go" using a portable device is helpful to my learning.	All Instructors	16	3	406	270	.202	.840	no
	All Students	35	3	920				
(Q27) I stream instructional video much more than I download it.	All Instructors	16	3	435	261	399	.690	no
	All Students	35	3	891				

Choice of video

With regard to the first research question, delivery preference for video presentations, 40% of instructors indicated they would choose to offer the information in a downloadable format (e.g. podcast) rather than streaming. One instructor who supported streaming over downloaded content voiced concerns that additional software might be needed to play downloaded content as opposed to streaming. All but one of the students surveyed indicated a preference for streaming. A summation of their open-ended responses revealed that this decision was driven by concerns about limited storage space on their devices and perceptions that limited bandwidth made streaming less problematic than downloading. A questionnaire item addressed a perception regarding students' preference for the "on the go" mobility of viewing, and responses indicated that 80% of both students and instructors agreed with this perception, with no significant difference between their responses.

Opinion regarding the effectiveness of specified video instructional delivery

To provide feedback for the second research question, respondents' opinions regarding the effectiveness of particular video instruction delivery categories – Kay's (2012) video categories of lecture replacement, lecture enhancement, supplemental information and problem-solving – were

queried using both Likert-scaled questions and open-ended questions. Table 5 presents the results of instructor and student responses to questions regarding the four types of multimedia videos.

Table 5. Comparison of responses between instructors and students regarding multimedia video type.

Questionnaire items and selected responses	Percentage response Student	Instructor
Which type of multimedia video would work within this class?		
Lecture replacement	37.1	25.0
Enhanced	74.3	68.8
Supplemental	37.1	68.8
Problem-solving	25.7	43.8
If you had to choose only one type of multimedia video for this class, which would you choose?		
Lecture replacement	17.1	--
Enhanced	40.0	25.0
Supplemental	25.7	31.3
Problem-solving	17.1	43.8

Note 1: Students n = 35. Instructors n = 16.
Note 2: Both groups were provided example definitions of each multimedia type within each question to avoid confusion from the terms.

Asked which of the four multimedia video categories students thought would be effective within their class (they could select all they thought would work), 74% indicated lecture enhancement, 37% indicated supplemental information, 37% indicated lecture replacement and 25% indicated problem-solving. Requested to prioritise the one category they thought was most effective, 40% of students selected enhanced video, with the remaining students almost equally divided amongst the other choices. Given the choice of listing which category of videos they thought would be effective within their classes, instructors indicated equally (69% for both types) that lecture enhancement or supplemental information would aid learners in their classes, and 44% indicated that problem-solving videos would work. Only 25% of instructors thought lecture-replacement videos would be effective. When asked to prioritise a single video category, instructors chose problem-solving (44%), supplemental information (31%) and lecture enhancement (25%). No instructors prioritised lecture-replacement videos. The breakdown of general responses regarding the four categories indicates that both instructors and students believe videos that enhance lectures to be an effective use of the medium. Students agreed with the statement with little variance of responses, whereas instructors had varied responses and did not, as a group, agree with the statement. The difference between both instructors and students selecting multimedia videos that enhance lectures as useful, yet instructors not indicating support for this being the "best" option, is specifically noted as a topic requiring further research.

Comparison of opinions regarding the use of video instruction

The third research question was purposefully broad in scope to allow for comparison of instructor and student responses across a variety of scaled items and the open-ended portion of the survey. Seven of the 26 Likert-scaled response items showed a statistically significant difference between instructor and student perceptions. Within this study both instructors and students were queried regarding their technical proficiency in navigating online locations and their ability to download or stream videos. Although both groups had members indicating novice status, none indicated an inability to perform these tasks. More specifically, with regard to the technological ability of presenting a video to students, no instructors indicated they could not perform this function. However, the scaled item inquiring about the ease of creating video instruction showed a

significant difference in responses. Students almost uniformly indicated a positive response, whereas instructors had some variance but predominantly responded negatively.

Another telling set of responses is more relevant to a misperception on the part of instructors. The first statement of the scaled items addressed the preference for face-to-face instruction as opposed to video instruction. Responses indicated a significant difference between the two groups' answers: the item produced a positive response from students but a negative response from instructors. This result matches the findings of previous research (Kelly et al. 2009; Parson et al. 2009). The two surveyed groups differed in their responses regarding the equivalence of viewing instruction "live" as opposed to from a video. Responses indicated that instructors did not overwhelmingly think students preferred face-to-face lectures. Students did agree that videos could be just as informational. Instructors' perception is that students would not rewatch videos. This is an intriguing response, as many instructors have the ability to see if students are actually accessing the material.

Students indicated that they would rewatch videos, and followed up with statements such as "You have a second chance to review the lecture for clarity or information you might have missed" as well as multiple variations of rewatching videos to aid in studying for exams. In this respect, Clark (1983) prescribed research into the affectation on students' learning behaviors. This is perhaps best captured in the scaled item regarding the motivational value of video-based learning, which indicated a significant difference between instructors' and students' responses. Instructors overwhelmingly disagreed with the statement, whereas student responses were mixed. Also, although instructors and students on average indicated that they did not review material more if a multimedia video presentation were available, student responses also included positive replies, and the comparison of the two groups' replies indicated a significant difference: students would choose to rewatch multimedia video presentations – for content review or as exam preparation – in deference to instructor beliefs.

Discussion

Although this study was not focused on types of devices, the data provoked the researcher's interest. By a wide margin, both female and male students indicated that laptops were the preferred device for viewing multimedia; however, men's secondary choice was smartphones, whereas women chose tablets. Although the distribution between the sexes regarding choice of devices was similar, there was a significant difference in that men indicated they would use a desktop computer: 64% as opposed to 16% of women. Combining the students' preference for portable devices over those in a fixed location and their affirmative response to preferring to watch multimedia "on the go", this researcher hypothesises that students perceive access to the internet – which includes any multimedia content associated with their courses – as universally available wherever they go. If this hypothesis is true, it would provide another explanation for students' overwhelming preference for streaming versus downloadable content.
Furthermore, if access to the internet is available at the vast majority of their study locations, this suggests that instructors' belief that material be available for download – to allow guaranteed unlimited access to the student – may not be a crucial consideration. Student perceptions that they will "always" have access to streaming multimedia video is effectively equivalent to "on-demand", which is advantageous for learning, as indicated in the literature review (Moore & Smith 2012; Parson et al. 2009; Smith & Morris 2014). The key take-away is that students did indicate a preference for portable devices and "on the go" viewing, which aligns directly with past research (El-Hussein & Cronje 2010; Singh 2010; Sun, Tsai, Finger, Chen & Yeh 2008) that

indicates portability as a positive impact to learning. Furthermore, the students' identified preference for "transient" learning – anywhere, anytime – is more evidence that validates the findings of Kennedy (2008) and Margaryan, Littlejohn and Vojt (2011), who assert the need for educators to acknowledge and use this student preference as a factor in designing curricula – especially multimedia inclusions – to improve learning outcomes.

As previously indicated, the population used for this study was instructors and undergraduates within the university's Honor's College who volunteered to participate. Since these students had shown a willingness to accept more challenges in their academic pursuits, the assumption was that they would also be more likely to participate in an educational survey. A similar consideration was afforded to participating instructors. As part of a population comparison, the groups were queried about their interest and academic effort in the specific class associated with the survey. Instructors believed that their course content had a higher amount of practical application and anticipated the need for more out-of-class hours spent studying than students indicated. However, both instructors and students indicated positive student interest in the course topics.

The inclusion of a prompting question for "never" answers regarding the use of the four types of multimedia video presentations created an interesting result. The assumption for the query was that instructors – whose careers include educating others – would answer from a mental model of "how *could* this type of multimedia be built/implemented" rather than "how do *you* implement this type of multimedia". The interest wasn't in the instructors' negative responses about lecture-replacement videos, since this coincided with other survey responses, but in the instructors' indicating that problem-solving multimedia videos wouldn't be effective, although previously within the survey instructors had indicated these types of videos as the most likely to be effective. In a relevant study, Liaw, Huang and Chen (2007) found that instructors and students who express a negative attitude regarding the use, type or application of multimedia video presentations will likely experience a negative impact on effective learning.

Limitations

The small number of participants may have affected the study's validity. Findings from this study cannot be generalised, since the majority of student participants were 18-20 years of age (94% of student respondents), which is reflective of most first-year university students, but is not completely representative of all students at this university. An identified limitation of this study is that the specific terminology of "video" may have influenced respondents to think only in terms of a mental model consisting of imagery portrayed by live actors (e.g. a movie or television program) and not encompassing a broader scope of other multimedia video imagery. In addition to the mental model associated with the term "video", another similar limitation that may have affected some respondents survey answers was the inability to differentiate between the four defined categories of multimedia video presentation.

In conjunction with the limitation of "video" terminology and inability to differentiate between the four described types of videos, participants may not have experienced a broad variety of effective multimedia presentations. Considering the limitations identified with the multimedia presentations, researchers believe the limitations can be addressed in future studies by the use of more examples – in both text and actual short video presentation segments.

Implications for instruction and future research

Instructors should acknowledge that students' perceptions regarding the use of multimedia videos for the presentation of course material are likely to have an impact on their actual learning. This study provided the impetus for further research into actual (versus self-reported) student reviews of video material and any positive effects on student learning outcomes based on their perceptions of the use of multimedia video presentations.

University instructors should seek out professional development to learn how to use multimedia video technology and incorporate it into their classrooms. This study indicates that students recommend that instructors use it, and feel it enhances their learning. Also, the (American) National Education Association endorses this recommendation in its position statement on technology and education (National Education Association, 2016). Instructors who seek out professional development to learn how to use multimedia video and how best to incorporate it into their classrooms will be able to develop (or update existing) course material, lectures and teaching strategies that are more appropriate for students who are themselves highly proficient in using multimedia.

The last recommendation derived from this study is that instructors should include more multimedia video presentations within their curriculum. Students' perceptions indicated that relevant multimedia videos would aid their learning. Specific comments included: "…I learn better with videos" and "They helped me revisit the material, view it from a new angle, or provided a foundation from which I could write or understand a topic". Thus, including more multimedia videos that emphasise key knowledge content, provide guided practice or demonstrate best practices may have a positive impact on what students actually learn, as demonstrated by a change in their behavior or performance on an examination.

Further research into student and instructor perceptions is required to develop a more detailed understanding, including why these perceptions exist, what the perceived effectiveness of each of Kay's (2012) types of presentations is within different courses and whether perceptions can be altered using examples of effective use of each type of multimedia presentation. One variable to be addressed is whether students' perceptions could be altered by a presentation. This variable could be addressed through a study that included pre- and post-delivery evaluations of students' perceptions regarding educational effectiveness of a specific type of multimedia presentation. If student perceptions were found to change, this would indicate that their original opinion was based on a lack of experience with a quality tool or perhaps an inherent bias regarding the type of presentation, rather than any difference in the quality of the presentations themselves.

Conclusion

This initial study showed that both instructors and students perceived multimedia video to be a viable teaching resource to communicate course content. Additionally, both groups agreed that numerous advantages validate the time and effort for the creation and provision of such resources. Additionally, this study (and future derivative studies) will provide insights and feedback from students regarding perceived increases to their learning that could influence instructor content provision. These student opinions, focused through the lens of study instruments, are unlikely to be captured in traditional after-course evaluations. The potential positive impact of the use of multimedia video on learner behavior is promising when managed by an involved instructor who is sufficiently skilled in its application. Students' perception that multimedia video presentations can enhance their learning aligns with Clark's (1983) assertion that this perception in itself may influence their learning.

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