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YouTube in the Classroom: Helpful Tips and Student Perceptions

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Abstract

The rise in popularity of YouTube has made the use of short video clips during college classroom instruction a common learning tool. However, questions still remain on how to best implement this learning tool as well as students' perceptions of its use. Blended Learning Theory and Information Processing Theory provide insights into successful integration of technology into the classroom. Literature on multimedia and discussions is also reviewed to shed light on their potential value as teaching techniques. As an example of successful integration, a method of presenting YouTube clips is described in a psychology course. Immediately after the videos, the class participated in structured discussions. Students' perceptions of the YouTube videos were positive; however, students perceived certain videos as more helpful than others. In addition, class quiz scores are reflected on as indices of learning.

Keywords: YouTube, blended learning theory, multimedia, discussions, psychology.

The use of multimedia in the classroom is not a new phenomenon. However, the type of media used and how it is used is changing with technological innovations. Educators have employed various forms of multimedia in the classroom for decades, dating back as early as the 1920's (Snelson & Perkins, 2009). In the 1950's, teachers used technology such as 16mm projectors; the 1980's and 1990's gave birth to VHS and DVD's to provide visual aids and increase student engagement (Berk, 2008, 2009; Kaplan & Haenlein, 2010). The 21st century has been marked by revolutionary growth in use of technology, including cell phones, tablets, and laptop computers (Greenhow, Robelia, & Hughes, 2009; Jones & Healing, 2010; Jones, Ramanau, Cross, & Healing, 2010). Media content is now accessed via the Internet and through Web 2.0 technologies where users interact and collaborate to create content (Harris & Rea, 2010). Such social media sites allow people to share and generate information with the rest of the world. The website "YouTube" is one source of social media that has grown in popularity over the past five

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years, including its use in the classroom as an educational tool (Fleck et al., 2013; Shere & Shea, 2011).

YouTube was launched in 2005 as a place where individuals could record and share their own videos without cost (Terantino, 2011; YouTube, 2013). The website is now owned by Google and is viewed daily by millions of individuals across the world. Although much of the content on YouTube is for entertainment purposes, there exists an enormity of educational content. For example, YouTube EDU was created in 2009 as an educational hub for lectures, courses, and examples and is used by professionals and non-professionals in a variety of fields. Evidence suggests that YouTube as an educational tool has extended to the medical field (Clifton & Mann, 2011; King, Greidanus, Carbonaro, Drummond, & Patterson, 2009), within the field of language learning (Terantino, 2011), in educator training (Hudock & Warden, 2001; Sun, 2014), and to promote cross-cultural understanding (Bloom & Johnston, 2010). With such broad applicability, YouTube is a source of media that is an integral part of the education system.

The ease of using YouTube has contributed to its popularity. Reports suggest that there are over 10 to 20 hours of video footage posted to YouTube every minute (Kaplan & Haenlein, 2010; Snelson & Perkins, 2009). This continuous and massive contribution to the website provides an endless source of information that has the potential to be used for educational purposes. Kaplan and Haenlein (2010) report that 51% of YouTube users connect with the website on a weekly basis and 52% of individuals who are 18-34 years-old post videos to YouTube frequently. This age range includes traditional college-aged students who have been identified as "digital natives" or the "net generation" and describes people reared in a world saturated with technology (Davis, Deil-Amen, Aguilar, & Canche, 2012; Roodt & Peier, 2013). Terentino (2011) reports that 93% of teenagers are considered digital natives, and that 73% of those teens are active users of YouTube. However, YouTube has also been used to bridge the gap between digital natives and non-traditional students (Cooper, Walker, Marks, & McNair, 2001).

While the use of YouTube in higher education is not new, its prevalence as an educational tool begets attention in regards to best practices and student outcomes. Although much research has approached the topic, it has been done anecdotally and often lacks educational theoretical foundations. The current study provides a literature review that focuses on the usefulness of YouTube media as a form of lecture support and conversation starter in the classroom. The general benefits of media in the classroom and the benefits of classroom discussions are considered and supported by Blended Learning Theory as well as Information Processing Theory. These theoretical foundations clearly demonstrate the intentional integration of YouTube creating positive student outcomes working to advance the current literature. In the developmental educational psychology course under investigation, YouTube videos, coupled with discussion questions, were implemented and assessed. The combination of videos and discussion is a unique and new paradigm to be studied. Student preference data provides helpful tips for use of YouTube in educational settings. In addition, class quiz scores are reflected on as indices of learning.

Multimedia in the Classroom

Faculty continue to increase their use of multimedia in the classroom due to the many potential learning benefits it provides (Berk, 2008, 2009; Hudock & Warden, 2001; Lee & Lehto, 2013; Wingard, 2004). Berk (2009) presented several examples of ways that media helps students to interact with the course material. For example, using a video may help to draw attention to a specific concept and work to maintain students' attention on that concept throughout the duration of the video. Other benefits to using media in the classroom include the ease in availability of diverse materials, vividness of procedural instruction, and relevance to the target population (Hudock & Warden, 2001; Lee & Lehto, 2013). Other researchers suggest that video content specifically from Web 2.0 technology increases student engagement (Roodt & Peier, 2013; Sherer & Shea, 2011). However, faculty should be critical of the videos selected in order to ensure their relevance and learning potential (Al-Jarf, 2012; Cooper et al., 2011; Fat, Doja, Barrowman, & Sell, 2011).

Blended Learning Theory. With the popularity of Web 2.0 technologies, instructors need to be deliberate and intentional in their use of multimedia in the classroom. Garrison and Kanuka (2004) define blended learning as, "thoughtful integration of classroom face-to-face learning experiences with online learning experiences" (p.96). The use of YouTube in the classroom ought to fall under this definition; however, it is of special importance to note the intention behind the blending of technology with face-to-face instruction. The two should complement one another in a well-balanced combination that is uniform and harmonious mixture (Hussey, Fleck, & Richmond, 2013; Osguthorpe & Graham, 2003). Adding videos to a course in a haphazard way will not have the positive effects on learning that a truly Blended Learning Theory class will have.

Attention and memory. There are numerous ways in which faculty can present information. In choosing such methods and materials, it is important for faculty to consider the ways in which students learn in order for their teaching to have the greatest impact. Mayer (2010) described the process of learning and creating memories according to the Information Processing Theory. To create a memory, individuals are exposed to information via sensory input that is either visual (icon) or audio (echo). These initial pieces of information are only held in the sensory memory for a brief moment, unless the individual focuses attention to the stimulus and the object of interest is moved into the working memory. The working memory has a limited capacity, holding only pieces of information at a given time. If the individual maintains attention, the theory dictates that working memory will encode the information for storage in long-term memory. The long-term memory is an unlimited storage space in which one must recall or recognize information to bring it back into working memory for conscious awareness (Deffenbacher & Brown, 1973; Mayer, 2010; Ravizza & Hazeltine, 2013).

The key component to information processing, as it relates to multimedia, is the working memory. Using media pictures and videos engages the student longer in the material to increase the attention spent on the information (Hudock & Warden, 2001; Mayer, 2010). As a result, the information has a greater chance of reaching the long-term memory cen-

ter and the individual has a greater span of memory cues to increase retrieval ability. Paivio's dual coding hypothesis suggests that when simultaneous verbal and pictorial representations are encoded in memory (the icon and echo), redundant retrieval routes are provided to the same information, thus heightening the chances of retrieval (Paivio, 1970; Paivio & Clark, 1986). Mayer (2010) posited that the use of multimedia tools in the medical field influenced an increase of attention paid to target information, subsequently increasing retention. This provided a helpful tool for medical students who were required to retain large amounts of information. In this way, multimedia can further increase a student's memory for information presented in the video.

Skill development and application. As learners expand their knowledge, they are able to have a broader base from which to draw from when making decisions and applying new concepts. Multimedia provides an opportunity to expand the understanding in a topic area by providing greater diversity in context (Hudock & Warden, 2001). Educators provide evidence that media tools help students transfer material from the educational setting to the real world (McLoughlin & Luca, 2002; Terantino, 2011). For example, students in a family-counseling course were exposed to fictitious videos portraying counseling techniques in a variety of contexts. These exposures increased the students' understanding of counseling skills and enabled them to transfer the skills into a variety of real settings (Hudock & Warden, 2001). Others have employed YouTube to provide procedural instruction for various tasks in technology, such as fixing a printer (Lee & Lehto, 2013). The use of YouTube is also popular in health fields such as nursing to further explain topics related to childbirth, mental health, pediatrics and leadership (Clifton & Mann, 2011; Mayer, 2010). Its use is especially helpful for topics that students might not have a chance to encounter in everyday occurrences like complicated birth (Cooper et al., 2011). Such videos are used as a learning tool for transmitting content knowledge as well as to increase class discussions and debates. YouTube videos are also useful in speeding time up (e.g. watching an organism grow) or slowing time down (e.g. examining the trajectory of a bullet); learning about remote locations or unsafe events (e.g., forest fires); as well as bringing expert lecturers to the classroom (Snelson & Perkins, 2009). Cooper and colleagues (2011) further note that the use of YouTube videos have the potential to increase skill building for a variety of learners, including Millennial students, who expect technology in the classroom. Although the Baby Boomer generation might not experience technology in the same way, they can still benefit from multiple modes of instructional delivery (Cooper et al., 2011).

Diversity and learning needs. Textbooks and teaching materials can lack the diversity that is present in the student population and/or the society in which our students will interact. This places the onus on faculty to include diverse perspectives in the classroom (Hussey, Fleck, & Warner, 2010). YouTube can help in this endeavor. For example, YouTube can be helpful in engaging students in language learning. Terantino (2011) postulates that videos available on YouTube often provide a cultural context relevant to the language being taught. Additionally, the videos provide alternative perspectives and explanations that support a variety of learning needs. Terantino (2011) does not limit the use of YouTube as an aid for any single language; rather the use of the videos is encouraged to support learning of any language. In a related topic, students who speak English

as a second language can benefit from YouTube clips as supplemental material in the classroom (Al-Jarf, 2012). This includes videos in which the content is covered in their native language and/or supplemental videos in English. Also, in areas where certain types of diversity might be lacking, videos can be used to introduce different social groups, perspectives, allow students to participate in cross-cultural exchanges, and so on (Bloom & Johnston, 2010; Glimps & Ford, 2008).

Availability of material. Educators have access to a plethora of material using YouTube as an instructional tool with Internet access and adequate search criteria. For example, the Blinkx video search website estimates almost 7 million hours of online videos exist (http://www.blinkx.com). Fat, Doja, Barrowman, and Sell (2011) found over 6,000 available videos that met their criteria for instructional videos. However, not all of these videos are effective instructional tools. They piloted 100 YouTube videos and found roughly half to be rated as poor examples. Educators can search these videos or narrow their search to education hubs (e.g. www.youtube.com/edu) or channels (e.g. Khan Academy: http://www.youtube.com/user/khanacademy). Snelson and Perkins (2009) also listed a sample of YouTube channels containing educational content in areas such as art, politics, math, science, history, education, and foreign language. In addition, Snelson's (2011) review of the literature shows that faculty from numerous disciplines, including agriculture, business and marketing, media studies, and forensics employed YouTube in the classroom.

In each case described, the researcher reinforced the importance of engagement in the material and visual cues that were provided through the use of media in the classroom and in many other educational contexts. Additionally, the information available on Internet sites such as YouTube provides a diverse base for students to learn from, is culturally relevant, and is easily accessed. Thus, media as a support tool provides greater opportunities for learning as students remain engaged and have a greater diversity in explanations.

Peer Discussions and Multimedia in the Classroom

Similar to multimedia in the classroom, peer learning has a history of being an integral part of the learning environment (Topping, 2005). Developmental, cognitive, and educational theories have recognized the importance of interaction amongst peers within a classroom setting. For example, Piaget (1928) noted that individual reasoning is promoted by social interactions; and Vygotsky (1978, 1986) considered learning to be a socially mediated process best facilitated by verbal conversational exchange to create and enhance meaning. Classroom discussions transform student engagement from being passive to active within the learning environment (Goldenberg, 1993; Sandora, Beck, & Mckeown, 1999; Dole & Sinatra, 1998). This in turn increases such things as students' attention, engagement, and content knowledge (Prince, 2004). In the present study, YouTube videos were intentionally paired with a discussion question and discussed in small groups. The literature suggests that these types of discussions can increase learning (Boud, Cohen, & Sampson, 1999; Smith et al., 2009; Topping, 2005; Murphy, Wilkinson, Soter, Hennessey, & Alexander, 2009).

Increased comprehension. A recent meta-analysis examined the role of classroom discussion on content comprehension (Murphy et al., 2009). A total of 39 empirical studies were reviewed that related to discussion practices in the classroom and the effect on overall comprehension. Results indicated that regardless of the discussion technique, classroom discussions were effective in increasing comprehension of text-related material. When teachers became facilitators of conversation, discussions converted from being teacher-led to student-driven. This collaborative reasoning amongst peers was shown to be the most effective at increasing comprehension (Murphy et al., 2009). Group discussion offers students the opportunity to share content knowledge as teachers and learners, thereby increasing collaboration, critical thinking, and metacognitive skills (Boud, et al., 1999; Topping, 2005). Even when no one in the group knows "the answer", group discussions have shown to be effective in aiding students to come to correct conclusions (Smith et al., 2009). In addition, peer discussions combined with lecturing help stronger students stay engaged in the material, resulting in greater learning gains (Smith, Wood, Krauter, & Knight, 2011).

Increased discussions. Classroom discussions are generally common practice in nearly all disciplines, including science, history, literature, and economics. Discussions require students to engage in active conversations, providing gains in theoretical skills and conceptual knowledge (Gross, 1990; McCloskey, 1998; Nelson, Megills, & McCloskey, 1987; Simons, 1989;). Research demonstrates that students value peer discussions, as it promotes reflection and critical thinking and allows individuals to engage in perspective taking, with the result being a more active learning environment (Prince, 2004; Roehling, Vander Kooi, Dykema, Quisenberry, & Vandlen, 2010). Classroom discussion in small groups of peers gives students the opportunity to build relationships, hear other people's perspectives, and voice their own opinions (Henning, 2005; Prince, 2004). Furthermore, by allowing students to talk to each other, it "primes the pump" for a more positive atmosphere for whole class discussions and increases the quality of conversations (Hyman & Whitford, 1990). Whole class discussions allow teachers to engage students by reframing, broadening, and synthesizing student responses, in addition to asking higher-level questions (Henning, 2005).

Discussions of multimedia. McLoughlin and Luca (2002) emphasize a combination of methodologies including project-based learning, collaborative learning, and extensive exposure to media combined to enhance the learning experience. However, it depends on what is shown and to whom (Snelson & Perkins, 2009). Although showing videos better connects to digital natives and bridges the gaps with non-traditional students, faculty should ensure the relevancy and learning potential of videos (Al-Jarf, 2012; Cooper et al., 2011; Fat et al., 2011). In addition, active learning techniques should be employed with multimedia use, versus simply showing a video. Researchers note the importance of student discussions after watching videos to further develop students' understanding of the material covered (Al-Jarf, 2012).

The research reviewed suggests that when used in the right way, Web 2.0 technologies (such as YouTube) have the potential to be a valuable asset in the classroom (Davis et al., 2012; Fleck et al., 2013). Blended Learning Theory recommends the need for technology

use to be deliberate and integrated into the course harmoniously (Osguthorpe & Graham, 2003). In the current classroom based study, class meetings began with the presentation of a short YouTube video. Immediately after the video, the class participated in a structured discussion answering a question that pertained to the course content and the video. It is the combination of the media and discussion that is unique to this study and combined, has not been the topic of investigation in previous research, especially based on theoretical frameworks. Student's opinions were assessed at both the start and end of the semester. It was hypothesized that college students would view the YouTube paradigm positively as a learning tool in the classroom. In addition, it was expected that the use of YouTube and discussions would contribute to an increase in students' understanding of course content.

Method

Participants

Eighty-five psychology students (19 males and 66 females) from a large, urban, commuter university participated in this study. On average, the students were 23.91 years of age (*SD* = 5.57); with an age range of 17-46 years. The majority of participants were Caucasian (70.6%), followed by African American (9.6%), Hispanic (9.4%), Multi-racial (4.7%), Asian/Pacific Islander (2.4%), Latino (2.4%), and (1.7%) chose "not to say". All participants were enrolled in various sections of a Developmental Education Psychology course that was taught using a hybrid format (50% online and 50% face-to-face). The semester ran for 16 weeks total, each class met one time per week for one-hour and 15 minutes. All sections were taught in the same way by the same professor. A total of 18 students reported they had taken a hybrid course in the past, while 67 students had not. Developmental Educational Psychology is an introductory level course most often taken by students entering the Human Development Major. The content bridges developmental psychology with educational applications. For participating in this study, students received 10 class points (out of 1,000 total). They were offered a brief reflective writing assignment as an alternative way to earn the points that was completed during the survey time if they opted not to participate.

Materials

Classroom materials. Each class period began with a short YouTube video relevant to the chapter read in the textbook that week. The videos ranged in length from 58 seconds to 6-minutes 46 seconds in time with most being between 2 and 3 minutes (*M*=2.78, *SD*=1.78). Table 1 presents a complete list of YouTube videos used during class including their title (for searching purposes), the related chapter of the text (McDevitt & Ormrod, 2012), and a list of the relevant concept and keywords associated with the video. In addition, the table includes the discussion question that was posed to the students after viewing the video. The teaching assistant selected several videos that were then viewed and considered for each topic by the instructor. The instructor chose the video that was the most appropriate, educational, and best demonstrated or related to the particular topic. After a video was selected, the instructor and teaching assistant wrote the related discussion question.

Table 1. YouTube Video Information.

YouTube Video	Textbook Chapter	Video Duration	Discussion Question
Alison Gopnik, What do babies think? (TEDtalk)	Ch 1: Making a Difference in the Lives of Children and Adolescents	18:30*	Why might it be important/useful for adults to think like children?
Correlation vs. Causality: Freakonomics Movie	Ch 2: Using Research to Understand Children and Adolescents	1:29	What factors do we need to consider when interpreting data from our research?
The Secrets of Einstein's Brain	Ch 5: Physical Development	6:46	What differences might you expect between Einstein's brain and your own? What are glial cells and how to they contribute to learning?
Piaget: Conservation	Ch 6: Cognitive Development: Piaget and Vygotsky	3:11	What stage of development are these girls in? How do you know?
Vygotsky: Roxanne – Private Speech	Ch 6: Cognitive Development: Piaget and Vygotsky	1:36	Discuss how this child's behavior is relevant to Vygotsky's theory. Be specific in your answer by choosing at least one aspect of Vygotsky's theory and apply it to Roxanne.
Selective Attention Test	Ch 7: Cognitive Development: Cognitive Processes	1:22	From an information processing perspective why is attention crucial for learning?
Star Wars according to a three year old	Ch 8: Intelligence	1:30	How does this child demonstrate intelligence based on Sternberg's theory? Be specific in your answer.
Positive Reinforcement – The Big Bang Theory	Ch 9: Behaviorist Views of Learning	4:54	Think back over the teachers you have had who used reinforcement. Jot down at least one example you remember. Discuss if it is positive or negative reinforcement.
Talking Twin Babies – Babbling Babies	Ch 9: Language Development	2:09	Identify the different components of language that exist in this conversation.
Kid Gives Speech After Learning to Ride a Bike	Ch 13: Development of Motivation and Self-Regulation	0:58	Is this an example of intrinsic or extrinsic motivation? Why? What is one way you can promote intrinsic motivation?
A Simple Map of Typical 'Theory of Mind' Development	Ch 12: Development of Self and Social Understanding	4:47	How can we encourage social perspective taking in our classrooms?
Bloom's Taxonomy According to 'Pirates of the Caribbean'	Ch 13: Instructional Strategies	3:29	Now that you have seen Bloom's taxonomy applied to a movie, how might we utilize it in our classrooms? In other words, why is this an important theory when developing a lesson plan?

Note. Behaviorist Views of Learning and Instructional Strategies were chapters assigned from Ormrod (2008), Educational Psychology: Developing Learners 6th edition.
**This video was viewed from 14.51 minutes until the end for a total viewing time of 3.71 minutes.*

Study materials. At the beginning of the semester, students completed a survey requesting demographic data. Additionally, questions were asked concerning their prior experience with YouTube when used in the classroom, including "Have you ever used YouTube for academic purposes?" and "Do you find multimedia (such as YouTube videos) to be helpful for academic purposes?". Students were then provided with a list of 10 adjectives and were asked, "When your teachers use YouTube during class time, you find it to be: (circle all adjectives that apply)". The adjectives were derived from a previous research study conducted by Fleck and colleagues (2013) in which college students described their opinions when various social media applications, including YouTube, were integrated into the classroom. This question was intended to gain an understanding of students' feelings based on prior exposure to YouTube in the classroom or their expectations of what the experience might be like. At the end of the semester, the same series of questions were asked of the students as well as three questions that requested them to indicate their most favorite, least favorite, and most helpful YouTube video clip. Students were also asked two yes/no questions regarding whether they enjoyed the YouTube videos that were presented, and if the videos had been helpful for academic purposes.

To reflect on learning, questions were selected from normally occurring weekly quizzes. One question was identified for each chapter that corresponded with the YouTube video topic for each week. The quizzes were taken online, prior to coming to class, thus providing a pre-YouTube assessment of the students' understanding. The same questions were given on the mid-term and final exam providing a post-YouTube assessment. In accordance to Bloom's revised taxonomy, each question was considered a low-level knowledge or understanding based question. Many checked for understanding or requested near-transfer application (application of concepts heavily related or already discussed in the text) (Barnett & Ceci, 2002; Krathwohl, 2002).

Procedure

On the first day of the semester, students completed the pre-semester survey. During the rest of the semester, prior to coming to class, students completed the assigned textbook reading and took a weekly quiz online. At the beginning of each in-class meeting (once a week), students watched the YouTube video clip selected for that chapter. Following the video, students discussed the posed question with peer groups of approximately three students (A list of all the discussion questions can be found in Table 1). After the small group discussion, the class discussed the question together at large. Class then proceeded with lecture, hands-on activities, or other group projects. On the last day of the semester, students completed the post-semester survey, concluding the study.

Results

To understand students' experience with YouTube, questions from the pre and post-semester surveys were analyzed. At the start of the semester, 85 students responded to the survey questions. Fifty-four (63.5%) indicated that they had prior experience with YouTube for academic purposes whereas 31 (36.5%) did not. When asked if they find multimedia, such as YouTube, to be helpful for academic purposes, the majority (80%)

reported that they did. Post-semester surveys indicated a similar high frequency and positive pattern. When asked if the videos were helpful for academic purposes, 68 of the students said th-ey were (80.7%), whereas 7 indicated they were not (8.2%). In addition, at the end of the semester nearly all of the students (97.3%) reported that they enjoyed the YouTube experience overall in the classroom.

Data from the survey question that prompted students with 10 adjectives to describe their experiences with YouTube can be seen in Table 2. The frequencies presented indicate an increase in favorable responses to positive adjectives (e.g., fun and engaging) from pre to post-semester. Likewise, there is a decrease in responses to negative adjectives (e.g., annoying and waste of time). Wilcoxon signed-rank tests were utilized to statically examine pre-semester and post-semester responses. Answers were coded as 1 indicating no and 2 indicating yes, thus higher values represent more agreement to the question or adjective. One adjective was significantly different. Students reported YouTube to be more beneficial for learning (z = -3.41, p = .001) after the semester (M = 1.69, SD = .46) as compared to before (M = 1.47, SD = .50).

Table 2. Adjectives used to Describe YouTube.

Adjective	Pre-semester (n=85)		Post –semester (n=75)	
	F	*%*	*F*	*%*
Positive				
Fun	49	57.6	65	76.5
Helpful	49	57.6	62	72.9
Beneficial for learning*	40	47.1	52	61.2
Engaging	42	49.4	49	57.6
Entertaining	47	55.3	61	71.8
Negative				
Annoying	2	2.4	1	1.2
Distracting	49	57.6	7	8.2
Waste of time	2	2.4	1	1.2
A time to nap	2	2.4	1	1.2
Irrelevant to course material	2	2.4	1	1.2
Overall was YouTube:				
Enjoyable (yes responses)	--	--	73	85.9
Helpful for academics (yes responses)		--	68	80

Note. Mean differences statistically significant. * p = .001

To reflect on learning, a paired samples t-test was run comparing the total score correct for pre-YouTube questions and post-YouTube questions. The questions were on the topics related to the videos. Pre-quiz questions were taken as homework prior to coming to class. The same questions were then given as post-quiz items and were taken on the midterm or final exam. The test revealed a significant difference, $t(45) = -6.13$, $p<.001$, with students performing better on quiz questions after coming to class (see Figure 1).

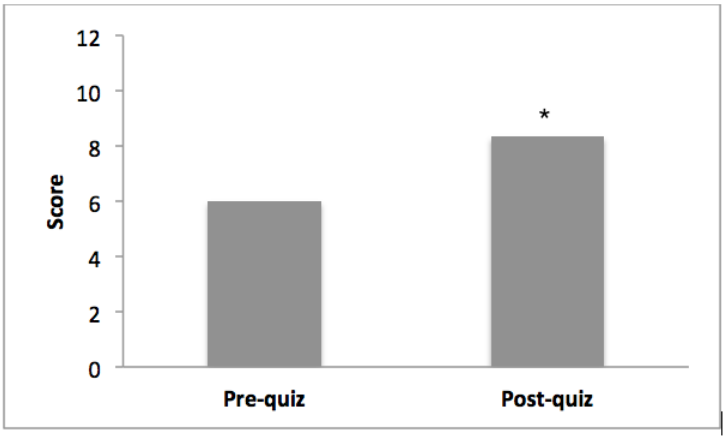

Figure 1. Mean difference values representing the score for pre and post-content knowledge quiz totals. *p < .001.

Finally, responses pertaining to students most favored and least favored videos were totaled. Percentages revealed that the "Babbling Babies" language development chapter was the most favorite (21% of students indicated so). Students found the "Big Bang" video to be the most helpful for understanding course content (15.3%). Although the "Pirates of the Caribbean" video was found to be helpful, students did not prefer it. It was found to have the highest percentage votes for least favorite (47.3%). See Table 3 for results, presented in rank order for videos chosen for each question.

Table 3. Student Perceptions of YouTube Videos in Descending Order.

Most Favored Video Rank Ordered	Most Helpful Video Rank Ordered	Least Favored Video Rank Ordered
1. Babbling Babies	1. Big Bang Theory	1. Pirates of the Caribbean
2. Big Bang Theory	2. Babbling Babies	2. Theory of Mind
3. Kid Gives Speech (Bike)	3. Kid Gives Speech (Bike)	3. Frekonomics

Discussion

Participants in this classroom-based study reported overall positive perceptions of using YouTube in the classroom for educational purposes. Many of the students in the pre-semester survey indicated that they had high expectations for the use of YouTube; the response of the post-semester survey indicated that these expectations were mostly met. Students associated their experience with adjectives such as fun, entertaining, beneficial for learning, and engaging. The comments associated with students' favorite videos (i.e., Babbling Babies and The Big Bang Theory) indicated that the students found the material to be funny and familiar. Indeed, these specific videos were not only class favorites, but they were able to demonstrate theoretical concepts by engaging students with familiar pop culture. Connection to student culture has been recognized to be important in modern day classrooms (Fleck & Hussey, 2009). Students are accustomed to easily accessible

information and entertainment (Roehling et al., 2010). Some of the least favorite videos were "Pirates of the Caribbean" to explain Bloom's Taxonomy, and "Freakonomics" to explain that correlation does not equal causation. The comments associated with these videos indicated that they were too complicated to follow or did not clearly connect with the course material for effective learning purposes. Such opinions indicate that entertainment value of the video is regarded as important, along side of its clear connection with the course material. These findings are similar to those of Fat and colleagues (2011), who found that only 50% of students found their carefully selected videos to be relevant to the course information.

YouTube provides a stimulating and differentiated approach to learning new material. Berk (2009) discussed the potential that media has to provide a greater entertainment value in the classroom. Entertainment, though not a goal of education, has been shown to increase student attention (Berk, 2009; Terantino, 2011). Media can help to draw attention and maintain interest in a topic for much longer than a traditional lecture, which might be missing visual stimulation (Berk, 2009). The students in the current study indicated on the post-semester survey that their overall experience with YouTube was fun, entertaining, and engaging. Thus, having an engaging stimulus in the classroom, such as YouTube, might increase students' interest and motivation to be successful in the class. According to Mayer (2010), this method of engagement should keep the information in working memory for a much longer period of time to help increase memory cues.

Related to feelings, students' expectations of YouTube were examined. Although sometimes viewed as a place simply for entertainment purposes, it appears that educational content is also accepted. The analyses suggest that students initially had high/positive expectations; after exposure to the course content, the majority of students reported that they were satisfied with the YouTube experience as a whole. George and Dellasega (2011) found similar results when assessing pre-post expectations of using YouTube in the classroom. Their students reported feeling unsure about the effectiveness of using YouTube for learning; however, after exposure they were happy with the support that the media tools provided. Particularly, the media videos expanded on available information to aid understanding. Our results suggest that students believe there is a useful educational component to the videos. Additionally, the majority of students reported that they found the videos to be beneficial for learning. Other researchers have found that YouTube is effective for increasing skills both in a lab setting and in the general public (Lee & Lehto, 2013; Fat et al., 2011) as well as long-term retention of material (Manasco, 2010). Thus, YouTube is being continually validated as an effective tool for teaching in a formal setting or in the home for common skills and tasks.

The increase demonstrated in quiz scores is reflective of overall learning in the course. The YouTube videos and discussion questions contributed to the rise in understanding and memory for course material. Following the information processing approach, learning and memory is enhanced when the student is provided multiple mediums for data input, thus creating more meaningful connections. Multimedia tools such as YouTube provide visual imagery to extend the attention spent on a stimulus that creates stronger cues for retrieving stored information (Mayer, 2010). Although these results indicate overall

learning in the course, readers should note that because there was not a control condition, or isolation of YouTube as a variable, a causal effect of YouTube and learning cannot be determined. Material was also read, lectured on, and worked on in various other formats. It would be expected that students would increase their knowledge having been exposed to the material in multiple modalities. Future research could include a control classroom to better compare the learning outcomes associated with the use of YouTube (Snelson, 2011). Similar to a control group study, lab-based research would be beneficial by controlling for extraneous variables that often muddy the results of classroom-based studies. The naturalistic approach used here is a strength; however, in the lab variables such as participants' gender, incentives (i.e., the ten participation points), the level of the assessment questions used to measure knowledge, the specific length of the videos, and the students' exposure to content through multiple modalities, could all be controlled.

An important component of this study was the additional use of classroom discussion after viewing the YouTube video. The structured discussions provided the students with opportunities to further engage with the material, share ideas, and clarify uncertainties. Collaborative reasoning amongst peers has shown to be effective at increasing comprehension (Boud et al., 1999; Murphy et al., 2009; Topping, 2005). Again, this process is consistent with the research by Mayer (2010) that keeping students engaged longer increases the time that information exists in working memory. Researchers Chen, Lambert, and Guidry (2010) also posit that technological applications increase the time spent on tasks, increase opportunities for collaboration, and foster executive functioning skills. These skills are suggested to have additional growths when the coursework is partnered with face-to-face interaction rather than the use of technology alone. Such interactions were also beneficial for generating interest (Chen, et al., 2010; Mayer, 2010). As discussed by Lee and Lehto (2013), an increase in self-efficacy in a given task also predicts higher interest and satisfaction with the information. Thus, those who find YouTube and class discussions to be useful components in their learning experience and feel competent in using the technology, are more likely to continue engaging in the activities to strengthen their understanding of the material.

Internet based platforms, like YouTube, offer a unique opportunity to enrich classroom learning environments. YouTube videos create a novel way of conveying educational content through real-life situations and observations, as well as connecting students with external experts. Using social media platforms associated with popular culture can also become a tool in which students can actively pursue learning on their own accord (George & Dellasega, 2011). Teachers, in all areas of education and within all fields of study, can enrich their classroom environment by properly utilizing YouTube as a tool to engage their students, particularly when it is connected to meaningful in-class peer discussions. The content of YouTube videos ranges from personal home movies, to television show clips, to formal lectures given by experts in a variety of fields. Videos are also posted in a variety of languages and diverse contexts. Given the sheer volume of videos that are accessible, incorporating YouTube videos accompanied by discussion questions can be replicated in any classroom; transcending nearly all academic disciplines.

Teaching Tips and Conclusions

Tips for successful integration of YouTube into the classroom include recognizing or measuring students' familiarity with it and being very explicit in its intended use. Research suggests that the more familiar students are with online learning tools, the more willing they are to use them in the class (Fleck et al., 2013). Polling students at the beginning of the class will aid faculty in gauging students' experience with YouTube and how much training of the use of the learning tool is needed. Also, because students primarily use YouTube for entertainment purposes, faculty should clearly explain the intended use and purpose of YouTube being used in the classroom (Dunlap & Lowenthal, 2009). In addition, gender differences and preferences might need to be considered. The majority of students in the current study were female. A predominately male-based class might yield different results in regard to video preferences.

In the past, traditional lectures have been the central method for content delivery in college classrooms. However, with advancements in technology, this type of teaching pedagogy alone might no longer be sufficient, especially for promoting thought, scientific inquiry, and critical thinking (Bligh, 2000). Faculty might consider adding a video per assigned reading, much like the examples provided in this paper. Other suggestions or tips include using YouTube in the classroom to increase diversity content (Glimps & Ford, 2008), demonstrate complex material (Manasco, 2010), show real life examples of events students would otherwise not be able to see (Cooper et al., 2011), analyze and produce performances (Desmet, 2009), and help meet diverse students' learning needs (Al-Jarf, 2012). Considering that the majority of students are digital natives and tech-savvy, the use of social media in the classroom appears to be the way education in general, and the individual classroom in particular, will be transformed (Ashraf, 2009; Fleck et al., 2013).

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