Using YouTube Videos as a Primer to Affect Academic Content Retention

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Abstract

College students today watch more content, academic or not, on the Internet than on any other media. Consequently, the authors argue that using any of these media, especially YouTube.com in particular, is an effective way to not only reach students, but also capture their attention and interest while increasing retention of academic content. Using a 2 X 2 between subjects controlled experiment, our study found that funny videos, which are congruent with course subject matter, improve student acquisition and material retention. Suggestions also are offered on how to source and integrate the videos into course content with an emphasis on the importance of matching the selection of video content with the intended effects on student learning.

Since 1999, Web 2.0 technologies have developed from their earliest form to include diverse widespread Internet applications. During the past decade, interactivity became the standard on the Internet as firms sought to increase their web sites' stickiness (the capacity of a web site to get viewers to spend more time on it) and memorability by inviting users to participate in the content creation process. Blogs, wikis, social networking sites, and RSS feeds are examples of Web 2.0 content co-creation applications common today. The pervasive adoption of Web 2.0 strategies has resulted in a plethora of content available to the public in various forms, including forums, blogs, videos, and review sites. Today's Internet-savvy college students are familiar and comfortable with many of the common platforms of content co-creation including Facebook, YouTube, and Amazon.

Strategies and rationales for integrating Web 2.0 into the classroom recently have begun to receive attention in academic literature (Duffy 2008; Berk 2009; Burke, Snyder, and Rager 2009; Sendall, Ceccucci, and Peslak 2008; Snyder and Burke 2008). Proponents of the utilization of Web 2.0 technologies in the classroom, including Facebook, YouTube, blogs, and wikis, suggest that these technologies can be used to increase levels of student engagement through visual stimulation (Burke, Snyder, and Rager 2009). Berk (2009) investigates a number of theories of multimedia learning as related to videos and finds that the Net Generation's learning styles and multiple intelligences makes this generation an excellent target for Web 2.0 applications. Having grown up with digital technologies and the Internet, today's student comes primed for the use of technology in the classroom. Prensky (2004) characterizes today's student as a "digital native" who operates at "twitch speed," expecting instant responses and feedback—an expectation readily met by many Web 2.0 technologies. Our research furthers this Web 2.0 line of research by investigating the effect of positive mood stimulus on retention in a YouTube context.

YouTube

YouTube, which operates as a subsidiary of Google, is a popular video-sharing web site that exemplifies the power of Web 2.0 applications. YouTube currently is rated as the third most popular web site in the world, as reported by Alexa.org, with approximately twenty-two percent of its web traffic originating in the United States. YouTube's primary purpose, which falls into the video-sharing classification of web sites, is to provide a platform where users can upload, share, and view videos. YouTube also enables its users to comment on the posted videos in addition to expressing opinions by liking or disliking videos and/or comments about the videos.

The content found on YouTube varies substantially in terms of both type of content and quality. This is because the users of the web site also are the generators of the content, instead of the content being created and disseminated by YouTube's web site administrators. Common types of user-generated content found on YouTube include movie clips, advertisements, television clips, music videos, amateur video blogging, and short amateur videos. One of the attractive features of YouTube content is the relatively short length of the majority of the videos. While amateur users create the bulk of the content on YouTube's web site, the YouTube partnership program also enables professional media outlets, including CBS, Fox, Disney, and BBC, to publish video materials as well.

Prior to YouTube, sharing videos was not easily accomplished online or offline. YouTube offers Internet users a platform to use to share and view videos without having to download files to their computer. YouTube video links can be easily shared because each YouTube video has an accompanying URL such as http://www.youtube.com/watch?v=_OBlgSz8sSM, which links to the popular "Charlie bit my finger" video—a video made by a mother (amateur) that went viral with more than 377 million views. YouTube provides anyone who has access to the Internet the ability to post a video capable of reaching a global audience with very little expertise or effort required. The popularity of video sharing and universal acceptance has made Web 2.0 video-sharing web sites a fundamental component of modern Internet culture.

Founded in early 2005, the rapid growth in popularity of YouTube has been impressive. By July 2006, the company announced that more than 65,000 videos were being uploaded to the web site every day and the site was hosting more than 100 million video views daily (*USA Today* 2006). In August 2011, YouTube was ranked as the most popular online video content property by comScore, with 162 million unique viewers compared to VEVO with 62.3 million and Facebook with 51.7 million (comScore 2011). While unregistered visitors are permitted to only view videos, registered visitors are able to upload an unlimited number of videos.

YouTube is particularly well suited for use in the classroom for a number of reasons. First, YouTube's vast content library provides instructors with an almost unlimited library from which to choose. In fact, twenty-four hours of video content are uploaded to YouTube every minute. Second, the average YouTube user spends between fifteen

and twenty-five minutes on the site, posting videos, watching videos, and providing video feedback. YouTube videos commonly are tweeted about through the Twitter platform. In fact, there are approximately 400 tweets a minute that contain YouTube links (Eliott 2011). Third, the demographics of YouTube users align with college-aged students quite well. Thirty-seven percent of YouTube users are between the ages of eighteen to thirty-four, which is the largest age concentration of any segment. Therefore, students are likely to be familiar with and receptive to viewing YouTube videos. Fourth, when compared to VHS or DVDs, the convenience of having videos accessible online makes an instructor's life much easier. There's no media to remember and no chance of player failure. As long as your Internet connection is viable, your video is ready to be served.

Purpose of the Study

YouTube videos can be used in the classroom for a number of educational and entertainment purposes. (See Berk 2009 for a review of generic techniques for the integration of video clips in the classroom). Berk suggests that while the use of videos as a teaching tool is not new, there are four fundamental changes impacting the use of video as a teaching tool. First, there is a wider variety of video formats available to instructors; second, the ease with which technology can facilitate video application in the classroom has increased; third, the number of video techniques an instructor can use has increased; and fourth, the body of academic literature providing theoretical and empirical support of the use of video as an effective teaching tool has increased. Berk compares three common sources for videos (DVD, Internet, and books with CD clips) and finds that Internet sources have many favorable attributes as compared to the alternate video sources. Internet videos tend to be free or cheap and good-to-high quality, in addition to being moderately to highly convenient and recently videoed and available. Many videos available on the Internet (including many on YouTube) also are PowerPoint compatible.

Berk elaborates on twelve generic techniques for using video in the classroom, which could all be applied to YouTube video use:

- To provide content and information
- To illustrate a concept of principle
- To present alternative viewpoints
- To apply content to real-world applications
- To serve as a stimulus for learning activities
- To provide a good or bad application to critique
- To exaggerate a particular point

- To snap students to attention
- To insert into collaborative learning exercises
- To motivate and inspire
- To provide a commercial break
- To signal return from a class break

Two of the most common reasons cited by professors today for the utilization of YouTube videos in the classroom are to (1) put the students in a good mood by showing a funny video prior to a lecture, and (2) use YouTube videos to present new material and concepts. While these motivations for the inclusion of YouTube videos may seem to be quite different, the ultimate goal is similar—to increase student retention and learning material.

Our study investigates the impact of the use of YouTube videos on material retention. We suggest that YouTube videos can be used as a mood primer, a content primer, or both. In the case of a mood primer, the chosen YouTube video should be one that students find humorous or entertaining, such that the resulting mood is positive (hedonic). Positive and negative moods have been shown to have an effect on student learning in a number of studies (e.g., Abele 1991, Schwartz and Bless 1991; Pekrum 1992). Empirical evidence from existing studies serves as the foundation for our hypothesis that mood can impact student learning. The effectiveness of imagery and music in promoting arousal, eliciting schemas (mental connections between memorized objects providing meaning to a phenomenon), affecting judgment, and increasing access to memory also has been researched extensively (Clore and Schnall 2005; Knobloch et al. 2003; Knobloch and Zillmann 2002). Consistent with this research, videos incorporating emotionally intensive content, such as music and imagery, should induce mood states and increase arousal and attention.

We furthermore suggest that YouTube videos can be used as a content primer. In this case, the chosen YouTube video can either teach the material to be discussed in the classroom through an informative/educational video, or the YouTube video can provide an example of the new material (content congruence). A key factor in learning is repetition as demonstrated by the use of YouTube videos as a content primer. Today's students are capable of learning information quickly through images, audio, and text in part due to their ability to multitask (Duffy 2008). Student-centered learning practices suggest that educators should be in touch with their students' learning styles and needs to increase their perception of the learning environment and teaching quality (Kember 2009).

Our study investigates the impact that YouTube videos, which are used as a mood primer and/or a content primer, have on students' material retention. We also intend to demonstrate an interactional effect between the YouTube video congruency to the

material being taught and retrieved. Emotionally charged videos that are congruent with the material not only increase attention by affecting mood, but also increase encoding and retrieval in a significant manner. For example, we hypothesize that funny (emotionally charged) videos, which are also congruent (filled with the same content) with the material being taught, will increase students' attention (students like YouTube videos in general), positively affect their mood (due to the emotions elicited), and increase their memorization and future access during tests in a significant manner.

Hypotheses

Based on the current research previously outlined, we developed several hypotheses to formally test:

H1: Viewing hedonic (funny) YouTube videos induces a more positive mood than viewing utilitarian (not funny) YouTube videos.

H2: Hedonic (funny) YouTube videos will have a positive impact on student retention as compared to Utilitarian (not funny) YouTube videos.

H3: Content congruent YouTube videos will have a positive impact on student retention as compared to non-content congruent YouTube videos.

We do not make any hypothesis related to the relative strength of the mood primer and content primer due to the lack of supporting literature. (See Figure 1 for hypotheses 2 and 3 summaries.)

Figure 1. Effect of Stimuli and Congruency on Learning

	Hedonic (funny)	Utilitarian (nonfunny)
Congruency	+ + Box 1	− + Box 2
No Congruency	+ − Box 3	− − Box 4

Note that in box 1 of Figure 1, a funny video that is also congruent with the course content will show a positive effect on mood (+) and a positive effect on material

retrieval (+). By opposition, in box 4, an nonfunny video that is noncongruent with the material will lower mood (–) and lower retrieval (–).

Methodology

We conducted controlled experiments in the form of exposing a random sample of undergraduate students to an emotionally charged, humorous video (hedonic stimuli) or a neutral video (utilitarian stimuli). The priming effect of the video was tested in the congruency manipulation-check; whereby, the content of the video will be either congruent to the material taught or not (Gazzaniga 2001, Nissen and Bullemer 1987). For example, a lesson's concept will be introduced by a video staging the concept in an emotionally charged manner (i.e., funny commercial related to the material), or by a video introducing the concept in a neutral manner (i.e., a person being interviewed about the material).

Because some students might come to class in a good or bad mood, possibly due to their personal lives, the first thing that needs to be done is to ensure all students start the experiment with the same mood level. For that, we used mood manipulation to gain control of the mood state affected by events prior to the experiment. The pre-experiment control consisted of an autobiographical recollection of a mood-inducing memory. We asked the students to either recall a positive moment in their life (inducing positive mood) or to think about unrelated concepts via reading neutral statements (leveling mood). Mood state is later confirmed using self-reporting measures (Kenealy 1986, Peterson and Sauber 1983).

A post-experiment questionnaire captured the difference in retrieval levels of the material taught. In essence, we gave the students a test on the material using different questions. Our expected results are summarized in Figure 1.

Design of the Experiment

The experiment was conducted via an online survey incorporating the necessary randomization of each condition (hedonic-utilitarian videos and congruent versus non-congruent video-teaching material). Students' moods were first induced to a mood-neutral level using the mechanism explained earlier, then they were shown a hedonic (utilitarian) video, leading them to view an online lesson congruent (non-congruent) with the content of the video. In our particular experiment, the lesson's topic was celebrity endorsements of brands (what is referred to as the balance theory effect in marketing literature). We showed a funny video of Beyoncé in an American Express commercial featuring Ellen DeGeneres. This video possessed both elements that we were interested in: increasing mood and being congruent to the content. While one group of students watched the funny Beyoncé -American Express video, another group watched a Beyoncé-American Express video, but this time the video was more descriptive and not funny in its treatment. Hence, this video was congruent but should not increase mood. A third group watched a funny video that involved babies (non-congruent), and a final group watched a video showing how to use Excel (not funny

and non-congruent). Finally, participants were asked a battery of questions aimed at measuring their retention of the teaching material. The experiment ended with another hedonic (funny) video in order to set the mood back to a positive state for all participants. (Note, the manipulation of mood in human experiments needs to be done carefully and in accordance with Institutional Review Board [IRB] standards, and setting the mood back to a positive state ensures that all participants leave the experiment in the proper state of mind.)

Manipulation of Video

Participating students were randomly shown one of four videos: The funny-congruent video (Beyoncé-DeGeneres-American Express commercial), the non-funny-congruent video (Beyoncé-American Express commercial), the funny-non-congruent video (funny babies), or the non-funny–non-congruent one (Excel video).

Manipulation of Mood

Prior to exposing the students to the video and teaching material, the students' moods were induced to a neutral level using a mechanism similar to that used by previous researchers (Jennings et al. 2000). Using a second group of students (n = 38, 54 percent male), we conducted another pretest aimed at evaluating the mood-inducing mechanism on the participants' mood state. The participants were randomly assigned to one of two groups. The first group watched a neutral-mood-state–inducing video containing a picture of a lake, relaxation music, and a text following the Velten's procedure (Jennings et al. 2000). For example, one statement would read, "The movie theatre was located downtown."

As a control mechanism, the second group watched a positive-mood-state inducing video. This video had an exciting photo, energetic music, and the text based on the Velten's procedure (Jennings et al. 2000). For example, one energetic statement would read, "I'm full of energy and ambition—I feel like I could go a long time without sleep."

Measuring Academic Content Retention

A battery of several multiple-choice questions with two different levels of difficulties in addition to an open-ended question allowed for a scoring of each student's comprehension of the material. (Note, we created our questions using the criteria put forth by Bloom and the ***Association to Advance Collegiate Schools of Business*** [the international accreditation organization for business schools]).

Main Student Sample

Students of an American metropolitan university located in the central East coast were invited to participate in the main experiment. We collected 106 usable responses out of 138 students surveyed in four classes—a response rate of 77 percent. Students were given five extra credit points as a motivational mechanism to enter the experiment.

Table 1. Descriptive Statistics

Dependent Variable: Material Retention

Video	Congruency	Mean	Std. Deviation	N
Hedonic	Yes	2.968	.7063	31
	No	2.640	.7572	25
	Total	2.821	.7412	56
Utilitarian	Yes	2.321	.9833	28
	No	2.833	.8165	24
	Total	2.558	.9375	52
Total	Yes	2.661	.9023	59
	No	2.735	.7846	49
	Total	2.694	.8478	108

Results

The results of the study further the understanding of the emerging practices utilizing Web 2.0 social media for both the traditional and online classrooms.

Pretest Results

First, we found that the participant's mood state was affected significantly in the right direction by the positive induction mechanism (mean difference between neutral and positive mood induction = .38, $t_{(36)} = 2.07$, $p = 0.045$), hence the neutral mood state induction could serve as a baseline in our experiment.

Second, using a different group of students ($n = 41$; 48 percent male), we conducted a pre-experiment test using the hand-picked hedonic (funny) or utilitarian (non-funny) videos to measure the level of emotions induced by the videos, and the level of familiarity with the content (celebrity and brand). The results of this pre-experiment test showed that the hedonic videos significantly were affecting the positive mood state of the participants in the right direction when compared to the utilitarian videos (mean difference between hedonic and utilitarian video = –.69, $t_{(39)} = 2.06$, $p = 0.046$), lending support to H1. Thus, hedonic (funny) videos tend to increase the positive mood of students.

Effect of the Video on Mood

As expected, the hedonic-funny videos positively affected the mood level of the students watching them (Mean $\text{mood}_{\text{funny}} = 3.98$, sd = .55, $n = 55$) compared to the students' mood watching the utilitarian videos (Mean $\text{mood}_{\text{not funny}} = 3.61$, sd = .61, $n = 51$), $\text{Mean}_{\text{diff}} = .36$, se = .11, $t_{104} = 3.22$, $p < .05$, supporting H1.

Interaction Effect of Video and Congruency on Retention

A 2 X 2 between subjects design using video (hedonic-funny and utilitarian-non-funny) and congruency (congruent and non-congruent) evaluated the degree by which undergraduate students retained online course material (see Table 2). The overall model is significant, $F(3,104) = 3.33, p = .02, \eta^2 = .09$, and explains nine percent of the variance in the dependent variable (retention). The effect would be considered medium-to-large size in the context of ANOVA studies (Cohen 1988). While the main effect of congruency, $F(1,104) = .34, p = .56, \eta^2 = .02$, and the main effect of video, $F(1,104) = 2.03, p = .16, \eta^2 = .003$ (a small effect size), were both insignificant, these were superseded by the significant video X congruency interaction, $F(1,104) = 6.98, p < .05, \eta^2 = .06$ (a medium effect size). These results mean that an average student would increase his/her grade on a given test by six percent, if the content would have been linked to a funny introduction video.

Figure 2 presents the previously described interaction. Simple effects tests were performed by using a Bonferroni adjustment to hold the alpha level at .05. This ensures that the results are insignificant due to the number of variables but are germane to the effect under study. Students who watched the hedonic video retained the material better when the video was congruent to the material taught.

Note: Bonferroni adjustment reduces the alpha level required to test the hypotheses in order to avoid a Type-I error frequently associated with multiple comparisons.

Table 2: ANOVA Summary Table of Between-Subject Effects

Dependent Variable: Material Retention

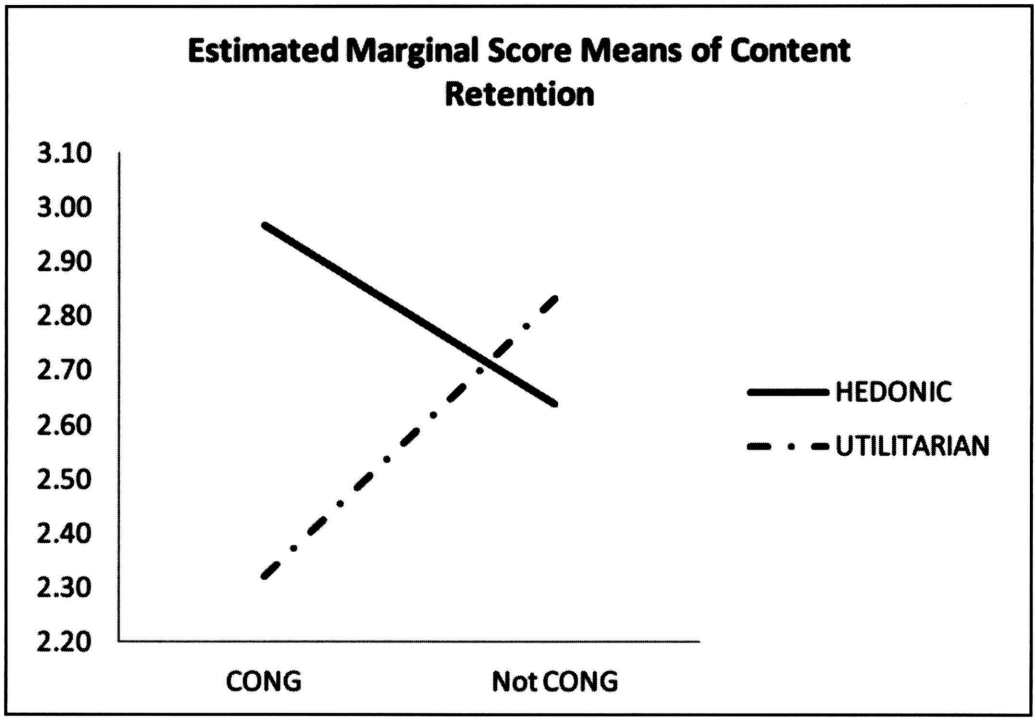
Source	Type III Sum of Squares	df	Mean Square	*F*	*p*-value
Corrected Model	6.748	3	2.249	3.334	.022
Intercept	774.07	1	774.073	1147.294	.000
Video	1.371	1	1.371	2.032	.157
Cong	.227	1	.227	.336	.563
Video Cong	4.711	1	4.711	6.983	.010
Error	70.168	104	.675		
Total	861.000	108			
Corrected Total	76.917	107			

While students that watched the utilitarian video retained the material better when the video was non-congruent to the material being taught, both groups showed significant differences. When subjected to a congruent video, students who watched the hedonic

video displayed a higher level of retention (M = 2.97, se = .15) than students subjected to the utilitarian video (M = 2.32, se = .16) supporting H2. However, the effect is reversed to a lesser extent in the case of the non-congruent video. Students who watched the hedonic video displayed a marginally lower retention level (M = 2.64, se = .16) than students subjected to the utilitarian video (M = 2.83, se = .17). The interaction further demonstrates via its significance that a funny video potentially will distract students and lower their content retention. If a teacher would rather show a utilitarian (non-funny) video than a funny one, it might as well be unrelated to the content in order to achieve a slightly better test score, possibly due to the attention required to understand such a video. However (and this is the focal point of our results), a teacher striving for the highest score on a test would be wise to show a funny video related to the material in order to positively affect the mood of the audience while at the same time priming the subject matter, consequently increasing its retention.

Figure 2 shows the score achieved on the test is greater for congruent-hedonic videos than for congruent non-hedonic videos (i.e., funny is better). In addition, as videos shown are non-congruent, the hedonistic group retains less material (i.e., possibly due to diversion), while the utilitarian group retains more (i.e., possibly due to concentration).

Figure 2. Interaction of Video and Congruency of Teaching Material



Note that Figure 2 shows the interaction between the effect of congruency and the effect of video type (hedonic or utilitarian). If the effects do not interact, the lines would be parallel.

A congruent hedonic video will act as a primer to the concepts being taught and significantly will increase retention of the course material evidenced by the significant mean difference ($m_{diff} = .65, p < .05$). Whether the video is hedonic or not does not seem to change the effect on retention when the video is non-congruent to the material ($m_{diff} = -.19, p = .41$); thus, supporting H3 only in the context of an interaction. This means that potential videos, which are only funny or only congruent, might not have any effect on retention, but when combined together the congruency and "funniness" do have an effect on retention.

Effects of Controlling Variables

Several controlling variables were used in the study: gender, experience with the material (number of marketing classes taken), average overall GPA, and likability of the celebrities and brands used in the videos or material. None of these control variables showed a significant effect on the dependent variable in the study (retention); therefore, we feel that this reinforces the results previously shown and demonstrates that retention is impacted by the priming effect of a congruent and hedonic video.

A post-check of the scores was done between the group of students that had little exposure to marketing material prior to this semester ($n = 60$), and those who had plenty—for example, more than four classes ($n = 46$). No significant difference was uncovered (mean difference between = .06, $t_{(104)} = .29, p = 0.77$), suggesting that material retention did not increase for the group that had potential prior exposure compared to the group that did not.

Discussion and Directions for Future Research

Today's students have grown accustomed to being entertained 24/7, thus putting pressure on professors to not only educate, but also to entertain in order to engage their students. Fortunately, professors now have a wealth of materials readily available on the Internet that can be used to bridge the gap between education and entertainment. As the body of Web 2.0 materials continues to grow, educators across all disciplines will have an increasingly diverse source of multimedia materials from which to choose, including YouTube videos to help them engage their students.

As our research indicates, showing a hedonic-funny video at the beginning of class can be used to increase the positive mood state of the students. Videos also increase retention significantly as long as the video is congruent to the material. A hedonic-congruent video has the potential to increase retention by an average of six percent, which for many students might correspond to half a grade increase. One of the challenges with integrating videos into the classroom is locating a congruent, hedonic video because this combination has shown to have the greatest impact on student retention of material. However, by showing a hedonic-funny video for the sake of it (which affects the mood state in a positive way yet does not significantly change retention), it marginally may decrease retention.

Perhaps the reduced retention in the hedonic-non-congruent case can be attributed to an overall drop in attention to the material because the positive mood is transient given the lack of content congruence between the video and the material. Another possibility is that the hedonic video set student expectations for the lecture to be hedonic in nature, and when students discovered no connection between the hedonic video and the lecture, students tuned out. We leave this issue for future research. Another possible avenue for future research would be to investigate the use of hedonic and utilitarian videos in the classroom to impact students' overall class evaluation, class satisfaction, and professor satisfaction.

Steps to Integrate YouTube in Your Class

A very easy way to integrate YouTube videos in your class and get a positive effect is to start by taking the following steps:

1. What is the main point of your class?

For example, if your class is on subjective knowledge and advertising, you need to make the point that our unconscious mind "sees" and "understands" things without our knowledge. Therefore, you are looking for a video that demonstrate that point.

2. Search YouTube for a funny video making the point you desire.

If typing "subjective knowledge" or "subjective knowledge advertising funny" in YouTube does not yield a good funny commercial, a little thinking about how subjective knowledge is used in a commercial needs to be done. For instance, marketers often use subliminal effects in an attempt to manipulate consumers' reality. Thinking about which commercials you remember that would have used the technique might yield ideas for a new search and search terms. Typing "subliminal ads funny" yields plenty of examples from which to choose. Keep in mind that some results will be good and some may be inappropriate; you need to be the judge before you get to class.

3. Alternatively, think about movie clips and TV shows.

Do you remember a TV show, preferably one that would resonate with your audience (for example, *The Office*, *The Family Show*, *Jersey Shore*, or other pop culture shows) or a movie that could make the same point? Many TV shows or series, for example, incorporate product placement into the show, sometimes product placement is obvious, and sometimes you (if you are a paying close attention) will notice it. When you stumble upon material that relates back to your subject matter, make a mental note so you can pull it up on YouTube for later use during classes.

4. Source a digital picture of the character or the show and paste it into PowerPoint.

In your search engine (i.e., Google, Bing), type the name of the show or movie and choose to view only pictures. Copy and paste the picture of your choice into a new PowerPoint slide.

5. Incorporate the YouTube video URL into the PowerPoint picture.

Open your video in a browser. Copy the video URL. Open the hyperlink box by right-clicking the picture you wish to use in your PowerPoint presentation. Paste the URL into the hyperlink box. Close the window. Your picture will be ready to launch the video when you are in show mode and you click on the picture.

6. Try it before class.

It is very important to consider yourself as the "edutainment." You do not want your show and your punch lines to flop by not having rehearsed before class.

7. Potential problems and troubleshooting

Potential problems are often linked to the playback capacity of the technology present in the classroom. You will need to make sure of several things before integrating videos in your course. First, the classroom needs to have a good Internet connection (i.e., broadband/cable will be better than Wi-Fi). Second, the projector, light, and screen will need to be adequate so that the picture is clear, the sound is audible, and everyone in the class can see from where they sit. If your school Internet connection is slow, you will see it as the video will stop to "buffer-download" more as it shows. If so, then you might want to do one of two things: first, try to show the video at a lower level of picture quality by setting the picture to show in 360p or 240p. If it does not fix the problem, or you do not like the quality of the picture, then download the video. As an alternative way to show videos in class without a good Internet connection, download it on your thumb drive and play the video from that source. Check with your school's technical department on how to legally download from YouTube for pedagogical purpose. Once you have created a file with the video download, you will then want to open it with video software such as Windows® Media Player or QuickTime.

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