

# Literature Review of YouTube in Teaching Activities

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## Abstract

*As the largest and most highly visited online video-sharing service, YouTube is becoming an educational tool that improves instructors' teaching and students' learning in many ways. However, few studies synthesized existing studies of using YouTube in teaching activities. This paper conducts a literature review of journal articles and conference proceedings to understand the benefits and limitations of using YouTube in teaching and how educators apply this technology in their teaching activities. A search of various databases including ACM Digital Library, Springer and ScienceDirect identified 30 unique articles on this topic. We analyzed these articles using a taxonomy for teaching. This literature review should be of interest to educators who want to apply YouTube in their teaching activity.*

**Keywords:** Literature review, Teaching, YouTube

## Introduction

According to a 2006 report, instructors need to teach students necessary networking skills in the world of 2.0. (Burke and Snyder 2008). Innovative technologies, such as YouTube online video-sharing sites, have been suggested as a powerful tool to stimulate student's learning interests and achieve teaching objectives (Roodt and Peier 2013).

Since its inception in 2005, YouTube has proliferated in popularity and use. YouTube is a place that individuals can freely access, watch and share videos online. (Burke and Snyder 2008). Website data showed that "over 1.9 Billion logged-in users visit YouTube each month and people watch over a billion hours of video and generate billions of views each day" (YouTube 2018). YouTube has already penetrated every corner of daily life (Szeto and Cheng 2014).

With the growth of research interest on YouTube, education-related YouTube scholarship has emerged in peer-reviewed journals and conference proceedings (Snelson 2011). Previous educational literature suggests that YouTube as a teaching tool has been applied in healthcare (e.g., Clifton and Mann 2011; Lim Fat et al. 2011), language learning (e.g., Brook 2011; Hafner 2014), music (e.g., Dougan 2014; Kruse and Veblen 2012) and educator training (e.g., Cupples et al. 2010; Hudock Jr and Warden 2001).

The purpose of this literature review is to investigate the current state of using YouTube in teaching activities. In doing so, this paper seeks to answer the following research question: what are the benefits and challenges of using YouTube in teaching? Several studies have been conducted to systematically assess the effects of YouTube in education (Alias et al. 2013; Snelson 2011). However,

few studies mainly focus on using YouTube as a teaching tool. Therefore, there is a strong need to understand the present state and foresee the future of teaching with YouTube.

Before we can address the research questions, we need an organizing framework of teaching with YouTube. It is essential to have a framework to guide researchers to assess the state of a research domain (Banville and Landry 1989). Therefore, I adopted a taxonomy for learning, teaching and assessing from Anderson et al. (2001). The original taxonomy was a principle for classifying educational goals. It has six major categories, which are remember, understand, apply, analyze, evaluate and create. It provides an organizational structure to help instructors decide where and how to improve their teaching plan (Krathwohl 2002). In this study, we use this taxonomy as a guide to conduct analyses and present discussions.

The paper is organized as follows. The next section introduces the conceptual background of using YouTube in the education field and taxonomy. The review methodology section follows. Next, we present review results to answer the research questions. The final section offers discussion, limitations, and conclusion.

## **Conceptual Background**

### ***YouTube in Education***

Using multimedia in teaching and learning is not new. The video is widely used for education and can have different learning and teaching outcomes (Fleck et al. 2014). Previous literature found that using videos in the teaching and learning environment can improve students' learning performance (Borko et al. 2008; Zhang et al. 2011).

YouTube has become the most widely used instructional resource for different teaching and learning goals. In 2009, YouTube announced the launch of an education service, called YouTubeEdu, which includes a compilation of YouTube channels produced by different colleges and universities. YouTubeEdu provides a useful range of educational videos of lectures, news, and campus life for every grade level.

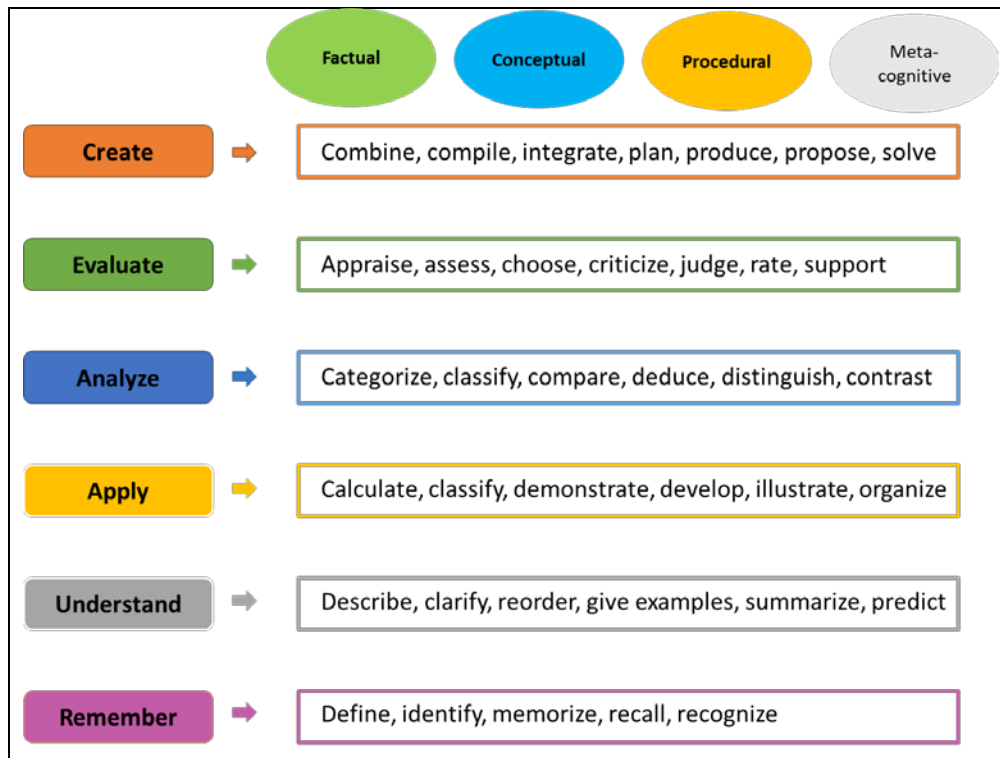
The growth of educational video on YouTube runs concurrently with broader trends in the educational environment. From teaching video to sharing content created by students, more and more educators are using YouTube as an educational resource. According to the literature review paper made by Alias et al. (2013), the topic of teaching and learning is among the top three categories of YouTube research topic. YouTube has been found to facilitate class discussion, deliver vivid and complex contents, and encourage students independent learning (e.g., Agazio and Buckley 2009; Berk 2009; Haase 2009). Also, most YouTube videos link to other web-based teaching platforms, like Blackboard, where there are impacts on teaching are profound. For both instructors and students, YouTube is a useful learning videos searching platform, comparing and analyzing ideas, qualifying hypotheses and theorizing knowledge (Szeto and Cheng 2014).

Teaching is still an area where more research needs to be done on the use and impact of YouTube, and, in addition, there is little literature on the synthesis of research findings in this area. The reviews provide researchers with insights into the limitations and deficiencies of current research subjects and plan future research projects to fill these gaps. While there are a few literature reviews about YouTube research (Alias et al. 2013; Snelson 2011), none of these offer an analysis of using YouTube in teaching activities. This paper is an effort to fill this gap and illustrate a picture of using YouTube in teaching activities.

### ***Taxonomy***

The taxonomy for learning, teaching, and assessing is a framework for classifying statements that "we expect or intend students to learn as a result of teaching" (Krathwohl 2002, p.212). There are four types of knowledge: factual knowledge, conceptual knowledge, procedural knowledge, and metacognitive knowledge. Factual knowledge refers to "the essential elements that students must know to become familiar with a subject or solve its problems." Conceptual knowledge is defined as

“the interrelationships between the basic elements of a more massive structure enable them to work together.” Procedural knowledge means “the method of inquiry, and the criteria for using skills, algorithms, techniques, and practices.” Lastly, metacognitive knowledge is “general knowledge of knowledge, and knowledge of their knowledge” (Anderson et al. 2001). The categorization of the cognitive process dimension aims to provide a comprehensive classification for those students' cognitive processes. The categories range from the cognitive processes most commonly found in objectives, remember, understand and apply, to those less frequently seen, analyze, evaluate, and create (Anderson et al. 2001). The original taxonomy as shown in the following figure 1 is a two-dimensional framework: Knowledge and Cognitive Processes.



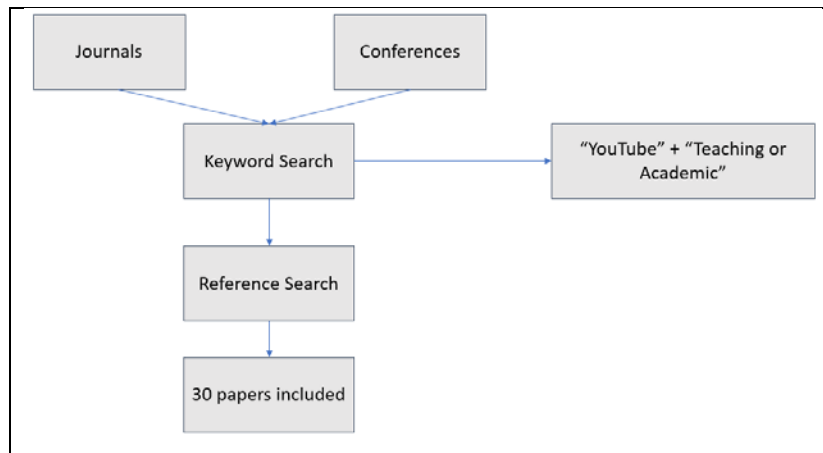
**Figure 1. Taxonomy for learning, teaching and assessing adapted from Anderson et al. (2001)**

Based on this taxonomy, instructors can understand how to improve their knowledge delivery and teaching plan (Krathwohl 2002). I applied this taxonomy to guide our analysis of the state of teaching with YouTube. It is useful for us to classify reviewed literature into these six different categories.

## Methodology

### *Search Strategy*

The basic strategy for identifying papers in this literature review was tailored to match the three stages by Webster and Watson (2002). This method is a well-established and widely used procedure for article selection for systematic review studies. Figure 2 depicts the process of our search strategy.



**Figure 2. Three stage search strategy adapted from Webster and Watson (2002)**

Our goal was to identify articles addressing using YouTube in teaching activities. To accomplish this, we used the following keywords query: ((“Teaching” OR “Academic” OR “Education”)) AND YouTube. This query was run on the following databases: ACM Digital Library, Springer, Journal of Information Systems Education (JISE) and Science Direct.

**Table 1. A Sample Table**

Query	Restrictions
((“Teaching” OR “Academic” OR “Education”)) AND YouTube	Language: English Content type: Journal articles and conferences proceedings Discipline: Any

### *Selection Criteria*

Initial keywords searches resulted in 27 papers to be reviewed in more detail. A reference search on these 27 papers produced another 18 articles which brought our total number of articles to examine to 45. These 45 papers were reviewed for the relevance of using YouTube in teaching activities. After a detailed review, 15 were eliminated due to the following criteria: only mentioned YouTube in teaching without analyzing, using key terms in another context, working papers, non-English published literature, research protocols, and editorials. After applying exclusion criteria, the final list comprised of 30 articles. The 30 articles were analyzed, and the results are presented in the following section.

### **Results**

The results of the literature review are discussed in the following sections which address: 1) the benefits and limitations of using YouTube in teaching activities, 2) teaching categories, and 3) used theories.

### *Benefits and Limitations*

The selected articles were analyzed for using YouTube in teaching activities. Each article was further analyzed for benefits and limitations of using YouTube as a teaching tool, and the results were coded (see table 1). A review of the selected papers revealed that all of 30 papers discussed the benefits of using YouTube in education. Based on the interest of the research, I classified the benefits from the articles into the following categories: information-based, engagement-based and communication-based benefits.

**Table 1. Benefits and Limitations of using YouTube in teaching**

Paper	Benefits			Limitations		
	Information-based	Engagement-based	Communication-based	Credibility	Efficiency	Availability
Palvia, 2013	X	X	X			
Steyn and Prinsloo 2015	X	X	X			
Syler and Baker, 2016		X				
Hafner, 2014			X			
Kapp et al. 2009	X					
McKemmish et al. 2018	X		X			
Berk, 2009	X	X	X			
Clifton and Mann, 2011		X	X	X	X	
Lichter, 2012		X	X			
Brook, 2011		X	X		X	
Lim Fat et al. 2011	X				X	
Duffy, 2008	X	X				
Burke et al. 2009	X			X	X	X
Tan and Pearce, 2011		X	X			
Buzzetto-More, 2015	X	X	X			
Alias et al. 2013	X	X	X			
Fleck et al. 2014		X	X			
Dougan, 2014	X		X			
Ljubojevic et al. 2014	X	X				
Roodt and Peier, 2013		X				
Majid et al. 2011	X	X		X		
Krauskopf et al. 2012	X			X	X	X
Sherer and Shea, 2011	X		X			
Jaffar, 2012		X				
Szeto and Cheng, 2014	X	X				
Burke and Snyder, 2008		X		X	X	X
Jones and Cuthrell, 2011		X				
Buzzetto-More, 2014	X	X				
Kruse and Veblen, 2012		X	X			
Othman, 2018	X	X				

Information-based benefit means instructors can easily use YouTube search for information to improve and refine their knowledge. For example, Majid et al. (2012) stated that instructors could access YouTube and search for different information on a 24/7 basis. Steyn and Prinsloo (2015) also pointed out instructors can access YouTube from anywhere and at any time. Besides, according to the survey results, Dougan (2014) found that more than half of music faculty think YouTube is much more convenient than traditional library search. Also, because of features like versatility, accessibility, breadth of content, and modern materials, Sherer and Shea (2011) argued that YouTube is an excellent teaching resource for instructors.

Engagement-based benefit relates to demonstrate and deliver the knowledge effectively with the use of YouTube to promote instructors' teaching performance and enhance learner's engagement. YouTube is a good teaching facilitator to inspire and engage learners. It can also support the teaching styles of instructors and support students understanding (Burke and Snyder 2008; Tan and Pearce 2012). Steyn and Prinsloo (2015) found that YouTube can simulate a real-life situation; instructors can deliver knowledge by using current and relevant video examples. Based on the research results, Ljubojevic et al. (2014) found that as a teaching tool, YouTube can improve students' learning motivation and efficiency.

Communication-based benefit relates to the interaction between teachers, students, disciplines, and information. Using YouTube as a teaching tool can increase students' communication and teamwork, make a strong connection between students and teachers and stimulate students' deep learning by discussion (McKemmish et al. 2018). This benefit can stimulate effective collaborative learning and teaching approach and bring new ideas to subject curricula in different contexts (Duffy 2008). Kruse and Veblen (2012) found that this benefit has a positive influence on students' interaction, which can stimulate the flow of ideas and foster creativity and deep learning.

Technology tools, like YouTube, cannot completely replace traditional teaching methods (Debevec et al. 2006). While YouTube provides the number of benefits as a teaching tool, this technology does have some limitations and risks of using it. There are 7 out of 30 papers investigated the limitations of using YouTube. Based on the results of coding, limitations of teaching with YouTube can be summarized into the following three different aspects: Credibility, Efficiency, and Availability.

The major limitation of using YouTube in teaching is credibility or accuracy. Because YouTube is all the videos on YouTube are updated by the user with no contents check. As Hossler and Conroy

(2008) reported that, because of the feature of user-generated, YouTube video is a source of medical misinformation. Majid et al. (2012) found that the quality and usability of some YouTube videos are too low to use in teaching activities. In addition, Krauskopf et al. (2012) found that instructors doubted about YouTube's credibility. Credibility as one of the main barriers to using YouTube in teaching activities.

Another limitation of using YouTube in teaching is efficiency. Because of a considerable number of videos (both in types and contents) on YouTube, searching for a content-specific or appropriate video on YouTube is time-consuming (Burke et al. 2009; Burke and Snyder 2008; Clifton and Mann 2011). If instructors don't have a clear mind on what information they are looking for, searching for information from YouTube is aimless and inefficiency. To mitigate this limitation, Lim Fat et al. (2011) urged that our instructors need to have some YouTube proper searching and selection training and practices.

Since videos on YouTube is Flash and Internet-based, using YouTube in teaching activities also presents another instructional limitation: availability. Instructors need to check web status and make sure that software like Adobe Flash Player is installed on their computers and students' computers (Burke and Snyder 2008). However, many schools don't have necessary technical support for these software (Brook 2011). Ljubojevic et al. (2014) also found that lacking technology support and availability is one of the main barriers to using YouTube in teaching activities.

There is a lot of controversy about low-quality videos on YouTube, but it is a social phenomenon that instructors cannot ignore (Skiba 2007). In general, in spite of some limitations of applying YouTube in teaching, the benefits outweigh these drawbacks. We as instructors want to get our students to engage in what they learn, using YouTube represents a significant opportunity (Clifton and Mann 2011).

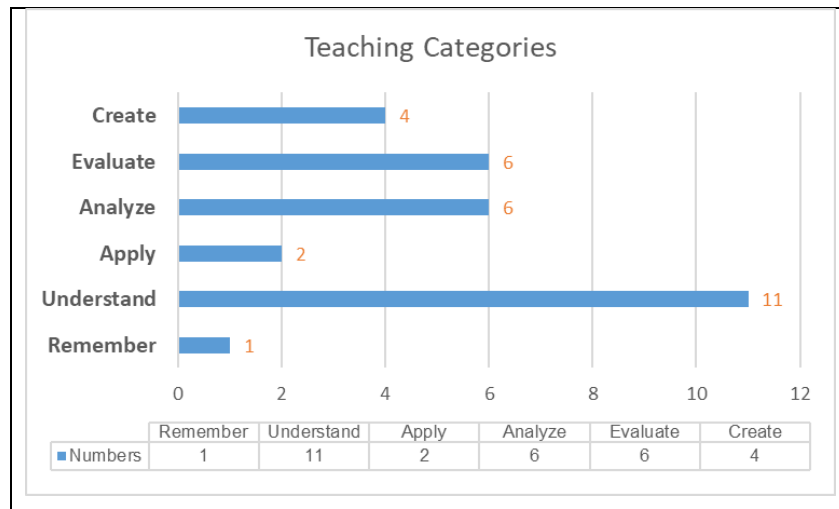
### Teaching categories

Each article was further analyzed for its teaching usage about the six types proposed in the taxonomy for learning, teaching and assessing and the results were coded (see table 2).

**Table 2. Teaching categories of using YouTube in teaching**

Paper	Teaching Categories					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Palvia, 2013			X			
Steyn and Prinsloo 2015		X				
Syler and Baker, 2016				X		
Hafner, 2014		X				
Kapp et al. 2009						X
McKemmish et al. 2018						X
Berk, 2009				X		
Clifton and Mann, 2011		X				
Lichter, 2012						X
Brook, 2011			X			
Lim Fat et al. 2011		X				
Duffy, 2008						X
Burke et al. 2009					X	
Tan and Pearce, 2011		X				
Buzzetto-More, 2015				X		
Alias et al. 2013				X		
Fleck et al. 2014					X	
Dougan, 2014					X	
Ljubojevic et al. 2014		X				
Roodt and Peier, 2013		X				
Majid et al. 2011		X				
Krauskopf et al. 2012	X					
Sherer and Shea, 2011				X		
Jaffar, 2012					X	
Szeto and Cheng, 2014		X				
Burke and Snyder, 2008					X	
Jones and Cuthrell, 2011					X	
Buzzetto-More, 2014		X				
Kruse and Veblen, 2012				X		
Othman, 2018		X				

I list one major teaching categories for each paper. This process yield following: remember (3%), understand (37%), apply (7%), analyze (20%), evaluate (20%), and create (13%). The result of all the categories is synthesized as following Figure 3.



**Figure 3. Major Teaching Categories**

Most literature lies in the category of understand. Because the primary element of YouTube is videos, which can be examples to explain difficult concepts and clarify students' understanding. YouTube is an effective teaching tool to engage students and support their understanding (Tan and Pearce 2012). For example, to determine whether YouTube use in the classroom has an impact on student engagement and understanding, Roodt and Peier (2013) conducted an online questionnaire and found that using YouTube in teaching had a positive influence on overall engagement and understanding. Another good example is that Tan and Pearce (2012) evaluated the potential effect of using YouTube in sociology course teaching. They used YouTube videos to illustrate key topics and raise discussion in the class. They found that YouTube videos can largely improve students' learning performance.

Due to the tremendous advantage of visualization effects and interactive feature, there is some research to evaluate and analyze categories. For the category of evaluate, Dougan (2014) found that faculty uses YouTube both in teaching and in their research. They use YouTube for teaching preparation and evaluation. While for the category of Analyze, Sherer, and Shea (2011) investigated four different types of assignments and analyzed the effect of using YouTube as an assignment. They found that incorporating YouTube in the assignment design and delivery can improve students' learning performance.

Because YouTube offers students an opportunity to edit and share their videos, there is some research focused on teaching category of create. One good example is that students use YouTube to create their own videos as assignments (Lichter 2012). Lichter (2012) found that this is effective for students to learn by performing not learn by listening. Another example is that physics teachers suggest their students to use YouTube to create videos as learning materials (McKemmish et al. 2018). By creating YouTube videos, students can gain skills to improve their communication and teamwork performance.

Not surprisingly, there is only one literature investigated YouTube's teaching category of remember. Multimedia like the video is not a good source for remembering or reciting key ideas. Krauskopf et al. (2012) pointed out that instructors can use YouTube videos to find the teaching plan and materials. This information on YouTube is accessible for instructors to understand and remember.

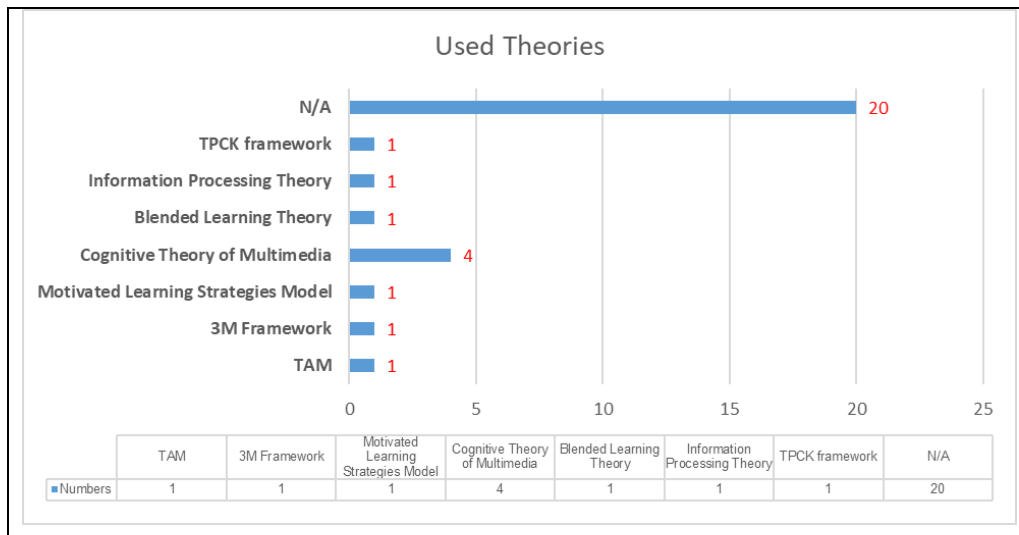
There are several papers focused on apply. Brook (2011) argued that YouTube is a useful supplementary tool for teaching and learning. Instructors can apply YouTube in teaching by demonstrating difficult concepts. Palvia (2013) applied Megaphone, Magnet, and Monitor Framework and explored the opportunities available to use Youtube over and beyond Blackboard. He found using YouTube as a megaphone, magnet and monitor for teaching is practical and promising.

In conclusion, this section reveals that the top three teaching categories of using YouTube are understand, analyze and evaluate. Researchers can seek more research opportunities from other different categories, like apply.



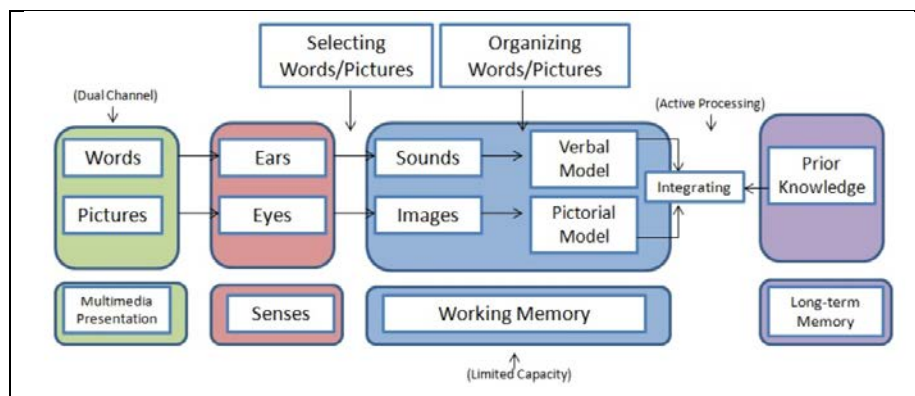
## Used theories

In this section, used theories of YouTube teaching literature are presented. As shown in Figure 4, several fundamental theories have been used by previous research.



**Figure 4. Used theories**

Based on the results above, Cognitive Theory of Multimedia is the most used theory. It describes all the dual-channel processing that learners do when using multimedia teaching (Mayer and Moreno 2003). There are three assumptions of this theory; these are dual channel, limited capacity, and active processing. The theory is illustrated as following figure 5.



**Figure 5. Cognitive Theory of Multimedia adopted from Mayer and Moreno (2003)**

There are two rows of information-processing channels: the auditory/verbal channel and the visual/pictorial channel (Gasigijtamong 2013). Multimedia learning requires a lot of cognitive processing through two channels (Mayer 2002). The five columns each represent the modes of knowledge representations or physical representations (Mayer 2002; Mayer and Moreno 2003). The following theories have been used at least one time to investigate using YouTube in teaching activities: Megaphone, Magnet, and Monitor Framework (3M) Framework, Motivated Learning Strategies Model, Technology Acceptance Model (TAM), Blended Learning Theory, Information Processing Theory, and Technological Pedagogical Content Knowledge (TPCK) framework.

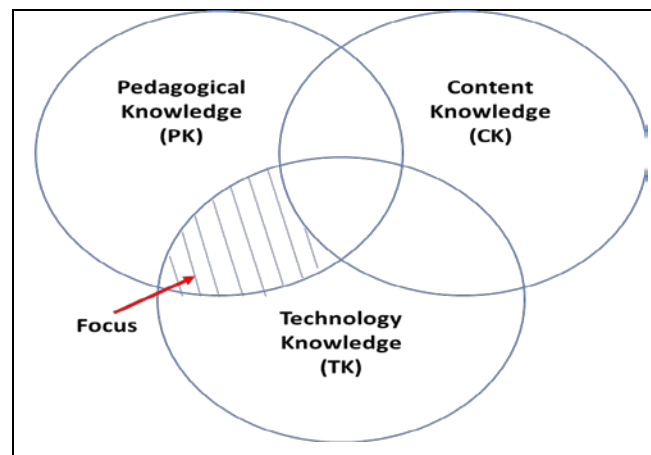
In sum, the Cognitive Theory of Multimedia has mainly used to explain using YouTube in teaching activities. Future research can apply different theories to investigate other topics of YouTube in teaching, like continuance use of YouTube in teaching. However, simply applying existed theories for



YouTube teaching study is not enough. We need to consider YouTube's unique benefits and different contexts to update our traditional models or create our own YouTube frameworks.

## Discussion

TPCK framework is an essential educational framework, which integrated technological aspects of knowledge (TK), content knowledge (CK), and pedagogical knowledge (PK) together (Krauskopf et al. 2012). This framework can be illustrated as following figure 6.



**Figure 5. TPCK framework adapted from Krauskopf et al. (2012)**

In this paper, we focused on the interaction between TK and PK. This area refers to the knowledge about how technologies like YouTube affect teaching activities, and how particular teaching concepts can take advantage of the different functions of this technology tool (Koehler and Mishra 2009).

This literature illustrates the benefits and limitations and teaching categories of using YouTube in teaching activities. Since the relationship between pedagogical knowledge and technology knowledge has rarely been investigated (Krauskopf et al. 2012), this literature contributes to enriching our understanding in this section. Instructors can draw upon these significant features of YouTube made in this paper. These features can help instructors understand what benefits they can gain from using YouTube in teaching and what limitations they need to avoid or mitigate. This literature can guide instructors, particularly if the instructor does not have any experience of using technology in teaching, to apply YouTube in teaching effectively and correctly.

## Limitation

This literature review does have some limitations. First, the small number of selected literature. The representative selection of four databases is by nature leaving much research out. I can address this drawback by extending a certain degree of the search range to gather more relevant research papers. Second, the classification for the literature is all made by my own reading. If literature covers more than one teaching category, I only conclude in one. This will lead to the risk of selection bias. I can invite more authors to select and read these papers independently. After individual work, we need to resolve disagreements through consensus and list teaching categories of each literature. Third, the searching method can be improved. We only used keywords to search for literature. Combining more different keywords may result in some new insights.

## Conclusion

Overall, the goal of our literature review is to summarize the current state of knowledge about using YouTube in teaching activities. Based on the focus of the articles and selection criteria, we finally selected 30 papers for our review materials. There are three main benefits of using YouTube in

teaching activities: information-based, engagement-based and communication-based benefits. While credibility, efficiency, and availability are three main limitations. Most research is investigating using YouTube as a teaching tool in the category of Understand, and most used theory is the Cognitive Theory of Multimedia.

As the importance of understanding and applying innovative technologies, like YouTube in our teaching environment is so apparent, we hope this literature review can be a guidance for instructors when using YouTube in teaching. It will also encourage more and more instructors to engage in this promising and fascinating field.

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