

Using YouTube as a Collaborative Learning Environment: A Case Study

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## Introduction

In the past year, I have observed many instances of learning that is occurring informally with the video sharing website (and application or "app") YouTube. Founded and created in early 2005, YouTube was an instant success, as individuals could upload their videos to share with the world. It was so successful, that in just over a year, Google bought the company for \$1.65 billion (Dickey, 2013).

For myself, I recently bought a house that needed to have some renovations done. I had had no experience with this type of work – drywall especially! I turned to YouTube for some advice. After watching YouTube videos, I was able to successfully build a new bedroom, including putting up drywall, mudding and taping, and painting it. I was not asked by an instructor in a classroom to learn this, but by my own volition. This is now an example of the type of learning that is now occurring in everyday life. However, it is not just adults that are learning informally, but also kids. YouTube has become a learning tool for them – learning musical pieces for the piano, learning how to create a bracelet with coloured elastics, how to pass a level of their favourite video game, to name a few examples.

I recently attended a conference on social media, which was keynoted by Alec Couros, a professor of educational technology and media at the Faculty of Education at the University of Regina. Throughout his keynote address, he showed numerous examples of how social media, and more specifically YouTube, was changing the educational landscape. It was not necessarily in formal education, but mostly outside-of-school learning. Social media, YouTube, and Web 2.0 in general, has become intertwined into everyday life and especially in the lives of children.

However, it was one of his examples involving YouTube that caught my attention. We viewed a YouTube video that was created by a young boy (<https://www.youtube.com/watch?v=JuFsDN8dsJU&list=PLpKuMokLw3TWPU1ff5tUh2crZKfDQfjSX>). As I mentioned before, I considered YouTube to be a great place to learn from someone who has had experience with a technique I was interested in or wanted to learn. This young man, however, used YouTube for a different purpose. He wanted to learn how to make a fire using a bow drill and was asking for help! In his video, he shows the technique he is using and declares "he knows he is doing it wrong," and asks other users to comment on how he can succeed. This is a great example of how YouTube can be used for collaborative learning.

In education, there is a new pedagogy called 21<sup>st</sup> Century Learning. According to the British Columbia's Premier's Technology Council, the skills and attributes of a 21<sup>st</sup> Century Learner are:

- Functional Numeracy and Literacy
- Critical Thinking and Problem Solving
- Creativity and Innovation
- Technological Literacy
- Communications and Media Literacy
- Collaboration and Teamwork
- Personal Organisation
- Motivation, Self-Regulation and Adaptability
- Ethics, Civic Responsibility, Cross-Cultural Awareness (British Columbia Premier's Technology Council, 2010)

YouTube is a great example of how students are learning informally using 21<sup>st</sup> Century Learning principles. In the case of the young boy with the bow drill, he was able to demonstrate critical thinking, technological literacy, communication, motivation and especially collaboration. This research proposal is based upon these ideals.

### Research Questions

My research questions are directly related to the ideas of 21<sup>st</sup> Century Learning and collaborating to apply to public education. If students are already using YouTube to learn informally, why not bring what is working outside of the school, into the school? Before I state my research questions, allow me to present the context that the study will take place in.

### Context

At my school, I am the sponsor teacher of a robot club for grade five and six students at Shannon Lake Elementary in West Kelowna, BC. I started the club after I recently came across the research of Seymour Papert and his book *Mindstorms*. Papert describes how children, using the "language of math" and constructivism, could program and learn from problem-solving using robots (Papert, 1980). More recently, the company Lego has created a division within their company called Lego Mindstorms which is a continuation of Papert's ideas.

Before starting this lunch hour club, which I have just simply named "robot club", I asked the grade five and six teachers in my school for a list of names of students who are stronger in math and science, but also that have a learning attitude that would accept failure. It was important to me that the students learn that in the creation and programming of these robots, they would need to learn from their mistakes. I did not want any students who would quit the club because it was *too hard*. At the first club meeting, I told the students that they would be learning to program robots to perform specific tasks. I also told them that it would be difficult and that they *will* fail, but there was a whole community of other robot builders on the Internet, and it would be our task to connect with them. Lego Mindstorms has a community discussion forum

that could be used to help solve problems, but I told them that YouTube will also be a great resource for them to collaborate.

### **Question**

Using the context of using YouTube collaboratively to co-construct knowledge, I will use a case study of this robot club, with the grade five and six students as participants. My problem question is: how are learners using YouTube collaboratively to build knowledge? My objective is to see if informal learning using YouTube could be applied to the public education system. If so, students, and teachers, could benefit greatly from this type of learning.

### **Critical Review of the Literature**

YouTube, as aforementioned, was founded in 2005 and did not receive mass public appeal until Google purchased it a year later. In the eight years since its popularity, there has not been a large body of published literature on YouTube. There *are* examples of how certain groups are using it to teach in different domains, such as nursing, dentistry, Shakespeare, physics, and physical education. However, this body of literature is more concerned about appealing to visual learners by using the videos for demonstration only, or for students to avoid listening to a lecturer "drone on". I am more concerned about how YouTube can be used collaboratively to build knowledge. With this in mind, I will detail the literature that deals with this belief.

### **Constructivism**

Constructivism is a theory where individuals or groups construct knowledge with one another collaboratively. Jonassen says that "constructivist conceptions of learning... assume that knowledge is individually constructed and socially coconstructed [sic] by learners based on their

interpretations of experiences in the world" (Jonassen, 1999, p. 217). In his description of what a constructivist learning environment requires, Jonassen states that you need some key elements. The key element that supports using YouTube as a learning environment is the need for an authentic problem or question to be answered within a community of stakeholders. YouTube could be considered a constructivist learning environment because real problems, demonstrated by users, can be solved collaboratively with other users.

### **Peer Feedback**

In order to collaboratively solve problems within a learning environment such as YouTube, users require the presence of feedback. Peer feedback between users is a valuable way that users can comment on one another's ideas through their videos. Anderson (2012) explains that "peer feedback is sometimes more beneficial to the learning environment because when students respond to and explain material they are gathering more information to push into memory" (p. 22).

### **Participatory Culture**

Participatory culture is another term that applies to learning with YouTube. Henry Jenkins (2010) defines participatory culture as:

1. relatively low barriers to artistic expression and civic engagement,
2. strong support for creating and sharing creations with others,
3. some type of informal mentorship whereby what is known by the most experienced is passed along to novices,
4. members who believe that their contributions matter and,
5. members who feel some degree of social connection with one another (at the least, they care what other people think about what they have created) (p. 5-6)

Jenkins goes on to describe that young people are already participating in online environments and evidence of this is through collaborative problem-solving by "working together in teams... to complete tasks and develop new knowledge" (p. 9). YouTube is an environment that can support Jenkins definition of participatory culture. Users freely upload their videos hoping to connect with others and create new knowledge or demonstrate their learning.

There is literature describing the many methods that YouTube could be used in a classroom, or education in general, however, the lack of literature of how YouTube can be used to problem-solve collaboratively demonstrates a need for such research. This proposed study will help analyse how students are using YouTube to learn a specific task.

## **Research Method**

### **Method Chosen**

The research that will be performed for this proposal will be a qualitative case study.

### **Participants**

#### **Description**

The participants of this study will be eighteen grade five and six students who are members of a robot club and meet 1-2 times per week. These students are enrolled at Shannon Lake Elementary in West Kelowna, BC. Within this group, there are three grade six students and fifteen grade five students. Of the eighteen students, only six are female. Generally, these students are either meeting or exceeding grade level expectations. However, there are two grade five students, one male and one female that would be considered minimally meeting or below grade level expectations.



### **Rationale**

The rationale behind the selection of these students is that they are already collaboratively learning how to create and program robots (from the Lego Mindstorms series and using different models). These students receive zero instructions from the sponsor teacher (myself) and are instructed to seek knowledge from other sources, especially YouTube. I chose a case study, as this club has a small number of members (due to lack of funding for more robot kits).

### **Exclusion of Participants**

There are two grade five students, one boy and one girl, who are significantly below the level of the other grade five students. I am considering to exclude these students, as they would not represent the larger sample. However, it would be interesting to compare their learning against the other students.

### **Ethical Issues**

Given that all of these students are only eleven or twelve years old, and the study would take place at a public elementary school, there are some ethical issues. Informed consent, confidentiality, permission from parents/legal guardians, and consent from the school and the school district are ethical issues that must be addressed.

### **Instruments or Materials**

#### **Tests**

To begin this study, I will conduct a pre-test of programming knowledge in regards to the Lego Mindstorms robots. Since these robots will be completely new to most of the students (and

perhaps *all*), I expect that they will not know how to create any tasks for the robots to perform. At the end of the study, I will conduct a post-test to assess what knowledge they have gained through their experiences in this club. These tests will be assessed through a comparative demonstration of the students' programming abilities both before and after.

### **Interviews**

In addition to the demonstrative tests, interviews will take place to learn what the student knows and later what they have learned. Students will be interviewed individually and these interviews will take place at the beginning, mid-point and end of the study. These interviews will be recorded by audio/video.

### **Journals**

During this study, students will be asked to keep a journal. At the end of each robot club session, students will be asked to describe what they learned that day, how they learned it, what they hope to learn, and how they are feeling about their learning.

### **Researcher Observations**

I plan to be an active participant observer during this case study. Because I am the only teacher in the club, students will naturally interact with me during the study. At the end of each session, I will keep field notes of my observations that day. It would be conceivable that I will not be able to actively write during each session, however, I plan to record what I remember at the end of each session.

### **Unstructured Interviews**

Because I will be an active participant observer, I will have many opportunities to have informal interviews with many students each day. I will keep notes from these conversations either in my field notes or on a separate form. It is likely that I will have to paraphrase many of these conversations.

### **Procedure**

#### **Setting**

The study will take place at Shannon Lake Elementary in West Kelowna, BC. Within the school, it will take place in the Multipurpose Room (computer lab). In this room, there are approximately thirty laptops and an interactive white board with a projector.

#### **Participant Roles**

The students in the club are broken into four groups. Two of the groups are using the new EV-3 model which enables more complex designs, as well as a remote control. The other two groups are using the NXT model, which is simpler in its capabilities, but easier to program and build. Groups are given only the instructions from the robot model's accompanying instruction manual, but are encouraged to work together collaboratively and seek information using YouTube. If they encounter a problem while programming and cannot progress, they will record a short video demonstrating what they know and will ask other users for help.

Groups are to create robots of their choice and have them function in a manner of their liking. Once they demonstrate this skill, they move on to another build of the current model or rotate into another group.

## **Research Design and Analysis**

### **Rationale**

YouTube is an educational resource that has very little research in terms of its ability for its users to learn collaboratively. This study will help fill the knowledge gap and create a description of how it can be used effectively in teaching.

### **Collection of Data and Analysis**

Data will be collected by the means described in the Instruments or Materials section above.

### *Analysis*

Analysis of the data collected during this study will be done by the listing of common observations in the field notes, establishing themes, coding patterns in the data, analyzing cause and effect relationships, and looking for "what's missing" from the study.

<b>Data Collection Technique</b>	<b>Associated Data</b>
Pre-test of knowledge	Establish knowledge base of programming abilities
Pre-study interview of students	Establish knowledge base of programming abilities and attitude through video/audio recordings

Mid-point interview of students	Establish growth in knowledge base of programming abilities and attitude from the start of the study through video/audio recordings
Post-study interview of students	Establish growth in knowledge base of programming abilities and attitude from the start and mid-point of the study through video/audio recordings
Participant Journals	Contains student perspective of learning
Unstructured interviews	Measures student learning and attitudes informally

Table 1: data collection technique and associated data

### Schedule of Activities

The timeline of the research is shown in Table 2.

Date	Research
April 2014	<ul style="list-style-type: none"> <li>- Pre-test of knowledge</li> <li>- Pre-study participant interviews</li> <li>- Observational field notes</li> <li>- Unstructured interviews</li> <li>- Submission of participant journals each week</li> </ul>
May 2014	<ul style="list-style-type: none"> <li>- Mid-point interview (May 14)</li> <li>- Observational field notes</li> <li>- Unstructured interviews</li> <li>- Submission of participant journals each week</li> </ul>
June 2014	<ul style="list-style-type: none"> <li>- Observational field notes</li> <li>- Unstructured interviews</li> <li>- Submission of participant journals each week</li> <li>- Post study interview (June 24-25)</li> </ul>

Table 2: Case Study Research Timeline

### Discussion

Students have many interests and hobbies that differ from the subjects that are learned in a formal setting such as public school. With the advent of Web 2.0, Internet users have the tools to be able to construct their own media and display it for others to view. YouTube is a Web 2.0 website/application where learning happens informally on a daily basis and users are learning specific tasks that stretch across many different domains. There are thousands of examples of "how to" videos that can be used to inform others of their experiences and their learning. YouTube is also being used as a medium to enlist the help of others. In this manner, users are co-constructing learning and knowledge with others. With this in mind, YouTube can be considered a constructivist-learning environment.

Because of this research, I expect to see that the grade five and six students will use YouTube to learn a specific task in programming their robots. I also expect them to have many failures and that they will turn to other YouTube users for guidance.

This case study will be significant, as there are very few studies that have been done using YouTube in this way. Educators will find value in this research, which they can apply to their own teaching. With the pedagogy of 21<sup>st</sup> Century Learning gaining more acceptance, teachers are discovering that their *students* are the ones creating knowledge and not necessarily being passed directly from the teacher through lectures (moving from the "sage on the stage" to the "guide on the side").

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**Appendix: Interview Questions**

## Interview Form – Pre-Study Interview Questions

Date \_\_\_\_\_

Student Pseudonym \_\_\_\_\_

## Questions:

1. Have you ever used YouTube before? If so, approximately how often do you use YouTube... each day/week?
2. Have you ever used YouTube to learn something you were interested in?
3. Have you ever used YouTube to ask for help in learning a specific task you were interested in?
4. Have you ever helped others on YouTube that were asking for help learning a specific task?
5. Did you know of the Lego Mindstorms robot models prior to the robot club starting?
6. Have you had experience building and programming robots prior to the robot club?
7. How do you anticipate to learn how to program the robot to perform a specific task?
8. How could you use YouTube to learn how to program the robot to perform a specific task?
9. What do you hope to learn from the experiences you will have in this robot club?
10. What questions do you have about this study or robot club?



## Interview Form – Mid-Point Study Interview Questions

Date \_\_\_\_\_

Student Pseudonym \_\_\_\_\_

1. What have you learned in this robot club so far?
2. Have you learned to program a robot to perform a specific task? If so, describe how you accomplished this.
3. Have you used YouTube to learn how to program a robot to perform a specific task? If so, describe the process from learning on YouTube to the task the robot performed.
4. Did you encounter any problems where you and your group could not progress any further?
5. Did you use YouTube to ask for help from other users? If so, were there any responses? How quickly did they respond? Did this help you achieve your task?
6. What do you hope to learn in the remaining portion of the robot club?
7. Do you have any questions regarding this study or the robot club in general?

## Interview Form – Post-Study Interview Questions

Date \_\_\_\_\_

Student Pseudonym \_\_\_\_\_

1. What have you learned in this robot club since the last interview?
2. Have you learned to program any more tasks for the robot to perform? If so, describe how you accomplished this.
3. Have you used YouTube to learn how to program a robot to perform a specific task since the last interview? If so, describe the process from learning on YouTube to the task the robot performed.
4. Since the last interview, did you encounter any problems where you and your group could not progress any further?
5. Did you use YouTube to ask for help from other users? If so, were there any responses? How quickly did they respond? Did this help you achieve your task?
6. What have you learned about using YouTube as a resource to learn specific tasks?
7. What have you learned about using YouTube as a place to ask for help?
8. Would you recommend that others use YouTube to learn a specific task?
9. Would you recommend to others that they use YouTube as a place to ask for help?
10. What are your feelings about YouTube now that this robot club has ended?
11. Do you have anything else you would like to say about the robot club or YouTube?