

Utilizing Social Media and Student-Generated Images and Video as a Facilitator of Metacognitive Skills

Lucius Von Joo, and Eric Hall

Abstract--This paper is for an initial study whose aim is to investigate the possible connections between student-produced images or video and their language development as related to metacognition. Video and photography are distinctly advantageous because they are intensely context rich and create a concrete format that acts a catalyst for the use of metacognitive skills. The production process, from pre-conceptualization to production, and post-conceptualization is entirely controlled by the students; hence the level of investment is influenced. An internal camera in our minds is constantly producing images as we conceptualize the abstract linguistic cues around us. This process may be diluted by exposure to explicit and guided imagery. For this study, students exhibit their images and videos to their peers using Pheed, a social media networking platform. Social networking is unique as a platform for academic peer interaction because it's possible to create a boundless, ever-expanding and spontaneous web of interactions between students that more traditional forms of exhibition cannot accommodate.

Keywords--Metacognition, Metacognitive Skills, Social Networking, Mutli-Vocal Ethnography, Video, Photography, Internal Camera, Language Development

I. INTRODUCTION

1.1 Research Question:

Are students' metacognitive skills activated by encouraging students to realize, produce, and reflect upon their own images in the absence of explicit and guided imagery?

1.2 The Concept of the "Internal Camera"

Our minds are constantly at work visualizing things we cannot see but have been told about, or that don't physically exist but have been imagined. However, these images are seldom created within a vacuum. They are in response to external cues, those both introduced to us deliberately and those we encounter incidentally in the world around us (Bruning, Schraw & Ronning, 2004) and the results are unique to each individual. Given the same cue, no two people will create exactly the same mental image in response to that cue. Each person creates an image nuanced by their own experiences (Glaserfeld, 1989). This process is something we begin to learn to do from the time we are infants and something we come to do intuitively as adults (Vygotsky, 1986). It helps us make sense of the world around us by enabling us to compare one thing to another in order to measure how they relate to each other.

It is, at its most basic level, a process of categorization and classification. This internal conceptualizing mechanism can be described as the "Internal Camera" of our minds (Kosslyn, Thompson, & Ganis, 2006).

The most extraordinary feature of the Internal Camera is that the images that it creates are viewable only by the person in possession of the camera. The same barrier that prevents people from reading our minds is the same that keeps us from sharing these images directly with others. We spend much of our time explaining to others the details of these images (e.g. our concept of love, or what our dream house looks like) but our description and their understanding of what we have in our minds always remain imperfect (Dewey, 1910). We are limited by the nature of whatever mode we choose to relate our ideas to others. It is an analog process where something is always altered in the transfer through the imperfection of the mode and the interpretation of the recipient. Normally these images are described using language; at times written, but most often spoken. This description of an internal image is in itself an external cue for the recipient, and is thereby transformed into another mental image by their own internal cameras, but one that is fundamentally unique to the original. A person's ability in describing an internal image can directly influence the level of meaning vividness for the receiver. Meaning vividness is how clearly the internal image can be communicated. Meaning vividness is often measured by the amount of clear and purposeful detail someone can put into an imagined image. This has been rigorously tested in sports psychology. A correlation linking how well a person can express a vivid image of an imagined outcome with what that person could accomplish has been shown in multiple studies. For example a person who trained to vividly express a picture of winning a race could often beat their personal records (Morris, Spittle, & Watt, 2005). Meaning vividness research has been a prominent subject of research in sports psychology due to the competitive nature and the high stakes involved in winning and losing for those in the field. However, meaning vividness also greatly influences the general level of meaning making in communication (Thomas, 2010). Just as the acquisition of language has many tiers, so too does the acquisition of visual imagery. For example, what is concrete and what is familiar to the user can be more easily expressed. Just as the word "dog" is easier to picture in the mind's eye than a word such as "impediment" (Palvio, 1971). However, this process of creating and delineating the images we have in our minds is an intuitive one that we normally don't think about explicitly (Wesch, 2010). In our study, we attempt to create a way for participants to become conscious of this process and to make it a deliberate exercise through the introduction of specific external cues, use of thoughtful pre-

Lucius Von Joo is with the Kanda University of International studies, Makuhari, Chiba, 261-0014 JAPAN

Eric Hall is with the Kanda University of International studies, Makuhari, Chiba, 261-0014 JAPAN

conceptualization, creation of an external image inspired by the internal image, and then a post-conceptualization where the original image created by the Internal camera is compared with the externally created image.

II. METHOD

2.1 Participants

All participants were university students at both the graduate and undergraduate levels. The experimental group consisted of members of media related courses that already had video production aspects involved in the course curriculum. The current sample group includes students attending university in Japan and Pakistan. All students use English regularly in their studies, though English proficiency among participants varies widely.

As an action research study, the sample participants were chosen from media English classes at two universities. We chose media classes specifically because the study could be beneficial in their English study and easily integrated without disrupting pre-existing curricula. Initially, we wanted the sample group to be taken from at least three different countries to follow the work of Joseph Tobin's (1989) multivocal ethnographic methods. However, the third country's sample group was unable to participate. Because of the nature of the multivocal ethnographic design all participants collaborated with a cohort of other participants in their class and at the collaborating school. All individuals who were requested to participate did, however the range of completion of the tasks varied amongst the sample group the average being 11 of the 15 cues (see figure 2). The sample size is currently 106 participants, 98 undergraduate and 8 graduate students.

2.2 Choice of Photo and Video

Though we normally use language alone to describe our internal images to others, this seldom requires us to reflect upon the process explicitly. We wanted to have our research participants translate their internal images into a more concrete medium that could be more easily compared with their original internal images. These images were also displayed to the other participants in their cohort and were commented and reflected upon. We chose to have our participants create still photographic images and video, because we believe it's a unique medium that offers advantages that many others don't. We believe there are four main advantages to the use of photography and video for such an exercise.

The first reason is due the ubiquity of photography and video in modern society. With the prevalence of smartphones and tablets in developed nations, the student who isn't in possession of one or the other is more and more often now the odd one out (Fiegl, 2014). Even if there are students who have neither, it's unlikely they don't know someone who they could borrow from.

The second is because the photo and video capabilities of these devices have advanced dramatically in the last five years, and now they're able to render impressive multi megapixel still images and full HD video. Impressively high quality media can be created by anyone with a mere press of the

button due to these devices' sophisticated automatic settings. Students need not be versed in the particulars of photographic or cinematographic technique or technology. The design of these devices has removed many of the obstructions students would have faced in the past in representing their ideas with photo and video.

The third reason has to do with convenience and connectivity. Smartphones in particular are enabling people to take more photos and videos than ever before. Step backwards 20 years into the film era and imagine what would be involved if someone felt the urge to take a photo of all their meals and then somehow share the photos with most of their friends and family (Fallon 2008). Imagine how expensive and time consuming this would be to accomplish. Now everyone seems to be documenting their meals (in addition to many other quite ordinary facets of their lives) and sharing it with everyone they're connected to online. This is not being done because there's a need to, but only because it's so *extraordinarily* easy. And ease is not the whole story. Photography and video have become conversation. Unlike the past, photography has now emerged as a social activity. People now possess cameras that can produce very high quality digital photos and videos combined with the networking potential to share their media with millions of others globally mere seconds after they've shot them... and they walk about their daily lives with these extraordinary devices *in their pockets* (Wesch, 2010). What's even more extraordinary than all this is that nobody seems to give any of it a second thought. In essence, photography and video have become conversations being held by individuals both nearby and across the globe. Participating in these conversations is now second nature to the young and plugged in, and it's easily put to the service of educators if they're mindful of its potential. This is precisely what we're counting on. Ask anyone when the last time it was that they painted, sculpted, composed a song, or wrote a poem, and with a few exceptions, the answer would be not for a long time (if ever, in many cases no doubt). Ask the same question about the last time they took a photo or video, and you wouldn't be surprised to be presented with a smartphone displaying a photo of last night's dinner. Photo and video, unlike other art and media, are created by nearly everyone without reservation or fear. In the words of Steven Mayes "Suddenly everyone is fluent in the language of photography" (2014).

The final reason why we chose photo and video as the medium for our research is because visual imagery is relatively concrete when compared to language. This is not to say that the viewer doesn't alter their images depending upon what kind of mental lenses and filters they view them through or who their supposed audience will be (Ranciere, 2009) but even so, we felt photo and video would be more easily reflected upon by the creators since they're in possession of the original internal images that inspired the photos and videos they've created. We hoped this would enable a reflection process where students could explicitly think about their own thinking (Flavell, 1979).

2.3 Choice of Platform

After our decision was made to focus on photo and video, we wanted to utilize a platform that could be used easily to create an interactive community for peers to respond validate and critique each other's processes. We wanted this platform to collect data and allow for a virtual interactive space. The postings from participants could be analyzed individually as well as a collectively. We also wanted a platform that would enable distance collaboration as well as allowing the participants to act as both inside and outside spectators and creators simultaneously (Ranceiere, 2009). Initially we had considered creating our own platform, but due to bandwidth restrictions and accessibility we eventually opted for a preexisting platform. After reviewing several online platforms we found the best combination of elements in Pheed, which is a social network focusing on enabling users to post video, audio, or text in a linear blog form. Pheed is similar to Facebook. However, there are a few significant differences that make the network more effective for use in the classroom. Like Facebook, all the posts created by members are organized in a chronological linear form much like a journal. However, unlike Facebook the site developers encourage users to create specific types of posts:

The social design on Pheed encourages users to create original content. Users can easily upload video, audio, words, pictures, or even a live stream onto their Pheed. One of the first aspects of the site we noticed was the little "copyright this pheed" button at the bottom of each post you make. All the while, we wondered what element set these guys apart from their intimidating list of competitors: Facebook, Twitter, and Instagram (to name a few). From the moment you Google the site, their slogan has answered that question: Express yourself. The mere presence of this button serves as a little, constant reminder that you should be posting your own content. The idea of original content on social sites has always been confusing, and Pheed has taken a massive step in offering peace of mind to their users (without making them dig through a mountain of privacy policy pages). (PC Tech Magazine, 2012).

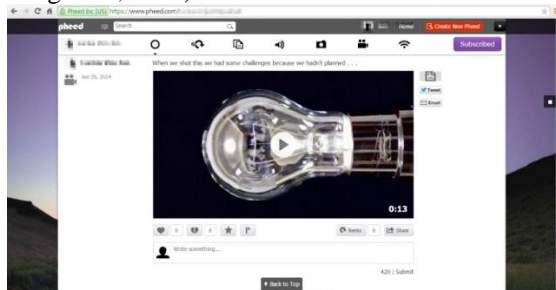


Fig 1. Screenshot Of The Pheed Social Network System Application, In Computer Form. The Top Icons Are The Choices For The Types Of Media Participants Can Choose To Post In.

For our research purposes Pheed seemed to be the best fit for what we're trying to accomplish. Social network sites often encourage users to post media from secondary sources. However, Pheed distinguishes itself in encouraging its subscribers to produce and post original media. Also in regards to functionality of the platform in the classroom, signing up for Pheed is simple. And once an account is created, posting multi-modal media requires only clicking on

a few buttons. Furthermore, though the participants are able to see their peers' submissions and comments, they are also able to protect their profiles from outside viewing by enabling specific privacy features built into the platform. Pheed is primarily intended to be used on tablets and smartphones using either Android or Apple operating systems. However, once an account is created, Pheed users can also use computers to access and upload media. Pheed was also chosen because it is not common amongst students personal social networking, which we hoped would facilitate separation between students' school and personal online identities so that activity unrelated to their work is minimized. Social networking is blending multiple identities together, often linking one online account with another because of agreements between different online platforms or the acquisition of one by another (e.g. the acquisition of Flickr and Tumblr by Yahoo! Inc.). Pheed however, is (for the time being) essentially free of these connections.

There is definitely merit to using social networking tools that participants are familiar with because it's something that they already bring to the classroom making it co-constructed. However, due to the aforementioned reasons, we choose Pheed to simplify the experiment. The skills needed to use Pheed are essentially the same as the ones needed to use most other popular social networking platforms, and thus, the participants are still learning practical skills through their participation.

2.4 External Cues

We provided a list of cues for participants to create a video on. They were to plan, create, upload, and reflect upon one cue per week on average. We wanted the cues to be a single word in order to let the participants create their own interpretation of that cue with minimal outside influence (with the exception of "sound" which limited explanation was needed).

Weekly Captured			
	Topic	Mon	Thu
September			☆○16 19
			○23 26
	Emotions	30	3
October	Color	7	17
	Light	☆○14	17
	Shadows	21	□24
November	Angles	□28	31
	Sounds with only video no audio	☆4	7
	Family	11	14
	Work	18	※□21
	Money	25	28
December	Fruit	2	5
	Broken	9	12
	Hidden/ secret	16	19
	Lost	☆○23	26
January		30	2
	Clothing	6	9
	Admire	○13	16
		20	<23>

Fig 2. The Schedule Of Cues Given To Participants.

*Note: Numbers indicate the days of the month, the other symbols (stars, circles, squares, etc...) indicate Japanese national holidays, and whether or not classes were held in spite of these holidays.

III. RESEARCH OUTLINE

The research followed a multi-vocal ethnographic approach in each tier collected through online learner postings and narratives describing their pre-conceptual and post-conceptual creative processes.

Data Collection Tiers		
Preconception stage	Production Treatment	Post-production/post conceptualization
The student is provided with a minimal prompt (see fig. 1). The student thinks about the prompt and imagines the best way to represent it with photography or video.	The student produces the image or video they conceptualized and then describe what they produced.	Students examine and analyze the final product and compare it to their original concept addressing their similarities and discrepancies and/or any changes they made to their original plan.

Fig 3. Chart Of The 3 Stages Each Participant Completed For Each Cue.

IV. RESULTS

In our attempt to measure participant metacognition, we adapted the Metacognitive Thinking Skills (MTS) Scale developed by Tuncer and Kaysi (2013). According to the developers, metacognitive skills “refer to all skills of critical and creative thinking, decision making and problem solving. Critical thinking is a form of thinking which consists of mental processes such as reasoning and assessment.” (Tuncer & Kaysi, 2013). In their scale, four specific categories are included. These categories are: Reflective Thinking, Reflective Thinking Skills Towards Problem Solving, Decision making Skills, and Alternative Skills of Evaluation.

In our treatment of the data, we examined participant writing describing their pre-conceptualization planning processes and their post-conceptualization reflections and attempted to determine what types of metacognitive skills participants were exercising according to the MTS scale. We have included the holistic band descriptions that we adapted from Tuncer and Kaysi’s (2013) scale, followed by samples of participant Pheed reflections and their placement within scale.

MTS	A. Reflective Thinking	B. Reflective Thinking Skills Towards Problem Solving	C. Decision Making Skills	D. Alternative Skills of Evaluation
HOLISTIC BAND DESCRIPTIONS	1. I create samples to make knowledge more meaningful. 2. I try different working methods to obtain the best solution. 3. Before beginning a new task, I think of what I will need to learn the task. I can learn better due to my previous knowledge. 4. After I complete my task, I repeat significant points in order to assure that I have learned it.	1. After solving a problem, I think if I could find a better way. While solving problems, I ask questions to myself in order to find different ways of solution. 2. When I cannot solve a problem, I ask questions to myself to understand why I cannot solve it. 3. After I solve a problem, I compare my results with my friends’ result and evaluate the solution. 4. When I read a problem, I think of similar problems that I solved before and make connections concerning the differences between the new problem and the old ones.	1. I think about how my decisions can affect others. 2. I think of the consequences of my decision. 3. I think of options before I make a decision 4. Before I make a decision, I think carefully what, how and to whom my decision will address	1. I am aware of thinking technique or strategies concerning the topic I am working on. 2. I am aware how my thinking mechanism works. 3. I correct my errors. 4. I change my thinking technique or strategy of my work when necessary

Fig. 4. Metacognitive Thinking Skills Rubric Used For Coding Student Text Samples

4.1 Individual Comments and Analysis

Below are selected participant texts located underneath descriptions of the specific MTS Holistic Bands they were

coded under. As stated before, not all metacognitive skills were exhibited and as such are not included below:

A. Reflective Thinking:

1. I Create Samples To Make Knowledge More Meaningful.

“shadow: My image of shadow is sundial. When I was child, I went to park and there was a big sundial that was made from stone. This sundial showed what time by shadow. Then I thought shadow is so interesting and how to make it. So, first when I listened the word "shadow", I remembered this old memory.”

2. I Try Different Working Methods To Obtain The Best Solution.

“Reflection 'emotion': because I used Vine, it was much easier than shooting with smartphone's camera, then combine and edit later.”

“I wanted to make a "fruit" describing it simply, so I tried to use RoadMovies again. However, this app has a limit to take pictures. Actually, there were more words and fruits I wanted to use, but I couldn't. I think this movie is flat. If I use many pictures to make videos next time, I'll choose another app.”

3. Before Beginning A New Task, I Think of What I Will Need To Learn The Task. I Can Learn Better Due To My Previous Knowledge.

“My image of "emotion". I think emotion is like weather in our mind so it is vary and influenced by so many things. Therefor, each person has each emotion. In addition, emotion can be shared with other people. Even if you are sad, other people share it with others it will be half. The other hand, when you are happy, you share the emotion, it will be double.”

B. Reflective Thinking Skills Towards Problem Solving:

1. After solving a problem, I think if I could find a better way. While solving problems, I ask questions to myself in order to find different ways of solution.

“Reflection of family: I used toy blocks to build a house, I think this house is not good, but I could express my image. So, I love this video. However, i wanna add wife and husband at last scene.”

“Feedback: This time, I think I could make a video because it's not just showing pictures. However, I think the content was poor. I wrote I would make a video without showing electricity lights, so I made it with lights which I think are not electricity lights. This video is not matches to my thought. Next time, I'd like to make much better.”

“it was difficult to express my image both in words and video because my image was little abstract. next time, I should image in detail.”

2. When I cannot solve a problem, I ask questions to myself to understand why I cannot solve it.

“Reflection: I tried shooting the things which are close to me and small one. I wanted to shadow of high buildings, but the weather was bad, so shadow didn't appear in this day. I felt shooting is difficult because can't shoot my image properly.”

“Feedback for my shadow video: This time I tried to make a shadow puppet, but the quality was terrible. Also I couldn't finish it by the dead line. The video was quite different from

my imagination, I learned it is hard to make video which matches to my imagination.:-("

D: Alternative Skills of Evaluation:

1. I Am Aware Of Thinking Technique Or Strategies Concerning The Topic I Am Working On.

“Reflection of Sounds with only video no audio: I picked up a scene which baseball players are singing the national song. Many countries have own national song and when people sing the national song, they put their hand on the chest and take their cap or hat off. Therefore, I thought you can imagine your national song when you watch the video.”

4. I Change My Thinking Technique Or Strategy Of My Work When Necessary

“reflection 'shadow' : I wanted to shoot in a sunny day, but I unfortunately had no chance to shoot with the sun. therefore it was little difficult to shoot he shadow with light in night time. so I changed the plan to shoot the object, not shadow.”

“reflection 'fruits' : I could only shooting a few of fruits in a grocery store because I used Vine. I should've used different application to shoot longer.”

V. DISCUSSION AND CONCLUSION

5.1 Student Use Of Pheed

Technology's quickly evolving and fluid nature can often lead to an organically co-constructed classroom. If you have five or more individuals working with a tool, that is constantly evolving, the users will adapt to the technology as it changes to suit their goals (Haftor & Mirijamdotter 2011). The use of Pheed as a platform for this research project evolved greatly throughout the duration of the study. The study has so far run for two consecutive years and Pheed's use has been greatly adapted by participants. The most recent cohort had problems uploading videos to Pheed because the newest models of smartphones that are becoming more common among students are now capable of shooting HD video. The quality of these videos is superb, but the increased resolution also results in very large file sizes. These large files are more difficult to share depending on the data transfer speeds and data cap restrictions of whatever networks the students are using. To adapt to this problem students began to post links to their videos that they uploaded to other video sharing sites that offered faster upload bandwidth. The technique of doing this spread naturally amongst the students as they collaborated to find ways to adapt to changes in hardware technology and Pheed. The group evolved together, co-constructing what worked best for the participants involved without having to seek instructions or approval from the instructors.

5.2 Interactivity

During the exercise, it's clear that Pheed enabled interactivity of participants as we had hoped it would. Students freely commented upon their peers' uploads facilitating a free-form dialog limited only by the enthusiasm and investment of the participants. On average each posted video got at least one pheedback from other participants. We found that students would repeatedly go back to same participants Pheed postings to view new activity.

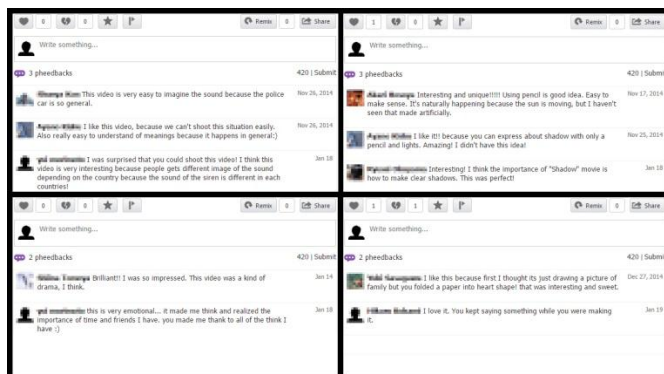


Fig. 6. Four Screen Captures Showing Example Pheedback Comments.

Research is ongoing and we are implementing changes in our methodology with the goal of measuring participant metacognition with more certainty. These changes are outlined below.

5.3 Future Steps

As we continue our research we have considered making the following changes to our methodology to improve the data. Proposed changes are as follows:

- (1) Establish another sample group in a third or even fourth country in order to make the data more multivocal. Each of the sample groups would have a larger and more diverse cohort to interact with yielding greater multivocal dialogue data.
- (2) Participants would have the option of using various modes during the pre-conceptualization process, such as making audio recordings or sketching images by hand.
- (3) More directly orchestrate the post-conceptualization reflective process by allowing students to make audio recordings (a feature that is conveniently already integrated into the Pheed platform).
- (4) Refine and reduce the number of cues.
- (5) Encourage the amount of text students produce to improve depth of data

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