Sculpture Walks: Mobile Technology and The Aesthetic Experience

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Abstract

This paper looks at how the use of mobile technology can aid in the aesthetic experiences of sculptures for students. Based on external scans, there are currently existing solutions of interactive learning trails used by other schools and enrichment groups in Singapore. However, although the feedback from these trails for student engagement was positive, the cost to engage vendors to run these trails was very high. A team of teachers from Beatty Secondary School therefore sat down to design a mobile art trail application or 'app' for short to tap on 21st century attributes and various theoretical frameworks.

Using the learning package and mobile application, a qualitative study was conducted and interviews were held for both students and teachers who went through the sculpture walk. The results were then triangulated with the researcher's own observation to form conclusions.

It was discovered that the choice of activity can help to determine if students notice sculptures better and/or gain a greater aesthetic experience of the sculpture. Also, it appears that technology does facilitate learning through funneling the experiences through the mobile app, but it can also impede the aesthetic experiences of the student. These findings impact curriculum planning and the role of the art teacher as a blended approach of out-of-classroom, mobile technology and face-to-face learning appear to better cater to the learning needs of students viewing sculpture than just using the mobile app on its own.

Keywords: mobile app, mobile technology, art, sculpture walks, aesthetic experience

Introduction

As schools become increasingly open to technology and community resources, the teacher's realm of influence reaches beyond the classroom. While it is critical to understand how the teacher's teaching, practices and knowledge impact student's learning in the art classroom, it is also important to investigate the influence of these factors on student's learning in out-of-school settings. Combined with the use of technology, works of Art and by extension sculpture, need to gather new insights to engage students in a critical, communicative and expressive manner.

This research looks into a few areas:

a) the use of technology in understanding sculpture and how the aesthetic experience of the student might improve when they go through a blended learning activity using mobile technology
b) the authenticity of the aesthetic experience in relation to emotions
c) that viewers presence on site at the sculpture is essential in order to appreciate its sculptural form
d) the notion that mobile technology can be used to heighten the attention to perception and thus the aesthetic experience of the sculpture

This study therefore tries to find out whether the use of mobile technology does help to support the aesthetic experience through students' opinions, teachers' observations and the overall experiences of the learning journey.

Literature Review

In today's society, youth spend a large amount of time on new media as seen by the proliferation of media texts found on Facebook, Instagram, Twitter and YouTube (Rideout, Roberts, & Foehr, 2005). In recent years, schools have been increasingly committed to educating students with diverse learning needs. Although learning has moved out of the classrooms, many educators are still highly dependent on pen and paper techniques. This limits the opportunities to connect to the various interests of youths and does not harness the wave of technology–what is needed "is a way for current curriculum objectives to connect to the youth culture and actively engage them in learning while preparing youth with critical 21st-century learning skills that extend beyond traditional types of literacy" (Peppler, 2010, p. 2119).

In Singapore, educators believe that ICT, and by extension mobile technology, can empower teachers and learners, transforming teaching and learning processes from a highly teacher-dominated to that of student-centeredness (CCD, 2008). This change will then allow for opportunities for learners to develop their creativity, critical thinking skills, problem-solving abilities, communication skills and other higher-order essential skills and competencies. This is supported by Jonassen, Peck and Wilson's (1999) constructivist approach towards learning whereby when students utilise technologies in a constructivist manner towards the implementation of mobile technologies. This allows students to work independently while the teacher's main role is that of a facilitator. The task of the teacher therefore is to translate information that will be learnt into a format appropriate to the student's current state of understanding. The students role then, is to explore and experiment in real world

situations instead of being told how to do something and through that process learn more (Craig & Van Lom, 2009). Constructivist learning theory therefore allows the individual to place value on the mobile technology rather than having the mobile technology imposing its worth on the individual. This principle thus helps to develop mobile technology into a hybrid model for integration in the educational setting.

Aside from the constructivist approach, other theories have also been used to support mobile technology in learning. The situated learning theory posits that learning is not merely the acquisition of knowledge by individuals, but rather a process of social participation (Brown et. al, 1989). Mobile technologies are therefore well suited in this instance as they are available in different contexts and can draw on those contexts to enhance a learning activity. Many museums and galleries have used these context-aware mobile computing capabilities by providing additional information about their displays and exhibits based on the visitor's location within them.

This emphasis on learner independence can be captured by Malcolm Knowles, a writer in the field of andragogy, who came up with a theory of self-directed learning (SDL). Knowles holds strong beliefs that students should be self-directed learners and teachers should be seen as facilitators of learning. He defined self-directed learning as that by which "individuals take the initiative, with or without the assistance of others, in diagnosing their learning needs, formulating learning goals, identify human and material resources for learning, choosing and implement appropriate learning strategies, and evaluating learning outcomes" (Knowles, 1975, p.18).

Background of Mobile Art App

The characteristics of MOE's 21st century classroom pose a huge challenge for the teachers as designers of instructional programmes and learning resources. There is a larger emphasis towards students' autonomy in the learning process and as such the role of the teacher has shifted towards facilitating in an increasingly dynamic and fluid learning space (Tan & So, 2012). The functional purpose of the teacher therefore would be "to allow an unstructured space within the structured learning environment, whereby learners have the liberty to exercise judgment, set new learning intent and pursue new inquiries / interest areas" (Tan, So & Zhang, 2012, p. 707).

Previously, the school where this study is based on, embarked on sculpture walk Art Trails that were conducted by the Singapore History Consultants and endorsed by the National Arts Council. However, the teachers had observed that there was a low level of student engagement as the art trail made use of pen and paper worksheets. The efficacy of this mode of assessment of learning was not effective with less motivated students. The mode of learning was also mainly instructor centred with a large class size of 40 students. It was thus difficult for students to learn at their own pace, ask questions and participate actively.

A professional learning circle team (PLC) was therefore set up in the school to study this problem. Based on external scans, the team found existing solutions of interactive learning trails used by other groups in the school, such as the humanities department. However, although the feedback for these trails for student engagement was positive, the cost to engage vendors to run these trails was very high.

The team therefore set down to brainstorm and design a mobile art trail to tap on MOE's 21st century attributes and the various theoretical frameworks like self-directed learning and collaborative skills. Combining some of the ideas from our research, the team worked at producing an app with features of guiding (museum apps), a little 'treasure-hunting' to find the site (waymarking) as well as activities and tasks that participants are required to do on site (geocaching). Students using the mobile art app navigate the various sites on their own in order to gather information as well as experiment with the iPad tools to fulfil the tasks (Figure 1 – 6). In addition, as the students are required to work in a group of four, the individual learner's interaction and collaboration with fellow group members would then form a critical part towards the learning.

Figure 1: Home Page of Mobile App (Student's Interface)

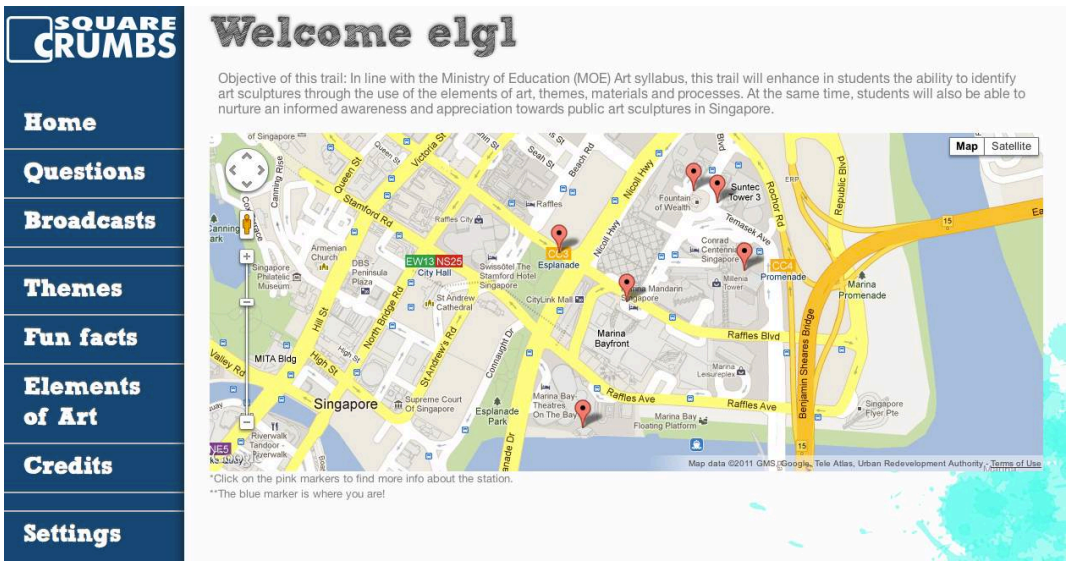


Figure 2: Activity Page for Sculpture Site

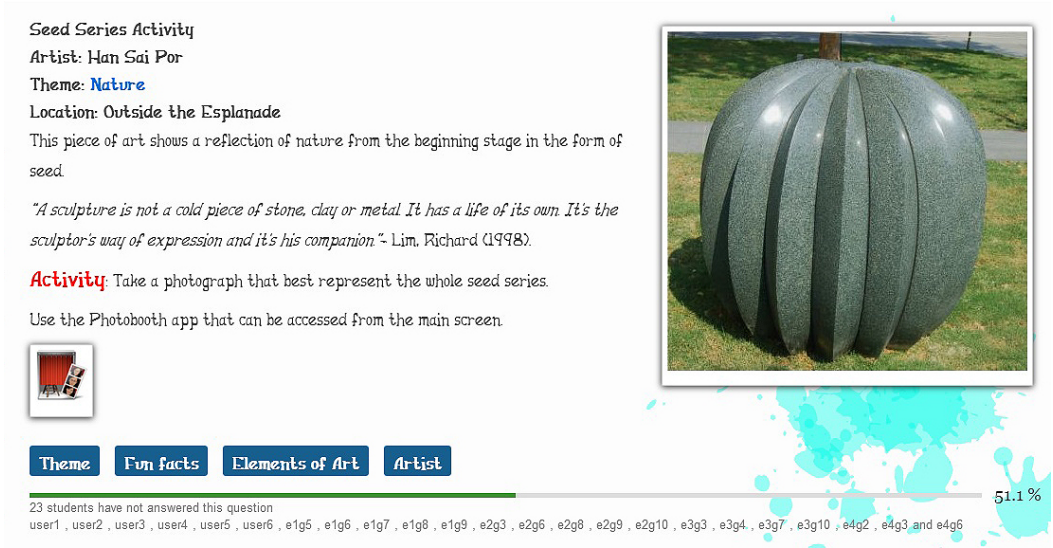


Figure 3: Question Page for Sculpture Site

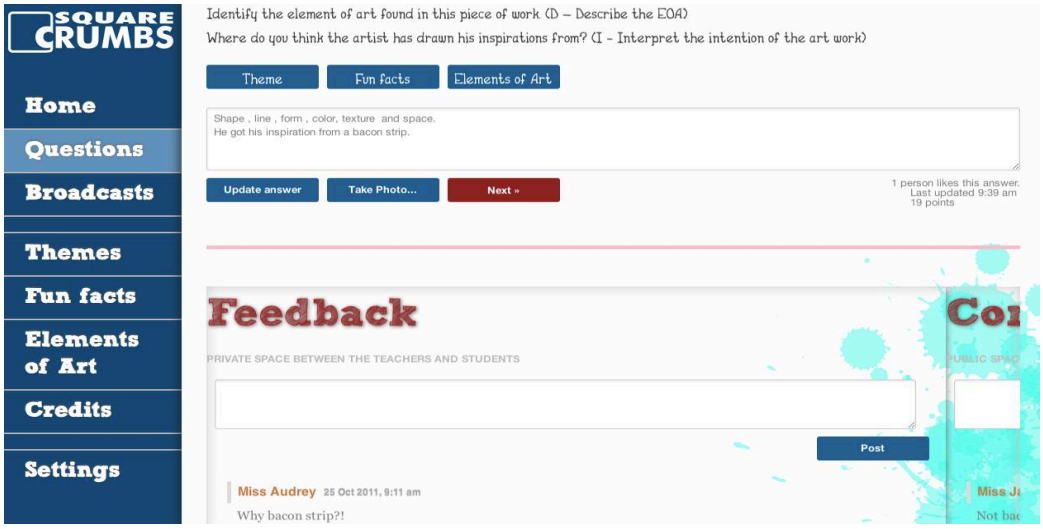


Figure 4: Feedback and Scoring

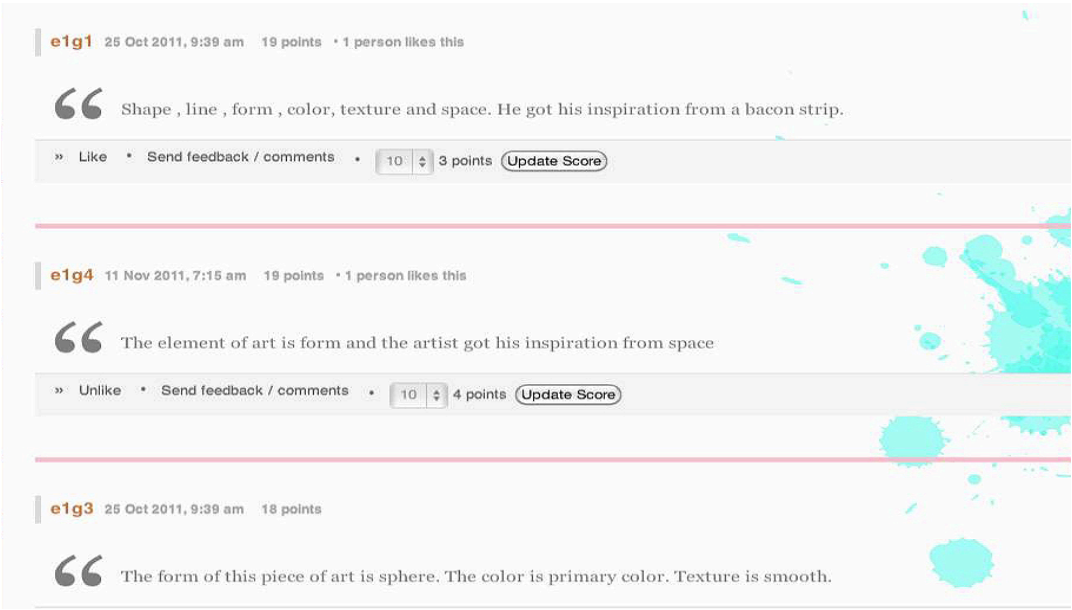


Figure 5: Home Page of Mobile App (Teacher's Interface)

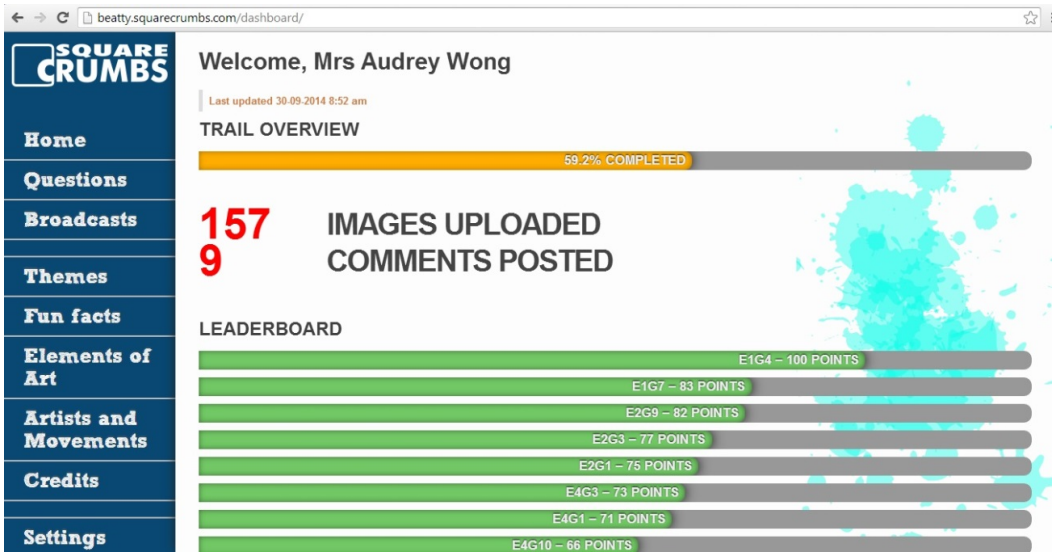
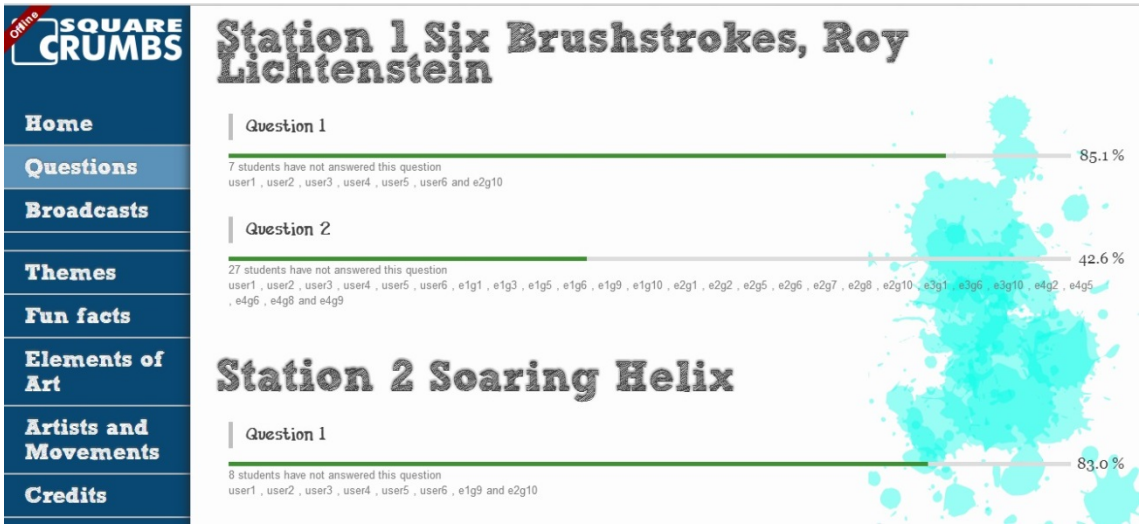


Figure 6: Questions Page of Teacher's Interface



In line with the Ministry of Education (MOE) Art syllabus, the mobile art trail therefore was designed to help students' find meaning in the art sculptures through the use of the elements of art, themes, materials and processes. As the teachers' recognised the importance of viewing sculptures on-site, the hope was that the aesthetic experience gathered by the students would help them to renegotiate the relationship between the sculpture piece, the place and themselves. Students would also be able to nurture an informed awareness and appreciation towards public art sculptures in Singapore.

Research Methodology

The research was qualitative and was done using in-depth analysis of interviews from students who went for the walk and teachers who were at the different sculptures as well as the researcher's field notes. The entire research consisted of three stages: the preparation stage, the data collection stage and the data analysis and evaluation stage.

Preparation Stage

Broad based open-ended interview questions were developed for this qualitative study so that it was flexible enough to enable respondents' feelings and attitudes to surface.

A total of 16 Secondary One students in a school in Singapore participated in this study. Four secondary one express classes were selected with each class having approximately 40 students. The ratio of boys to girls in these classes were almost equal. Four students (10% of the cohort) 2 boys and 2 girls, were selected at random as well as 2 art teachers. Selected respondents were briefed prior to the sculpture walk on the upcoming interviews that will be conducted after the walk. Students and teachers were then given the autonomy to decide the day and time that they preferred to have the interviews on. There was in-principle agreement from the school, staff and selected students in mid-October prior to ethics clearance in November. A couple of weeks prior to the interviews, students were required to fill up and submit the parental and individual consent forms while the teachers had to fill up the adult consent form.

Data Collection Stage

At this stage, a pilot interview session was carried out which consisted of three participants to test its feasibility. The participants had done the sculpture walk about two years prior to the writing of this paper. Based on feedback, the interview questions were tweaked to have greater clarity in terms of the type of questions asked.

The main interviews were then conducted in groups of 4 with each group of students belonging to the same class. The interviews for both students and teachers were collected within a few weeks after the sculpture walk and not on the day itself due to time constraints. Although 16 students were selected, only 14 students made it to the interviews while the remaining two chose not to participate due to personal reasons. It was observed that the participants in this study were fairly heterogeneous as students came from different racial as well as cultural backgrounds. Each interview session was done in a quiet, air-conditioned room and took approximately 15-20 minutes to complete. Participants were assured of their confidentiality prior to the start of the interviews and given the option to leave the interview sessions should they feel uncomfortable with no penalty or loss. The interviews were all audio-recorded and then transcribed for analysis.

Student interviews were structured loosely with the following set of questions:

- Have you seen the following sculptures prior to the sculpture walk?
- Can you describe your first impressions or feelings when you arrived at the designated sculpture before you did the e-activity?
- Describe how you feel participating in the e-activities
- Describe your feeling or impression of the sculpture after you carried out the e-activity.
- Did you have a favourite sculpture?
- Did the presence of the teacher at each sculpture help in your understanding of the sculpture?
- Would the experience of the sculpture walk be the same for you if it was done online via e-learning instead?
- What were your feelings at the end of the sculpture walk?

The data collected from students were responsive and emergent in nature and largely used to validate whether the use of mobile technology helped in reaching an aesthetic experience. The interviews from the students were used to triangulate with the art teachers as well as the observations done during the sculpture walk so as to provide the study with multiple sources of evidence for the theoretical propositions. Validity of the results was addressed as responses from both students' and teachers' interviews were checked against each other and later with the researcher's notes.
The teacher interviews were conducted individually in November. Questions for the teachers include the following:

- From your observations, what were the students' reactions like when they approach the sculpture?
- Did you notice if the students used any prior knowledge or experiences when viewing the sculpture? If yes, what and how did they do that?
- Do you think the experience of the sculpture walk would be the same for the students if it was done online via e-learning?
- How do you think the students can apply / have applied their learning from this sculpture walk in their art making?

Other qualitative data included the researcher's field notes which was captured in a notebook at the end of the mobile trail. These notes were collected based on the researcher's observation in three areas: how the mobile technology was used, the effectiveness of each activity during the sculpture walk and the students' reactions when they first approached the sculptures. Approximately 15 minutes was spent at each sculpture site to observe both students and teachers behaviours and conversations.

Data analysis and evaluation stage
The analysis of the interviews involved transcribing the audio-recordings into written text and then coding the interviews. Each transcript was read and re-read for the researcher to develop a sense of the data. The data was analysed both using the above questions as a guide as well as identifying themes that emerged from the transcripts. The following questions were used to suss out the themes:

- What did the students do at each sculpture site? How did they react to the sculpture?
- How were they using the mobile app and was the app easy to navigate?
- How did the students talk and do they understand what was going on? Did their past experiences relate to their behaviour and attitudes?
- What did the researcher see when the students were doing the activities?
- Were the patterns that emerge similar across the different classes?

The documented codes were then analysed for patterns and relationships before being collapsed to create categories. These were then further combined to create some overarching themes like technology in learning, advantages and disadvantages of mobile technology and the aesthetic experience when using the mobile app. The themes were then looked at to see how they support the theoretical perspectives and the understanding of the data sets. The responses were then triangulated against the researcher's own observations before some conclusions were drawn.

Limitations of Study

The sample of 14 students from four Sec One Express class were selected to represent a cohort of 160 students involved in the sculpture walk. It is assumed that the views and perceptions of students from the sample is representative of the entire cohort and generalizations can be drawn from the students' and teachers' interviews at the end of the sculpture walk. In addition, as the interviews were not done immediately after the sculpture walk, the memories of the students might have faded over time. Therefore the responses may have emerged in a different way if the interviews were done on the day, straightaway after the walk.

From the researcher's notes, it was noticed that the two students from Korea appeared to have gained more insights in this learning journey and were able to express their views regarding the sculptures due to previous exposure to art works in their own country. Future studies therefore might want to look at how the different racial and cultural backgrounds might have played a part towards how students experience the sculptures.

Research Findings

Although connectivity does open the door to limitless possibilities for interaction, it was fairly clear that the right choice of activity helped to encourage a greater aesthetic experience and appreciation of the sculptures. From the way the app was constructed, the six stations had six different facets and provided six different experiences. Sculptures and activities which allowed room for students to utilize their various senses – sight & touch predominantly resulted in a greater aesthetic experience.

In addition to the activities done, the questions that relate to each sculpture forces the students to view and think about the sculptures not only by itself but in relation to particular themes and the larger community. As a result, students appear to better integrate their understanding of the sculpture and its purpose *"Also about the way they ask, we can understand more about the sculpture itself…we had to use creativity to think about it, to see what is the…from our point of view what do you think is the purpose of this artwork."* Here, the students generally agree that the iPad 'forces' them to see "*the piece more carefully when we answer those questions and realize more stuff*" as well as they having to "*concentrate more on the iPad*" versus the use of a pen and paper (Table 1).

Table 1: Description and Samples of Student Comments

Questions	**Representative Student Comments**	**Researcher's Inference/Notes**
Have you seen the following sculptures prior to the sculpture walk?	*"I've seen the Fountain of Wealth and the Seed Series before"* *"Fountain of Wealth and the Esplanade"*	Students mostly cited sculptures that serve dual functions of being an artwork and a tourist attraction.
Can you describe your first impressions or feelings when you arrived at the designated sculpture before you did the e-activity?	*"It felt majestic"* (of the Fountain of Wealth) *"…I feel that it was huge…so big that I can't take it…"* (of the Fountain of Wealth) *"I just thought 'Oh my God!'…. Because it is very big" (*of the Six Brushstrokes) *"Ginormous….because when, when you do a brushstroke on an ordinary paper, it is like so small. But then when you look at the six brushstrokes, it is like super gigantic."* (of the Six Brushstrokes)	The few comments made by students mostly reflected the size and impact of the sculptures. The feelings generated tend to be of surprise, amazement and awe.
Describe how you felt when participating in the e-activities.	*"The first one was a killer! …The puzzles…"* *"I didn't really enjoy it…I just wanted to enjoy the scenery, I did not feel like completing the activity"* *"It was hard, hard to upload the photos"* *"It felt a bit like frustrating because some of our friends like, like very difficult to communicate, so…"*	The activities were reflected as difficult and time-consuming, taking away the enjoyment of the sculpture. Students also complained of technical issues and the instability of the network.
Describe your feeling or impression of the sculpture after you carried out the e-	*"After reading the fun facts….cos like the artist…you understand how the artist get the inspiration from, and then like what it's made of…"* *"The Fountain of Wealth gave you different perspectives* (of the activity)*...I didn't know you can go underneath, I always see from the top there…"*	Common consensuses appear to be that the activities and the questions asked helped in the understanding of the sculpture. The activities are seen

activity.	*"Also about the way they ask* (of the questions), *we can understand more about the sculpture itself…we had to use creativity to think about it, to see what is the…from our point of view what do you think is the purpose of this artwork."* *"Uh…there is 1 question where they make us sketch the 2 buildings…and then when I was sketching it, err…I noticed more details about it"*	to provide a different perspective while the questions provide the knowledge about the sculpture. There were favourable comments that talk about the perceived benefits of using technology-supported learning tools.
Did you have a favourite sculpture?	*"The wave thingy…Yar, the six…they were different heights and they were all unique in their own ways"* *"For me it is the Abundance because it looks very cool because it is 3D but it looks very much like 2D, and then um, the e-activity asked us to write a poem about what it is for and then I understood more about it."* *"Um, I find the Helix really really very awesome…yar…Um because the sculptor used like um, um tiles, and then he um stacked up the whole thing and it was really really very tall."*	Sculptures cited by students all required presence on-site to feel its impact in terms of size, weight and form.
Did the presence of the teacher at each sculpture help in your understanding of the sculpture?	*"There was information on the iPad that help you tell, tell things about the sculpture"* *"Not really, because mostly when we go, the teachers, we just ask them for technical help."*	The presence of the teachers is perceived as mostly unnecessary as the iPads provided all the required information for learning.
Would the experience of the sculpture walk be the same for you if it was done	*"No….because you can't feel it, you can't smell it* (the water)*"* *"No…because we have to go through like seeing how big it is, in real life size"* *"Because online they mostly just put one picture over there and then ask you to describe it…then then when you are there in real life, you have to see*	All students perceived that web-based learning alone would not be helpful towards the experience of the sculpture. Students gave reasons

online via e-learning instead?	*it, see it through many different angles and understand it matter rather than online where it is through one angle."* *"No…Because it is a different feeling…because it is like when we first saw the six brushstrokes through the photos it looked very small. And it's like..yar..But after um, I saw it in really life, it looked more majestic."*	which implied that web-based learning was not effective as it serves mainly as a tool for information gathering rather than the experience of the sculpture.
What were your feelings at the end of the sculpture walk?	*"I feel, I feel like I have achieved something."* *"…learn about the elements of art…"* *"I feel that the art, of each station was quite nice, and we seem to appreciate it more than before…the art trail."*	The aesthetic appreciation is seen through the emotional reactions, feelings and the students' comments about the sculptures at each site.

In addition, stations like those of the large water attraction, Fountain of Wealth, which utilizes the camera function in the activity, tend to feature more prominently in the area of aesthetic experiences. Mobile technology thus can be seen to heighten perception and the aesthetic experience. However, the reverse reaction was found when it came to using the camera to take a video at the sculpture of the Soaring Helix. Some students spent a large amount of time at the sculpture trying to obtain a 'perfect video' and failed to observe the essence of the sculpture. The camera then serves to draw the focus away from the sculpture instead of helping students to pay more attention to it.

It was noticed that the activities which resulted in convergent answers, like that of the jigsaw puzzle, tend to result in less participation from all the group members. Instead, usually only a couple of students in the group will contribute to getting the single, most accurate answer. Once it is done, there is no room for negotiation as the solution is fixed. However, those activities which gave room for various solutions to the task, e.g. taking photographs or the writing of the haiku, resulted in greater involvement from more (if not all) members of the group.

The use of mobile technology allowed for greater mobility and the ability to be connected while on the move. This greatly assisted in students learning as they were able to access the internet via the tabs in the app to obtain information while viewing the actual sculptures at the site. This finding contradicts John Dewey's belief that theoretical explanations impedes the aesthetic experiences but instead it appears that this access to information helped further their understanding of the sculptures and gave them greater insights such that it adds to their aesthetic experience (Dewey, 1934).

Table 2: Description and Samples of Teachers Comments

Questions	Teacher Comments	Researcher's Inference/Notes
From your observations, what were the students' reactions like when they approach the sculpture?	*"I should say expression would be…most of them tried to touch because I think the rest, they didn't had the opportunity to go near, especially the Lichtenstein to touch…so this one was um, made available for them to touch it and feel and so most of the boys were hugging it, trying to feel it, and all that..yar"* *"So the technical aspect of it…but taking picture I think they, they were a little carried away because for the pictures because some of them took with the artwork…they were part of the artwork…"*	Students were very excited when they approached the sculpture. They participated in the work by being part of the work. The need to touch and feel the art pieces in order to understand the work appears to be a highlight for them.
	"Oh, the drawing one…oh, they had a bit of a difficulty because I think they, they were expecting to see nice pictures…and they don't have a tool to draw but only their fingers so they find it so difficult and um, most of them were not very happy with what they draw… with their fingers" *"Yar yar, they were very excited, not really frustrated they just thought it was quite cool…. Because different station offer them different activities…so, like my station the photo-taking one was quite fun for them in a way because they have to go from different angles then they had a lot of…some had arguments lah, like from where, which and that kind of thing"*	Students' appeared to spend a large amount of time doing the activities and hence deprived themselves of the experience of the sculpture. In addition, the activities did not match their expectations of quality. Lens based activities appeared to result in more engagement and enthusiasm amongst the students.
Did you notice if the students	*"Um…they were trying to associate with the uh elements…uh trying to see which elements would this fit…are we talking about shapes here or are we*	Students could link their observations to

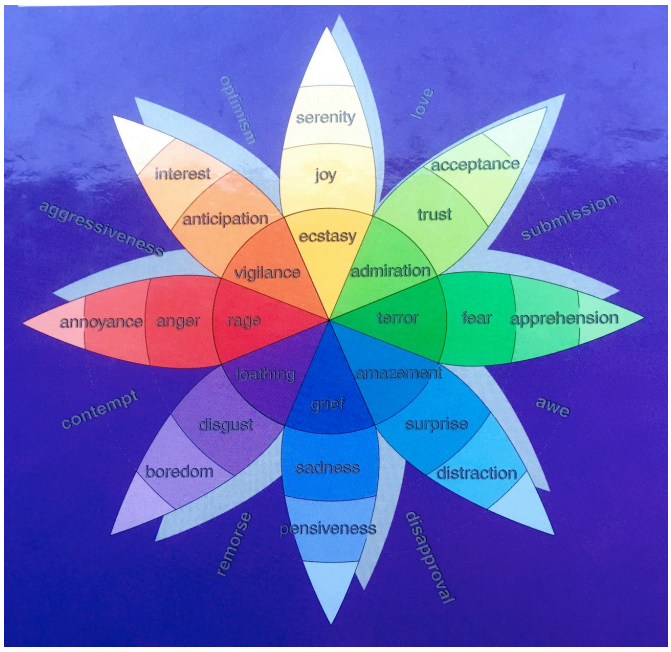
used any prior knowledge or experiences when viewing the sculpture? If yes, what and how did they do that?	*talking about lines…or I mean um those type of questions."* *"Ok, the Litchenstein, because they did the Litchenstein work in class, so they were trying to see how much they had learn reflected in the artwork. So they were trying to give 'eh, this doesn't really look like Litchenstein, it doesn't really look like this, this doesn't really look like his brushstroke', you know, trying to figure out what they know with the artwork."* *"the Abundance, because Haiku, er students, I don't think they they would see how art is related to poetry making or things like that but when we put it in that kinda of er..force them that it is an activity that they have to complete then er…I guess it actually brings them out from the, the standard thinking of the you know, always have to take picture, video, things that are visually moving or aesthetics related, but instead it is all in text."*	items that they have seen before and other schemas. Critical and analytical thinking were also seen through students association with previous lessons learnt as well as trying to see relationships between 2 different art forms – sculpture and poetry.
Do you think the experience of the sculpture walk would be the same for the students if it was done online via e-learning?	*"Via e-learning? No, I don't think so. Because some of these uh… structures here, I mean the sculptures here, uh, you are looking at the massive size, uh, the fact that you can actually touch, you can go through, you can interact, all these you are not able to do it via e-learning. I mean, talk about size alone, some of it you are walking into the uh fountain, so you, you will not get that same experience."* *"Err…of course not! Because er…it's more authentic learning when they get to go there and be part of the sculpture because certain things like getting into the sun, seeing how the water comes out of different parts of the sculpture is very different from looking at it in pictures…so it's a lot better when they are there to see and feel…in in terms of scale yar, it actually er, brings them to…things that are different lah…basically not the textbook pictures kinda thing"*	Both teachers see the merit of being at the sculpture site and related the experiences gathered to that of the senses – sight and touch. In addition, the setting and ambience of the sculpture site itself appears to play a part towards the aesthetic experiences.
How do you think the students can apply / have applied their learning from this	*"I think that they can apply, um…..the fact that all the time they have seen artwork in 2D, and now they are seeing it first time in 3D, so, if they have an assignment that is demanding them to do in 3D, I think they may be able to you know, understand what a 3D should be and focus more on the form, the dimension and all that because at the moment,*	Learning seems to be related to perspective (2D to 3D) as well as that of the elements of art (texture).

sculpture walk in their art making?	*everything is flat for them and this is a different experience for them."* *"I think after the walk er how they can use this in their art lessons or in their art making would be their…probably their …would be a lot more sensitive to textures"*	

Through the teacher interviews (Table 2), it was noticed that the students were very excited when they approached the sculptures. This emotional response of excitement falls under Robert Plutchik's wheel of emotion, where excitement is seen as a subset of zest which is in turn a subset of the primary emotion of joy. Joy is just step away in the colour wheel from the most intense emotion of ecstasy, which would be the highest emotive state that a viewer can experience when looking at the work (Figure 7). Following Dewey, this emotional response of joy from the students therefore lends itself towards building a qualitative unity which can eventually give an aesthetic experience.

In addition, there was a sense of awe detected at the Fountain of Wealth and the Six Brushstrokes, and this was corroborated by both teacher and students "*I just thought 'Oh my God!'…. Because it is very big*" and "*They were they were more er… they were kinda overwhelmed by the whole structure"*. This supports Plutchik's theory of emotion where 'awe' is featured as one of the eight primary emotions and is a composite of the emotions of fear and surprise. Based on the emotional reactions, the students' sense of sight appeared to be completed filled with the viewed object and this resulted in them being thunderstruck. This awe when viewing a piece of art is relevant to Edmund Burke's concept of the sublime, where the physiological effects of the sublime, in particular the dual emotional quality of fear and attraction would result in a person being thunder-struck. According to Burke, the mind is entirely filled with the viewed object that it cannot entertain any other, causing the effect of the sublime, the attainment of the highest degree of the aesthetic experience (Goldblatt & Brown, 2005). From the emotional responses therefore, the students' appeared to have attained an aesthetic experience while viewing these two sculptures.

Figure 7: Robert Plutchik's Wheel of Emotions (Plutchik, 2003)



Source: Cover page of Robert Plutchik's Book Emotions and Life

There was a common consensus across the students and teachers interviews that there was a need to be on site in order to fully experience the sculpture, "*they can actually go around near and feel the texture and things like that…so I would think it is a lot better than compared to if they had done it on e-learning"*. The students' interviews on how walking around helped them in understanding perspectives better as well as the 'need to touch' and not just look at the sculpture, reinforces Herder's notion that sculptures are appreciated by the sense of touch and that this touch helps to form the concept of the three dimensional form and combines with vision to give the viewer a sense of the aesthetic experience of the work (Zucker, 2009). Through the contact with the sculpture via touch, some students ended up being "*part of the artwork*" when asked in the activity to take a picture of the sculpture. This physical interaction with the sculpture appears to provide a means with which students could identify with the work and possibly increasing their enjoyment of the sculpture.

Both students and teachers agreed that the sculpture walk should not be conducted via e-learning at home but instead see value in the authentic context of each site towards achieving an aesthetic experience "*Because er...it's more authentic learning when they get to go there and be part of the sculpture because certain things like getting into the sun, seeing how the water comes out of different parts of the sculpture is very different from looking at it in pictures…so it's a lot better when they are there to see and feel…in in terms of scale yar"*. This is akin to the notion of situated learning, where through the process of participation (mobile app activities) in an authentic context (sculptures on site), students are better able to integrate their experiences.

Although the mobile art trail was considered mostly successful, there were some limitations in the use of technology to conduct the trail. The most prevalent problem stems from that of poor network connection. Although each iPad had their own SIM

cards with wireless connection, all the groups accessed the mobile app at the same time causing the site to load fairly slowly and was sluggish. In addition, some of the picture resolution on the site were fairly large and coupled with the addition of third-party apps within the site, added to the slow download speed. Therefore, even though it is agreed that mobile technology allows greater mobility and the ability to be connected while on the move, the management of resources concerning the use of this technology, if not deployed properly, causes learning to slow down. This contradicts the thinking that technology which is expected to make learning faster, actually causes delays in learning instead.

Fragmentation could also be observed in relation to the experiences and learning styles of the students. This could have been caused by technical problems like that of network connections and glitches with the device or the application but in some cases however, the problem was with having shared technology. Due to the limitation of resources, students were divided into groups of four with each group allocated the use of one iPad. However, it was noticed that if the group dynamics do not work out or if students were not given opportunities to hold the iPad to work on the activities, the effectiveness of mobile app on the aesthetic experience was diminished. This was further emphasized by one of the students' reflection that he was deprived of the opportunity to do the walk because his friend refused to give up the iPad "*I didn't get to do anything…Darren, Darren said that I will make a mess of it so yar…*"

The design of the mobile app was done as a means to facilitate the acquisition of learning. Aside from the camera function, one of the features of the mobile app included the tabs at the side where students could conduct their own search to acquire information that was not provided just by viewing the sculptures. This was to facilitate self-directed learning such that students are able to navigate to the various sculpture sites and obtain the necessary information to complete the activities. However, the expectations of students with regard to learning with the mobile app did not match those of the teachers. The students' saw the technology as another means of delivering their learning and they expected the software to teach them the same way a teacher would demonstrate to them in class. However, this was not so from the viewpoint of the teachers who felt that the app itself was sufficient for students to acquire learning and did not feel that they needed to facilitate at all. There was still learning involved, but the form it took was unexpected. The learning expectation appeared to be that students expected learning to be delivered rather than acquired, which was the teacher's perspective. Independent learning therefore was absent but it was still self-directed because of the mobile application.

To conclude, it appears that technology does facilitate learning because it funnels all experiences and learning through one platform, in this case, the mobile app. However, the aesthetic experience is about accessing the object (sculpture) via multiple ways - through sight, touch, sound and the emotional senses, and these are areas which technology cannot capture all at once. Therefore, although the increasing use of technology in the teaching may result in enhancing learning, it appears that the same technology can work to impede the aesthetic experience for the student.

The Impact on Curriculum and Pedagogy

The results of the study showed that the use of the camera does help students to notice better as it allows them to get closer to the sculptures. This technology provides many opportunities for students to zoom into a sculpture, to closely examine areas that they might not be able to access due to the size and space that the work occupies. In addition, through structuring the camera activity such that it requires students to capture the sculpture in an aesthetically pleasing manner, it forces students to study various angles and viewpoints which they would have otherwise not paid attention to without the frame of the camera. Due to the relationship that students have with lens-based media, activities which focus on using such tools did ignite a greater engagement level with students and help them to better pay attention to an artwork.

Based on the interviews, it was evident that it was not the iPad alone which helped in the noticing of sculptures but rather the kind of activities that were designed for the purpose of learning more about the sculptures. Divergent versus convergent answers as well as the difficulty level of each activity impacted the learning process and resulted in affecting the students' level of attention. Tasks which were deemed as 'too difficult' e.g. the jigsaw puzzle, resulted in students spending more time fiddling with the app and trying to find a solution rather than paying attention to the sculpture at hand, while 'easier' tasks like taking a picture allowed for more focused attention on the sculpture. Therefore, certain guiding principles need to be identified before the games and its appropriateness to the activity can be added into a mobile app. Instead of having a 'user-centred design', there is a need then to look at a more 'learner-centred design' in the design of a mobile app, where the "environments are built by valuing an individual's creative energy" (Thomas et. al, 2004, p. 173).

Conclusion

This case study was designed to explore the sculpture walk aesthetic experiences with the use of mobile technology at a sculpture site. Admittedly, the study had its limitations in terms of sample size and the time that was allocated to do the sculpture walk. However, although the findings from this qualitative study is a generalization of the whole student population, the purpose however was to enhance understanding of how the use of mobile technology can aid in the aesthetic experiences of sculptures for these students. From the responses gathered in the interviews, it was also not very clear as to whether having an aesthetic experience of the work is equitable to being better able to relate or understand the sculptures. Other tools of measurements might need to be used for future research in order to gather clearer indication as to whether students are truly experiencing an aesthetic moment with the sculptures or they just possess the head knowledge without having any emotions tied to the work.

The influence of mobile technology towards sculptures in terms of their inquiry and enjoyment of the sculpture supported the notion that mobile technology and learning theories can be used together to serve as catalysts for fundamentally rethinking how sculptures can be viewed in the future. However, the user satisfaction and enjoyment of the activities does not necessarily help students to notice better. To accomplish this, there is a need to move away from a user-centred design and look towards a learner-centred design (Thomas et. al, 2004) where the learning environments are adaptive, flexible and feature variability. This study therefore provides useful insight for art

educators in Singapore who share the vision of integration of mobile technology into art teaching and learning processes.

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