Creative Process Experiences with Digital Storytelling: A Tale of Two Engineering Students

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Abstract

Creativity is an essential trait for engineering students to be innovative and successful in current and future global economy. Thus, it is important for their creative potential to be nurtured. Since digital storytelling has been portrayed by previous studies as being influential in enhancing creativity, the purpose of this study is to explore the creative processes of two engineering students in their development of digital stories in the English reading class. Both of them were chosen based on their reading performance in an English reading placement test. One of them was considered an above-average reader, while the other a below-average reader. The duration for the digital storytelling project was three weeks. The study employed a case study research method. Data sources included observational field notes, interview transcripts and digital stories. The findings of this study showed that both students exhibited the preparation, incubation, illumination and verification steps of the creative process as proposed by Wallas (1926). However, it was found that the above-average reader prepared extensively, wanted to be different from the other students, and was more self-critical of and not easily satisfied with his work. The below-average reader, on the other hand, completed his work through trial and error, did not worry much of the project and was generally satisfied with his work.

Keywords: engineering students, digital storytelling, creative process

Introduction

To think creatively is a quality significantly needed by all university students in their collaborations, interactions and contributions of ideas (Livingston, 2010). For engineering students, creativity is also essential in their innovations and applications (Constantino, Kellam, Cramond, & Krowder, 2010). In fact, the 21st century has been named 'The Creative Economy Era' that emphasizes on creative industries, such as advertisements, software, video games, and research and design which all provide 7.3 percent of the world economy (Hawkins, 2002 as cited in Mohd Azhar Abd Hamid, 2004). Therefore, it is important for educators to prepare engineering students to not only be analytical and technically capable, but also be creative thinkers because creativity is vital to engineering and design (Constantino, Kellam, Cramond, & Krowder, 2010). Besides, creativity can be a critical factor in seeking employment and maintaining jobs in workplaces (Huber, Leigh & Tremblay, 2012).

With the globalization of industry, the Malaysian university academics in any discipline has been demanded by the Malaysian Ministry of Higher Education to provide a system that fosters creativity and this includes the ones who are involved in teaching engineering students (Norhayati M. Nor, Noraini Rajab, & Kamsiah Ismail, 2008). Unfortunately, it is not clear how creativity can be nurtured within engineering students (Baillie, 2002) and little has been done in many universities to place emphasis on the means to develop creativity in their engineering students (Liu & Schwonwetter, 2004).

To foster creativity, O'Brien (2001) proposed that educators include a multimedia project such as digital storytelling. A review of literature on digital storytelling shows that digital storytelling has enabled students to showcase their creativity (Di Blas, Garzotto, Paolini & Sabiescu, 2009; Dupain & Maguire, 2005; Genereux & Thompson, 2008; Jenkins & Lonsdale, 2007; Robin, 2008; Stuart, 2010). However, one significant gap was that the creative processes that students may undergo while creating their digital stories was not reported. Understanding about students' creative processes is necessary as it may allow educators to effectively train students to demonstrate creative thinking later.

The aim of this study was twofold: to explore the creative processes of two engineering students with different reading achievements in their development of digital stories in the English reading class and to identify the levels of creative processes among them. Ellmers (2006), Giloi (2011) and Richards (2010) have proposed that more research be carried out to understand about the creative processes because creativity is the byproduct of creative processes. Kaufman (2009) reported that people with high cognitive abilities were strongly linked to producing more creative products. In relation to this, this study aimed to find out whether a more successful reader could exhibit better creative processes than a less successful reader. This is because a more successful reader is reported to having more cognitive abilities, such as identifying main ideas in reading texts, making more inferences and making more summaries, than the less successful reader (Tatum, 2009). In other words, could a more successful reader exhibit better creative processes than a less successful reader since the latter is linked to be using less cognitive abilities (Tsai, 2012)?

Review of Literature

Digital storytelling

Digital storytelling is described as the art of telling stories or presenting main ideas in the visual form incorporating multimedia tools like graphic, images, still photographs, audio, video and animation (Dupain & Maguire, 2007; Robin, 2008; Sandars, Murray & Pellow, 2008). In this study, digital storytelling refers to the using of computer to create a story containing textual contents, images, videos and songs based on the understanding of expository texts in the multimedia form.

A significant reason for digital storytelling to be considered as a learning tool is because it addresses the 21st century literacy skills. The employment trends nowadays emphasizes on creative industries like software and research and design (Mohd Azhar Abd Hamid, 2004). Education has thus begun to focus on the teaching and learning skills which include digital, scientific, economy, technological, visual, information, multicultural and global literacies (North Central Regional Educational Laboratory, 2003). The Malaysian Ministry of Higher Education (2011) acknowledged the importance of these literacies as they are integral for students' knowledge base in order to live and work in this demanding era. Robin (2008) explained a few of these literacies and discussed their relationship to digital storytelling:

a. Digital literacy – the ability to communicate with a large community to discuss issues, gather information and assistance;
b. Technological literacy – the ability to use computers and other technology to improve learning, productivity and performance;
c. Visual literacy – the ability to understand, produce and communicate through visual images;
d. Information literacy – the ability to find, evaluate and synthesize information; and
e. Global literacy – the ability to read, interpret and respond to messages from a global perspective.

Digital storytelling thus can act as a means that encompasses the literacies that students need to know and perform well in order to function in the 21st century.

In producing effective digital stories, there are seven elements of digital storytelling that students can follow. However, the seven elements of digital storytelling are not prescriptive (Alexander, 2011; Kajder, 2006; Lambert, 2003) but offered to encourage students to pace and express their points in their digital stories well (Lambert, 2003). The seven elements as described by Alexander (2011), Kajder (2006) and Lambert (2003) are as follows:

a. *The point of view* – this is the main theme of the story that the creator of the story would like to communicate. This element is present from the beginning to the end of the story. As such, the creator is advised to write textual contents that are short, sharp and connected to the theme. They can be sentences, questions or proverbs. In this study, these textual contents may resemble the main ideas, summaries or syntheses of ideas that the creator made from his understanding of the reading texts he read.
b. *A dramatic question* – this is to keep the audience's attention until the story is over. The audience can be the creator's classmates, lecturer or anybody who

watches the digital story. A dramatic question can be a question or a series of questions that are formed to build interest or suspense about the theme emphasized in the digital story. The questions will be answered as the digital story moves. When the dramatic questions are answered, the story is over. They can be written according to the theme of the digital story. For example, if the theme is 'plastic surgery', a dramatic question can be "Will one find complete happiness after a plastic surgery?".

c. *An emotional content* – this is to highlight the challenge, frustration or any feeling that the creator associates with the theme emphasized in his digital story. It is to evoke the audience's attention. For example, in a digital story entitled 'Human Trafficking', the creator effectively contrasted a wedding scene which is supposed to depict happiness with a sad scene showing a young lady being forced into slavery after being kidnapped.

d. *The gift of voice* – voice here does not necessarily mean the sounds produced by a person speaking. A digital story can be a story with only textual content, images, sound effects and music that portray the unspoken words of interaction, pause and response. This was the approach that this study took.

e. *The power of soundtrack* – soundtrack may be music or sound effects that can set the mood or give an impact and embellishment to the story. It is intended to influence the audience's emotions and deepen their understanding of the visual information.

f. *Economy* – economy refers to content that is not overloaded with too much information, words, images or special effects. Only what is necessary is included to powerfully communicate the intended meaning.

g. *Pacing* – pacing refers to how slowly or quickly the story progresses. A good digital story breathes and moves along at an even pace; it gives some room for the audience to pause and think awhile.

Studies done by some researchers (Dupain & Maguire, 2005; Genereux & Thompson, 2008; Jenkins & Lonsdale, 2007) had shown that digital storytelling has allowed creativity to spark among undergraduates in health sciences, biology, landscape design, accountancy and sports development. Next, Di Blas, Garzotto, Paolini and Sabiescu (2009), Robin (2008), and Stuart (2010) had also reported that by doing digital storytelling, students of different ages can be creative. Despite indicating the aspect of creativity acquisition among students of various fields, these researchers made no mention of engineering students, nor had they elaborated on the creative process of the students being studied.

Since there is a dearth of research on the creative processes that may occur while developing digital storytelling, this study aimed to explore the creative processes that engineering students exhibited through their development of digital storytelling based on their comprehension of expository reading texts in the English reading classroom. This phenomenon needed a thorough understanding because a case could be made whether digital storytelling is suitable for engineering students in their creative endeavour.

Creativity

Creativity is synonym to the contribution of original ideas, production of something pleasing, good and beautiful, and having fresh ways of looking at something (Torrance, 1963; 1988). With the challenges of internalization and global marketplace, students' minds need to be stimulated to think creatively. The education system has the obligation to create rich opportunities for students to be creative (Lee, 2006) so that they can make creative contributions to the society later. Creativity is critical and significant in the engineering sector especially if economic growth and competition across enterprises and industry are anticipated (Zampetakis & Tsironis, 2005).

Wallas' (1926) Creative Process Model

Creativity is not only about the end product; it is also a process. Any ways of looking at problems, combinations of ideas or production of new products need a process. Torrance (1988) defined creativity as a process of sensing problems or difficulties, making hypotheses about the problems, evaluate and revise the hypotheses, convey the results and doing something about the idea. He also acknowledged Wallas' Creative Process Model (1926) as "the basis for almost all the systematic, discipline methods of training in existence throughout the world today" (p. 47). A framework of this study was the Wallas' Creative Process Model (1926). In this model, there are four steps in the creative process: preparation, incubation, illumination and verification.

a. *Preparation* – during this stage, the creator is exploring a situation and thinking about the problem, gathering as much information as he can, becoming acquainted with innuendos and even unsuccessful anwers, analyzing available materials and resources, and coming up with many possible ideas.

b. *Incubation* – during this stage, the creator does not consciously think about the problem and goes about doing other activities. At some level, however, the creator's mind continues to consider the problem which is referred to as the unconscious or preconscious processing.

c. *Illumination* – during this period, the creator feels that his ideas suddenly fit together and the solution to meet the requirements of the problem becomes clearer.

d. *Verification* – during this period, the creator evaluates the solution for practicality, effectiveness and appropriateness. The solution may be elaborated and improved if necessary.

Such process flow may find embodiment in the development of digital stories by engineering students in the English reading classroom.

Lindstrom's (2006) Creative Process Rubric

Another framework of this study is Lindstrom's (2006) Creative Process Rubric. This rubric can assess the creative processes that students exhibit while developing their digital stories. The creative processes which can be assessed are investigative work, inventiveness, the ability to use models and the capacity for self-assessment. The assessments range from the novice level to the apprentice, master and expert levels. The explanation of the assessment criterion for the novice and expert creators is as follows:

a. *Investigative work* – for this criterion, a novice creator is seen as one who gives up easily, does not have ideas to complete work and only does a little of what he is required to do, whereas an expert creator is seen as one who takes much effort, drafts to develop his work and goes beyond the required elements.
b. *Inventiveness* – for this criterion, a novice creator is seen as one who does not experiment and works in a usual way, whereas an expert creator is seen as one who experiments regularly and produces work that is brilliant and unexpected.
c. *Ability to use models* – for this criterion, a novice creator is seen as one who shows no interest in other people's work or a model to help him in his work, whereas an expert creator is seen as one who actively searches for models to emulate and can use these models to develop a good piece of work.
d. *Capacity for self- assessment* – for this criterion, a novice creator is seen as one who cannot identify his strengths and weaknesses in his own work, whereas an expert creator is seen as one who can clearly identify and justify his strengths and weaknesses in his work.

The creative process grading rubric adapted from Lindstrom's (2006) process criteria with rubrics with his permission (Lindstrom, personal communication, April 3, 2013) is shown in Table 1.

Table 1
The creative process grading rubric

No	Creative process	Scoring Marks				Marks
		Expert (4)	Master (3)	Apprentice (2)	Novice (1)	
1	**Investigative work** [similar to the preparation and incubation steps of Wallas (1926)]	Takes considerable efforts, uses a few approaches and drafts to develop work, goes beyond the required elements.	Does not give up in the face of difficulties, prefers to concentrate on a particular approach and refines it.	Demonstrates a degree of patience, thinks of solutions and approaches but does not develop them.	Gives up easily; does not have ideas for work completion, or only does a little of what the lecturer requires.	
2	**Inventiveness** [similar to the illumination step of Wallas (1926)]	Experiments regularly and reformulates problems set by lecturer. Work developed in a brilliant and unexpected way.	Experiments and develops own knowledge. Work developed in a unique way with minimum support.	Shows tendency to experiment. Work developed in a unique way, but only with guidance and encouragement.	Shows no sign of experimenting. Work developed in a usual way.	
3	**Ability to use models** [similar to the preparation, illumination and verification steps of Wallas (1926)]	Actively searches out models such as pictures, images and videos to emulate and can use them in work in a multifaceted, independent and well-integrated way.	Makes active efforts to find pictures, images and videos for own work. Demonstrates an ability to select pictures, images or videos that suit intentions.	Shows an interest in other people's works, but she confines herself to copying them.	Shows no interest in other people's work and cannot benefit from them even when the lecturer has helped find them.	
4	**Capacity for self-assessment** [similar to the verification step of Wallas (1926)]	Clearly identifies merits and shortcomings in own work. Can justify opinions and explain why a particular result was obtained. Can produce qualified judgements of peers' work and contribute constructive criticism.	With minimal assistance, can manage to see the merits and shortcomings in own work. Can produce qualified judgements of peers' work.	With some assistance can identify own strengths and weaknesses and differentiate between good and less successful work. Views about peers' work are limited to subjective preferences (good / bad/ like / dislike)	Cannot identify strengths and weaknesses in own work or differentiate between good and less successful work. Has no views about the work of the peers.	
	Scale: **13 - 16 Expert; 9 - 12 Master; 5 - 8 Apprentice; 1- 4 Novice**				Total marks	

Conceptual framework

In developing a digital story, a student or creator may consider using the seven elements of digital storytelling. While applying these seven elements, there are several creative processes that a student may exhibit. This study looked at the relationship between the seven elements of digital storytelling, Wallas' (1926) model

of creative process and Lindstrom's (2006) creative process criteria. This relationship is summarized in Table 2.

Table 2
The relationship between the seven elements of digital storytelling, Wallas' (1926) model of creative process and Lindstrom's creative process.

The seven elements of digital storytelling		Requirements	Wallas' (1926) model of creative process	Lindstrom's (2006) creative process criteria (selected expert criteria)
Element 1	Identify the issue wanted to be portrayed in the digital story	- To gather as many ideas as possible from the given expository texts, experiences, additional reading texts and others	The preparation step: - Identify the problem - Clarify the problem - Accumulate information - May face unsuccessful solutions that lead to frustration	Investigative work: - Takes considerable efforts (to solve problems) - Uses a few approaches and drafts to develop work (and accumulate information) - Goes beyond the required elements - Does not give up in the face of difficulties
Element 2	Form some dramatic questions to keep the audience's attention	- To make interpretations - To visualize ideas		
Element 3	Think of an emotional content to highlight the issue of the story	- To collect images, videos, songs - To do a lot of imagination	The incubation step: - May go about doing other activities and not be thinking consciously about the problem (after acquiring possible ideas, questions, images, videos, songs)	- Demonstrates patience
Element 4	Think through about the possible ideas, content, images and questions wanted to be portrayed in the digital story	- To select important ideas and transform them into words, statements or questions called textual contents - To pair the textual contents with appropriate images - To synthesize ideas	The illumination step: - Experience the 'aha' or 'eureka' moment - May experience a change of perception, a new idea combination or a transformation	Inventiveness: - Experiments regularly and reformulates problems set by the lecturer - Work developed in a brilliant and unexpected way The ability to use models: - Actively searches out models to emulate and can use them in work in a multifaceted, independent and well-integrated way.
Element 5	Think about the suitable music / songs to accompany the digital story	- To think about the suitable music / songs to accompany the textual contents	The verification step: - Check that the solution is effective and appropriate If the solution is not effective, the preparation and incubation steps may be repeated	Capacity for self-assessment: - Clearly identifies merits and shortcomings in own work - Can justify opinions and explain why a particular result was obtained - Can produce qualified judgements of peers' work and contribute constructive criticism.
Element 6	Ensure that the content is brief and compact	- To think about suitable textual content to accompany the images, and vice versa		
Element 7	Ensure that the pace is smooth	- To pace the story well		

a. The relationship between the preparation / investigative work and elements 1, 2 and 3 of digital storytelling

In developing a digital story, a student must first identify the issue of the story (Element 1 of Digital Storytelling), form some questions about it (Element 2 of Digital Storytelling) and think of the emotional content to highlight the issue (Element 3 of Digital Storytelling). These require him to gather many possible ideas from the reading texts given by his lecturer and other reading texts. At this stage, he too needs to collect still images or videos from the internet which Kajder and Swenson (2004) described as the acquiring phase. This is similar to Wallas' (1926) preparation step and Lindstrom's investigative work criterion. In this step, a student needs to identify a problem, clarifies the problem, investigates the problem thoroughly, thinks about the problem, tries to accumulate information and data in order to solve the problem, and perhaps also faces unsuccessful solutions that leads to frustration (Ananda Kumar Palaniappan, 2005; Crowe, 2010; Davis, 1992; Starko, 1995) but does not give up in face of difficulties (Lindstrom, 2006).

b. The relationship between the incubation / investigative work and elements 1, 2 and 3 of digital storytelling

After acquiring possible ideas, questions and images for the digital story for some time, the student may not be consciously thinking about them. This is what Wallas (1926) described as the incubation period in his model of creativity. During this period, the student may go about doing other activities, while at some level, his mind unconsciously or preconsciously continues to consider the ideas (Ananda Kumar Palaniappan, 2005; Crowe, 2010; Davis, 1992; Starko, 1995) he wants to include in his digital story.

c. The relationship between the illumination / inventiveness and ability to use models and elements 4 of digital storytelling

After gathering all possible ideas, content, images and questions, the student needs to think through about them (Element 4 of Digital Storytelling). At this stage, Wallas described it as the phase in which the student may experience the 'aha' or 'eureka' experience which results in a change of perception, a new idea combination or a transformation that produces a clear solution (Ananda Kumar Palaniappan, 2005; Crowe, 2010; Davis, 1992; Starko, 1995). Lindstrom (2006) describes it as the criterion in which the student may search out model to emulate and develop work in a brilliant and unexpected way.

d. The relationship between the verification / capacity for self-assessment and elements 5, 6 and 7 of digital storytelling

In the fifth element of digital storytelling, the student thinks about the music that can accompany the digital story well and give an impact to the audience. Whereas in the sixth element, he needs to make sure that the content is brief and compact. In the last element, he needs to ensure that the pace of his story is smooth. These elements need a student to face the 'trial and error' session and always test out the practicality of an idea. This is similar to the verification stage of Wallas (1926) in which the student checks the solution for effectiveness and appropriateness (Ananda Kumar Palaniappan, 2005; Crowe, 2010; Davis, 1992; Starko, 1995). In other words, verification confirms whether an idea is acceptable and if it does not, the student goes back to the preparation and the incubation stages (Davis, 1992). Similarly, Lindstrom

(2006) described this phase as the student having the ability to identify his own shortcomings in his work and justify why it happens that way.

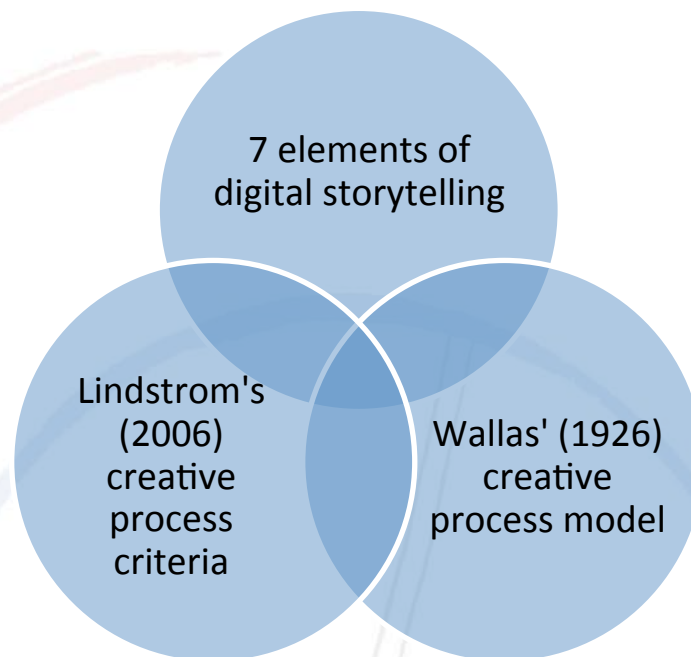The conceptual framework of this study is presented in Figure 1.

Figure 1. Conceptual framework of the study

Methodology

This study, carried out in 2012, employed a qualitative case study research design (Bogdan & Biklen, 1992; Creswell, 2007; Merriam, 2009; Yin, 2009). It sought to understand students' creative processes so that they could be better appreciated in their endeavour to comprehend expository reading texts and henceforth develop creative digital stories. The selection of participants was based on two criteria. The first criterion was that participants were the opposite of typical or average students (Maxwell, 2005). Since the engineering diploma students were reported by the participating university's Academy of Language Studies in 2012 to be the least proficient in the English for Academic Purposes course in comparison to students from other faculties (i.e., Pharmacy, Health Sciences and Hotel and Management), a group of thirty-five engineering students were chosen to participate in this study. However, only the above-average and below-average readers identified through a reading placement test were selected to be studied closely as they were the opposite of the average readers that normally represent the average students. The second criteria proposed by Maxwell (2005) in purposeful selection of sampling is establishing comparisons between individuals. Henceforth, in this study, the above-average and below-average readers were both chosen so as to provide clarity about their similarities and differences in creative processes while developing digital stories. Their consent to participate in the study was sought. Both respondents were nineteen year-old, Malay males.

The placement test used was the university's October 2009 official English for Academic Purposes final exam for the reading component. It was categorized as a criterion-referenced standardized test because it compelled each student's score to be compared to a cutoff score set by the test authors (Wolf, 1993, as cited in Caldwell, 2002). The English language lecturers marking the reading test were expected to follow all directions for scoring the test without adapting or changing any of the procedures set. The total mark for the reading test component was set at twenty and the mean grade equivalent reading scores for the total population sitting for the paper was 11.3 marks (Akademi Pengajian Bahasa, UiTM Cawangan Pulau Pinang, 2009). Block (1986), Levin (1973) and Paris and Myers (1981) defined good or above-average readers as those with reading comprehension test scores were at or above the mean score for the total population, and poor or below-average readers as those with reading comprehension test scores below the mean score for the total population. In this study, the above-average reader scored 16.5 marks in the placement test, whereas the below-average reader scored 6.5 marks.

Data were drawn from observational field notes, interview transcripts and respondents' digital stories in three weeks of the digital storytelling project. There were three two-hour classes in each week. Prior to the project, all the students were introduced to digital storytelling, the significance of the seven elements of digital storytelling in developing a digital story, the Windows Movie Maker tutorial (a software needed to build a digital story), and some hands-on practice on Windows Movie Maker. The project sequence was planned as follows:

- Week 1: Mete out reading placement test and identify the above-average and below-average readers.
- Week 2 and 3 (six two-hour classes): Introduce students on how to utilize the seven elements of digital storytelling and Windows Movie Maker.
- Week 4 to 6 (nine two-hour classes): The students prepare and make their own digital stories.

The title of the digital story was 'Plastic surgery: the reasons, the risks and a lesson learned'. The respondents and their classmates were given two expository texts on plastic surgery from which they could find ideas for their digital stories. However, they could find other reading texts and videos to help them develop their digital stories.

Case study one: Mizzi

An above-average reader, Mizzi (pseudonym), was nineteen years old and had scored 16.5 marks in the placement test taken on the 15th of June, 2012. He scored A in his English paper for the Malaysian Certificate of Education, and granted the university's dean's list award when he was in his first year. Mizzi was a composed person and did not talk much while completing his digital story project. Twice he was fifteen minutes late for class during the observations but both times he was courteous with his lecturer by apologizing before taking his seat. He paid attention to the explanation given by the lecturer and after that preferred doing his work quietly and rarely asked questions or moved around, unlike the other students in the class who were active. He was selected for case study in order to understand what creative processes such an above-average reader would exhibit while developing a digital story.

According to Mizzi, he had undergone a plastic surgery when he was five years old for tripping off an edge while reading a book. Therefore, when he was given the task to read the two reading articles on plastic surgery and develop a digital story, he immediately became very interested in the project as it reminded him of his own experience, "*I had an experience with plastic surgery, because when I was five years old, I some sort like a bookworm, I read a book while walking and on the floor there was a sharp part, I walked on it and slipped, and got this scar. That's why I have an interest in reading the texts,*" (Mizzi, personal communication, July 25, 2012).

The preparation process / investigative work

After being told to develop a digital story on plastic surgery, Mizzi searched for some more reading articles on the topic, "*The two articles were enough but I read another four to six articles. I took them from the Google Scholar Mr. Fazrul (pseudonym) taught me,*" (Mizzi, personal communication, July 25, 2012). A few parts of the reading articles, which were sometimes referred to by him in class while doing his digital story, were underlined. He also viewed some Youtube videos on health care series, and from there formed his ideas that he wanted to include in his digital story, "*The health care series got my attention because, because of the visuals, because of the drama, they invite artists, or people that have experience, really touching experience about their body, sort of defects on the face. So, I think I'll put the elements of suspense in my story*," (Mizzi, personal communication, July 25, 2012). This was evident when words like 'suspense, slow and dramatic' were present in his digital storytelling elements worksheet (Mizzi's digital storytelling elements worksheet, July 6, 2012). After reading some articles and viewing videos on plastic surgery, Mizzi decided that his digital story would depict plastic surgery as giving more risks than advantages. In his digital storytelling worksheet, he wrote "There are more cons than pros in plastic surgery" (Mizzi's digital storytelling elements worksheet, July 6, 2012) and commented "*The society doesn't know the risks of having plastic surgery. They only think about the beauty, the secret, they don't think about the risks, because plastic surgery through my research, more cons than pros. For successful surgery maybe only 40% really, really successful rate*," (Mizzi, personal communication, July 25, 2012).

The incubation process / investigative work process

According to Mizzi, a digital story was similar to movies, "*... the digital story and the movies, they have ... the same characteristics, they build up the momentum from zero to the drama and then to the ... solution,*" (Mizzi, personal communication, July 25, 2012). He was not someone who could easily feel satisfied with his work. He reported that developing a digital story needed time, concentration, and continuous revision, and when he was fatigue and running out of ideas, he "*… stepped outside for fresh perspectives. I left my stuffy workstation and let myself enjoy the warmth of sunlight, the coolness of breeze and the freshness of air which I believed could do miracles to my mind and body. I came back feeling rejuvenated and ready for my work,*" (Mizzi, personal communication, July 25, 2012).

The illumination process / inventiveness and ability to use models

Mizzi regarded an example of digital story shown in class as a model that he could follow but stressed that he preferred his own ideas to shine and be different from others, "*It's a good model, a very good model*," but "*I like to do work with my own idea. I do not take 100% from any sources ... I combine it with my own idea to make it more interesting*," (Mizzi, personal communication, July 25, 2012). This was also evident in his digital story when he went at length to edit several healthcare videos and news taken from several websites, and then appended them in his digital story according to the issues he highlighted. In contrast, many of his other classmates put still pictures in their digital stories. What was more important was that he was pleased with his work, "*I felt 'Yes, this is it!' when I filled in the final touch – the music score*," although he voiced his little disappointment about "*the lack of variety of information materials*," in his digital story (Mizzi, personal communication, July 25, 2012) by stating that the articles posted on the websites were mainly from the western point of view and very minimal came from the eastern point of view (Mizzi's journal, July 11, 2012).

The verification process / capacity for self-assessment

Mizzi was someone who would go beyond what was required of him. When the class was given the task to develop a digital story that contained the reasons for and risks of plastic surgery, he went further to touch on the solutions to overcome the dangers of plastic surgery, "*... people always talk about the risks, the reasons, they don't talk about the solutions to overcome the risks*," (Mizzi, personal communication, July 25, 2012). In his digital story, he included an excerpt from a news showing a plastic surgeon explaining that the dangers could be avoided if people who wished to undergo plastic surgery would also do some research on the surgeons they chose (Plastic Surgery: Slide 15).

Mizzi's level of creative processes

Based on the assessment of his own English lecturer for working closely with him and another English lecturer who assessed his folder containing all his preparation work (Lindstrom, 2006), Mizzi was ranked an expert in the creative processes with 14 marks. For investigative work, Mizzi was given a perfect 4 marks because he took the effort to go through each element of digital storytelling thoroughly, searched for additional reading materials, and chose appropriate videos, music and still pictures. The assessors also found that he could work with minimum support and awarded him 3 marks. In class, for his effort to find and select appropriate pictures, videos and music that depict the theme of his digital story well, he was given 3 marks. Finally, for his own identification of his merits and shortcomings in his work and others', he was awarded 4 marks.

Case study two: Alif

A below-average reader, Alif (pseudonym), was nineteen years old and scored 6.5 marks in the placement test taken on the 15th of June, 2012. He scored B in his English paper for the Malaysian Certificate of Education. Alif had two younger siblings and liked to travel and go for camping. Alif was always smiling, early for

class and paid attention well. Like Mizzi, he too preferred doing his work in class quietly although at times he consulted his friends for work that he needed help in.

The preparation process / investigative work

Alif reported that at first he found that creating a digital story was difficult. However, after learning from his friends on how to add pictures, manage the time to the music and practising on his own how to arrange all the features for some time, he found doing it was easy, "*I thought it's difficult. But I get help from my friends. During the tutorial sessions, using Movie Maker in class, they taught me how to put pictures and music, and burn the CD. After that, I practised for an hour on my own. I can do it ... I learn a lot from my friends,*" (Alif, personal communication, July 26, 2012). To him, reading more articles on the topic of plastic surgery or doing extra research was not necessary as all important points that he wanted to convey in his digital story were already present in the given reading articles. He admitted that he did not plan ahead for his digital story but completed it through trial and error, "*No, I didn't plan my digital story, I just did it. Like the Nike slogan – 'Just Do It'. I read the articles and I did my digital story at the same time. By just doing it, I think we do a lot of mistakes. But it's still okay. We learn from trial and error,*" (Alif, personal communication, July 26, 2012). However, he may have not realized that he had planned his work in advance, even if it was a little, when he wrote in his seven elements of digital storytelling: 'I will give more pictures than words' and 'My music must be lively so that the audience will not be bored to watch it' (Alif's digital storytelling elements worksheet, July 6, 2012).

The incubation process / investigative work process

Alif was not worried about completing the digital story because he thought that he had had much information with him. He went about doing his normal daily tasks as usual, "*I don't think I was worried because I had a lot of information before doing the digital story. I do other activities which I do normally. I play futsal or badminton in the evening. At night I go to the mosque,*" (Alif, personal communication, July 26, 2012). In class, he only had with him the expository texts given to him by the English lecturer without referring to other reading texts. While others went about the classroom to look at other friends' work, Alif was calm and composed, and concentrated on his work.

The illumination process / inventiveness and ability to use models

Alif claimed that his digital story was "*... purely my own creativity and I didn't take other videos to follow,*" (Alif, personal communication, July 26, 2012). His claim though may be questionable since the class lecturer had shown the entire class several examples of digital stories.

The verification process / capacity for self-assessment

Alif gave mixed opinions about the satisfaction with his digital story, "*I'm satisfied with my work generally,*" (Alif, personal communication, July 26, 2012). However, after a while, he stated a contradictory opinion, "*I think I don't really like my work. Because I think there are many others who are better than me. I've seen their work,*"

(Alif, personal communication, July 26, 2012). However, he was able to judge his own digital story by stating the strength of it in comparison to other students' digital stories, "*My friends can learn about bad effects of plastic surgery in my digital story. I look at their videos, the pictures we use are the same ... we take from the internet ... but my overall product of the digital story is different. The song is different, the introduction and the conclusion, all different. My introduction is like I'm teasing those who undergo plastic surgery. I put the bad images, and I put a question. I said, 'Do you want to look beautiful like them?',*" (Alif, personal communication, July 26, 2012). Alif also included an element of sarcasm for those who undergo plastic surgery in his digital story, "*The closing, I put a cartoon, it's about a plastic surgery on a pig. The doctor said 'Pig, after you do plastic surgery, your face will improve but you are still a pig',*" (Alif, personal communication, July 26, 2012). This was actually his response to a part of the title of the digital story: 'Plastic Surgery: The lesson learnt'. He elaborated by being philosophical, "*No matter how ugly or pretty you are, it's your behaviour that is more important*" (Alif, personal communication, July 26, 2012).

Alif's level of creative processes

Based on the assessment of his own English lecturer for working closely with him and another English lecturer who assessed his folder containing all his preparation work (Lindstrom, 2006), Alif was ranked a master with 11 marks in the creative processes. For all the investigative work, inventiveness and ability to use models, Alif was given 3 marks for each respective element of the creative processes. He did not give up when he found that Windows Movie Maker application was not easy to be used. He practiced hard on his own until he was satisfied that he could use it easily. Next, he planned what he wanted to include in his digital story in his digital storytelling elements worksheet although he was not really aware of the fact. What was lacking was that he did not search for additional reading materials on plastic surgery. However, his search for suitable pictures to be inserted in his digital story was excellent because these pictures explained difficult words like 'hematoma' and 'necrosis' well. Alif was philosophical in his digital story but could not give a justified view on his peers' work, and thus was awarded 2 marks.

Conclusions

The findings of this study showed that both the above-average and below-average readers exhibited the preparation, incubation, illumination and verification steps of the creative process as proposed by Wallas (1926). In addition, the below-average reader was ranked a master in his creative processes and not a novice. This could mean that with digital storytelling, a below-average reader could have exercised his cognitive ability better.

However, there were some differences between the above-average reader and below-average reader in their creative processes. The above-average reader did not need any help from his friends while making his digital story, preferring to work on his own. Whereas the below-average reader admitted that he learned a lot from his friends initially to learn to manoeuvre the Movie Maker before practising on his own the application in order to develop a digital story. Both of them exhibited the characteristics of a creative person: the above-average reader was being independent

(Montgomery, Bull, & Baloche, 1993) as well as being private (Plucker & Makel, 2010), while the below-average reader was exercising a trait called 'collaborative creative process' (Romero, Hyvonen, & Barbera, 2012). It is a trait needed as nowadays technology requires continuous learning between people sharing a situation that involves technology. Next, the above-average reader prepared extensively by reading other articles besides the given two articles, and searching for related videos on plastic surgery. This is another characteristic of creativity called inquisitiveness or idea finding (Montgomery, Bull, & Baloche, 1993). The below-average reader, however, thought that the information to develop his digital story was already adequate and concentrated more on how to have a lively digital story. This could reflect his relaxed and lively nature which is another creativity trait (Botella, Glaveanu, Zenasni, Storme, Myskowski, Wolff, & Lubart, 2013). He also reported that he completed his work through trial and error which means that he had adopted the role of a creative person by being an explorer who could embrace ambiguity and intuition (Montgomery, Bull, & Baloche, 1993). The above-average reader wanted to be different from the other students, self-critical and was not easily satisfied with his work. This shows that he was a creative individual for aiming for originality and being a non-conformist (Botella, Glaveanu, Zenasni, Storme, Myskowski, Wolff, & Lubart, 2013). The below-average reader, on the other hand, was generally satisfied with his work though he showed a tendency to doubt his own work. This skepticism is another creative characteristic that is shared by other creative people (Montgomery, Bull, & Baloche, 1993).

If data from this study can be trusted, the power of digital storytelling can be recognized. One of the significant aspects of this study was the ability of digital storytelling in helping students, be them above-average or less-average readers, to embrace creative processes and creative traits. The challenge now is to convince the educational policy maker to integrate digital storytelling in the educational process.

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