

## Enhancing Digital Literacy in Generation Z through Digital Storytelling การเสริมสร้างทักษะความเข้าใจและใช้เทคโนโลยีดิจิทัลสำหรับเจนเนอเรชันซี โดยการเล่าเรื่องด้วยสื่อดิจิทัล

Purita Sayavaranont<sup>1\*</sup> and Assoc.Pro.Dr.Panita Wannapiroon<sup>2</sup>

ภูริตา สายะวารานนท์<sup>1\*</sup> และ รศ.ดร.ปณิตา วรณพิรุณ<sup>2</sup>

<sup>1\*, 2</sup> Division of Information and Communication Technology for Education, Faculty of Technical Education, King Mongkut's University of Technology North Bangkok

<sup>1\*, 2</sup> สาขาเทคโนโลยีสารสนเทศและการสื่อสารเพื่อการศึกษา คณะครุศาสตร์อุตสาหกรรม มหาวิทยาลัยเทคโนโลยีพระจอมเกล้าพระนครเหนือ

\* Corresponding author e-mail: purita1@gmail.com

### Abstract

This paper is a report of the development of an instructional model to enhance digital literacy of generation Z through digital storytelling. The purposes of this study are: 1) to develop and 2) to evaluate and gain experts' opinion on the proposed model. The 6 essentials learning steps included: 1) Idea generation and information exploration; 2) Style & designing direction, 3) technology and media selection; 4) Script writing and storyboard preparation; 5) Media gathering, creation, organize and production; 6) Reach out to audience; and Why? Reasons to adjust my work according to audience's feedback and evaluation. The research was conducted through a qualitative methodology with an online five-point Likert scale survey tool with eight specialists. All specialists agreed that using of the instructional model based on digital storytelling to enhance digital literacy in generation Z was suitable. In overall, the whole model was very strongly appropriate ( $\bar{X}=4.39$ ,  $S.D.=0.60$ ).

**Keywords:** Generation Z, Creative Learning Community, Digital Literacy, Digital Storytelling

### บทคัดย่อ

บทความนี้ได้รายงานผลการพัฒนารูปแบบการเรียนรู้เพื่อเสริมสร้างทักษะความเข้าใจ และใช้เทคโนโลยีดิจิทัล สำหรับเจนเนอเรชันซี (Z) ด้วยการเล่าเรื่องด้วยสื่อดิจิทัล โดยมีวัตถุประสงค์ในการศึกษา คือ 1) เพื่อพัฒนา 2) เพื่อประเมินและรับความคิดเห็นของผู้เชี่ยวชาญเกี่ยวกับรูปแบบการเรียนรู้ รูปแบบการเรียนรู้นี้ประกอบด้วย 6 ขั้นตอนสำคัญ ได้แก่ 1) การคิดริเริ่มและค้นหาข้อมูล 2) การกำหนดรูปแบบและการออกแบบ และการจัดการและการผลิต 3) การเลือกเทคโนโลยีและสื่อ 4) การเขียนและจัดทำบท และการเขียนกรอบแสดงเรื่องราว 5) การรวบรวมสื่อ การสร้าง และการจัดการและการผลิตสื่อ 6) การส่งออกให้แก่ผู้รับสาร และเหตุผลในการปรับเปลี่ยนงานตามคำแนะนำ และการประเมินผลจากผู้รับสาร งานวิจัยนี้จัดทำโดยใช้วิธีวิจัยเชิงคุณภาพ โดยผ่านการประเมินรูปแบบการเรียนรู้จากผู้เชี่ยวชาญ 8 ท่าน โดยการประเมินผลผ่านระบบออนไลน์ ใช้เกณฑ์การประเมิน 5 ระดับ ของ Likert Scale ซึ่งผู้เชี่ยวชาญทั้งหมดได้เห็นตรงกันว่ารูปแบบการเรียนรู้ด้วยการเล่าเรื่องด้วยสื่อดิจิทัล เพื่อเสริมสร้างทักษะความเข้าใจ และใช้เทคโนโลยีดิจิทัล สำหรับเจนเนอเรชันซี นี้มีความเหมาะสม โดยมีผลการประเมินอยู่ในระดับ "มีความเหมาะสมมาก" ( $\bar{X}=4.39$ ,  $S.D.=0.60$ )

**คำสำคัญ:** เจนเนอเรชันซี ชุมชนการเรียนรู้สร้างสรรค์ การรู้เท่าทันดิจิทัล การเล่าเรื่องแบบดิจิทัล

## 1. Introduction

### 1.1 Technology Disruption and Global Challenges

Technology and the rapid development of it continuously lead to disruption in our lives; disruption in the way we do things, the speed at which we do it, and tools we utilize to get things done. Countries all over the globe are putting an emphasis on developing their technology, in order to advance their country and economy forwards. As a result, one finds ourselves in an increasingly competitive atmosphere. This is probably a key factor in determining survival for the next generation - more than anything, they will need to be aware of this competitiveness and be able to utilise the ever-changing technology to their advantage. For countries to be able to enhance their technological competitiveness, they need to work on developing the workforce in their country too; their educational systems and overall capacity for innovation and harnessing digital tools, a task that is especially difficult for countries that are still developing in these areas. For young students, it is incredibly important that they are able to get the education that they need to be able to grow up as a relevant person in the workforce; someone with a set of unique skills who can stand out and actively contribute towards a company due to the (mostly technology-based) skills they are able to harness on the job. To be able to really stand out, people must be able to move beyond simply using tools, to being able to manipulate them and modify them to work in the most efficient manner for them. To achieve this, it requires certain skills that are not only about being computer savvy – but skills like creativity, innovation, problem solving. This should be an immediate priority for all countries, whether developing or fully developed, because an innovative workforce equates to an innovative country.

### 1.2 Thailand Challenges

A report that discusses innovation and countries' innovative capabilities is the Global Competitiveness Report 2015-2016, an annual report by the World Economic Forum that aims to analyse countries' competitiveness based on a variety of factors, or 'pillars' in which competitiveness is defined as "the set of institutions, policies, and factors that determine the level of productivity of a country" (World Economic Forum, 2015).

Thailand is classified as an 'efficiency-driven' economy, scoring 4.6/7.0 and ranking 32<sup>nd</sup> out of the 140 countries. While this does not actually sound entirely negative – 32 out of 140 is not altogether bad after all, the results are quite worrying as all other ASEAN nations with the exception of Thailand have managed to improve their rankings since 2007 (World Economic Forum, 2015).

As described in the report, Thailand's scores are lowest in the areas of innovation and business sophistication, indicating that Thailand needs to work on these two factors (in conjunction with improving the other pillars) in order to become an innovation-driven country. Therefore, one of the key issues Thailand needs to address is how they are going to foster innovation. Improving the education system is paramount to achieving this, as it would create innovative, creative children who grow up with that mentality ingrained in their beliefs and actions. Teaching students to use digital storytelling as a platform of expressing themselves to foster innovation and creating something new can help improve digital literacy rates and overall competitiveness in Thailand, in which Thailand 4.0 could be a key driver.

Before moving on to Thailand 4.0, it is important to understand the underlying inspiration behind the government's initiative: Industry 4.0. According to Deutsche Bank, the first industrial

revolution commenced at the end of the 18th century with the introduction of mechanical production equipment, such as the mechanical loom for goods manufacturing. At the turn of the 20th century, electrically powered machinery was implemented for use in mass production. The third industrial revolution then commenced in the 1970s, and was based on the use of electronics and information technologies to automate production processes (Deutsche Bank, 2014). The fourth industrial revolution, or Industry 4.0, is to become a reality in the coming decade, in which it is not only about improving competitiveness, it is also seen as a tool for tackling the most pressing global challenges as well as specific national challenges (for example, the labour supply that is changing due to demographic shifts).

Similar to Industry 4.0, Thailand 4.0 focuses heavily on competitiveness and a thriving workforce. In an interview column with Dr. Suvit Maesincee, Deputy Minister of Commerce, Government of Thailand (Aim-Aiam, 2016), he explained in-depth, the details of Thailand 4.0, stating that it is about equipping its citizens with enough knowledge to propel the country forwards. He stated that Thailand 4.0 does not start with industrial developments, but rather, with human developments; for instance – farmers can hone their craft by incorporating elements of technology into the way they work, efficiently utilising technology to better manage their crops and increase their income as a result. From his statements, we can infer that a huge component relates to finding the best and most efficient ways to advance the country, with most of these solutions incorporating elements of technology. Therefore, one of the aspects of education that must be addressed is that of digital and technology-based education - i.e. improving digital literacy. The effort to modernise education, especially in Thailand, has in a few cases, been referred to as Education 4.0 (a reference to both Industry 4.0 and Thailand 4.0).

### **1.3 Digital Literacy – A required skill for future workforce of the 4.0 era**

A framework created by Partnership for 21<sup>st</sup> Century Learning (P21), details the necessary components for 21<sup>st</sup> century learning; in essence, a framework of the skills that need to be taught to students to prepare them for a drastically different 21<sup>st</sup> century (Partnership for 21<sup>st</sup> Century Learning, n.d.). Information, Media, and Technology Skills, which P21 state as being important as: “to be effective in the 21st century, citizens and workers must be able to create, evaluate, and effectively utilize information, media, and technology.” These types of literacies were listed as Information Literacy, Media Literacy, and ICT Literacy, all of which are things that digital storytelling helps students achieve - as well as creativity, the main purpose of the Learning and Innovation Skills.

One of the ways to achieve this framework, is through digital storytelling; essentially the idea of combining storytelling with different computer-based tools. The use of various multimedia tools improves digital literacy through giving students first-hand experience with using computers for a specific purpose, teaching them how to shape technological tools to create their desired output. This is particularly effective because there is a personal element to these stories, allowing students to express themselves through digital means, a form of self-expression that has the potential to be appealing across generations. This is an important point to keep in mind because students of different generations tend to have different learning methods - Generation Z, for instance (an increasingly popular name for the generation of children after Generation Y) are characterised by a shorter attention span and a dislike of traditional learning environments.

## 2. Research Objective and Framework

### 2.1 Research Objectives

1) To study and develop an instructional model based on digital storytelling to enhance digital literacy in Generation Z

2) To evaluate the instructional model based on digital storytelling to enhance digital literacy in Generation Z

### 2.2 Procedure of the Research

This research procedure included 4 phases:

Phase 1: Study and analyze current global trend and issues, i.e. technology disruption, global competitiveness and future workforce, Thailand's challenges and the latest development in order to tackle those challenges through literature and research review before applying to local context.

Phase 2: Literature and research review on key elements of this research that include:

- 1) Generation Z
- 2) Creative Learning Community – A Powerful Tool to Enhance Digital Literacy
- 3) Cloud-based Technologies
- 4) Digital Literacy
- 5) Digital Storytelling
- 6) Learning Process: Digital Storytelling Learning Process (Morra, 2014)
- 7) Learning Theories Underpinning Learning through Digital Storytelling: Constructivism (Piaget, 1955) and Constructionism (Papert, 1991)

Phase 3: Develop the instructional model based on digital storytelling to enhance digital literacy in Thai Generation Z based on the literature and research review of the instructional design based on the educational theory of learning theories underpinning learning through digital storytelling : Constructivism (Piaget, 1995) and Constructionism (Papert, 1991).

Phase 4: Evaluation of the instructional model based on digital storytelling to enhance digital literacy in Generation Z by using an online five-point Likert scale survey method.

### 2.3 Literature and Research Review

#### 1) Generation Z

Generation Z typically refers to people born between 1995-2009 (McCrindle, 2015), during a time when the world was being faced with a multitude of challenges (an example of this being terrorism and environmental concerns). Generation Z's are raised by their parents, Generation X's, who are often more lenient with their children than previous generations were. Generation Z's independence could also be due to the economic recession, which caused people to have fewer children than before. They are known as 'digital natives, tech savvy, globally connected, flexible and smarter, and tolerant of diverse cultures (Singh, 2014).

Generation Z growing up in Thailand will be faced with many of these technological and environmental disruptions. In order to tackle these challenges, it is vital to prepare these children and equip them with the knowledge and skills in order to succeed in the 21<sup>st</sup> century.

#### 2) Creative Learning Community – A Powerful Tool to Enhance Digital Literacy

Barth (1990) said that "A good school for me is a place where everyone is teaching and everyone is learning - simultaneously, under the one roof".

Referring to the Lifelong Kindergarten Group at the MIT Media Lab (n.d.), a creative learning community, in this study, is a programming language and an online community where children can program and share interactive media such as stories, games, and animation with people from all over the world. As children create with creative learning community, they learn to think creatively, work collaboratively, and reason systematically.

According to studies done in the past in which students were allowed to think differently, to self-reflect, express their opinions and make judgment that support or oppose different perspectives initiated by their colleagues (Ng, Nicholas & Williams, 2010; Fung, 2004).

Lave and Wenger described Creative Learning Community as a community of practice which derived when people who interest in the same common issue regularly interact each other in order to share a concern or a passion for something (Lave & Wenger, 1990).

From the above statements, it can therefore be interpreted that in sharing their digital stories about their personal stories, experiences or interests with their peers on creative learning community, students may create their own communities of practice. Within their communities of practice, they are able to share these experiences with the storyteller, and offer encouragement and ideas to enhance the cognitive and emotional experiences of the storyteller.

Communities of practice are able to grow over time and furthermore, have the capacity to promote lifelong learning if the students maintain regular interaction with members of their community as they enter teaching and develop their digital literacy. The opportunity to relate an experience in a digital story format caters to students who may not be linguistically sophisticated in expressing opinions and emotions in a written form (as in traditional reflective essay writing) but who may be able to use a combination of modes of representations afforded by digital technology to convey and share their stories.

### 3) Cloud-based Technologies

Oxford Dictionary defined Cloud Computing as the practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer.

Griffith, E. (2016) described that cloud is just a metaphor for the internet. Cloud computing is as a mean storing and accessing data and programs over the internet instead of computer's hard drive. The key characteristic of cloud computing is that the users need to access their data or programs over the internet, or the very least requirement, to have the data synced with other information over the web.

According to IBM (2017), cloud computing is defined as a service over the internet. It is a delivery of on-demand computing resources—everything from applications to data centers—over the internet on a pay-per-use basis.

There are many advantages of using cloud-based technologies for educational purposes. According to Fort, A. (2014), key benefits included; Information storage – allows students to work together, to share and exchange information on group projects as well as to submit assignment; Classroom in the clouds - allows students to attend the classroom from remote areas; E-learning – provides more opportunity for learners to improve their skills using online services, and; Mobility – students and teachers are perpetually connected to the internet through various mobile devices.

#### 4) Digital Literacy

UNESCO (2011) states that the most important components of digital literacy are common for future computer users and ICT professionals. These are accessing, managing, evaluating, integrating, creating and communicating information individually or collaboratively in a networked, computer-supported, and web-based environment for learning, working or leisure (Karpati, 2011). Details summarized as below:

1. Accessing: identify, collect and retrieve information
2. Managing: search and use resources where validity and authenticity
3. Evaluation: make judgment about adequacy, currency, usefulness, quality, relevance or efficiency of information
4. Integration: synthesize, summarize, compare and contrast information from various sources
5. Creation: generate new information digitally by adapting, applying, designing, inventing and authoring information
6. Communication: use ICT as a mean to transmit information, present and persuade wider audience

Whereas Deakin University Library (2014) described the three key elements of digital literacy in which students are required to develop: to find; to use; and to disseminate. This research will be conducted, based on these elements listed below:

1. To find: accessing global information in many formats from diverse sources (search and navigate)
2. To use: being able to critically analyse and evaluate sources; create new knowledge (think critically and analyse)
3. To disseminate: using appropriate technology to communicate information and connect with others in an academic environment (create, communicate and connect)

The RUBRIC score will be used to determine and measure the level of Generation Z's digital literacy being developed within the context of their performance criteria and discipline at each level, in which this survey will be based on the "foundation level" in accordance with Deakin University's Digital Literacy Framework (Deakin Univeristy Library, 2014).

#### 5) Digital Storytelling

Malita, L. & Martin, C. (2010) said that "storytelling has been around for thousands of years as a means for exchanging information and generating understanding". Throughout the time, it had transformed into many different forms as well as adapted to various mediums that have emerged e.g. cave painting, Egyptian Hieroglyphs, glass mosaic, paper and press printing. In today's world, the 21<sup>st</sup> century era, the world of technology rich society, digital technology has been introduced as a successive medium.

Standley, M. (2003) said "Digital Storytelling is exponentially more powerful than other forms of storytelling because the digital format immediately makes student's knowledge available to global audience"

University of Houston Education (2017) defined digital storytelling as the practice of using computer-based tools to tell stories, for instances, digital documentaries, computer-based narratives, digital essays, electronic memoirs, interactive storytelling, which combine the art of telling stories with a variety of multimedia, including graphics, audio, video, and Web publishing.

According to Leslie, R. (2010), Digital Storytelling is the modern expression of the ancient art of storytelling. Digital stories derive their power by weaving images, music, narrative and voice together, thereby giving deep dimension and vivid colour to characters, situations, experiences, and insights.

According to the aforementioned definitions and reviews, it can be concluded that digital storytelling is a creative way of using technology as a tool to communicate, to share personal stories, experiences, thoughts and interests, in which, at the same time self-reflected one's beliefs, values and express their emotions. It can potentially be used as a powerful tool for developing, enhancing, storing and disseminating the stories in new ways as well as to teach and to learn from one another.

#### 6) Learning Process: Digital Storytelling Learning Process (Morra, 2014).

According to Samantha Morra, the process of digital storytelling can be summarized as an eight step – Come up with an idea and write proposal; Research/Explore/Learn; Write script; Storyboard/Plan; Gather/Create images, audio and video; Put all together; Share; and Feedback and Reflect (Morra, 2014).

#### 7) Learning Theories Underpinning Learning through Digital Storytelling: Constructivism (Piaget, 1955) and Constructionism (Papert, 1991).

Learning theories that underpin the learning associated with digital storytelling are constructivism (Piaget, 1955) and constructionism (Papert, 1991). The constructivist learning theory posits that people learn by actively interacting with the learning materials where their prior knowledge and past experiences will influence that learning. Getting generation Z to reflect and share their personal stories, experiences or knowledge through digital tools, this way will encourage them to be more actively engaged in the learning activity while, at the same time, attaining digital literacy throughout the learning processes.

The construction of a digital story to share with their peers is underpinned by Papert's constructionism learning theory that focuses not only on the mental construction of knowledge but also on a physical construction of a complete digital storytelling. Students will be more motivated and engaged with the overall learning processes if they get the opportunity to construct digital stories that can be shared with peers and receive useful feedback from (Papert, 1991).

Based upon the aforementioned learning theories and the digital storytelling learning process, the researcher has developed the instructional model based on digital storytelling to enhance digital literacy in Generation Z. An essential step for media production i.e. style & designing direction, technology and media selection was added to the learning processes in which align with production process in production house or PR agency. Therefore, this model consists of 6 essential steps, with abbreviations in the brackets, to obtain digital literacy through digital storytelling, which included:

1. Idea generation and information exploration (I)
2. **S**tyl & designing direction, technology and media selection (S)
3. Script writing and storyboard preparation (T)
4. Media gathering, creation, organize and production (O)
5. **R**each out to audience (R)

6. Why? Reasons to adjust my work according to audience's feedback and evaluation  
(Y)



Figure 1: Proposed instructional design model, Digital Storytelling Model

According to Malita & Martin (2010) study, which described that technology become a medium of expression, communication, integration and imagination to tell stories in the digital era, but still aim to create an emotional effect and/or convey the messages to audience which is the purpose of the oral traditional stories. In the same study, it also stated that “we can see ePortfolio as a digital story”, which is a great example to describe the learning process of the proposed model. Starting with the first step in which learner needs to do a self-exploration and come up with an idea generation (I) on what information should be included in his/her portfolio. Follow by designing direction, style (S) and media or technology to be used. Media gathering, organizing (O) and creation, for instance, creating a link to their past works that were stored in the digital archive are the following step before reaching out (R) to share with the world through social media or networking. During the final process, the learner could automatically receive indirect feedbacks and self-reflection on how successful their work (ePortfolio) where and why (Y) they should adjust it. The more public or employers' interests, the more success their works are.

After completing the learning process described above, of the proposed instructional model, Digital Storytelling model, and learners' level of digital literacy – foundation level, should be assessed by using RUBRIC score. In this way, learners' performances will be evaluated through criteria and discipline as earlier stated by Deakin University Digital Literacy Framework (Deakin University Library, 2014) in which each learning process (in abbreviated letter – see Figure 1) of the proposed model will be attained as outlined below.

Find: Search - Navigate

- Identify a need for the required information to effectively complete a task. (I, Y)
- Define the scope of the research required and determine key concepts and contexts. (I S)
- Successfully locate sources from a list of provided citations. (T)
- Research and access key sources of information in the subject area. (I, Y)
- Use: Think Critically – Analyse
- Recognise that the quality of information varies. (I)



- Awareness of elementary evaluation criteria to avoid use of misleading knowledge resources. (I, S, T)
- Disseminate: Create – Communicate - Connect
- Recognise the importance of referencing and acknowledging the ideas of others in creative works. (S, T, O)
- Demonstrate an understanding of copyright requirements, information security and privacy and ethical use of information. (I, S, T, O)
- Select and use technologies to communicate in an academic environment. (R)

#### 2.4 Research Methodology

This study used a qualitative methodology with an online five-point Likert scale survey tool conducted with purposive selected eight specialists. In accordance with literature and research reviews, the instructional model based on digital storytelling to enhance digital literacy in Generation Z was developed with the intention of being suitable for a Thai context. It addresses current issues, concerns and characteristics of Generation Z. The survey was completed by eight Ph.D. members in which each expert has at least 10 years of experience in their chosen fields, with these fields covering various areas of curriculum and instruction, instructional design, information and communication technologies and graphic design & production agencies from reputational universities in Thailand.

#### 2.5 Research tools

2.5.1 An online five-point Likert scale survey to evaluate the appropriateness and application of the model. (5=very strongly agree, 4= strongly agree, 3= agree, 2=slightly agree, and 1=least agree)

2.5.2 The instructional model based on digital storytelling to enhance digital literacy in Generation Z (Figure 1)

#### 2.6 Evaluation of the model

In the fourth phase of the study, the evaluation form was designed by the researcher in and was separated into five parts. The first three parts used a five-point scale (5 = very strongly agree, 4 = strongly agree, 3 = agree, 2 = slightly agree, 1 = least agree). The fourth part was an open-ended question about the participants' ideas and comments on the model. The fifth part, consisted of a conclusion, and asked if the participants considered the overall instructional model to be appropriate, appropriate but should be adjusted according to their suggestions, or not appropriate.

The data from this five-point rating scale was calculated for arithmetic purposes. These means show the specialists' opinions toward the instructional model constructed by the researcher. The criteria of means which were adopted from Suppasetsee (2005) was from a range divided by number of level created. This was  $(5-1) / 3 = 1.33$  for each level the means was added up with 1.33. The following criteria were used for interpretation.

Table 1: The Criterion of the Efficiency of the Model

| $\bar{x}$ | Interpretation                              |
|-----------|---|
| 1.00-2.33 | The instructional model is not appropriate  |
| 2.34-3.67 | The instructional model is appropriate      |
| 3.68-5.00 | The instructional model is very appropriate |

The table above shows the level of appropriateness of the instructional model based on digital storytelling to enhance digital literacy in generation Z. If the mean score from the evaluation form results are from 1.00-2.33, it shows that the instructional model is least appropriate. If the mean score is from 2.34-3.67, it shows that the instructional model is appropriate. If the mean scores are from 3.68-5.00, it shows that the instructional model is very appropriate.

## 2.7 Data Collection

2.7.1 A comprehensive briefing presentation of research proposal and details of the instructional model, an online five-point Likert scale survey were sent to the specialists via email prior to the interview for their preparation. 20-minute phone conferences were arranged as appropriate at the specialists' preferences.

2.7.2 Analyse and interpret the evaluation results of the appropriateness of the instructional model based on digital storytelling to enhance digital literacy in generation Z reviewed by eight experts by using Arithmetic Means and Standard Deviation.

## 2.8 Data Analytics and Statistics

2.8.1 Arithmetic means ( $\bar{x}$ )

2.8.2 Standard Deviation (*S.D.*)

## 3. Research Outcomes

According to the eight experts that evaluated the developed instructional model through an online five-point Likert scale survey, they suggested the opinion that the instructional model based on digital storytelling to enhance digital literacy in generation Z was developed at the 4.39 level of appropriateness. The experts interviewed had a positive reaction to the proposed learning framework and agreed on the applicability and the quality of learning of the proposed instructional model adapted by the researcher, as called "Digital Storytelling Model".

### 3.1 Evaluation of the appropriateness of the instructional model based on digital storytelling to enhance digital literacy in generation Z

Table 2: Evaluation of the appropriateness of the instructional model based on digital storytelling to enhance digital literacy in generation Z

| No.   | Item  | $\bar{x}$ | <i>S.D.</i> | Level of Appropriateness  |
|---|---|-----------|-------------|---------------------------|
| <b>Part 1: Appropriateness of the Instructional Model: concept, conceptual framework and learning theories of the model</b> |   |           |             |                           |
| 1   | The appropriateness of the instructional objectives                               | 4.75      | 0.43        | Very strongly appropriate |
| 2   | Generation Z's learning behavior and characteristic                               | 4.50      | 0.71        | Very strongly appropriate |
| 3   | Creative Learning Community   | 4.38      | 0.70        | Very strongly appropriate |
| 4   | Cloud-based Technology  | 4.25      | 0.43        | Very strongly appropriate |
| 5   | Digital Literacy and the appropriateness of the evaluation                        | 4.50      | 0.71        | Very strongly appropriate |
| 6   | Digital Storytelling and Learning Process (Morra, 2014)                           | 4.50      | 0.71        | Very strongly appropriate |
| 7   | Learning theory: Constructivism (Piaget, 1955) and Constructionism (Papert, 1991) | 4.63      | 0.48        | Very strongly appropriate |
| <b>Part 2: The appropriateness of learning process</b>  |   |           |             |                           |
| 8   | Step 1: i = Idea generation and information exploration                           | 4.50      | 0.50        | Very strongly appropriate |

| No.   | Item  | $\bar{X}$   | S.D.        | Level of Appropriateness         |
|---|---|-------------|-------------|----------------------------------|
| 9   | Step 2: S = Style & designing direction, technology and media selection   | 4.38        | 0.70        | Very strongly appropriate        |
| 10  | Step 3: T = Script writing and storyboard preparation   | 4.50        | 0.71        | Very strongly appropriate        |
| 11  | Step 4: O = Media gathering, creation, organize and production  | 4.38        | 0.70        | Very strongly appropriate        |
| 12  | Step 5: R = Reach out to audience   | 4.38        | 0.48        | Very strongly appropriate        |
| 13  | Step 6: Y = Why? Reasons to adjust my work through audience's feedback and evaluation   | 4.50        | 0.50        | Very strongly appropriate        |
| <b>Part 3: The appropriateness of the instructional model</b> |   |             |             |                                  |
| 14  | The appropriateness of the model for Thailand context   | 3.88        | 0.60        | Strongly appropriate             |
| 15  | The appropriateness of the model for Generation Z characteristic and learning behavior  | 4.25        | 0.83        | Very strongly appropriate        |
| 16  | The instructional model is sufficiently capable of being effective in developing lessons to increase Generation Z' digital literacy | 4.00        | 0.50        | Strongly appropriate             |
| <b>Average</b>  |   | <b>4.39</b> | <b>0.60</b> | <b>Very strongly appropriate</b> |

The findings from the evaluation revealed that all experts agreed overall that the whole model was very appropriate ( $\bar{X}=4.39$ ,  $S.D.=0.60$ ), according to the criterion of the efficiency of the instructional model described on the Table above.

In the first three parts, specifically, item 1 received the highest mean score ( $\bar{X}=4.75$ ,  $S.D.=0.43$ ), follow by item 7 received slightly lower mean score values ( $\bar{X}=4.63$ ,  $S.D.=0.48$ ). Whereas the items 2, 5, 6, 10 received mean and  $S.D.$  scores equally ( $\bar{X} = 4.50$ ,  $S.D.=0.71$ ), while items 8 and 13 received the same mean score with slightly lower  $S.D.$  score ( $\bar{X}=4.50$ ,  $S.D.=0.50$ ) which can be interpreted that the experts' opinions went to the same direction. Items 3, 9, 11 received mean score equally ( $\bar{X}=4.38$ ,  $S.D.=0.70$ ) whereas item 12 received the same mean score with slightly lower  $S.D.$  score ( $\bar{X}=4.38$ ,  $S.D.=0.48$ ). Items 4, 12 and 15 received an equal mean score ( $\bar{X}=4.25$ ) with slightly different  $S.D.$  (item 4  $S.D.$  score= 0.43, item 12  $S.D.$  score=0.48 and item 15  $S.D.$  score=0.83). Item 16 received the second lowest mean scores ( $\bar{X}=4.00$ ,  $S.D.=0.50$ ) whereas item 14 received the lowest mean scores ( $\bar{X}=3.88$ ,  $S.D.=0.60$ ). The findings of the evaluation indicated that all eight experts agreed that 1) the instructional objectives are appropriate 2) concept, conceptual framework and learning theories of the instructional model are appropriate 3) each learning step of the instructional model meets learning objectives 4) each learning step of the instructional model appropriately used the right learning materials with the right technologies; 5) The instructional model sufficiently capable of being effective in developing lessons to increase Generation Z' digital literacy.

Under the open-ended section i.e. the fourth part of the evaluation form, a few experts provided useful suggestions for future studies and development of the model that included the following:

- Suggested alternate learning theories, model and technique that are more current, accommodate the new technologies, digital native learning behavior and might be useful for this study: Social Constructivism (Vygotsky, 1978) which is an extended version of the Constructivism and Bloom Taxonomy (1956) by Benjamin Bloom, Connectivism by George

Siemens (2005), Nonaka & Takeuchi Knowledge Spiral Model (1995) and Digital game-based learning by Marc Prensky (2001) to enhance logical thinking skill

- Suggested alternate creative learning communities i.e. Code.org (sharing with online peer feature with certificate), docs.com (document sharing and thumbnail creation options), Kodu3d.com, Kahoot.it, Scretive.com, Plickers.com (Pokemon similarly with QR code), Youtube.com and Tedtalk.com.

- Suggested to add dependent variables in the conceptual framework i.e. 4 Types of Learners – Activists, Reflectors, Theorists and Pragmatists (Honey and Mumford, 1982), which should analyse every learner in every generation and the Digital Storytelling process (Morra, 2014). The researcher agreed with this suggestion and had adjusted the framework accordingly.

- Comments on age gap of generation Z. According to the definition, they were born between 1995-2009 (15 years gap), whom are currently studying in Grade 3 – or Year 3. This means that they will require different learning framework, techniques, tools and technologies for different age group. In response to this, the researcher had specified a target group for generation Z who are currently studying in Grade 6 for research trial.

- Concerns on the adoption in a Thai context in which the model might not be appropriate and might not be easy to implement due to family backgrounds, educational, cultural differences as well as limitations in the educational system, infrastructure and IT access. In response to this, the researcher explained that at this phase of the study, focus will be on the overall picture of Generation Z at the global level and will be recommended for any future research study to focus at local level.

- Concerns on limited resources that will be required for local implementation i.e. capable teacher with adequate digital literacy knowledge, digital pedagogy and instructional model

In the conclusion part, 6 experts considered this instructional model as appropriate whereas 2 experts agreed that it is appropriate but should be adjusted according to their suggestions which had already done.

#### 4. Conclusion

Malita & Marting (2010) stated that “through digital storytelling (DST) students develop a plethora of skills, necessary to be effective in the 21st century”. It also mentioned that apart from developing various skills such as communication skills, digital storytelling improved their computer skills by using combination of multimedia software. Moreover, when digital stories are created, students will become more technologically literate (Kajder, 2004). From these statements, it can be evidenced that digital literacy is an essential skill for the 21<sup>st</sup> Century which is significantly required for our future workforce, i.e. generation Z for future employability and preparation for innovation and digital-driven economy. One of the key features of digital storytelling is allowing learners to create and share their own personal stories, experiences, and interests as well as express their emotions with others through creative digital tales created by various forms of multimedia. According to Mendosa (2015), an intrinsic characteristic of human beings is the nature of telling stories, sharing our life events with others and experiences in which the way to communicate with others. Taking those aspects into consideration, the eight experts had evaluated and overall agreed on the appropriateness of the proposed instructional

model which had answered the research objective. Therefore, one can conclude that the proposed digital storytelling instructional framework might be suited to generation Z' behavior and learning style, especially their short attention span and interest, while fulfilling their digital literacy.

## 5. Recommendation for future studies

In order to be successfully implemented at the local level, Thai generation Z's, including their educational and family backgrounds, culture difference as well as educational system, infrastructure and access to IT will need to be studied in-depth prior to further development of the model before seeking more experts' revisions and research trails.

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## Authors



### **Purita Sayavaranont**

Senior Corporate Branding & Communications, CDG Group  
Ph.D. Student  
Division of Information and Communication Technology in Education,  
Department of Technological Education,  
Faculty of Technical Education,  
King Mongkut's University of Technology North Bangkok (KMUTNB)  
E-mail: purita1@gmail.com



### **Associate Professor Dr. Panita Wannapiroon**

Division of Information and Communication Technology in Education  
Department of Technological Education  
Faculty of Technical Education  
King Mongkut's University of Technology North Bangkok (KMUTNB)  
Director of Innovation and Technology Management Research Center,  
Science and Technology Research Institute,  
King Mongkut's University of Technology North Bangkok (KMUTNB)  
E-mail: panita.w@fte.kmutnb.ac.th