



Digital Classroom for Digital Native to Enhance Digital Literacy

Jira Jitsupa,^{*1} Titiya Netwong,² & Kanjanarat Rattanasonthi³

¹ Faculty of Education, Suan Dusit University, Bangkok, 10300 Thailand.

² Faculty of Science and Technology, Suan Dusit University, Bangkok, 10300 Thailand.

³ School of Tourism and Hospitality Management, Suan Dusit University, Bangkok, 10300 Thailand.

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Abstract

The objectives of this research consists of: 1) to study digital classroom for digital native to enhance digital literacy and 2) to study satisfaction of learning process through digital classroom. The sample included 59 undergraduate students of section D1 who registered in the Digital Literacy course of the 2019 academic year. The research instruments were the learning management plan for digital classroom management model, the digital literacy questionnaire and satisfaction with the learning management process questionnaire. Data were analyzed by using percentage, mean and standard deviation. The results of the study were as follows: 1) digital literacy was high level ($\bar{X} = 3.46$, SD = 0.84) and can be sorted in ascending order as follows; information literacy ($\bar{X} = 3.59$, SD = 0.86) media literacy ($\bar{X} = 3.54$, SD = 0.93) and technology digital literacy ($\bar{X} = 3.49$, SD = 0.96) and 2) the satisfaction of learning process through digital classroom was at the highest level ($\bar{X} = 4.28$, SD = 0.82)

Introduction

The digital classroom is the implementation of digital technology both hardware and software such as smartphones, e-learning, digital content and multimedia to manage digital learning into basic structures. The media are useful for digital teaching and learning and digital learning activities. Online communication and collaboration, including digital tools, are available to support interactive learning (European Commission, 2018; Garavaglia & Ferari, 2012) Almost every student has an internet capable smartphone, allowing them to search and study the content of the teaching and learning from their devices. Teaching content can also be obtained from smart phones. As a result, teachers have to bring

students into the digital world (Go Digital) and create an environment that includes digital technology in their daily lives. For example, teachers can create an interactive classroom by using smartphones and applications on smartphones. They also can actively use cyber activities to encourage students' learning in the digital classroom (Wongyai, 2017). The principle of digital classroom design relies on the concept of the learning quality of learners which is caused by 75% of individual skills and 25% of learning environment in the digital classroom (Garavaglia & Ferari, 2012). Therefore, the management of good basic structures and the digital classroom environment can affect the value of communication. Using online role-playing can be a motivation to learn,

but there are issues to consider such as the effectiveness of digital classroom management. Teachers need to consider what kind of hardware and software can be used for each student's differences and needs.

At present, students are a digital native group. They are familiar with digital technology and digital content. There are many online social networks that use communication devices as the main tool to search, research, record and communicate online such as Facebook, Google and Line. As a result, there are numerous teaching content and learning management tools in more interactive style in order to create understanding of digital media format practice process. Therefore, this group of students need to have skills in accessing, understanding, using and communicating information which is digital literacy.

Digital literacy is essential for learners to be able to perform complex digital activities, including communication, collaboration on social media, information dissemination in the form of digital information and knowledge exchange in a variety of media formats and safety. If learners are capable of digital literacy, they will develop skills in thinking, analyzing, evaluating, constructing and applying with digital learning resources. This is in line with the National Education Plan of 2007-2036 and the 12th Economic and Social Development Plan that requires all people to be aware of, understand and have the skills to use digital technology to benefit and create advanced changes of technology and to the changes of the 21st century world (Ministry of Digital Economy and Society, 2018; Office of the Education Council, 2017).

It can be said that teachers can use modern digital technology to create learning and stimulate online learning among learners. The digital classroom is an online environment that supports teaching and learning management to create opportunities for digital collaboration. (Mashhadi & Kargozari, 2011; Wongyai 2017) This is the preparation of the digital native to be a good digital citizen. Digital literacy skills are the core skills that are important and necessary in this digital age so that this group of students can live in a safe digital world and utilize digital media for their best benefits personally and socially.

Objectives

1. To study digital classroom for digital native to enhance digital literacy.
2. To study satisfaction of learning process

through digital classroom.

Literature review

1. The concept of digital classroom

Digital classroom means bringing digital technology, both hardware and software, to manage digital learning as an infrastructure such as smartphones, e-learning, digital content and multimedia. Digital classroom uses as a digital teaching and learning medium for digital learning, activities, online communication and collaboration Including digital tools to support interactive learning (European Commission, 2018; Garavaglia & Ferari, 2012).

Nowadays, almost all students have a smartphone which smartphones can connect to the internet. The content of the course can be obtained from the smartphone. What an educational institution or instructor must do is to take the student into the digital world. Provide an environment of living with digital life by bringing all digital technologies such as interacting in the classroom via smartphones and applications. Learners adapt to active learning through cyber activities, used to manage teaching and learning in the digital classroom (Avvisati et al., n.d; Phosaard, 2016).

The key elements in sustainable digital classroom management should include the following elements: (Avvisati et al., n.d.)

- 1) Information and communication technology infrastructure must have at least a personal computer but can be linked to both the Internet and intranet, visualizer and projector.
- 2) Open Educational Resource: OERs for content presentation and accessibility suitable for learning.
- 3) Online learning portals and interactive communication platforms setting support both synchronous and asynchronous communication. Asynchronous communication reflects a communication where only one person can communicate at a time such as e-mail, personal message, telephone answering machine. Synchronous communication through live session (i.e., MS Team or ZOOM) Webinar or Web conferencing or interactive conference, allows students from various geographical locations to discuss and share information.
- 4) Monitoring and evaluation of the use of digital technology in digital classroom instructional with great investment and optimization.

It can be said that the digital classroom arrangement is the integration of digital technology to suit the different learners with different needs. To be able

to find a common point for the use of digital technology for maximum benefit and cost. To increase educational opportunities for all and develop digital literacy for all learners to survive in the digital society.

2. The concept of digital native

The digital native as a young generation of learners who have grown up immersed in new digital technology. The characteristics of this group are having advance ability of multitask, a reliance on technology to maintain social contact, a disposition to share content and the ability to adopt and adapt new technology to satisfy their personal needs (Rakhmawati & Kusuma, 2015; Smith, 2012).

In the learning aspect, the digital native believes that this group of generation think and learn differently from other people. The digital native generation prefer random non-linear access to information (i.e. hyperlinks) and prefer images over text-based content. Described as multitaskers, they are comfortable being engaged in several tasks simultaneously. Additionally, according to these theories, they are highly adaptive, function best when networked and use a range of technologies to network with their peers (Rakhmawati & Kusuma, 2015).

According to Smith (2012), the digital native students in higher education as:

- 1) Possessing new ways of knowing and being.
- 2) Driving a digital revolution transforming society.
- 3) Innately or inherently tech-savvy
- 4) Multi-taskers, team-oriented and collaborative.
- 5) Native speakers of the language of technologies.
- 6) Embracing gaming, interaction and simulation.
- 7) Demanding immediate gratification.
- 8) Reflecting and responding to the knowledge economy.

It can be said that the digital native students may have ideas about how their mobile phones could be used to support their learning, as to whether students of the technology tools in designing rich and engaging extra experiences of learning for all student.

3. Digital literacy

Ministry of Digital Economy and Society (2018) has set digital literacy in the digital development plan for the economy and society in strategy 3: Build an inclusive and equal quality society with digital technology. Aiming to create a Thailand that is a place where people of all groups, especially farmers, those in remote communities, the elderly, the disadvantaged and people

with disabilities can access and utilize government services through digital technology to have knowledge of both national and local levels in a digital format that people can access and utilize easily and conveniently. People are aware of information and have the skills to make use of digital technology in a socially responsible manner.

Having the skills and knowledge of each era is different some of the skills that are still required by any age are required such as creativity skill, critical thinking skill, communication skill and collaboration skill and there are some skills that change over time such as knowledge of the world, knowledge of finance, economy, business and entrepreneurship, knowledge of citizen, health and environmental. But when we enter the 21st century, the era of digital technology has advanced and changed dramatically causing the knowledge and understanding of life, economy, society and culture to change as well. Therefore, new skills were born to learn and understand the change that occurs to be applied for survival and safety, including cross-cultural learning skills and skills and knowledge in information, media and information and communication technology. Digital technology has changed communication, lifestyle and social norms, for example, being able to communicate with others face to face through digital technology and ability to buy and sell products without having to travel to shops or markets. Abundant media and resources can be accessed at your fingertips and the ability to express thoughts and express oneself to others as has never happened before. It is undeniable that digital technology is of great value to humanity, but digital skills and knowledge are required. This is because access to technology alone may not be enough, for example if looking for information about certain products online one needs to have search skills that match the needs. It is necessary to understand, distinguish and compare which products are quality products any product is too convincing to be true or following the news of the world, it is necessary to distinguish which news is real news and which is fake news and most importantly, digital technology must be knowledgeable and safe from digital threats such as identity theft, computer virus, etc. Therefore, knowledge skills in information, media and information and communication technology will help to use digital technology as a digital tool for accessing information sources efficiently (Access) and once the data has been accessed, it must be able to analyze Assess the quality and reliability of the data (Analyze and

Evaluate) and then using information to create multimedia media through digital tools (Create) with regard to social responsibility and ethical use of digital technology (Reflect) and can use digital tools to work independently and collaborate with others and continue to share the knowledge and understanding received with family, community and society (Act) (Hobbs, 2010) as in figure 1. Correspond to Office of the Civil Service Commission (2017) mentioned understanding and applying digital technology is the skill of bringing in today's digital tools, devices and technologies such as computers, phones, tablets, computer programs and online media to make the most of operational communication and working together or use it to develop work processes or work systems in the organization to be modern and efficient and must have skills covering four dimensions. It consists of use, understand, create and access digital technology effectively.

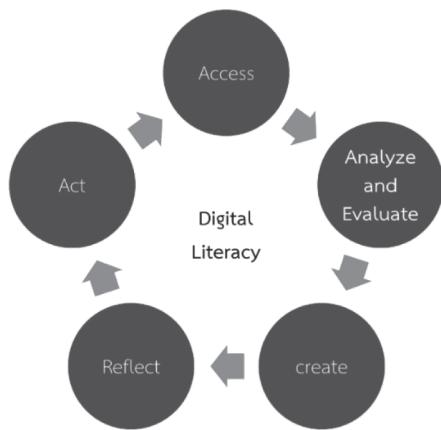


Figure 1 Understanding and applying digital technology skill (Hobbs, 2010)

Office of the Civil Service Commission (2017) has defined 9 topics for digital understanding and technology skills that need to be known and understood in order to be able to access and apply them effectively consisting of 1) computer usage, 2) Internet usage, 3) use for security, 4) using a word processing tool, 5) using spreadsheet tool, 6) using presentation tool, 7) using a digital media, 8) online collaboration and 9) using digital for security. Correspond to Suan Dusit University (2019) has required students of every year to acquire content covering 11 topics of concepts, theories and essential skills needed to become a good citizen in the digital age as in figure 2.

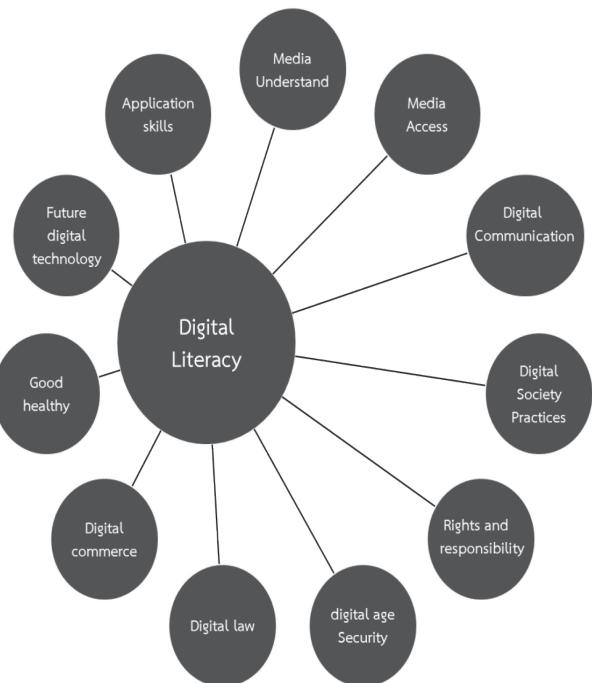


Figure 2 Concepts, theories and essential skills for being a good citizen in the digital age (Suan Dusit University, 2019)

Research methodology

1. Population and samples

The research population was Suan Dusit University students who registered in the 1st semester of 2019 academic year.

The research sample consisted of 59 undergraduate students of section D1 who registered in the Digital Literacy course of the 2019 academic year.

2. Research instruments

The researcher had conducted the following research instruments.

2.1 Learning management plan for digital classroom management model for learning through website <https://sites.google.com/view/digitalliteracy-sdu>.

The elements in the digital classroom of this research are as follows:

1) Online learning portals and interactive communication platforms setting support both synchronous and asynchronous communication. Synchronous communication through live session (i.e., MS Team, Line), asynchronous as website, e-mail, etc.

2) Open Educational Resource: OERs for content presentation and accessibility suitable for interesting and inspiring of learning.

3) Monitoring and evaluation of the use of digital technology in digital classroom by google form and Suan Dusit electronic assessment, (<http://e-assessment.dusit.ac.th/login.aspx>) and the digital literacy questionnaire.

The elements of activity in the digital classroom to develop digital literacy for digital native as in figure 3. (International Federation of Library Associations and Institutions, 2015; Netwong, 2019; Ontario School Library Association, 2010).



Figure 3 The elements of activity in the digital classroom for digital native

From figure 3, the elements of activity in the digital classroom for digital native were 7 elements as follows: 1) Exploring to their interests, 2) Inspiration to stimulate the urge to learn, 3) Individual problem to create knowledge by themselves, 4) Team investigating to find, collect, distinguish, bring to create new knowledge, 5) Processing team project, 6) Creative presentation of the project and 7) Evaluation and reflection of knowledge.

2.2 The digital literacy questionnaire consists of 3 elements as follows: 1) 16 items of digital information literacy, 2) 12 items of digital media literacy and 3) 12 items of digital technology applications, totaling 40 questions. The questionnaire is a ratio of 5 levels, which is the highest, high, medium, low and lowest. The instruments had the following methods:

1) Study information to cover issues related to digital knowledge and digital learning development of learners in the 21st century.

2) Create a questionnaire to cover issues in section 2.1)

3) Send a questionnaire to 5 experts to check content validity, consider the consistency of questions and objectives or the IOC (Item Objective Congruence). The average of each item is 0.80 - 1.00 and the correctness is adjusted according to the experts' suggestion.

4) Test with the experimental group that has similar characteristics to the sample group which was 30 Suan Dusit University students who were in Information Technology Program and enrolled in the Information Integration Course in the first semester of the 2019 academic year. The Cronbach's Alpha coefficient of the whole questionnaire equals to 0.94. Review questions, wording and revise according to experts' suggestions.

5) Collect data with the sample group.

3. Data collection

3.1 The researcher conducted the learning through the website. <https://sites.google.com/view/digitalliteracy-sdu>

3.2 When completing the teaching and learning activities in week 15, the students made a digital literacy questionnaire.

4. Data analysis

The researcher analyzed information knowledge with questionnaires by using the mean and standard deviation of the group sample. There are 5 scoring criteria as follows: (Srisa-ard, 2013)

5 means the level of practice is at the highest level.

4 means the level of practice is at the high level.

3 means the level of practice is at the medium level.

2 means the level of practice is at the low level.

1 means the level of practice is at the lowest level.

For the criteria for judging the results of the analysis, the details are as follows.

Mean of 4.21-5.00 means that the level of practice is at the highest level.

Mean of 3.41-4.20 means that the level of practice is at the high level.

Mean of 2.61-3.40 means that the level of practice is at the medium level.

Mean of 1.81-2.60 means that the level of

practice is at the low level.

Mean of 1.00-1.80 means that the level of practice is at the lowest level.

Results

1. The digital classroom for digital native

1.1 The component of the digital classroom for digital native as in figure 4.

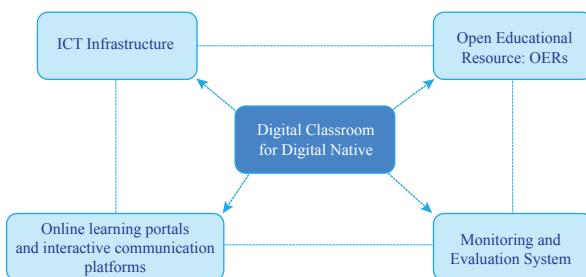


Figure 4 The component of the digital classroom for digital native

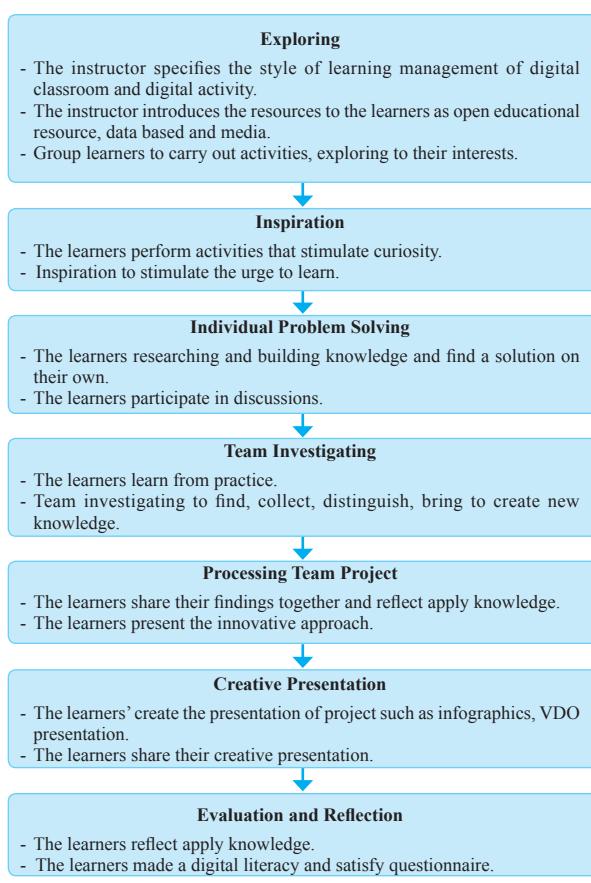


Figure 5 The instruction of the digital classroom for digital native to develop digital literacy

From figure 4, the component of the digital classroom for digital native was 4 components as follows: 1) ICT Infrastructure both of hardware and software, 2) Open Educational Resource: OERs, for interesting content and accessibility suitable for inspiration learning, 3) Online learning portals and interactive communication platforms setting support both synchronous and asynchronous communication and 4) Monitoring and evaluation system for reflection of knowledge and evaluate of digital literacy.

1.2 Learning management plan consisted of 7 steps for digital classroom approach in 15 weeks as in figure 5.

From figure 5, the instruction of the digital classroom for digital native to develop digital literacy consisted of 7 steps as follows: 1) Exploring, 2) Inspiration, 3) Individual Problem Solving, 4) Team investigating, 5) Processing Team Project, 6) Creative Presentation and 7) Evaluation and Reflection.

2. Digital literacy

Analysis of digital literacy practices is presented in Table 1.

Table 1 The results of the analysis of digital literacy

Evaluation lists	Digital literacy		
	\bar{X}	SD	Interpretation
Digital information literacy	3.59	0.86	high
1. Students can search digital information online according to the needs of students or as assigned.	3.76	1.02	high
2. Students can distinguish the reliability of digital information from various online sources that can be used for academic or general information.	3.55	0.92	high
3. Students can choose to use digital information as needed for learning and learning activities.	3.74	1.00	high
4. Students decide to use digital information by always considering the costs and its benefits.	3.53	0.98	high
5. Students use accurate digital information in accordance with copyright laws.	3.53	1.06	high
6. Students analyze origin and reliability of information before applying.	3.68	1.07	high
7. Students have improved search strategies to select the appropriate digital information search system.	3.53	0.86	high
8. Students can review and compare digital information from multiple sources to assess reliability, accuracy and modernity of digital information.	3.47	0.86	high
9. Students can identify that digital information collected is an opinion or a fact	3.53	0.95	high
10. Students can change digital information into various formats in order to present new information such as Word files as pdf and video files as image files, etc.	3.74	0.98	high
11. Students can transfer digital information and new knowledge by presenting information in the form of multimedia to others.	3.63	0.05	high
12. Students can choose the appropriate format for publishing digital information for the target group of digital information recipients.	3.61	0.92	high
13. Students have an understanding of intellectual property and the Computer Crime Act, No. 2, 2017 in using electronic information.	3.39	0.03	medium

Table 1 The results of the analysis of digital literacy (Continue)

Evaluation lists	Digital literacy		
	X	SD	Interpretation
14. Students can classify what type of digital information can be accessed at a cost and without cost.	3.71	0.84	high
15. Students can apply digital information for learning, work and daily life appropriately.	3.58	0.95	high
16. Students realize that digital information has both positive and negative ways to be utilized in daily life.	3.61	0.97	high
Digital media literacy	3.49	0.96	high
1. Students can choose information and filter the information that they want to be consistent with the project or study.	3.47	0.92	high
2. Students have the ability to protect themselves from being motivated by the content of digital media, especially social media.	3.53	0.06	high
3. Students can analyze the content of digital media and interpret digital content from that media with critical judgment.	3.58	0.11	high
4. Students can compare, analyze, find reasons, prioritize and interpret predictions of the consequences of digital media recognition.	3.58	0.92	high
5. Students can evaluate the quality of digital media content that is valuable to the perception of moral values, ethics, society and culture.	3.55	0.01	high
6. Students can use content from digital media that has been used to benefit recipients in other situations.	3.58	0.06	high
7. Students can learn digital media, plan, write script and research information for digital media creation.	3.50	0.01	high
8. Students can choose the appropriate program to develop digital media to distribute digital content suitable for the target audience.	3.58	0.06	high
9. Students can choose to use media with content to promote morality, ethics, art, culture and learning.	3.55	0.03	high
10. Students use written language and spoken language effectively according to linguistic principles for digital media development.	3.50	0.08	high
11. Students can create and choose images effectively to achieve the objectives of digital media presentation.	3.47	0.06	high
12. Students use communication technology to structure the content of digital media presentations.	3.66	0.02	high
Using digital technology	3.49	0.96	high
1. Students can use digital technology to record and edit information for project preparation and project report.	3.45	0.03	high
2. Students can use hardware and software to analyze and synthesize information before using it.	3.34	0.03	medium
3. Students can apply and choose hardware and software for project presentation.	3.42	0.03	high
4. Students use the internet and online social networks for project activities.	3.47	0.11	high
5. Students use digital technology for project management within the group.	3.50	0.01	high
6. Students use digital technology to create networks to contact, coordinate and operate projects or learning activities.	3.53	0.08	high
7. Students can apply the network technology in a cost-effective manner for the maximum benefit of the project and learning activities.	3.45	0.98	high
8. Students have the ability to apply network systems to connect to access digital content in every device.	3.55	0.08	high
9. Students can use digital technology to create new forms of content and rely on art to present new images and sounds	3.63	0.10	high
10. Students can use digital technology to link hypermedia that can surf websites, link in various directions under the principles of analytical thinking, synthesis and judgment.	3.53	0.03	high
11. Students are aware of the use of digital technology appropriately, securely and share ethical digital communications.	3.58	0.06	high
12. Students can avoid being tempted and cyber-attacks from using digital technology.	3.64	0.98	high
Total	3.46	0.84	high

From Table 1, it is found that digital knowledge has a high level of practice ($\bar{X} = 3.46$, $SD = 0.84$). When separated by individual aspects, the level of practice can be sorted in ascending order as follows; digital information literacy ($\bar{X} = 3.59$, $SD = 0.86$), digital media literacy ($\bar{X} = 3.54$, $SD = 0.93$) and using digital technology ($\bar{X} = 3.49$, $SD = 0.96$).

3. Satisfaction with the learning management process

Satisfaction with the learning management process is presented in Table 2.

Table 2 The results of satisfaction analysis of learning management process

Evaluation lists	Satisfaction		
	X	SD	Scores (%)
1. The purpose of teaching and learning			
1.1 The instructor clearly informs the purpose of the teaching.	4.30	0.88	86.00
1.2 The instructor prepares the content taught in accordance with the stated objectives.	4.30	0.91	86.00
1.3 The instructor prepares activities in accordance with the content taught in each objective.	4.18	0.84	83.60
1.4 The instructor appropriately allocates time in each content.	4.30	0.82	86.00
2. Teaching and learning activities			
2.1 The instructor had knowledge and understanding of the subject matter taught.	4.43	0.75	88.60
2.2 Teaching and learning activities.	4.25	0.84	85.00
2.3 The instructor organizes activities that encourage students to participate in teaching and learning.	4.38	0.81	87.60
2.4 The instructor organizes activities that encourage students to work as a team.	4.35	0.83	87.00
2.5 The instructor organizes activities for students to learn by themselves.	4.20	0.91	84.00
2.6 The instructor cultivates order and neatness in their work.	4.08	0.76	81.60
2.7 The instructor assigns work appropriately with the content taught	3.98	0.00	79.60
2.8 The instructor uses appropriate media and teaching equipment for teaching content and activities.	4.20	0.82	84.00
2.9 Students understand the media and teaching materials of the instructor.	4.28	0.85	85.60
2.10 The instructors can instruct students to use technology and other learning resources for additional self-learning (searching through online databases such as ERIC, ProQuest).	4.40	0.78	88.00
3. Evaluation of teaching and learning			
3.1 The instructor clearly and appropriately sets the criteria for assessing student performance.	4.33	0.80	86.60
3.2 The instructor has a variety of learning assessments.	4.30	0.79	86.00
3.3 The instructor provides information to improve themselves and students on a periodic basis.	4.33	0.83	86.60
4. Characteristics of the instructor			
4.1 The instructor has the ability to explain and transfer knowledge.	4.25	0.93	85.00
4.2 The instructor is responsible for teaching (on-time and consistent teaching).	4.15	0.80	83.00
4.3 The instructor has the appropriate personality and dress code.	4.33	0.73	86.00
4.4 The instructor is polite and is a good role model.	4.33	0.83	86.60
4.5 The instructor arranges for students to meet for consultation outside the classroom.	4.25	0.71	85.00
4.6 The instructor provides opportunities for students to express their opinions in teaching and learning.	4.38	0.84	87.60
4.7 The instructor gives advice and care for students thoroughly.	4.38	0.81	87.60
Total	4.28	0.82	85.60

From Table 2, it was found that the satisfaction of the learning process through the digital classroom was at the highest level ($\bar{X} = 4.28$, $SD = 0.82$).

Discussion

From the results of this research, the component of the digital classroom for digital native was 4 components as follows: 1) ICT Infrastructure both of hardware and software, 2) Open Educational Resource: OERs, for interesting content and accessibility suitable for inspiration learning, 3) Online learning portals and interactive communication platforms setting support both synchronous and asynchronous communication and 4) Monitoring and evaluation system for reflection of knowledge and evaluate of digital literacy. According to Smith (2012), the digital native students in higher education as: possessing new ways of knowing and being, multi-taskers, team-oriented and collaborative, native speakers of the language of technologies, interaction and simulation and reflecting and responding to the knowledge. So, the digital native students may have ideas about how their smartphone could be used to support their learning, as to whether students of the technology tools in designing rich and engaging extra experiences of learning for all student.

The instruction of the digital classroom for digital native to develop digital literacy consisted of 7 steps as follows: 1) Exploring, 2) Inspiration, 3) Individual Problem Solving, 4) Team investigating, 5) Processing Team Project, 6) Creative Presentation and 7) Evaluation and Reflection. According to Reaves (2019), the concept of 21ST-Century skills and the fourth industrial revolution: A critical future role for online education, online education is often represented as the future of education, to help the learner survive and thrive in a VUCA environment (volatility, uncertainty, complexity, ambiguity), to teach so-called 21st-century skills—flexibility, adaptability, observation, empathy, creativity, innovation, learning how to learn. Many of the skills are inherently metacognitive and fractal, demonstrating the same basic principles at various levels of detail and knowledge.

The study of digital literacy, it is found that digital knowledge has a high level of practice. When separated by individual aspects, the level of practice can be sorted in ascending order as follows; digital information literacy, digital media literacy and using digital technology. Digital information, digital media and technology can be used to support learning digital

literacy. Therefore, digital learning is an important foundation of survival skills in the digital age (Eshet-Alkalai, 2004; Parameswari & Priya, 2016). The key elements are digital information literacy, digital media literacy and digital information technology use (Trilling & Fadel, 2009). The digital classroom therefore requires digital technology to support learning as a medium for digital teaching, digital learning activities, online communication and collaboration and digital tools to support interactive learning based on the digital knowledge process. Digital classrooms for joint learning that will be successful must have a creative nature, learning without boundaries or classroom with walls. There should be unlimited space for participants to study, have creative activities, promote diversity in various knowledge processes. The instructors play an important role in designing the teaching and learning management so that students can think critically, be creative and be responsible for using digital technology. They must create content in the learning media and design co-educational activities as a way to help all students learn together, understand each other and solve problems together. Especially, the learning on the online world where content is presented quickly but with low quality and lack of content evaluation before publishing (Phosaard, 2016; White, 2015).

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