Next Normal Education, Hybrid Learning Model for Active Imagineering Learning to Enhance Digital Innovator Competency

Naphong Wannapiroon, Sorrachai Shawarangkoon*, Chatchada Chawarangkoon, and Atis kucharoenthavorn

***Abstract*—This study aims to develop a hybrid learning model for active Imagineering Learning to enhance digital innovator competency. The research methodology was divided into two phases: Phase 1 focusing on the development of a hybrid learning model, and Phase 2 concerning the evaluation of digital innovator competency, as well as the quality of digital innovation. The sample group included 136 undergraduate students. The duration of the experiment was 15 weeks. The research instruments consisted of a hybrid learning model, a hybrid learning lesson plan, cloud learning management platform, worksheets, digital innovator competency and digital innovation assessments form, using scoring rubric. The data was analyzed by using the arithmetic mean and standard deviation. The results showed that: A hybrid learning model for active Imagineering Learning, consisting of 3 components: model principle, hybrid learning model for active Imagineering Learning process, and methods for assessing learning outcomes. The students using the hybrid learning model had the excellent level of digital innovator competency and excellent level of quality. Rapid change and development of digital technology and the COVID-19 Pandemic. As a result, educational institutions need to adapt their learning approach to blended learning and develop student characteristics to be able to innovate using digital technology. This developed learning model is therefore a suitable method for digital learning and next-generation education.**

***Index Terms*—Next normal education, hybrid learning, active learning, imagineering, digital innovator competency.**

I. Introduction

In today's world, changes in social, economic and technological contexts areis very rapid, and in fact have been ongoing since 2020. The disruptive changes in the way of life, business environment, socio-economic, and technological evolution and competition altogether could be called "VUCA World", which is characterized by V-Volatility, U-Uncertainty, C-Complexity, and A-Ambiguity [1].

The transformation in the social context from the COVID-19 pandemic is a new challenge for educational institutions. Education has over the last few years been transformed into learning by: using digital technology as a key tool for supporting learning even more; becoming a new normal, leading to a new normal of teaching and learning; and becoming a next normal, after going through the COVID-19 epidemic situation, leading to the next normal education reimagined [2].

Teaching in the next era, normal education reimagined should be flexible and adaptable to the rapidly changing situations and contexts of the world. Education in the 21st century must adapt to respond to learning and develop more individual learners by creating an educational ecosystem to become a production base for excellent human capital [3]. This is consistent with active learning, which is a learning process that students practice creating hands-on experiences for learners by interacting with classmates and teachers by doing activities together in and outside the classroom. This learning process results in the creation of new knowledge originated from what students have practiced through their listening, speaking, reading, writing, discussion and group reflection. Studying by this means helps create meaningful learning and connect it with student's previous experiences, so making it consistent with Imagineering learning, i.e. which is a combination of "imagination" and "engineering" become "Imagineering." In other words, it means making the imagined into action by bringing the imagination to create invention and innovation [4].

II. Theoretical Foundation

A. Next Normal Education

Next normal education reimagined is a new post-COVID learning approach with the following features [5]-[7]:

1) Learning will have more accessible channels, especially online learning channels where most learners have their own devices, and so take advantage of seeking knowledge, exchanging knowledge with others, communicating with teachers in real time. Instructors who used to teach traditional lectures online will shift to more online coaching, focusing on hybrid learning, enhancing multi-dimensional interactions to help students have the opportunity to learn and develop themselves in various fields.
2) Emphasis on experiential learning that is more connected to social context and local culture, such as Imagineering Learning, design thinking, project-based learning, STEM and STEAM education, which integrates prior experiences and knowledge to create Innovation in solving problems in the community by being supported by local wisdom as a coach of learning more in the area. The role of the instructors will change to become a more facilitator of learning [8].
3) Learners have more space to express their learning

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potential from the original space in the classroom only to a space in the real world, such as in the community or in society, including the space in the online and virtual world, where students learners can apply knowledge. Creativity and innovation from learning are shared for others to learn together.

4) Learners must have responsibility and self-discipline in their learning by setting learning goals and learning guidelines, self-regulation and self-assessment [9].
5) Learning will be Personalized and more consistent with the nature of individual learners. Instructors will design the learning process according to the needs of the learners, enabling all learners to learn effectively through adaptive learning [10].
6) Digital Innovation in Education. Using digital innovations in student learning through the use of learning support tools such as online learning through the Internet, smartphones, and new communication technologies, as well as the use of digital learning platforms. open education resources. This makes education reshape to be more flexible learning and hyflex learning that responds to the individual differences of the learners [11], [12].

B. Hybrid Learning

Hybrid Learning combines the best of classroom teaching and learning outside the classroom with electronic distance education using new technological tools. Teaching activities that encourage students to learn with self-directed learning. It is an instruction that responds to the differences between the individual learners by combining types of teaching: online, on demand, on site, and on ground, so that learners can learn effectively in both theoretical and practical [13].

Hybrid Learning is a new dimension of learning in higher education. It is a strategic approach to designing a learning environment using face-to-face and online activities. The reason why hybrid learning is popular is because it includes social interaction both in and outside the classroom, access to knowledge, personalized learning, educational equity, and cost-effectiveness. Hybrid learning meets the different learning needs and styles of learners, and provides opportunities for teachers to design instruction with a student-centered learning. Past research has revealed that hybrid learners are statistically significantly more knowledgeable than traditional classroom learning or online learning only, and have longer learning retention [9], [14].

C. Active Imagineering Learning

1) Active learning

Active Learning is a teaching and learning process that focuses on engaging and interacting with learning activities through a variety of practices, such as analysis, synthesis, brainstorming, discussion, creative presentation, and critique. Active learning activities enhance the development of critical thinking skills, analytical thinking skills, creative thinking skills, communication skills, presentation skills and appropriate use of information and communication technologies [15], [16].

2) Imagineering learning

Imagineering Learning is a new concept of learning for innovation and innovator. It is a combination of “imagination” and “engineering”, based on Walt Disney's conception. Imagineering Learning means learning by putting imagination into action and becoming invention and innovation. Therefore, it is the learning process for developing learners in the 21st century of the World Economic Forum, New Vision for Education, which focuses on learners to be self-learning, creative and innovative. Imagineering's learning activities are designed for learners to do activities together to achieve their learning objectives, consisting of 6 stages: imagine, design, develop, present, improvement, and evaluat [17], [18].

Integrating active learning with Imagineering learning allows learners to be more involved in learning activities and interact with teachers and classmates. Instructors should reduce lectures and increase student enthusiasm for activities and provide a learning environment for lifelong learning [19].

D. Digital Innovator Competency

An innovator is a person who is able to create new ideas, methods or products that have never been seen before, either by developing an existing product or improving or making a significant contribution to innovation. Once a product or service is created, innovators conduct a feasibility test (POC: Proof Of Concept) to determine whether their idea can be transformed into a product or service [20].

Digital innovator competency is the knowledge and skills required and relevant to innovation development. Its key characteristics are knowledge and expertise in the field, skilled practitioners, creative thinking skills, productivity skills, good attitude for creative problem solving, and the ability to integrate digital literacy skills [21].

Digital literacy is the skill in using digital tools, devices and technologies such as computers, mobile devices, computer programs and online media to optimize communication, operations and collaboration for the development of effective work processes in the organization, and integrating digital literacy as the basis for innovation development, including use, understand, create, and access [21].

Digital Innovator is an innovator using information technology and communication that is effective in developing digital innovation with quality in 5 areas as follows: objective problem solving, innovation efficiency, novelty and uniqueness, usability, and cost-effectiveness [22].

III. Research Objectives

To develop Hybrid learning model for active Imagineering Learning to enhance digital innovator competency

To evaluate digital innovator competency of students studying using hybrid learning model for active Imagineering Learning

To evaluate the quality of digital innovation of students studying using hybrid learning model for active Imagineering Learning

IV. Research Hypothesis

Students studying using hybrid learning model for active Imagineering Learning The digital innovator competency is at its excellent level.

Students studying using hybrid learning model for active Imagineering Learning developed digital innovation with the excellent level of quality.

V. Scope of Research

A. Research Variables

Independent variables is: Hybrid learning model for active Imagineering Learning

Dependent variable are: digital innovator and the quality of digital innovation

B. Population and Samples Group

Population are undergraduate students in the Faculty of Science and Technology, Rajamangala University of Technology Suvarnabhumi

Samples group are undergraduate students in the Faculty of Science and Technology, Rajamangala University of Technology Suvarnabhumi, who were enrolled in the following courses: Animation Production Technology, Introduction to 3-dimensional Animation, Operating Skills for Multimedia Technology, Courseware Design and Development, and Virtual Reality Technology. A total of 136 people were included at multi-stage sampling.

VI. Research Methodology

The research methodology is divided into 2 phases according to the research objectives as follows:

A. Phase 1: Development Hybrid Learning Model for Active Imagineering Learning to Enhance Digital Innovator Competency

1) Synthesis of documents and research related to next normal education, hybrid learning, active learning, imagineering, digital innovator competency to define the development framework. hybrid learning model for active Imagineering Learning to enhance digital innovator competency
2) Synthesis of the digital innovator competency from the combination of two competencies, comprising Innovator competency and digital competence, by using content analysis techniques. The tool used is the content analysis form.
3) Synthesis of the blended learning process by using content analysis techniques. The tool used is the content analysis form.
4) Synthesis of the conceptual of active engineering learning process by integrating the Imagineering and active learning process by using content analysis techniques. The tool used is the content analysis form.
5) Develop a hybrid learning model for active Imagineering Learning to enhance digital innovator competency, presented as diagrams and descriptions.
6) Evaluate the suitability and quality of hybrid learning model for active Imagineering Learning to enhance digital innovator competency by 10 experts in next normal Education, Hybrid Learning, Active Learning, Imagineering, Digital Innovator Competency. The model's suitability assessment form was used as a 5-level approximation scale. The data was analyzed using the arithmetic mean and standard deviation.

B. Phase 2: Digital Innovator Competency Assessment of Students Studying by Using Hybrid Learning Model for Active Imagineering Learning

1) Preparation stage

1) Orientation: instructor explain learning guidelines according to the learning model, learner roles, learning interactions (learner- instructor, learner-learner, learner-content), and methods for measuring and evaluating learning outcomes.
2) Practice using cloud learning management platform: login registration, self-study content, group activities, homework assignments and assignments. and online testing

2) Experimental stage

Students using hybrid learning model for active Imagineering Learning for 15 weeks. The experiments were carried out according to the specified learning plan, consisting of learning objectives, instructor's roles, learner's roles, teaching activity steps, instructional media, measurement and evaluation methods. The hybrid learning method is divided into off-line learning and online learning through the cloud learning management platform.

3) Evaluation stage

After the students studied using the hybrid learning model, the instructors assessed the digital innovator competency consisting of 2 components:

1) Digital innovator competency assessment consists of knowledge, skill, and attitude. The digital Innovator competency consists of five characteristics: 1) knowledge and expertise in the field, 2) skilled practitioners, 3) creative thinking skills, 4) productivity skills, and 5) good attitude for creative problem solving. The evaluation tool was the digital innovator competency assessment with 4-level scoring rubric. The total score was 40. The data were analyzed using the arithmetic mean and standard deviation.
2) Digital innovation quality assessment consists of 1) objective problem solving, 2) innovation efficiency, 3) novelty and uniqueness, 4) usability, and 5) cost-effectiveness. The assessment tool was the digital innovation quality assessment form with 4-level scoring rubric. The total score was 40. The data were analyzed using the arithmetic mean and standard deviation.

VII. Research Findings

A. Hybrid Learning Model for Active Imagineering Learning to Enhance Digital Innovator Competency

Hybrid learning model consists of 3 main components as follows:

1) Learning model principle

1.1) Purpose of learning model

1.1.1) To enhance the digital innovator competency, consisting of knowledge, skill, and attitude. The digital Innovator competency consists of five characteristics: 1) knowledge and expertise in the field, 2) skilled practitioners, 3) creative thinking skills, 4) productivity skills, and 5) good attitude for creative problem solving.

1.1.2) To develop digital innovation with quality in 5 areas as follows: 1) objective problem solving, 2) innovation efficiency, 3) novelty and uniqueness, 4) usability, and 5) cost-effectiveness.

1.2) Instructor's role: The instructor acts as a facilitator in the learning of the learners, and an instructional designer focusing on designing hybrid learning environments, designing competency-based learning activities, providing content, on-ground learning area, knowledge media, digital learning platform, work sheet, and learning measurement and evaluation

1.3) Learner's role: The students are active learners and self-directed learners, skilled in using digital technologies for learning, and have a positive attitude towards hybrid learning.

1.4) Infrastructure, consists of internet network (Wi-Fi network/mobile network), digital devices (laptop computer/ personal computer/ tablet computer), and network administrator.

1.5) The hybrid learning model is a flexible learning activity design for next normal education by combining 5 types of learning as follows:

1.5.1) Online learning: It is a teaching method that focuses on learning activities through a digital learning platform consists of (1) live learning activities via teleconferencing with web and video conferencing that emphasizes synchronous interaction between students and teachers and learners with classmates, and (2) Self-paced learning activities through content and knowledge media that are included in digital learning platforms.

1.5.2) On Site learning: It is a meaningful learning activity to develop operational skills in classrooms and laboratories such as computer laboratory, 3D animation laboratory and virtual reality laboratory, so that learners practice creating results from experience-based learning and learning from hands-on practice. The Next normal education learning activities under the COVID-19 pandemic, such as social distancing, wearing masks at all times in the laboratory, cLearning laboratory equipment with alcohol before and after use, limiting the number of students in the laboratory, and measuring the temperature of all students before using the laboratory, etc.

1.5.3) On Demand learning: It is a teaching that emphasizes self-directed learning activities, learners can design and customize their own learning according to their needs, can study form anywhere, anytime, anytime, any device by using knowledge media that teachers have prepared, by using it as a complementary and supplementary media such as work sheets, knowledge sheets, exercises, question bank, knowledge repository, and video on demand.

1.5.4) On Ground learning: This is a learning activity outside the classroom and laboratory, such as community-based learning practice, which is an instruction that focuses on learning in real situations in the community, such as visiting the community and exchanging knowledge, creating innovations with the community. It is a learning activity in the form of next normal education, which is to create a learning experience for learners by transferring and sharing knowledge between classrooms and communities.

2) Hybrid learning model for active Imagineering Learning process

2.1) Imagine: Determining the way to create innovation by using imagination from the problem situation or community needs. Learning activities include brainstorming, expressing opinions, and collectively analyzing the feasibility of imagining solutions to problems. Hybrid learning consists of online, on site, on demand, on ground.

2.2) Design: Prototyping from Imagine stage

Students research relevant information or ideas for brainstorming, planning innovative designs and presenting them as prototypes, storyboards, scripts, or mock-ups. Hybrid learning consists of online, on site, on demand, on ground.

2.3) Development: All group members work together to create innovations from prototypes of the design stage and then test the functionality of the innovations created. hybrid learning consists of online, on site, on ground.

2.4) Presentation: Learners present the results of innovation prototype development, innovation development process, innovation implementation guidelines, innovation prototype efficiency test results. Afterwards, teachers and classmates shared suggestions for improvements in innovation. Hybrid learning consists of online, on site.

2.5) Implementation and Improvement: Learners improve innovations based on the suggestions of teachers and classmates, and then implement innovations to solve problems according to the innovation development objectives. Hybrid learning consists of online, on site, on demand, on ground.

2.6) Evaluation: Learners evaluate the effectiveness of the innovation implementation in solving the problem according to the innovation development objectives. Hybrid learning consists of online and on site.

Active Imagineering Learning process with hybrid learning is shown in Table I.

TABLE I: ACTIVE IMAGINEERING LEARNING PROCESS WITH HYBRID LEARNING

Active Imagineering Learning Process with Hybrid Learning				
Active Imagineering Learning Process	Hybrid Learning			
	Online	On Site	On Demand	On Ground
Imagine	✓	✓	✓	✓
Design	✓	✓	✓	✓
Development	✓	✓		✓
Presentation	✓	✓		
Implementation and Improvement	✓	✓	✓	✓
Evaluation	✓	✓		

From Table I, the active Imagineering Learning process uses the hybrid learning activities as follows:

Online and on site activities in imagine, design, development, presentation, implementation and improvement, and evaluation, on demand activities in imagine, design,

implementation and improvement, and on ground activities in imagine, design, development, implementation, and improvement.

Active Imagineering Learning process is presented in Fig. 1 and the hybrid learning components is presented in Fig. 2.

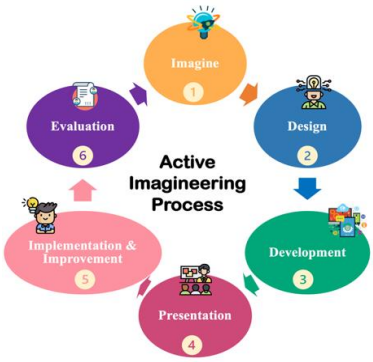

Fig. 1. Active imagineering learning process.

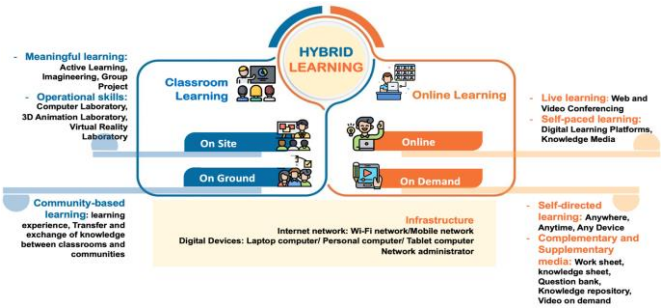

Fig. 2. Hybrid learning components.

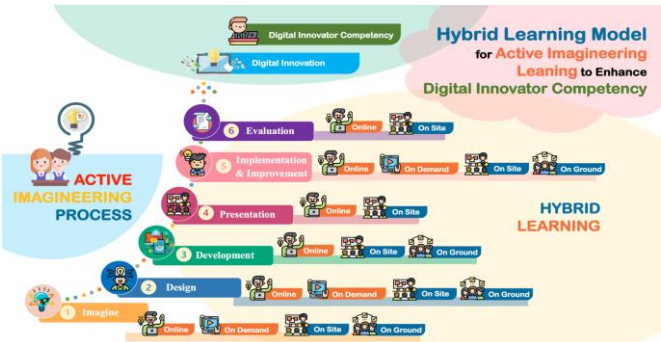

Fig. 3. The hybrid learning model for active imagineering learning to enhance digital innovator competency.

The hybrid learning model for active Imagineering Learning to enhance digital innovator competency is presented in Fig. 3.

3) Methods for assessing learning outcomes

3.1) Digital innovator competency assessment consists of knowledge and expertise in the field, skilled practitioners, creative thinking skills, productivity skills, and good attitude for creative problem solving.

3.2) Digital innovation quality assessment consists of objective problem solving, innovation efficiency, novelty and uniqueness, usability, and cost-effectiveness.

B. Assessment Results of the Suitability of the Hybrid Learning Model for Active Imagineering Learning to Enhance Digital Innovator Competency

The assessment results of the appropriateness of the Hybrid learning model for active Imagineering Learning to enhance digital innovator competency are shown in Table II.

TABLE II: RESULTS OF ASSESSMENT OF THE SUITABILITY OF HYBRID LEARNING MODEL FOR ACTIVE IMAGINEERING LEARNING TO ENHANCE DIGITAL INNOVATOR COMPETENCY

(*n* = 10)

Hybrid learning model for active Imagineering Learning to enhance digital innovator competency	Evaluation results		
	Mean	*S.D.*	Suitability level
1. Model principle	4.90	0.30	Excellent
1.1 Purpose of learning model	4.80	0.40	Excellent
1.2 Instructor role	4.90	0.30	Excellent
1.3 Learner role	4.90	0.30	Excellent
1.4 Infrastructure	4.90	0.30	Excellent
1.5 Hybrid learning model	5.00	0.00	Excellent
2. Hybrid learning model for active Imagineering Learning process	4.90	0.35	Excellent
2.1 Imagine	5.00	0.00	Excellent
2.2 Design	5.00	0.00	Excellent
2.3 Development	5.00	0.00	Excellent
2.4 Presentation	4.70	0.64	Excellent
2.5 Implementation and Improvement	4.80	0.40	Excellent
2.6 Evaluation	4.90	0.30	Excellent
3. Methods for assessing learning outcomes	4.95	0.22	Excellent
3.1 Digital innovator competency	5.00	0.00	Excellent
3.2 Digital innovation	4.90	0.30	Excellent
4. Appropriateness of the learning model for enhancing the digital innovator competency	4.90	0.30	Excellent
5. Appropriateness of the learning model for enhancing the digital innovation development	4.90	0.30	Excellent
Total	4.91	0.31	Excellent

From Table II, the hybrid learning model for active Imagineering Learning to enhance digital innovator competency was at the excellent level of overall suitability (*Mean* = 4.91, *S.D.* = 0.31). When considering each aspect, it was found that methods for assessing learning outcomes were the most appropriate (*Mean* = 4.95, *S.D.* = 0.22), followed by model principle, appropriateness of the learning model for enhancing the digital innovator competency, appropriateness of the learning model for enhancing the digital innovation development (*Mean* = 4.90, *S.D.* = 0.30), and hybrid learning model for active Imagineering Learning process (*Mean* = 4.90, *S.D.* = 0.35).

C. Assessment Results of the Digital Innovator Competency of Students Studying Using the Hybrid Learning Model for Active Imagineering Learning

The assessment results of the digital innovator's competency of students using the hybrid learning model for active Imagineering Learning are shown in Table III.

TABLE III: RESULTS OF THE ASSESSMENT OF THE DIGITAL INNOVATOR'S COMPETENCY OF STUDENTS USING THE HYBRID LEARNING MODEL FOR ACTIVE IMAGINEERING LEARNING

(*n* = 136)

Digital innovator competency	Evaluation results		
	Mean	*S.D.*	Competency level
Knowledge and expertise in the field (8)	7.41	0.60	Excellent
Skilled practitioners (8)	7.12	0.87	Excellent
Creative Thinking Skills. (8)	6.41	0.49	Excellent
Productivity skills (8)	6.68	0.47	Excellent
Good attitude for creative problem solving (8)	7.29	0.57	Excellent
Total (40)	34.91	2.43	Excellent

From Table III, the students using the hybrid learning model had the excellent level of digital innovator competency (*Mean* = 34.91, *S.D.* = 2.43), consistent with the research hypothesis, when considering each aspect it was found that the students had the most competency in knowledge and expertise in the field (*Mean* = 7.41 , *S.D.* = 0.60), followed by good attitude for creative problem solving (*Mean* = 7.29 , *S.D.* = 0.57) and skilled practitioners (*Mean* = 7.12 , *S.D.* = 0.87)

D. Assessment Results of the Digital Innovation Quality Assessment of Students Studying Using the Hybrid Learning Model for Active Imagineering Learning

The results of the digital innovation quality assessment of students using the hybrid learning model for active Imagineering Learning are presented in Table IV.

TABLE IV: RESULTS OF THE DIGITAL INNOVATION QUALITY ASSESSMENT OF STUDENTS USING THE HYBRID LEARNING MODEL FOR ACTIVE IMAGINEERING LEARNING

(n = 136)

Digital innovation quality	Evaluation results		
	Mean	*S.D.*	Quality level
Objective Problem Solving (8)	7.68	0.47	Excellent
Innovation Efficiency (8)	7.15	0.84	Excellent
Novelty and Uniqueness (8)	6.47	0.50	Excellent
Usability (8)	7.59	0.49	Excellent
Cost-effectiveness (8)	7.35	0.48	Excellent
Total (40)	36.24	1.56	Excellent

From Table IV, students using the hybrid learning model were able to create digital innovations with the excellent quality (*Mean* = 36.24, *S.D.* = 2.43) consistent with the research hypothesis. When considering each aspect, it was found that the objective problem solving aspect had the excellent quality (*Mean* = 7.68 , *S.D.* = 0.47), followed by usability (*Mean* = 7.59 , *S.D.* = 0.49) and cost-effectiveness (*Mean* = 7.35 , *S.D.* = 0.48).

VIII. DISCUSSION

The Students who studied using the hybrid learning model for active Imagineering Learning had the excellent level of digital innovator competency, and the ability to create digital innovations with the excellent quality, consistent with the research hypothesis. This is a result of active Imagineering learning activities, which are learning activities that can develop students' characteristics in the 21st century, and next normal education concept that focuses on learning and innovation skill (creativity skill, critical thinking skill), communication and collaboration skills, information communications and technology skills, and life and career skills. Active Imagineering learning activities begin with setting goals for innovation, requiring students to start with a thought-to-work process, Imagining innovation, planning and designing an innovation development process, selecting the necessary media and technology, management and use of information and communication technology for communication and innovative presentations [23]-[25].

Active Imagineering is a learning activity that focuses on learning by doing (Learning by doing) consistent with Competency-based learning refers to systems of instruction, assessment, grading, and academic reporting that are based on students demonstrating that they have learned the knowledge and skills they are expected to learn as they progress through their education, through creative innovation processes that make learning meaningful and effective, consistent with Pimpatchara Pornsawan [22] was develop the gamification collaborative Imagineering model on social cloud, the relationship result between innovator characteristics and innovative thinking skills of students after studying with the gamification collaborative Imagineering model on social cloud using pearson correlation showed that innovator characteristics and innovative thinking skills was related at .05 level and had positive correlations, The student who study with the model have higher innovator characteristics score and have evaluation score of innovative product at very high level, and Panita Wannapiroon and other [26] was study the augmented reality interactive learning model, using the Imagineering process for the smart classroom. The results showed that the 15,000 vocational students who used the Imagineering process exhibited a high level of creativity and the quality of creative innovation was at the highest level.

IX. CONCLUSION

Learning in the next normal education reimagined is enriching learning for digital learners who use digital tools to continuously build their own knowledge for lifelong learning. Learning happens seamlessly anywhere, anytime and is flexible to the needs of learners based on a hybrid learning approach, teaching methods and a variety of learning materials.

Hybrid learning model for active Imagineering Learning to enhance digital innovator competency consists of 3 main components: 1) model principle consisting of purpose of learning model, instructor's role, learner's role, infrastructure, and hybrid learning model; 2) active Imagineering Learning with hybrid learning consisting of six steps: imagine, design, development, presentation, implementation and improvement, and evaluation; and 3) digital innovator competency and digital innovation quality assessment. The developed hybrid learning mode can be used to effectively enhance the Digital Innovator competency and digital innovation of undergraduate students, and can be used as a guideline for teaching and learning by using the hybrid model for higher education.

Hybrid learning combines the best of classroom teaching and learning outside the classroom by using information technology to support collaborative learning to enable learning anytime, anywhere. Instructors focus on designing meaningful learning activities based on student experiences, designing a seamless learning environment with digital tools. The combination of 4 teaching styles (online on demand, on site, on ground) enables learners to learn effectively in both theory and practice. This is a new model for managing education in the next normal education era with efficiency and effectiveness. Subsequent research should study the continuity and sustainability of digital innovator competency of undergraduate students, using time series designs to compare the development of learners using the developed learning model.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Naphong Wannapiroon conducted the research by defining research frameworks, designing research methodology, analyzing data, modeling, discussing the findings, writing and reviewing the paper. Sorrachai Shawarangkoon conducted the research by collecting data, and preparing the data for modeling. Chatchada Chawarangkoon, and Atis kucharoenthavorn conducted the research by editing the paper, and reviewing models. All authors had approved the final version.

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