

# The Community-Based Learning Model via Game Simulation to Promote Community Public Health Diagnosis Skills

Nongluk Weerasiri<sup>1</sup> & Pinanta Chatwattana<sup>1</sup>

<sup>1</sup> King Mongkut's University of Technology North Bangkok, Thailand

Correspondence: Nongluk Weerasiri, King Mongkut's University of Technology North Bangkok, Thailand.

Received: November 1, 2024

Accepted: January 9, 2025

Online Published: February 8, 2025

doi:10.5539/jel.v14n3p230

URL: <https://doi.org/10.5539/jel.v14n3p230>

## Abstract

The community-based learning model via game simulation to promote community public health diagnosis skills, or CBL model via game simulation, is a research tool that was devised based on the concepts of public health diagnosis using the seven community tools (geo-social mapping, genogram, community organization chart, local health system, community calendar, local history, and life story) combined with the simulation game-based learning. The learning of this style encourages learners to learn and conduct activities in virtual environment of metaverse. In addition, it is believed that this will help promote learners' community public health diagnosis skills and systematic thinking skills as well. This study is intended to design the CBL model via game simulation as a guideline to further develop the CBL system via game simulation with self-directed learning to promote community public health diagnosis skills. The sample group are nine experts who are experience in design of instruction models. The tools employed in this research consist of (1) the CBL model via game simulation, and (2) the evaluation form on the suitability of the CBL model via game simulation. This study shows that (1) the overall elements of the CBL model via game simulation is at highest level, and (2) the overall suitability of the elements of the CBL model via game simulation is at highest level as well.

**Keywords:** CBL model via game simulation, community-based learning, metaverse, public health diagnosis skills, seven community tools

## 1. Introduction

At present, digital technology has an influence on both life and work of humans; therefore, government officers who are highly significant for national development are required to adapt themselves to the contexts of the ongoing changes in order to prevent culture shock caused by technological changes, and meanwhile to avoid the risks that may arise from the misuse of the said technology. In reference to the contexts of changes mentioned above, the Ministry of Public Health has established the eHealth strategy (2017–2026) with an intention to use digital technology along with the services about information and communication technology (ICT) to connect health service providers and the general public, so that everybody can access health services effectively, equally, fairly, and safely (Ministry of Public Health, 2017). This strategic plan primarily provides that medical personnel must possess the skills and understanding of digital health literacy so that they can provide public health care in an efficient manner. At the meantime, they must be able to make the ultimate use of the current digital tools, devices, and technologies such as computers, phones, tablets, computer programs and online media in communication, operation, and collaboration (Chinwatsopol et al., 2024).

Thailand's Education 4.0 refers to an education that mainly emphasizes the application of new educational technologies and innovations to promote the access to knowledge sources in order that learners can further create the more creative bodies of knowledge. Thereby, the quality and the standards of education must be widely accepted in the international level and must be consistent with the national educational standards that focus mainly on the development in all dimensions (Pengpan, 2018). Currently, a number of higher education institutions have begun to adjust their educational models, aiming to encourage learners to focus more on proactive learning and use analytical thinking, problem-solving, and logical thinking (Chatwattana, 2021). Moreover, the improvement of skills and the creation of positive attitudes towards lifelong learning have also been addressed in order to promote learners to succeed not only in their careers but also in their lives.

Community-based learning is an experiential learning model designated to promote learning and develop learners by encouraging them to take part in activities that are relevant to the needs of both individual and community. The

objective thereof is to promote active learning based on the real practices and real situations in the community while focusing on the participation of instructors, learners and groups of people in the community (Jensantikul, 2021).

Game simulation learning is a style of learning management in which learners are allowed to learn and practice in the realistic situations by means of playing games. In the learning of this format, learners are able to react and interact with the things in virtual situations through the role-playing games and based on the rules as if they were in the real world (Khumsuk & Nillapun, 2021). Referring to the earlier studies, it is found that the use of computer games as learning media can attract learners' attention because games are considered the media that can provide fun for learners. Furthermore, instructors are able to insert the contents of different subjects for learners to learn through the said games. It is believed that game simulation learning will help learners get better learning achievement and it can be effectively applied in both on-site and online learning (Phiwma, 2021).

Game simulation learning is a style of virtual learning management in which the situations of the real practices are simulated and prepared for learners to learn. It is expected that such virtual simulations enable learners to learn and face with problems in the situations that are similar to reality as much as possible (Khumsuk & Nillapun, 2021). At present, the simulation-based instruction management is widely applied in conjunction with traditional classroom learning because this learning format allows learners to learn practical skills from the simulated situations that are close to the real situations as much as possible. Furthermore, game simulation learning also helps improve communication skill, collaboration skill, and decision-making skill; and meanwhile it encourages learners to gain experiences from simulated situations, learn by reflective thinking, and adjust themselves before confronting the real-life situations (Oyserman et al., 2012). The aforementioned benefits of game simulation learning result from the learning process using virtual simulations that can promote experiential learning based on the specified simulated situations. By this way, learners are able to apply their knowledge derived from varied theories to actual practices, and then receive feedback right after learning through the simulated situations.

Metaverse is considered a new dimension of borderless education management that makes use of advanced virtual reality technologies to access learning resources and meanwhile enables users to exchange their information within the 3D virtual world (Damar, 2021). In the learning environment via metaverse, the learning activities are facilitated in the immersive learning environment in which the physical and digital worlds are blended with the aid of augmented reality and virtual reality technologies. It is believed that this style of learning enables users to learn deeply through their hands-on learning experiences. Thanks to the rapid growth of technologies and the development of data presentation through virtual environments (Chatwattana et al., 2023), learning via metaverse technology has become a new dimension of education management that is in consistence with the concept of New Normal learning while promoting continuous learning.

Community public health diagnosis skills refer to the skills derived from collection and analysis of data in order to get the results that can indicate the level of well-being of people in that community, as well as other factors that affect the health of people in that community (Manotham et al., 2020). In this study, the researchers employed the seven community tools of Chuengsatiansup (2002) to conduct health studies, i.e., geo-social mapping, genogram, community organization chart, local health system, community calendar, local history, and life story.

According to the above principles, theories, and reasons, the researchers had an idea to design the community-based learning model via game simulation, or CBL model via game simulation, for use as a guideline to promote community public health diagnosis skills. The objective thereof is to make use of the seven community tools so as to obtain the results that can indicate the level of well-being of people in community, as well as other factors that have effects on the health of people in community. In addition, this study is intended to encourage learners to develop critical thinking skills and apply them in community health diagnosis.

## **2. Research Objectives and Hypothesis**

- 1) To synthesize the conceptual framework of the CBL model via game simulation to promote community public health diagnosis skills.
- 2) To design the CBL model via game simulation to promote community public health diagnosis skills.
- 3) To study the results of the design the CBL model via game simulation via game simulation to promote community public health diagnosis skills.

The hypothesis of the research in the design of the community-based learning model via game simulation to promote community public health diagnosis skills (CBL model via game simulation) is at high level.

### 3. Methodology

This study is the design of the community-based learning model via game simulation to promote community public health diagnosis skills (CBL model via game simulation), and the research methodology is as follows.

#### 3.1 Sample group

The sample group are nine experts who are experience in the fields of instruction design.

#### 3.2 Research Instruments and Data Analysis

In designing the CBL model via game simulation, the researchers relied on the following tools for design and data collection: (1) the CBL model via game simulation, and (2) the evaluation form on the suitability of the CBL model via game simulation consisting of five levels scoring questions. This study, the researchers had used for data analysis include mean and standard deviation.

#### 3.3 Method

The research methodology designated to design this model is based on the systems approach (Khemmani, 2018; Utranan, 1982), which can be divided into three stages as follows.

At the first stage, the researchers had studied and analyzed the documents and the research for determine of the conceptual framework, which are concerning community-based learning, game simulation, metaverse, and community public health diagnosis skills. The conceptual framework as shown in below.

At the second stage, the researcher designed the CBL model via game simulation on the principles of systems approach (Khemmani, 2018; Utranan, 1982) is composed of four main elements, i.e., input factor, CBL process via game simulation, output, and feedback.

At the third stage, it is studied results in the designed of the CBL model via game simulation with nine experts who were derived by means of purposive sampling in the fields of instruction design. This stage, the researchers used the concept of Srisa-Ard (2010) are the criteria for evaluation and the interpretation of results.

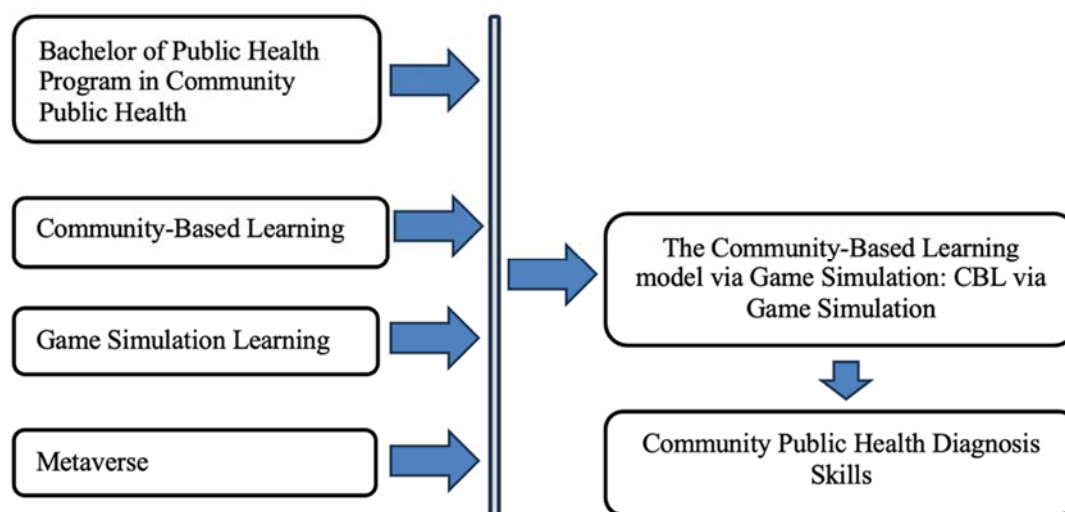


Figure 1. Conceptual framework of the CBL via game simulation

### 4. Results

The design of the community-based learning model via game simulation to promote community public health diagnosis skills (CBL model via game simulation) can be summarized as follows:

#### 4.1 The Design of the CBL Model via Game Simulation

The CBL model via game simulation to promote community public health diagnosis skills is a research tool that was initiated with the concepts of public health diagnosis using the seven community tools (geo-social mapping, genogram, community organization chart, local health system, community calendar, local history, and life story)

integrated with the simulation game-based learning. The CBL model via game simulation allows learners to learn and do activities in virtual environment within metaverse, and it is expected that this will help promote learners' community public health diagnosis skills. The CBL model via game simulation is illustrated in Figure 2.

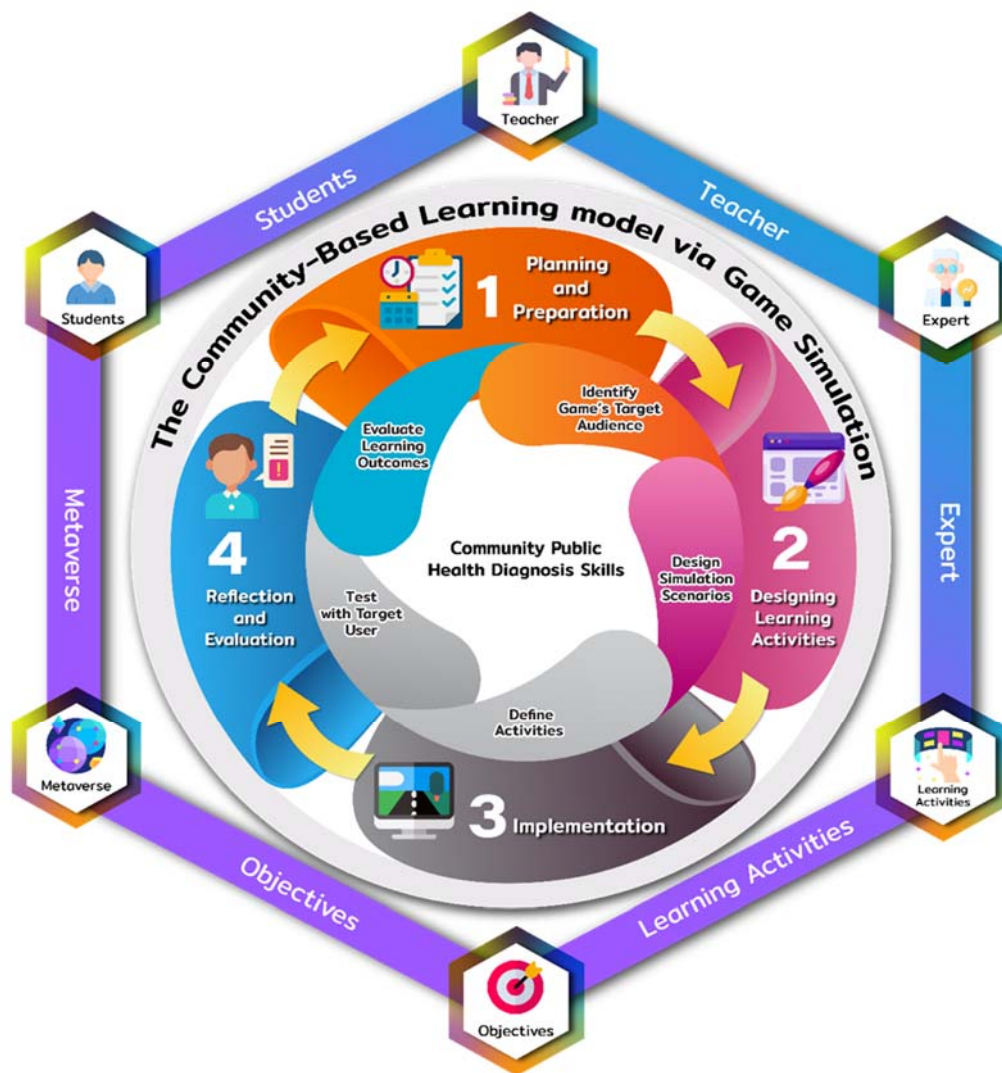


Figure 2. The CBL model via game simulation to promote community public health diagnosis skills

Figure 2 represents the CBL model via game simulation to promote community public health diagnosis skills which consists of the following elements:

- 1) Input factor: This element refers to the data needed in the design of the CBL model via game simulation, which includes students, teacher, expert, learning activities, learning objectives, and metaverse.
- 2) The CBL process via game simulation: It is the learning process within the CBL model via game simulation, which was initiated by the integration of the four steps in community-based learning process, i.e., planning and preparation step, designing learning activities step, implementation step, and reflection and evaluation step, with the five steps of game simulation learning process, including identify game's target audience, design simulation scenarios, define activities, test with target users, and evaluate learning outcomes, respectively.
- 3) Output: It is the outcomes after learning with the CBL process using the seven community tools. In other words, this element refers to the community public health diagnosis skills, which are the abilities to use critical thinking skills in the process of making decisions on any particular issues through questioning or argumentation with an aim to derive reasonable answers about the community that have impacts on health problems.
- 4) Feedback: This element is the results of reflection and evaluation, which will be used for consideration in the

learning process. The feedback herein is the results of assessment on community diagnostic skills.

The study results of the design of the CBL model via game simulation with nine experts in this research who were derived by means of purposive sampling. All of them are the experts from different institutions, who are experience in the fields of instruction design are shown in Tables 1 and 2.

Table 1. The suitability of the overall elements of the CBL model via game simulation

| Evaluation list   | Results |      | Interpretation |
|---|---------|------|----------------|
|   | Mean    | SD   |                |
| 1. The suitability of the principles and the concepts used to develop the PBL model via cloud technology. | 4.89    | 0.31 | Highest        |
| 2. The suitability in the elements of the CBL model via game simulation.                                  |         |      |                |
| 2.1 Input factor  | 4.75    | 0.43 | Highest        |
| 2.2 The CBL process via game simulation   | 4.67    | 0.67 | Highest        |
| 2.3 Output  | 4.56    | 0.50 | Highest        |
| 2.4 Feedback  | 4.56    | 0.50 | Highest        |
| Total average   | 4.69    | 0.48 | Highest        |

Regarding Table 1, it is found that the overall elements of the design of the CBL model via game simulation is at highest level (Mean = 4.69, SD = 0.48). Therefore, the researchers concluded that the CBL model via game simulation contains all necessary elements and it can be applied as a guideline to further develop other CBL models via game simulation in order to promote community public health diagnosis skills. Thereby, the use of games as learning media in the learning management in this model is also said to help learners achieve more effective learning outcomes.

Table 2. The suitability of the elements of the CBL model via game simulation

| Evaluation list  | Results |      | Interpretation |
|--|---------|------|----------------|
|  | Mean    | SD   |                |
| 1. Input factor  |         |      |                |
| 1.1 Students   | 4.89    | 0.31 | Highest        |
| 1.2 Teacher  | 4.89    | 0.31 | Highest        |
| 1.3 Expert   | 4.89    | 0.31 | Highest        |
| 1.4 Learning activities  | 4.89    | 0.31 | Highest        |
| 1.5 Learning objectives  | 4.89    | 0.31 | Highest        |
| 1.6 Metaverse  | 4.89    | 0.31 | Highest        |
| Overall  | 4.89    | 0.31 | Highest        |
| 2. CBL process via game simulation   |         |      |                |
| 2.1 Community-based learning   |         |      |                |
| 2.1.1 Planning and preparation step  | 4.78    | 0.44 | Highest        |
| 2.1.2 Designing learning activities step                                     | 4.78    | 0.44 | Highest        |
| 2.1.3 Implementation step  | 4.78    | 0.44 | Highest        |
| 2.1.4 Reflection and evaluation step   | 4.67    | 0.50 | Highest        |
| Overall  | 4.75    | 0.46 | Highest        |
| 2.2 Game simulation learning   |         |      |                |
| 2.2.1 Identify game's target audience step                                   | 4.67    | 0.71 | Highest        |
| 2.2.2 Design simulation scenarios step                                       | 4.67    | 0.71 | Highest        |
| 2.2.3 Define activities step   | 4.67    | 0.71 | Highest        |
| 2.2.4 Test with target users step  | 4.67    | 0.71 | Highest        |
| 2.2.5 Evaluate learning outcomes step  | 4.67    | 0.71 | Highest        |
| Overall  | 4.67    | 0.71 | Highest        |
| 2.3 Metaverse  | 4.78    | 0.63 | Highest        |
| 3. Output  |         |      |                |
| 3.1 Community public health diagnosis skills                                 | 4.33    | 0.87 | High           |
| 4. Feedback  |         |      |                |
| 4.1 Result of the evaluation of the community public health diagnosis skills | 4.44    | 0.73 | High           |
| Total average  | 4.64    | 0.62 | Highest        |

In reference to Table 2, it is evident that the overall suitability of the CBL model via game simulation is at highest level (Mean = 4.64, SD = 0.62). This insists that the CBL model via game simulation is composed of all appropriate elements and it can be employed as a guideline to further design the learning tools that can be put in practical use to promote community public health diagnosis skills. Whereby, the community public health diagnosis skills mentioned herein refer to the abilities to use critical thinking skills in the process of making decisions on any particular issues through questioning or argumentation with an aim to derive reasonable answers about the community that have impacts on health problems.

## 5. Conclusion & Discussion

The CBL model via game simulation is a research tool that was developed based on the concepts and the theories of community-based learning integrated with the simulation game-based learning. The learning of this style is intended to encourage learners to learn and conduct activities under virtual environment in metaverse. In addition, this study also applied the concepts of public health diagnosis using the seven community tools of Chuengsatiansup (2002), which include geo-social mapping, genogram, community organization chart, local health system, community calendar, local history, and life story. The main objective of the learning of this style is to promote learners' community public health diagnosis skills, which are the abilities to take into account causes and effects in order to find out the most reasonable solutions to the issues that have direct impact to community health.

According to the results of this study, it is found that (1) the overall elements of the design of the CBL model via game simulation is at highest level (Mean = 4.69, SD = 0.48), and (2) the overall suitability of the CBL model via game simulation is at highest level (Mean = 4.64, SD = 0.62). This is consistent with the research of Simswat (2022), who stated that community-based learning management is considered an instruction model that encourages learners to achieve active-learning from the real scenarios in community. This format of learning not only promotes learning but also enhances learners' knowledge and skills in many aspects, such as analytical thinking and critical thinking. The results are also in line with the research of Wongpattananipap and Sumruamjit (2023), who applied computer simulation games in their research and found that this method can promote learners' strategic thinking by means of reactions and interactions, and meanwhile increase their satisfaction towards learning as well. Moreover, this is also in accordance to the research of Buenae (2023), who mentioned that the integration of metaverse technology and creative-based learning for the instruction of mathematics can encourage learners to develop the skills of innovative thinking, problem solving and creative thinking. Learners shall receive learning experiences through a variety of teaching activities and media which are designed by the use of varied technologies in order to attract learners' attention and assist them in learning. This is also in line with the research of Phuthong (2021), who studied the factors that encouraged Thai university students to use social media platforms for collaborative learning during the New Normal after the outbreak of COVID-19. The said research found that the most important factors that promoted the adoption of social media platforms for collaborative learning among university students in the New Normal era were the ability to work together and the fun perceived while using the said platforms. Overall, this clearly reflects that the said university students considered the social media platforms as helpful tools for group working, class discussions, and exchange of information regardless of space and time limitations. Thus, these students preferred to use these tools to interact with their classmates and instructors.

## 6. Limitations & Recommendations for Future Research

The results of this research have some limitations that need to be addressed in the future. First of all, the sample group in this research is quite small, including only nine experts in the fields of instruction design. As a consequence, the findings are considered merely those of a pilot study. Therefore, in order to confirm the clarity and validity of study results, the future researches should be conducted with more diverse sample groups along with the surveys with large population and more tests. Moreover, there are also limitations in terms of the techniques used in this research, which restricts the scope of presentation. Thus, the future researches should focus more on design of a wider variety of technologies. To summarize, this research is considered a pilot study that can be applied as a guideline to further develop other CBL systems via game simulation to promote community public health diagnosis skills that can be put in practical use in the future.

## Acknowledgments

This study has been accomplished by relying on participants who encouraged the researcher to complete the research properly.

## Authors' contributions

Nongluk Weerasiri develops the main idea of this research, wrote and compose the manuscript, developing the tools and studied the results. Assoc. Prof. Dr. Pinanta Chatwattana revised and compose the writing quality of the

manuscript and rechecked the manuscript before it was to be submitted. The two authors have approved the final version of this manuscript for publication.

### **Funding**

Not applicable.

### **Competing interests**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### **Informed consent**

Obtained.

### **Ethics approval**

The Publication Ethics Committee of the Canadian Center of Science and Education.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

### **Provenance and peer review**

Not commissioned; externally double-blind peer reviewed.

### **Data availability statement**

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

### **Data sharing statement**

No additional data are available.

### **References**

- Buenae, H. (2023). *The development of metaverse learning innovation through creativity-based learning management on probability to develop problem-solving skills for grade 9 students*. Master's thesis, Yala Rajabhat University, Thailand.
- Chatwattana, P. (2021). Creative Educational Innovations based on Experiential Learning to Enhance Education of Digital Learners. *Journal of Industrial Education*, 20(1), 82–90.
- Chatwattana, P., Saisong, P., Rojanapasnichwong, K., & Khiankhokkrud, W. (2023). The Virtual Laboratory Learning Environment: VLLE on Metaverse for University in Thailand. *International Journal of Engineering Pedagogy*, 13(5), 30–41. <https://doi.org/10.3991/ijep.v13i5.38565>
- Chinwatsopol, S., Jaikaw, W., Kongka, J., Nilnate, N., & Jaidee, P. H. (2024). Digital health literacy of public health workforce in health care system. *Journal of Health and Environmental Education*, 9(1), 63–70. Retrieved from <https://so06.tci-thaijo.org/index.php/hej/article/view/269647/181988>
- Chuengsatiansup, K. (2002). *The 7 Community Tools: Simple Instruments for Effective Learning of Community Life*. Retrieved from <http://pws.npru.ac.th/kanitta/data/files/7tools%281%29.pdf>
- Damar, M. (2021). Metaverse Shape of Your Life for Future: A bibliometric snapshot. *Journal of Metaverse*, 1(1), 1–8.
- Jensantikul, N. (2021). Community-Based Learning Process: Reflections on experience and learning. *Journal of Humanities and Social Sciences Mahamakut Buddhist University Isan Campus*, 2(3), 78–85. Retrieved from <https://so06.tci-thaijo.org/index.php/jhsmbuisc/article/view/253640/171506>
- Khemmani, T. (2018). *Science of Teaching: Knowledge of Efficient Learning Process Management*. Bangkok: Chulalongkorn University Press.
- Khumsuk, W., & Nillapun, M. (2021). Simulation-based learning. *Journal of Council of Community Public Health*, 3(1), 1–11. Retrieved from <https://he01.tci-thaijo.org/index.php/JCCPH/article/view/247834/168613>
- Manotham, M. (2022). Community health problem diagnosis for health promotion. *Journal of Nursing and Health Science Research*, 14(2), 295–308.
- Ministry of Public Health. (2017). *eHealth Strategy (B.E. 2560–2569)*. Bangkok: Ministry of Public Health. Retrieved from [https://ict.moph.go.th/upload\\_file/files/eHealth\\_Strategy\\_THAI\\_16NOV17.pdf](https://ict.moph.go.th/upload_file/files/eHealth_Strategy_THAI_16NOV17.pdf)
- Oyserman, D., Elmore, K., & Smith, G. (2012). *Handbook of Self and Identity*. London: Guilford Press.

- Pengpan, W. (2018). Thai Education 4.0 and the Development of the Eastern Economic Corridor. *Journal of Education*, 29(3), 1–12. Retrieved from <https://ojs.lib.buu.ac.th/index.php/education2/article/view/5694>
- Phiwma, N. (2021). Learning management using game-based learning by integrating computer game technology. *Journal of Humanities and Social Sciences*, 7(Special), 1–15. Retrieved from <https://so03.tci-thaijo.org/index.php/rpu/article/view/257367>
- Phuthong, T. (2021). Antecedents Influencing the Adoption of Collaborative Learning Social-Media Platforms Among Thai University Students During the Covid-19 ‘New Normal’ Era. *International Journal of Emerging Technologies in Learning*, 16(13), 108–127. <https://doi.org/10.3991/ijet.v16i13.18083>
- Simswat, G. (2022). Community-based learning in the 21<sup>st</sup> century among the outbreak of coronavirus disease 2019 (COVID-19). *Srilangchang Research Journal*, 2(6), 47–54.
- Srisa-Ard, B. (2013). *Basic Research*. Bangkok: Suweerivasarn Press.
- Utranan, S. (1982). *Systematic Instructional Management*. Bangkok: Chulalongkorn University.
- Wongpattananipap, P., & Sumruamjit, U. (2023). The development of a time-based simulation digital game for learning tenses in secondary 2 students. *Journal of Technology Management Rajabhat Maha Sarakham University*, 10(1), 75–90.

### Copyrights

Copyright for this article is retained by the author, with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).