Development of Experiential Learning Model using Board Games to Enhance Strategic Thinking for Undergraduate Students

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This research is a research and development. The objectives of this research are: 1) to study the elements of the experience-based learning model using board games to promote strategic thinking for undergraduate students, 2) to develop the experience-based learning model using board games to promote strategic thinking for undergraduate students, 3) to study the effects of using the experience-based learning model using board games to promote strategic thinking for undergraduate students. Phase 1, results of the study of the elements of the experience-based learning model using board games to promote strategic thinking for undergraduate students. Phase 2, the development and design of the experiential learning model using board games to promote strategic thinking for undergraduate students. Phase 3, the results of studying the effects of using the experience-based learning model using board games to promote strategic thinking for undergraduate students. The sample group consisted of 27 undergraduate students from Mahasarakham University who were enrolled in the data science course (cluster random sampling). Research Tools included the study of the elements of the experience-based learning model using board games to promote strategic thinking for undergraduate students, as well as the Student Strategic Thinking Assessment and Student Academic Achievement Assessment. The statistics used for data analysis included percentage, mean, standard deviation, and hypothesis testing (dependent t-test). The results of the research showed that, 1) The components of the experience-based learning model using board games to promote strategic thinking for undergraduate students consist of seven components: content, instructor, learner, activities, board game, strategic thinking, and measurement and evaluation, 2) The steps of the experience-based learning model using board games to promote strategic thinking for undergraduate students are as follows: PEBE Model = Prepare Experiential Boardgame Strategy. This starts with preparing content, preparing instructor, preparing learner, preparing activities, experiential learning, board game, and evaluation, 3) results of using the experience-based learning model using board games to promote strategic thinking for undergraduate students: 3.1) Students exhibited a higher level of strategic thinking after learning compared to before learning, with statistical significance at the .05 level in all aspects: Thinking, Vision, Knowledge, 3.2) The academic achievement of students using the experience-based learning model using board games to promote strategic thinking was found to be higher after learning compared to before learning, with statistical significance at the .05 level.

1. Introduction

A review of legal provisions, policies, and strategies reveals that the constitution of the Kingdom of Thailand 2017, the 20-Year nNational strategy, Thailand 4.0, and the 12th National Economic and Social Development Plan (2017-2021) all aim to create factors that will support the development of the country in the same direction. This will be done through the use of innovation, technology, and creativity, as well as the upgrading of human resources to the 21st century. One of the important skills is strategic thinking skills. This makes the goals and directions of higher education development in the future clearer. (Long-Term Higher Education Plan 2018-2047, 2018)

Strategic thinking is a form of thought process that aims to evaluate various options to achieve set goals and select the most appropriate course of action. It involves formulating a well-considered, step-by-step plan that remains flexible and adaptable to changing circumstances, objectives, and challenges. Strategic thinking enables individuals to overcome obstacles, prepare for unforeseen events, and ultimately achieve their desired outcomes.

According to Kriengsak Chareonwongsak (2546), strategic thinking involves making the best possible choices among available alternatives. Mintzberg (1994) and Liedtka (1998) further emphasize the importance of cultivating strategic thinking skills, as they are deemed essential for individuals in the 21st century. In line with this, the National Economic and Social Development Board (NESDB) of Thailand's National strategy for human resource development and empowerment (2018)

Learner-centered instruction aims to integrate learners' knowledge and understanding of all related disciplines in theory to practical application in order to build important skills and competencies necessary for quality daily problem-solving or practice. For example, the subject of computational science in the Basic Education Curriculum Framework B.E. 2008 (Revised 2017) has been announced to move to the science group and is a compulsory subject that all children must study for all, from grade 1 to grade 6 (Basic Education Curriculum Framework, 2008, revised 2017). It is a subject that focuses on teaching children to think computationally (Computational thinking), have a basic knowledge of digital technology (Digital technology), and have a basic knowledge of media and information literacy (Media and information literacy). Learning computational science is not limited to thinking like a computer, and it is not limited to thinking in the field of computer scientists. However, it will be a process of analytical thinking to be used to solve human problems. The teaching of computational science has an important goal in developing learners, namely to enable learners to use computational thinking skills to analyze and solve problems in a step-by-step and systematic manner, have skills in searching for information, evaluating, managing, analyzing, synthesizing, and using information to solve problems.

The development of processes to promote learning among Thai university students faces several challenges due to the limitations of classroom-based education. The current teaching and learning methods are not conducive to nurturing individuals with broad perspectives, foresight, and a thirst for knowledge. The emphasis remains on rote memorization of subject

matter rather than fostering genuine understanding and thinking skills (Suman Amornviwat, 1998). Teaching activities often prioritize rote memorization over encouraging thinking (Charan Suwannakala, 1996). Instructors primarily focus on preparing students for exams, leading students to prioritize memorizing and practicing past exam questions to achieve passing grades or advance to the next level. As a result, the cultivation of thinking, analytical, and synthesis skills is often neglected (Uthai Dulyakasem, 2000). Additionally, outdated curricula and teaching methods emphasize one-way transmission of knowledge, focusing on rote memorization rather than analysis, reasoning, and holistic understanding.

Experiential learning is a comprehensive approach to the learning process and the multifaceted development of children into adults. It emphasizes the crucial role of experience in the learning process and views it as an internal process within the learner, forming a cycle of learning that is interconnected with the learner's internal cognitive processes. Learning can begin at any point in the learning cycle, but it must complete the four stages of the learning cycle:

Concrete Experience: Learners engage in hands-on experiences and gather information.

Reflective Observation: Learners reflect on their experiences, analyze them, and identify patterns and relationships.

Abstract Conceptualization: Learners form abstract concepts and generalizations based on their reflections and observations.

Active Experimentation: Learners apply their newly acquired knowledge and concepts to solve problems and make decisions in new situations.

Learners can gain knowledge from any of these four stages, but effective learning requires all four stages to be incorporated into the learning process.

In the context of 21st-century education, active learning has gained significant attention as a teaching approach that emphasizes student-centered learning and hands-on activities (Jirapat Phuangchampa, 2019). Board games are one form of innovative media for active learning that can stimulate diverse thinking and enhance the effectiveness of learning for students. They encourage hands-on participation, fostering experiential learning (Siriporn Srijant and others, 2019; Jirapat Phuangchampa, 2019). Furthermore, incorporating games into the teaching process creates a novel learning environment that motivates students and makes learning enjoyable. This innovative approach utilizes game-based success and rewards to enhance engagement and motivation in learning (Setthapong Duangrattanaekchai, 2019). Studies on the use of board games in developing various problem-solving skills have demonstrated the connection between problem-solving in computer science and the potential for fostering strategic thinking.

Cultivating strategic thinking abilities is an essential process for achieving success in various aspects of life, including everyday activities, education, and problem-solving. Individuals equipped with strategic thinking skills possess the confidence to navigate challenges and attain their goals (Danai Thianphut, 2003). The development of strategic thinking skills is particularly relevant for university students. During this formative stage, individuals are well-positioned to acquire and refine diverse thinking skills, including those involved in multi-step

and complex processes. Effective implementation of strategic thinking skills requires a supportive learning environment, ongoing research and evaluation, and comprehensive training programs (KwanYing Sriprathumphan, 2000). Given its significance, incorporating strategic thinking instruction into higher education curricula is crucial. Various methodologies can be employed to foster strategic thinking skills among students. These approaches can be broadly categorized into two main frameworks:

Experiential and Learning-Based Approach: This method emphasizes the development of strategic thinking skills through hands-on experiences and active learning. techniques such as lectures, problem-solving exercises, practical workshops, and guided questioning can be effectively utilized.

Board Game-Based Approach: This innovative approach leverages board games as a tool to enhance strategic thinking skills. Board games provide an engaging and interactive platform for students to practice strategic decision-making, problem-solving, and critical thinking under simulated scenarios.

By implementing these diverse instructional approaches, educators can effectively cultivate strategic thinking skills among university students, empowering them to navigate challenges, make informed decisions, and achieve success in their academic pursuits and beyond.

Based on the background and importance of the problem, the researcher is interested in designing and developing an experiential learning model using board games that promotes strategic thinking for undergraduate students. This is an integrated teaching and learning approach that combines experiential learning, strategic thinking, and board games. Various innovative board games can be selected from stores for use in the classroom. There will be criteria for selecting board games for use in teaching and learning, such as games that require cooperation or competition. The games will be designed to promote strategic thinking. Students will learn while having fun and enjoyment, motivating them to want to learn and not be bored. It will also help students use their judgment in decision-making in learning. This can be applied appropriately to lead to the development of teaching and learning, the development of students' learning to be appropriate, to be lifelong learners, and the progress in producing quality graduates of Thai educational institutions, which will lead to the quality of the population in the future.

2. Literature Review

This research aims to develop an experiential learning model using board games to promote strategic thinking for undergraduate students. It includes a review of relevant literature and research to inform the development of the model. The literature and research are categorized into four sections:

1. Experiential Learning (EL), This section provides an overview of experiential learning theory, including its key concepts, principles, and benefits. It also discusses the different types of experiential learning activities and how they can be used to promote learning.

2. Concepts and Theories Related to Board Games (Board Game), This section explores the

concepts and theories related to board games, such as game mechanics, game Play, and player engagement. It also discusses the different types of board games and their potential benefits for learning.

3. Strategic Thinking, This section defines strategic thinking and discusses its importance for undergraduate students. It also identifies the key components of strategic thinking and how they can be developed through board games.

4. Related Research, This section reviews relevant research studies that have investigated the use of board games to promote strategic thinking. The research is synthesized and evaluated to identify key findings and implications for the development of the experiential learning model.

3. Research methodology

Development of Experiential Learning Model using Board Games to Enhance Strategic Thinking for Undergraduate Students, This research is a research and development (R&D), and the objectives:

1. To study the elements of the experience-based learning model using board games to promote strategic thinking for undergraduate students.

2. To develop the experience-based learning model using board games to promote strategic thinking for undergraduate students.

3. To study the effects of using the experience-based learning model using board games to promote strategic thinking for undergraduate students.

Phase 1, Results of the study of the elements of the experience-based learning model using board games to promote strategic thinking for undergraduate students.

Objective: To analyze and synthesize the components and steps of the model by studying information from document reviews, online databases, and related research.

Research Tools: document review, the researcher reviewed various documents, including academic papers, books, and reports, to identify and gather relevant information on the model's components and steps. Online Database Search: The researcher utilized online databases to search for additional information on the model, such as case studies, examples, and expert opinions. Related Research Analysis: The researcher analyzed existing research related to the model to gain insights into its effectiveness, limitations, and potential applications.

Phase 2, The study developed and design the experiential learning model using board games to promote strategic thinking for undergraduate students, The research was conducted in two Step:

Step 1, Development (draft) of an experiential learning model using board games to promote strategic thinking for undergraduate students The first phase involved the development of a draft experiential learning model using board games to promote strategic thinking for undergraduate students. The model was based on the findings of the first phase of

the research and was designed using the instructional design model of Lee and Jang (2014). The model consisted of four phases: 1) Analysis, 2) Design, 3) Development, 4) Evaluation

Step 2, Evaluation and validation of the experiential learning model using board games to promote strategic thinking for undergraduate students, The second phase involved the evaluation and validation of the experiential learning model using board games to promote strategic thinking for undergraduate students. The model was evaluated by five experts.

Phase 3, The results of the study the effects of using the experience-based learning model using board games to promote strategic thinking for undergraduate students, The sample group consisted of 27 undergraduate students from Mahasarakham University who were registered in the Data Science course (Cluster random sampling). Research instruments is study the elements of the experience-based learning model using board games to promote strategic thinking for undergraduate students and Student Strategic Thinking Assessment and Student Academic Achievement Assessment The statistics used for data analysis include percentage, mean, standard deviation, and hypothesis testing (t-test dependent).

Research tools

The research tools for developing an experiential learning model using board games to promote strategic thinking for undergraduate students consist of the following:

1. Draft Experiential Learning Model Using Board Games to Promote Strategic Thinking for Undergraduate Students and User Guide: This draft outlines the experiential learning model and provides instructions on its implementation.

2. Expert Opinion Questionnaire on the Experiential Learning Model Using Board Games to Promote Strategic Thinking for Undergraduate Students: This questionnaire is used to gather feedback from experts on the effectiveness of the experiential learning model.

3. Strategic Thinking Assessment for Learners Using the Experiential Learning Model Using Board Games to Promote Strategic Thinking for Undergraduate Students: This assessment measures the strategic thinking skills of learners before and after participating in the experiential learning model.

4. Achievement Test for Learners Using the Experiential Learning Model Using Board Games to Promote Strategic Thinking for Undergraduate Students: This test measures the academic achievement of learners before and after participating in the experiential learning model.

5. Feedback Form on the Experiential Learning Model Using Board Games to Promote Strategic Thinking for Undergraduate Students: This form collects feedback from learners on their experience with the experiential learning model.

The Design of an Experiential Learning Model Using Board Games to Promote Strategic Thinking for Undergraduate Students a experiential learning model that utilizes board games to promote strategic thinking skills in undergraduate students. The model, titled "Prepare Experiential Boardgame Evaluation" (PEBE), consists of seven steps:

1. Content Preparation: The instructor carefully selects and prepares the course content that aligns with the learning objectives and the board game mechanics.

2. Instructor Preparation: The instructor thoroughly reviews the course content, the board game rules, and the PEBE model to ensure effective facilitation of the learning experience.

3. Learner Preparation: Students are provided with clear instructions, expectations, and any necessary background knowledge to actively participate in the board game activity.

4. Activity Preparation: The physical space is arranged to accommodate the board game, and the necessary game materials are prepared and organized.

5. Experiential Learning: Students engage in the board game activity, applying their knowledge, skills, and strategic thinking abilities to achieve the game's objectives.

6. Boardgame: A carefully selected board game that aligns with the learning objectives and promotes strategic thinking is utilized as the primary learning tool.

7. Evaluation: Students' performance in the board game activity is assessed and evaluated to measure their understanding of the course content and their development of strategic thinking skills.

The Design of an Experiential Learning Model Using Board Games to Promote Strategic Thinking for Undergraduate Students

The model, titled "Prepare Experiential Board game Evaluation" (PEBE), consists of seven steps: 1) Content Preparation 2) Instructor Preparation 3) Learner Preparation 4) Activity Preparation 5) Experiential Learning 6) Board game 7) Evaluation
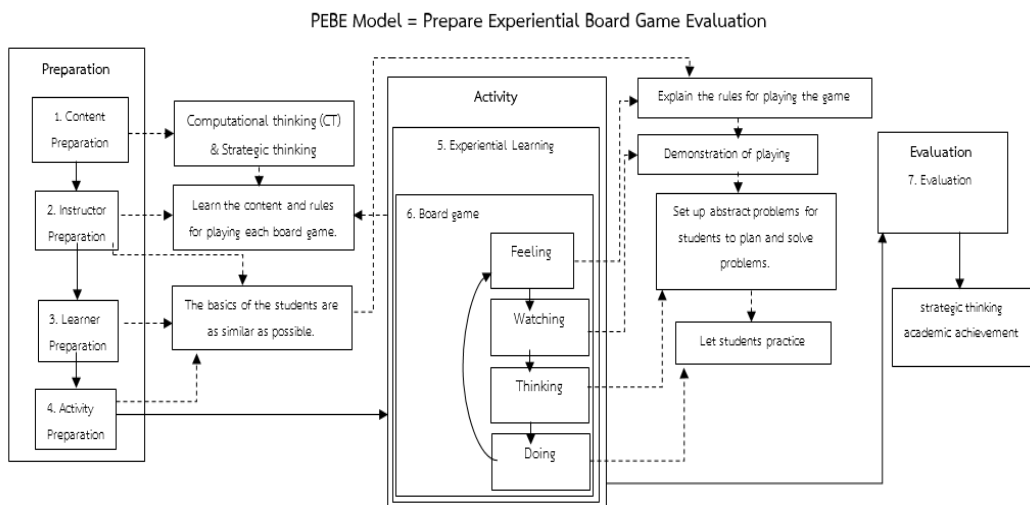

Fig 1. PEBE   Model

Data Analysis

The researcher employed a one-group pretest-posttest design for this study.

Notations:

R: Represents the randomly selected sample, which is divided into an experimental

group and a control group.

X: Represents the intervention, which is the use of an experiential learning approach with board games to promote strategic thinking for undergraduate students.

O1: Represents the pre-test assessment of achievement and strategic thinking.

O2: Represents the post-test assessment of achievement and strategic thinking.

Data Management and Analysis

1. Analyze the strategic thinking skills of the experimental group after experiencing the experiential learning approach with board games to promote strategic thinking for undergraduate students.

2. Analyze the academic achievement of the experimental group before and after experiencing the experiential learning approach with board games to promote strategic thinking for undergraduate students.

3. Compare the differences in academic achievement and strategic thinking skills between the pre-test and post-test.

Evaluation of Strategic Thinking in Undergraduate Students: The Impact of Experiential Learning Using Board Games

This study investigated the impact of an experiential learning approach using board games on the development of strategic thinking skills among undergraduate students. The sample consisted of 27 first-year undergraduate students enrolled in a Computer Science course at Mahasarakham University. Cluster random sampling was used to select a sample of students for the experimental group. The results of the study are summarized in Table 1.

Table 1: Comparison of Strategic Thinking Skills Before and After Experiential Learning Using Board Games (n = 27)

Strategic Thinking	volume	$\overline{\text{x}}$	S.D.	t	p-value
1. Thought aspect				1.74	.092
Before	27	7.14	1.68		
After	27	7.81	1.46		
2. Vision				2.14	.042
Before	27	12.03	2.54		
After	27	13.29	2.07		
4. Knowledge				1.58	.126
Before	27	10.11	1.82		
After	27	10.73	1.61		
Total				2.12	.043
Before	27	29.29	5.41		
After	27	31.81	4.81		

Table 1 shows that strategic thinking skills were significantly improved after learning with a board game-based experiential learning approach that promotes strategic thinking for undergraduate students. The mean pre-test and post-test scores for the three aspects of strategic thinking were as follows: 1. Thinking (Before: 7.14, After: 7.81) 2. Vision (Before: 12.03, After: 13.29) 3. Knowledge (Before: 10.11, After: 10.73)

The differences between the pretest and posttest scores were statistically significant at

the .05 level, which indicates that the board game-based experiential learning approach that promotes strategic thinking for undergraduate students effectively enhances strategic thinking skills.

The academic achievement of the group that received pre- and post-instruction, and the group that did not receive pre- and post-instruction

The academic achievement of the group that received experiential learning with board games to promote strategic thinking for undergraduate students was measured by the researcher using pre- and post-tests. The total sample size was 27 people, and the sample was selected randomly by classroom (cluster random sampling). The experimental group. The research results are as follows:

Table 2: Analysis of the comparison of academic achievement before and after instruction using experiential learning with board games to promote strategic thinking for undergraduate students (n = 27)

academic achievement	volume	$\overline{X}$	S.D.	t	p-value
academic achievement Before After	 27 27	 21.34 41.23	 5.98 8.04	 10.11	 .000

Table 2, the learning achievement with the post-learning format was higher than the pre-learning format, with an average of ($\overline{X}$ = pre-learning 21.34, post-learning 41.23). The difference was statistically significant at the .05 level. This suggests that the experiential learning format using board games to promote strategic thinking for undergraduate students resulted in higher student learning achievement.

4. Research results

1. Components of the experiential learning model using board games to promote strategic thinking for undergraduate students

The experiential learning model using board games to promote strategic thinking for undergraduate students consists of seven components:

1. Instructor: The instructor is responsible for planning and facilitating the learning experience.

2. Learners: The learners are the undergraduate students who will participate in the learning experience.

3. Activities: The activities are the tasks that the learners will complete during the learning experience.

4. Board games: The board games are the tools that will be used to promote strategic thinking.

5. Strategic thinking: Strategic thinking is the ability to plan and make decisions in a way that is likely to lead to success.

6. Assessment and evaluation: Assessment and evaluation are used to measure the

learners' progress and the effectiveness of the learning experience.

2. Steps of the experiential learning model using board games to promote strategic thinking for undergraduate students

The steps of the experiential learning model using board games to promote strategic thinking for undergraduate students are as follows:

1. Prepare the content: The instructor should select the content that will be covered in the learning experience.

2. Prepare the instructor: The instructor should familiarize themselves with the content and the board games that will be used.

3. Prepare the learners: The learners should be introduced to the content and the board games that will be used.

4. Prepare the activities: The instructor should prepare the activities that will be completed during the learning experience.

5. Experience-based learning: The learners should engage in the activities and use the board games to learn the content.

6. Assessment and evaluation: The instructor should assess the learners' progress and the effectiveness of the learning experience.

3. Results of using the experiential learning model using board games to promote strategic thinking for undergraduate students

3.1 Students have significantly higher strategic thinking skills after the learning experience than before the learning experience in all areas, namely: thought, vision, and knowledge.

3.2 The results of academic achievement using the experiential learning model using board games to promote strategic thinking for undergraduate students found that students had significantly higher grades after the learning experience than before the learning experience.

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