

THE EFFECTS OF THE USE OF A 9 SQUARE GRID AND THE DONKO TEACHING ON INNOVATIVE THINKING ABILITIES AND BEING INNOVATOR

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ABSTRACT

The purposes of this research were 1) to study the innovative thinking ability of students, 2) to study the satisfaction of the students towards being innovator. The population used in this research were 17 first-year students in the first semester of the academic year 2022 who enrolled in an introductory science and innovation course. Tools used to research is lesson plans using 9 square grid and Donko teaching. Innovative thinking abilities test and student satisfaction questionnaire on being innovator. The data analysis is based on statistics, percentage, mean, and standard deviation. The results showed that:

1. The students' ability to think innovatively was on mean higher than the set criteria equal to 70%.
2. The satisfaction of the students towards being innovator was very level.

Keywords: 9 square grid, Donko teaching, Innovative thinking

INTRODUCTION

The 20-Year National Strategy (2018-2037) is a national strategy that will lead to implementation in order for Thailand to achieve its vision. Thailand is stable, prosperous and sustainable. It is a developed country based on the philosophy of sufficiency economy for the happiness of all Thai people. The evaluation of development according to the national strategy has been assessed in several dimensions. But one of the many dimensions that have been discussed is national strategy for competitiveness building, economic development and income distribution has development goals that focus on enhancing the country's potential in various dimensions based on 3 concepts. 1) Building on the past by looking back at the economic roots, identity, culture, traditions, way of life, and the strengths of diverse natural resources. Including the advantages of the country in other areas to apply with technology and innovation. To be in line with the context of the modern world economy and society. 2) Adjust the present to pave the way for the future by developing the country's infrastructure in various dimensions, including transportation and transportation networks. Science, technology and digital infrastructure and environmental adaptation conducive to the development of future industries and services. 3) In the future, create new value by increasing the potential of entrepreneurs, developing new generations, including adjusting business models [1].

There is almost unanimous opinion that innovation is extremely important to today's economy, but how can we teach young people to be innovators? What are the capabilities most important to innovation? Including which methods are best used to teach them [2].

While education has been upgraded to be education 4.0, that is, it wants students to be able to create innovation. Therefore, the learning process has been reformed in response to changes in the 21st century by setting the goals of learning in 3 areas, namely skills, content, and characteristics. There are details in terms of skills, which are divided into 2 skills, the first skill is learning and innovation skills. want students to be creative problem solving, communication, working with others. As for the second skill, life and work skills, people need to be adaptable in social skills and cross-cultural learning. In Thailand, there are many ways to promote innovation, such as in cooperation with the Kosen Institute (KOSEN) or providing STEM education is all to lead to enable learners to create innovation [3].

9 square grid is a tool used to develop learning and cognition of the brain, making thinking and decision more efficient, focusing on the development of both the left and right of the brain together. In addition, 9 square grid has been used in areas such as training athletes in movement, exercise, and has also been used in teaching, developing thinking and learning skills, enhancing concentration, reducing stress and brain cognitive development. However, the 9 square grid is like a sports field or a stage of creativity that teachers and students can use to convey their learning, stimulates awareness learning and coordination of the brain lead to the development of creativity. The learning style on the 9 square grids affect intellectual, mental, emotional and social development can be concrete [4].

Teaching and learning in today's era, which is a digital age, can be learned through notebook, computer, iphone, ipad and tablet. Students can learn both online and offline and choose to study anywhere. Teachers can teach both in the classroom and outside the classroom, students and teachers can create learning activities together. Today's teachers need to learn technology along with teaching and child centered learning [5]. Learners must rely on a variety of learning processes, such as the process of coping with situations and problems, learning process from real experience process, action, etc. To provide learners with the following key competencies: communication ability, thinking ability, problem-solving ability, life skills ability, and the ability to use technology. However, teaching style is an important element that will lead learners to goals. The teaching style is like a mold or blueprint for teachers to use in designing instruction with a sequence of activities and evaluating the results of activities for students according to the goals. Each teaching style is designed to develop students in a specific area. At present, there are many teaching styles such as question method, CIPPA model, problem-based learning, etc. The Donko teaching is a teaching style that has 6 steps as follows: 1) the prologue step is to create interest and check the basic knowledge, 2) teaching step is presents important content, principles and techniques,3) practical step for students to do problems, set their own problems and find answers,4) the conclusion step, the students help each other to summarize the essence of various subject matter with the teacher to add the missing subject matter to fill, 5) the knowledge expansion step allows students to do exercises and study new content that is linked to the content they have already learned, 6) the evaluation step checks students' knowledge and understanding. Some stages of Donko teaching include activities in the form of a 9 square grid to encourage students to think innovatively.

Innovative thinking is a creative process to create new innovations that can solve user problems, such as service or product innovation, with the benefit of innovative thinking adding value to the service or product and increase the competitiveness of the organization and increase the efficiency of work in this era. Generating more new ideas to solve a wide range of problems gives us the opportunity to discover new innovations. This will lead to the concept of innovative thinking based on the principle that innovation is a skill that must be practiced to become proficient [6]. In Thailand, to develop the country towards the goals set in the next 20 years, it will focus on research and innovation development and applying new technologies to adapt and extend the current production and service sectors to increase productivity and create added value. Including the restructuring of the current production and service sectors to new potential production and service sectors. Developing trade models to be in line with changing technologies, promoting an entrepreneurial society, developing skills and talents of the workforce [7].

This research, the researcher defined the meaning of satisfaction as the student's interest in learning management on various issues such as the achievements obtained from participating in teaching and learning activities, feelings. on the content, feelings towards learning activities that are in line with the expectations of student [8]. For satisfaction with being an innovator, there were five measurement points: initiative skills, questioning skills, observation skills, experimental skills, and networking skills.

Based on the information mentioned above, together with the researcher teaching students in the science and innovation course, who are aware of the problems in innovative thinking is that students have few innovative ideas. Therefore, the researcher is interested in studying the effects of using 9 square grid and how Donko teaching would enable students to develop innovative thinking.

OBJECTIVE

1. To study students' ability to think innovatively, compared to the 70% threshold.
2. To study the satisfaction of the students towards being innovator.

METHODOLOGY

The research is presented according to the following topics:

1) The population used in this research is 17 first-year students enrolled in science and innovation courses in semester 1 of the 2022 academic year.

2) There are 3 types of research tools for this research, which are as follows:

2.1 Learning management plan using 9 square grid and Donko teaching.

2.2 Innovative thinking abilities test is subjective with 9 items with a total score of 65 points.

2.3 The satisfaction questionnaire for innovation is a rating scale according to the Likert model that evaluation 5 levels as follows: the score level 5 means the most satisfaction, score level 4 means very satisfied, score level 3 means moderately satisfied, score level 2 means less satisfied and score level 4 means the least satisfied. There are criteria for interpretation the average score of 4.51 – 5.00 means the most satisfied, the average score is 3.51 – 4.50 means

very satisfied, the average score is 2.51 – 3.50 means moderate satisfaction, the average score is 1.51 – 2.50 means low satisfaction, the average score of 1.00 – 1.50 means the least satisfaction [9]. The number of questions is 25 questions, with a scope of questions in 5 areas, which are: initiative skills, questioning skills, observation skills, experimental skills and networking skills.

3) Data collection: The researcher used the 9 square grid learning management plan and Donko teaching method. After teaching, the students were tested using the innovative thinking abilities test and satisfaction questionnaire towards being innovator.

4) Data analysis: The researcher used the data obtained from the data collection to analyze the percentage, mean and standard deviation to draw conclusions based on each research objective.

RESULTS

In this research, the findings were obtained as follows:

1) The students' ability to think innovation was on mean higher than the set criteria equal to 70%. The results are shown in table 1.

Table 1
Table innovative thinking ability score

No.	Full score (65)	No.	Full score (65)
1	45	11	44
2	49	12	47
3	44	13	47
4	51	14	43
5	52	15	47
6	46	17	50
7	46	17	45
8	46	Total score	802
9	51	mean	47.18
10	49	percentage	72.28

From table 1, it was found that the students' innovative thinking ability had a mean score equal to 47.18 points, representing 72.28 %, which was higher than the criteria set by 70 %.

2) The overall satisfaction of the students towards being an innovator was very level. The results are shown in table 2.

Table 2
Table descriptive statistics show student satisfaction.

	N	Minimum	Maximum	Mean	Std. Deviation
initiative skills	17	3.00	5.00	4.00	.66
questioning skills	17	2.00	5.00	3.68	.77
observation skills	17	2.50	5.00	3.94	.79
experimental skills	17	2.50	5.00	3.59	.71
networking skills	17	3.00	5.00	3.94	.85
total	17	2.80	4.80	3.80	.66
Valid N (listwise)	17				

From table 2, it found that the overall satisfaction of students towards being innovators were very level (Mean = 3.80, SD = .66). When considering side by side students' initiative skills were found to be the most satisfying (Mean = 4.00, SD = .66). As for experimental skills, students were the least satisfied (Mean = 3.59, SD = .71). However, the students' satisfaction towards being innovators was a very level in all aspects.

CONCLUSION AND FUTURE WORK

From the research results can be discussed as follows:

1) The mean student's innovative thinking ability equal to 72.28 %, which was higher than the criteria set by 70 %. This is due to the use of a 9 square grid in activities that make students fun, challenging, not pressured, and mentally focused on the lesson. Make it easy for students to recognize, remember and understand the lesson content [4]. Along with the Donko teaching, there are prologue, teaching, practical, concluding, knowledge expansion and evaluation that have a sequence of learning steps. In particular, the practical and concluding stages allow students to participate in real practice and have the opportunity to think for themselves to stimulate the development of creativity.

2) The overall satisfaction of the students towards being an innovator was very level (Mean = 3.80, SD = .66). This is because the 9 square grid is a tool that students have the opportunity to demonstrate their ability to learn, think skills, transfer and organize knowledge to lead to the development of creativity and imagination rationally [10].

In the future, research should focus on more experimental activities for students to help increase students' experimental skills.

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