Scientific Learning Innovation to Promote Scientific Process Skills for Teacher Students Bachelor of Education Program

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Abstract
The purposes of this research were: 1) to develop the scientific learning package Subject: 5 Integration scientific process skills to promote effective scientific process skills 2) to compare the 5 Integration scientific process skills of the 3rd year teacher students in the bachelor of education program before and after the learning management by using the scientific learning package to promote scientific process skills; and 3) to study the 5 Integration scientific process skills and the level of satisfaction of the 3rd year teacher students in the bachelor of education program toward learning by using the scientific learning package to promote scientific process skills. The research tools consisted of 1) the scientific learning package to promote scientific process skills; 2) the science process skill test; and 3) the questionnaire to measure students' satisfaction with the scientific learning package to promote scientific process skills. The sample group was one classroom of 3rd year students, one group of 27 students from the Faculty of Education. Obtained by a simple random sampling method. The results showed that the quality of the scientific learning package to promote scientific process skills assessed was of very good quality ($\bar{X}$ = 24.46, S.D. = 0.59). The mean score of the scientific process skills of the posttest was higher than those of the pretest at the statistically significant.05 level, and the students' satisfaction toward learning by using the scientific process skill packages was at a very good level ($\bar{X}$ = 4.39, S.D. = 0.45).

Keywords: Learning Innovation, Scientific Learning Package, Scientific Process Skills

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Introduction

Thai society is currently experiencing rapid transformations in all aspects. The ongoing impact stems from the transition to the industrial revolution. The world is currently grappling with the challenge of adapting to accommodate change. Therefore, it is imperative to advocate for the Thailand 4.0 policy. Human resource capital is a critical factor in enabling organizations to adapt to changing trends. This capital must be prepared to adapt to change. Thailand was rated 21st in the 2017 international ranking of entrepreneurial skills by the International Institute of Management. Thailand was ranked 34th in terms of quality of living (IMD, 2017). In 2018, Thailand was ranked 24th in terms of quality of life and 37th in terms of economy, indicating that Thailand experienced declines in both categories. Furthermore, Thailand's national income was identified as a shortcoming in the ranking. The ranking places Thailand's national income at No. 53 and its investment impact at No. 49 (IMD, 2018). In its past national development, Thailand has prioritized economic prosperity. The country has made significant advancements in the field of information technology. To highlight the importance of innovation and product development This aligns with the development of empirical process skills as a foundation for improving learning quality. The twenty-first century requires essential concepts and cognitive abilities (N. L. Choirunnisa, P. Prabowo, & S. Suryanti, 2018, pp. 1–5).

The first step in enhancing scientific process skills is to promote them. Develop practical abilities. Students of science teachers' cognitive abilities The goal is to improve the design of learning management systems. Activities aimed at acquiring scientific knowledge can further enhance the development of adolescents. This aligns with Addie and her colleagues' research, which aimed to understand the scientific process skills of elementary school science teachers. It was discovered that instructors continued to have misconceptions. It influences the development of practice-based learning activities. It is imperative to advance it during the teacher production process. In the 21st century, scientific process skills and analytical reasoning abilities are indispensable for science teachers to effectively implement the skills in schools (Edy H. M. Shahali, Lilia Halim, & David F. Treagust, 2017, pp. 257–281). Students employ scientific process skills to resolve intricate and unstructured problems through analytical thinking (Irwanto & Eli Rohaeti, 2017, pp. 1–4). Develop scientific process skills so that they can be integrated with learning management processes. This is necessary to ensure that the younger generation understands its significance. Developed practical and cognitive abilities To develop learning management that is both integrated and practical in daily life, Consequently, it is imperative to prioritize the organization of learning to emphasize scientific process skills. In order to enhance the capabilities of pupils in the fields of education and pedagogy at the higher education level, this is crucial because a collective of individuals is responsible for transmitting this knowledge to the younger generation.

Scientific processing abilities this behavior is a result of consistent practice. Engaging in the development of systematic reasoning abilities is a consequence of practice. It is a method that scientists employ in their pursuit of knowledge. Employed to resolve issues it is a cognitive procedure. (Intellectual Process Skills) include the practice of observing data, recording, calculating, categorizing assumptions, and conducting experiments. The Institute for the Promotion of Science and Technology (1992, p. 28; Phop Laohapaibun, 1999, p. 15; Pimpan Dechakupt, 2002, p. 9) defines Intellectual Process Skills. As a result of their education, students acquire process skills. Because of its emphasis on the learning process, Student motivation is associated with the creativity, values, and attitudes of students that are implemented in their daily lives (Maison & Darmaji, 2019, pp. 48–56). The Institute for the

Promotion of Teaching Science and Technology (1992, pp. 1–3) has identified 13 science process skills that can be segmented into the following: There are two primary groups: 1) fundamental scientific process skills; and 2) rudimentary and integrated scientific process skills. These are the fundamental science process abilities found in all eight areas: 1) Observational abilities (observation) 2) Skill assessment (skill assessment) 3) Classification abilities (classification) 4) The capacity to recognize the interrelationships between space and time, as well as the interrelationships between space itself and time. 5) numerical computation abilities 6) Proficiency in data organization and communication is crucial. 7. The skills of expressing opinions from data (inferring) and 8) predicting, which are integrated science process skills in all five categories, are as follows: 1) skills in hypothesis formulation (formulation hypothesis). 2) Operational Definition (Definition of Operation) 3. The ability to identify and manage variables 5. The capacity to analyze and draw conclusions from data, along with 4) the ability to conduct experiments. (Conclusion and Interpretation of Data) Research studies concerning scientific process abilities (Namfon Kucharoenpaisan et al., 2016, pp. 83–100; Mariam Wattanat et al., 2016, pp. 254–264; Paradee Phakdiyothin, 2017, pp. 131–139) revealed that the majority of the studies were focused on scientific process skills.

The level of scientific process skills in education was divided into two primary categories: 1) Fundamental scientific process abilities; and 2) Integrated scientific process skills Using the ability to learn as a reference, Skills such as thinking, collaborative working, practice, and learning management design are essential. We are creating a test to gauge academic performance and tools to measure scientific process abilities. We conduct research on the results of developing science learning tools, aiming to improve the scientific process skills of graduate program students. It is a component of the investigation of graduate students' fundamental scientific process skills in primary education, with the goal of improving their learning capabilities. The curriculum encompasses thinking skills, collaborative working skills, practice skills, and learning management design skills. This is the typical essence of education in terms of scientific process skills. The majority pursued their education in the following disciplines: 1) Academic achievement in various learning sets; and 2) Science process abilities. It is a fusion of learning management and innovation that aims to enhance the learning experience for students. The students independently generate knowledge and engage in the learning process in accordance with their individual interests and abilities. Students acquire knowledge with enthusiasm. This is due to the fact that educators provide motivation. Learning activities are implemented and reinforced. We incorporate learning media that are appropriate, diverse, and aligned with the students' learning methods. The researcher recognizes the importance of implementing a science learning management system to improve the scientific process skills of graduate students. The aim is to promote the continuous progression of higher education levels within the education and education disciplines. The majority of science learning kit research (Kesinee Intha, 2015, pp. 132-141; Damrongsak Sapkhueankhan, 2016, pp. 123-136; LIU RONGHAN, 2016, pp. 73-79; Nanthapat Phongsriroj, 2017, pp. 78-82; Panitthida Rungchaeng, 2017, pp. 95-102) was devoted to the development of science learning kits. a set of activities for studying science The purpose of these activities is to promote the growth of scientific learning skills. Academic success in the field of science requires a capacity for innovative reasoning. Capacity to resolve scientific issues to investigate learning management in the 21st century, I have created a collection of chemistry learning activities that prioritize morality in conjunction with knowledge. Investigate the extent to which students are satisfied with the scientific learning kit. Create a tool to assess students' academic achievements. The instrument includes a questionnaire to gauge student satisfaction with the learning bundle and

a test to assess science learning skills. Researchers aim to investigate how the creation of science learning tools improves the scientific process skills of graduate program students. This is an integral part of the development process for scientific learning kits. It aims to improve the development of skills related to the scientific process. theoretical comprehension The science education learning kit encompasses thinking abilities, group collaboration abilities, and hands-on skills. The following are the fundamental characteristics of the science education learning kit: 1) Create the science learning kit; 2) examine the level of student satisfaction with the learning kit; and 3) develop science learning skills.

For this reason, the researcher plans to conduct a study on the outcomes of developing a science learning kit, with the aim of enhancing the science process skills of graduate education students. which can develop scientific process skills. For graduate students We aim to promote integrated science process skills in all five areas, as follows: 1) Formulation Hypothesis 2) Defining Operations 3) Identifying and controlling variables 4) Conducting experiments; and 5) Interpreting Data and Making Conclusion. Students can help to design learning management. Continue to design science-learning activities.

Research Objectives

1. To create a science learning set Topic: 5 integrated science process skills to promote the science process skills of students in the graduate education program.
2. To compare the five integrated science process skills of third-year graduate students before and after organizing learning using a science learning kit to promote the science process skills of students in the graduate studies program.
3. To study the satisfaction level of third-year graduate education program students who received learning management using science learning kits to promote the scientific process skills of graduate education program students.

Conceptual Framework

The researcher has introduced the concept of developing student learning through a learning management process that emphasizes student participation. Interact with a variety of learning activities through practice, which is active learning management as a conceptual framework for research as follows:

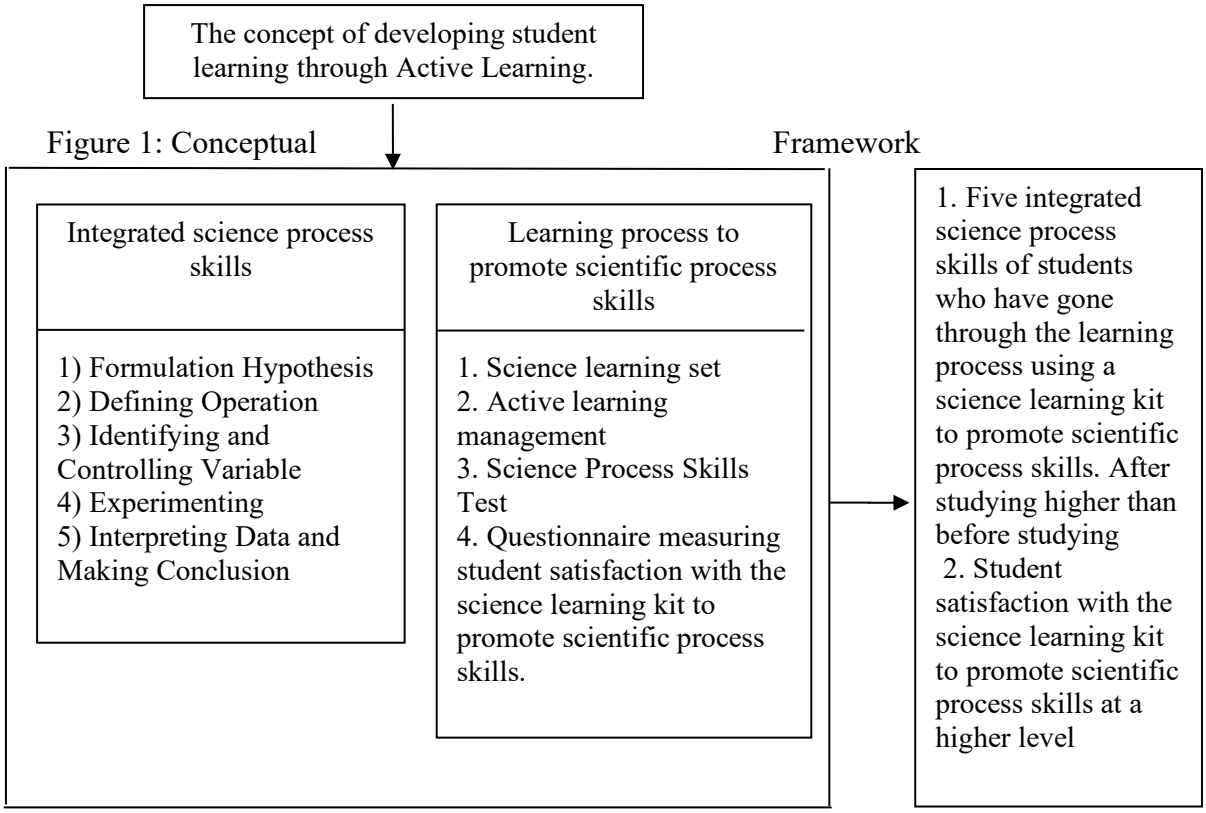

Figure 1: Conceptual Framework

Methodology

Research Hypothesis

1. Integrated science process skills of students who have gone through the learning process using a science learning kit to promote scientific process skills. After studying higher than before studying.
2. Student satisfaction with the science learning kit to promote scientific process skills at a higher level.

How to Conduct Research

Population and sample:

1. The population in this research includes 81 third-year students in the Primary Education Program.
2. Sample group studied in this research Obtained by simple random sampling, including 3rd year students in the primary education field, totaling 27 people.

Variables Studied

1. The primary variable is a science learning package to promote scientific process skills of graduate education program students.
2. The dependent variable is 1) 5 integrated science process skills of students who have undergone a learning process using a science learning kit to promote science process skills. After studying was higher than before, and 2) students' satisfaction with the science learning package to promote science process skills.
3.

Research Tools

1. Science education is designed to foster scientific process skills.
2. Science Process Skills Test
3. The questionnaire measures student satisfaction with the science learning kit to promote scientific process skills.

Data Analysis

1. Basic statistics are used to interpret the science process skills test. In order to promote scientific process skills, we also use a questionnaire to assess student satisfaction with the science learning set. The questionnaire includes the following categories: 1) mean (X), 2) standard deviation (S.D.), and 3) percentage (Percentage).
2. The quality of the tools is evaluated using the following statistics: 1) the content reliability index (IOC) of the science process skills test and the assessment of student satisfaction with the science learning set to promote science process skills; and 2) the confidence value of the science process skills test. Additionally, a questionnaire is used to gauge students' satisfaction with the science learning kit, with the aim of enhancing their scientific process skills.
3. We verified the hypothesis using two types of statistics: 1) a t-test (dependent samples) to compare the scores of science process skills before and after the organization of learning using science learning packages, and 2) t-statistics test for a single sample. Comparing the specified criteria to the study satisfaction scores obtained after organizing learning using science learning packages to promote science process skills (3.50).

Procedure

This research involves the following steps: study basic information. Creating research tools Conducting experiments and data analysis The researcher developed the learning kit through a research and development process, which consists of four important steps.

Step 1: Studying basic information Examine documents and conduct research on the fundamental concepts, theories, and principles included in the science learning kit. scientific process skills The promotion of scientific process skills involves conducting related research, ensuring satisfaction, studying scientific content, and utilizing learning management methods in conjunction with science learning kits. It is a guideline for organizing science learning activities in order to promote scientific process skills.

Step 2: Creating research tools Science learning kits are among the tools used in research to promote scientific process skills. Researchers utilize the Science Process Skills Test and a questionnaire to gauge students' contentment with the science learning kit, which aims to enhance scientific process skills.

Step 3: Conducting the experiment Before organizing learning activities using science learning kits to promote scientific process skills, the researcher conducted a pre-test using the Science Process Skills Test on 27 third-year students in the primary education field, then recorded the scores. Carrying out learning activities after organizing the learning activities and recording the scores for further statistical analysis, the researcher took the science process skills test and questionnaire to measure student satisfaction with the science learning kit.

Step 4: Data analysis Find statistics used in data analysis. We use basic statistics to interpret measures related to science process skills. We use a questionnaire to gauge student satisfaction with the science learning kit, with the aim of promoting scientific process skills.

Discussion

The outcomes of the development of science learning packages are to enhance the scientific process skills of students in graduate programs. We can summarize these outcomes as follows:

Part 1 aims to evaluate the five integrated science process skills of graduate students. Table 1 illustrates the pre- and post-organization of learning using science learning kits, with the aim of enhancing the scientific process skills of graduate students.

In the graduate education program, students' five integrated science process skills were compared in Table 1. The comparison took place both before and after the organization of the learning process.

Table 1: Integrated Science Process Skills

Integrated science process skills	Full score	n	($\bar{X}$)	S.D.
Before studying	30	27	17.51	0.45
After school	30	27	24.46	0.59

* Statistically significant at the .05 level.

Table 1 revealed that the five integrated science process skills of students in the graduate studies program were significantly higher after studying than before studying at the.05 level.

The satisfaction level of students in graduate education programs is evaluated in Part 2. The program has been structured using a science learning package to improve the scientific process skills of students in the graduate studies program.

It is found that the satisfaction of students in the graduate education program that were organized using science learning kits to promote scientific process skills of students in the graduate education program were overall at the highest level ($\bar{X}$= 4.39, S.D. = 0.45), divided into 3 areas as follows: 1) Scientific process skills is at the highest level ($\bar{X}$= 4.21, S.D. = 0.43) 2) learning activities are at the highest level ($\bar{X}$= 4.51, S.D. = 0.45) and 3) overall picture of the learning package Knowledge is at the highest level ($\bar{X}$= 4.45, S.D. = 0.47). As for suggestions, It can be summarized as follows: 1) Activities in the learning set are diverse. Students participate in activities and learn on their own through interesting activities. 2) Learning activities should be selected using virtual reality technology that responds to the current situation. 3) Students can apply a variety of learning skills and activities to design learning activities. You can know it yourself. Design learning activities by yourself and applied in daily life 4) can promote and extend learning activities to further promote integrated science process skills, and 5) can develop problem-solving abilities and creativity along with development scientific process skills.

Conclusion

Research on the results of developing science learning kits to promote the scientific process skills of graduate education program students. The researcher discusses the results at the following important points:

In all five areas of the graduate studies program, students are taught science through the integration of scientific process skills. The science learning kit was employed to investigate the fundamental science process skills of students who underwent the learning process in order to enhance their scientific process abilities and the students' satisfaction with the science learning kit in order to enhance their scientific processing abilities. Students were discovered to possess classification skills, measurement skills, and observation skills. Talents for identifying connections between space and time, as well as space and space. Proficiency in mathematics Proficiency in the preparation and interpretation of information the capacity to form opinions based on data and to forecast has been enhanced. This is in accordance with the findings of Alnol and colleagues (2020: 3425–3448), who investigated the development of scientific process skills through a series of science experiment activities by structuring instruction in a flipped classroom. For educators of science, this is consistent with the work of Namfon Kucharoenpaisan and colleagues (2016: 83–100), who created a fundamental science process skills training program for lower secondary students that was based on the states of substances and solutions. In the case of Wahanni et al., the findings indicated that each science process skill that was acquired encompassed observation skills. Ability to form hypotheses Proficiency in experimental methods Proficiency in the preparation and interpretation of information; proficiency in classification The application of outdoor learning through a variety of activities is effective in the development of scientific process skills and problem-solving abilities, as evidenced by a 75.33% increase in the skills required to form opinions from data and those required to interpret data and draw conclusions (Wahyuni, Indrawati, Sudarti, & Suana, 2017, pp. 165–169).

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