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การศึกษาความพึงพอใจและผลสัมฤทธิ์ทางการเรียนแนวปฏิบัติกิจกรรมทางวิทยาศาสตร์สำหรับเด็ก เรื่อง การศึกษาสตีมในวัยเด็กของนักศึกษาชั้นปีที่ 1 วิชาเอกการศึกษาปฐมวัยโดยใช้รูปแบบการจัดการเรียนรู้แบบ 5E มหาวิทยาลัยนานาชาติกว่างซี เป่ยเซียน

The Study on The Satisfaction and Learning Achievement of Children's Scientific Activity Guidance on Childhood STEAM Education of First Year Students in Preschool Education Majoring Using 5E Instructional Model in GUANGXI PEIXIAN INTERNATIONAL UNIVERSITY

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บทคัดย่อ

การวิจัยครั้งนี้มีวัตถุประสงค์ (1) เพื่อศึกษาความพึงพอใจของนักศึกษาที่มีต่อการเรียนแนวปฏิบัติกิจกรรมทางวิทยาศาสตร์สำหรับเด็กเรื่องการศึกษา STEAM ในวัยเด็ก ของนักศึกษาชั้นปีที่ 1 สาขาวิชาเอกการศึกษาปฐมวัย โดยใช้รูปแบบการจัดการเรียนรู้แบบ 5E และ (2) เพื่อเปรียบเทียบค่าเฉลี่ยของคะแนนระหว่างก่อนและหลัง และเปรียบเทียบกับเกณฑ์ร้อยละ 75 กลุ่ม ตัวอย่างคือ นักศึกษาชั้นปีที่ 1 จำนวน 36 คน สาขาการศึกษาปฐมวัย ได้มาโดยการสุ่มแบบกลุ่ม เครื่องมือที่ใช้ในการวิจัยประกอบด้วย (1) แผนการเรียนรู้ตามรูปแบบการจัดการเรียนรู้แบบ 5 E มีคุณภาพในระดับมากที่สุด (2) แบบทดสอบวัดผลสัมฤทธิ์ทางการเรียนแบบเลือกตอบ 4 ตัวเลือก จำนวน 40 ข้อ ค่า IOC ระหว่าง 0.60 - 1.00 ค่าความยากง่ายระหว่าง 0.28 - 0.75 ค่าอำนาจจำแนก0.20 – 0.45 ค่าความเชื่อมัน 0.77 (3) แบบประเมินความพึงพอใจแบบมาตราส่วนประมาณค่า (Rating scale) 5 ระดับ จำนวน 15 ข้อ มีค่า IOC ระหว่าง 0.60 - 1.00 สถิติวิเคราะห์ข้อมูลได้แก่ ร้อยละ ค่าเฉลี่ย ค่าความเบี่ยงเบนมาตรฐาน และ t-test

ผลการวิจัยพบว่า

1. นักศึกษามีความพึงพอใจต่อกิจกรรมการเรียนรู้ โดยใช้รูปแบบการจัดการเรียนรู้แบบ 5E

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โดยรวมในระดับมากที่สุด

2. ค่าเฉลี่ยของคะแนนทดสอบหลังเรียนสูงกว่าก่อนเรียน อย่างมีนัยสำคัญทางสถิติในระดับ 0.01 และสูงกว่าเกณฑ์ร้อยละ 75 เรียนอย่างมีนัยสำคัญทางสถิติในระดับ 0.01

คำสำคัญ : การศึกษาสตรีม การจัดการเรียนรู้แบบ 5E กิจกรรมทางวิทยาศาสตร์สำหรับเด็ก ผลสัมฤทธิ์ทางการเรียน ความพึงพอใจ

Abstract

The purpose of this research was to study 1) the satisfaction of Guangxi PeiXian International University first year students in preschool education majoring with the use of 5E Instructional Model together with the activity series on early childhood scientific activities in early childhood steam education. 2) compare the learning achievement between before and after school and after school with 75% of the criteria. The sample group used in the research was the first year students at Guangxi Peixian International University conducted by cluster random sampling. The research instruments consisted of 1) learning management plan based on 5E instructional model which was evaluated from five experts and was suitable at the highest level ($\overline{X}$=4.81) 2) the 30 items of four options multiple choice achievement test with has got IOC values from 0.60-1.00 and the difficulty (the p) ranged from 0.28 to 0.75. and the classification power (r) is between 0.20-0.45. 3) The satisfaction 5 rating questionnaire consisted of 15 items, which had the Item Objective Congruence value (0.60 ≤ IOC≤ 1.00). The data were analyzed by means ($\overline{X}$), standard deviation (S.D.) and t-test. 2) compare the learning achievement between before and after school and after school with 75% of the criteria. The sample group used in the research was the first year students at Guangxi Peixian International University conducted by cluster random sampling. The research instruments consisted of 1) learning management plan based on 5E instructional model which was evaluated from five experts and was suitable at the highest level ($\overline{X}$=4.81) 2) the 30 items of four options multiple choice achievement test with has got IOC values from 0.60-1.00 and the difficulty (the p) ranged from 0.28 to 0.75. and the classification power (r) is between 0.20-0.45. 3) The satisfaction 5 rating questionnaire consisted of 15 items, which had the Item Objective Congruence value (0.60 ≤ IOC≤ 1.00). The data were analyzed by means ($\overline{X}$), standard deviation (S.D.) and t-test.

The results were as follows:

1. The satisfaction of Guangxi Peixian University Preschool education first year students with the use of 5E Instructional Model on Children's scientific activity guidance on Childhood STEAM education in all aspects, was at the average of 4. 59, which was the highest level of satisfaction.

2. The academic achievement of Guangxi Peixian University Preschool education first year students who have been learning using the 5E Instructional Model on Childhood STEAM education post-study achievement was significantly higher than before at the .01 level and the post-study achievement was 75 percentage that higher than the threshold at the .01 level.

Keywords : Steam education, 5E Instructional Model, Early childhood science activities, Learning Achievement, Students' Satisfaction.

Introduction

Science has enabled people to develop both rational and ways of thinking. Creativity, analytical thinking, critical thinking have important skills in researching knowledge. Knowledge of systematic problem solving Able to make decisions based on diverse information and verifiable testimony. Science is a culture of the modern world which is a Knowledge Based Society, therefore everyone needs to be developed to know Science (Scientific Literacy for All) in order to have knowledge, world understanding Human-made nature and technology and apply knowledge in a rational, creative, virtuous manner. Scientific knowledge is not only used to improve the quality of life. but also helps people to have the knowledge and the correct understanding of the use Maintaining and developing the environment and natural resources in a balanced and sustainable manner and most importantly Knowledge of science enhances economic development capacity. able to compete with other countries and live happily together in the global society (Ministry of Education, 2002). It is therefore regarded that science plays an important role in the global society. both now and in the future because it involved with daily living and in professional work Scientific knowledge has greatly contributed to the development of technology which is beneficial to the development of human society (Sarit Wong, 2003)

Integrating with the regulations of the Ministry of Education, early childhood science education is one of the main courses of university preschool education major, and preschool children's science education is the teaching method course of preschool education major. University the course to kindergarten teachers professional standard (trial), 3~ 6 children learning and development guide, kindergarten education guidelines (trial) and other documents, combined with the kindergarten teacher qualification examination standard (higher vocational school preschool education professional teaching standards and other relevant standards, based on the kindergarten teachers and preschool education students learning needs, on the basis of ensuring students understand related basic theoretical knowledge, outstanding practicality, strive to make students have strong design, implementation and evaluation of kindergarten science education activity practice and operation ability.

Since the second half of the 20th century, with the rapid development of science and technology and the continuous deepening of preschool education reform, preschool children's science education has been paid more and more attention. As early as 1989, the former State Education Commission in the "Kindergarten work Regulations (trial)) on the germination of children" love science " emotion as one of the main goals of preschool education formally proposed. In 2001, the Ministry of Education promulgated (Kindergarten Education Guidelines (trial)), proposed that the content of kindergarten education can be relatively divided into five aspects according to the category of children's learning activities, one of which is science education. (The Outline also clearly puts forward the "goals", "content and requirements" and "guiding points" of the scientific leading city. All these show that preschool children's science education has become an important aspect of preschool children's learning as well as in other fields. The Guidelines for Learning and Development of Children aged 3~ 6 promulgated in 2012 clearly puts forward the learning and development goals in the field of preschool children science, and gives educational suggestions. From real experience to practice, be able to think, act, love to read, and constantly want to know. However, teachers and students can study together. From a variety of media and learning resources, parents, guardians and the community are involved in learning management, which can occur anytime, anywhere (National Council of Education, 2000).

Because of the problem of student achievement in early childhood science activities subject group Guangxi Peixian International University and the importance of the aforementioned quest for knowledge (5E) learning activities, and the researcher is teaching at the college level, early childhood scientific activities group. found that the content of the kindergarten science education theory and practical ability is the content that students are difficult to understand and relatively low academic achievement. Therefore, the problem must be solved by bringing the quest for knowledge learning activities (5E) was used to organize learning activities of Guangxi Peixian International University first year students on the kindergarten science education theory and practical ability to develop learning achievement early childhood science education activities learning subject group.

Research objectives

1. To study the satisfaction of Guangxi PeiXian International University firstyear students in preschool education majoring with the use of 5E Instructional Model together with the activity series on early childhood scientific activities in early childhood steam education.

2. To compare the learning achievement between before and after school and after school with 75 percentage with the criteria, by using 5E Instructional Model together with the activity series on early childhood scientific activities in early childhood steam education.

Research Hypothesis

1. Guangxi PeiXian International University, first year students who have been taught by using 5E using 5E Instructional Model together with a series of activities were satisfied on early childhood steam education at heigh level.

2. Guangxi PeiXian International University, first year students in preschool education major who have been taught by using 5E Instructional Model on early childhood steam education have got the learning achievement after school higher than before school and that exceeds the threshold of 75 percentage.

Research Framework

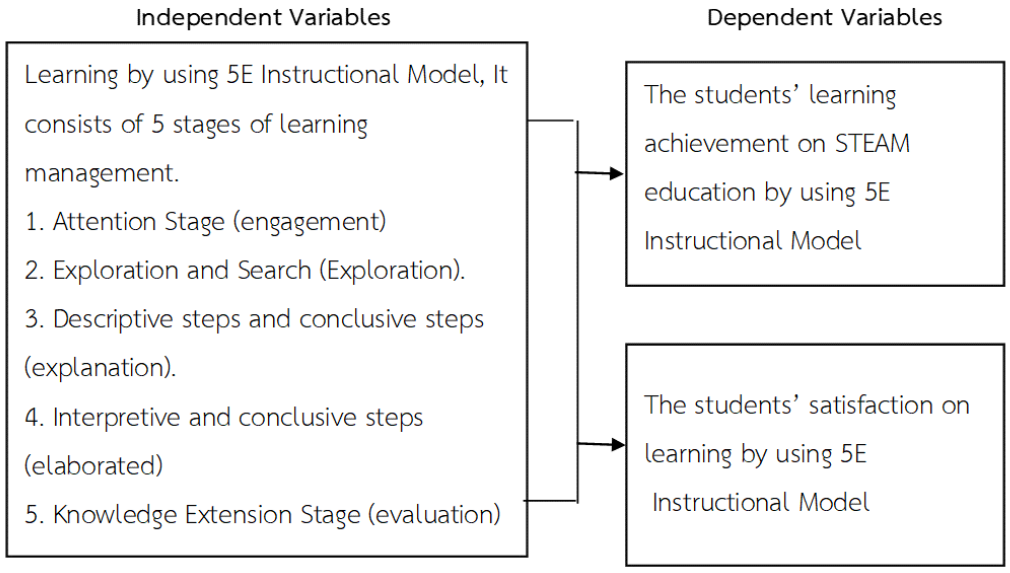

Figure 1 : Research Framework

Research Methods

Population and sample

The population groups used in this research were Guangxi Peixian International University first year students of Pinguo city college Center, studying in semester 2 of the academic year 2021 out of 3 schools, a total of 100 students

Sample group

The sample group used in this research were Freshmen majoring in Preschool Education at Guangxi Peixian International University in the semester2 of the 2021 academic year at Guangxi Peixian International University under the Office of the Private Education Commission A total of 36 students were obtained by cluster random sampling.

Research Tools

The tools used in this research consisted of 3 parts, as follows:

1) The learning management plan by using 5E Instructional Model, the researcher has developed a learning management plan based on the content according to children science activity Learning Subject Group, The process of learning management is divided into 5 steps: Step 1, Engagement, Step 2, Explore and Search.

(Exploration) Step 3 Explain and draw conclusions (Explanation) Step 4, expanding knowledge (Elaboration) and step5, the evaluation stage (Evaluation).

2) the 30 items of five options multiple choice achievement test with has got IOC values from 0.60-1.00 and the difficulty (the p) ranged from 0.28 to 0.75. and the classification power (r) is between 0.20-0.45.

3) The 20-item Rating scale satisfaction questionnaire which had the Item Objective Congruence value ($0.60 \leq IOC \leq 1.00$).

Creation and quality of research tools

The tools used in the research are the tools created by the researcher as the following;

1. Management plan, the researcher carry out The learning management plan by using 5E Instructional Model, divided into 5 steps: Step 1, Engagement, Step 2, Explore and Search. (Exploration) Step 3 Explain and draw conclusions (Explanation) Step 4, expanding knowledge (Elaboration) and step5, the evaluation stage (Evaluation). The specific steps are as follows:

1.1 Study concepts, theories, principles from documents and teaching using5E Instructional Model, Study the indicators and core learning of the activity series on early
childhood scientific activities in early childhood steam education

1.2 Develop guidelines for learning management plans from various documents and studies.

1.3 Send to the 5 expert to examined the management plans if it suit with the 5 steps of 5E Instructional Model By using the criteria to consider the suitability of a 5–level scale as follows: (Pannee Leekitwattana, 2012).

Level 5 means the most appropriate.

Level 4 means very appropriate.

Level 3 means moderate suitability.

Level 2 means less suitable.

Level 1 means least appropriate.

The findings are based on an average of the requirements of the criteria. (Pannee Leekitwattana, 2012). : Average Comment Level

4.51–5.00 is most suitable

3.51–4.50 is very appropriate
2.51–3.50 is moderately appropriate
1.51–2.00 is less appropriate
1.00–1.50 is least appropriate

Based on the average score of 3.51 or higher as a criterion to judge that experts believe that learning management plan of suitable quality and in accordance with the essence, subject matter, learning management process learning materials measurement and evaluation. The results of the expert review found that the learning management plan created the mean value of 4.84, which means that the learning management plan created is appropriate at the highest level

2. The achievement test;

2.1 Study the course documents such as teacher manuals, evaluationresults, learning subject groups. The researchers used a unit of research on the teaching objectives and exam syllabus for early childhood scientific activities in early childhood steam education creating a standards-based test and creating a ultiple-choice test.

2.2 Analyze the students' learning situation, screen out valuable points according to the teaching content, and design the test paper closely. The pre-test is the same as the post-test, with a total of 30 questions, multiple-choice questions, 5 choices per question, 1 point for each question, and the total score is 30 points.

2.3 Complete the test papers. The test papers are handed in to the tutor and the expert gives advice. Content coverage of the test objective consistency with the test objective Suitability of the test time difficulty and suitability of the questions and options. The criteria are considered as follows. (Pichit Ritcharoen, 2013)

+1 means when you are sure that the test measures the purpose.
0 means when you are not sure whether the test measures the purpose.
-1 means when you are sure that the test does not measure the purpose.

2.4 Record the results of each expert review and find the index Consistency (the Item of Objective Congruence; IOC) is an item that is making the assessment of the consistency between exams with the aim of learning analysis for the IOC using a

formula IOC qualifying exam with IOC (IOC). Between 0.50-1.00 is a test that meets the criteria for validity in content. The results of the expert review found that the correspondence between the exam and the learning objectives got IOC values from 0.60–1.00

2.5 Try-out on the sample group of 30 students. And was making the score from the test to determine the level of difficulty (the p) and the authority may bring Saranac (the r) by selecting the item with difficulty ranging from 0.20 to 0.80.

3. The satisfaction questionnaire

3.1 Create an assessment scale questionnaire based on the data obtained in the study. The five questions in the rating scale are divided into five levels; (Pannee Leekitwattana, 2012).

Level 5 means satisfaction at the highest level.

Level 4 means there is a high level of satisfaction.

Level 3 means satisfaction at a moderate level.

Level 2 means there is a low level of satisfaction.

Level 1 means the satisfaction of the minimum.

the criteria has been set for interpreting the mean level according to the following criteria (Pannee Leekitwattana, 2012).

4.50–5.00 means satisfaction at the highest level

3.50–4.49 means satisfaction at a high level of

2.50–3.49 means satisfaction at a moderate level.

1.51–2.49 means satisfaction at a low level.

1.00–1.49 means satisfaction at the lowest level.

3.2 Obtain valid data through the questionnaire survey. As part of monitoring and providing feedback, the questionnaire provides the data needed for the course the scholar is studying.

3.3 Submit the questionnaire questions to a five-member expert group for review to ensure the accuracy of the questions and the proper use of language and content. The questions cover the results of Chinese-Vietnamese translation and conformity evaluation, and illustrate junior Vietnamese students' views on the application of the Jigsaw II cooperative learning method. The activity of Chinese-Vietnamese translation by the IOC is 1.00

3.4 Conduct a satisfaction questionnaire test (Try-out) for third year students majoring in Vietnamese in the first semester of 2021 at Guangxi Normal University for Nationalities. Before the questionnaire is distributed, the reliability of the questionnaire is tested to ensure the rationality and scientificity of the questionnaire.

3.5 Distribute complete satisfaction questionnaires to students and continue to collect information.

Data Analysis

In this research the researcher used the data collected from the tools used in the experiment, including tools used in learning management and tools used for data collection. The data were analyzed in the following order:

1. Data Analysis of Children Science activity Learning Achievement Test Regarding the kindergarten science education theory as follows:

1.1 Find the mean standard deviation (S.D.) of achievement scores in science subjects. about the kindergarten science education theory.

1.2 Comparison of achievement scores in science subjects about the kindergarten science education theory of pre- and post-study students using dependent t-test.

1.3 Comparison of achievement scores in science subjects about the separation of Post-graduate students with 75 percentage criteria.

Summary of research results

1. The satisfaction of Guangxi Peixian University Preschool education first year students with the use of 5E Instructional Model on Children's scientific activity guidance on Childhood STEAM education in all aspects, was at the average of 4. 59, which was the highest level of satisfaction.

2. The academic achievement of Guangxi Peixian University Preschool education first year students who have been learning using the 5E Instructional Model on Childhood STEAM education post-study achievement was significantly higher than before at the .01 level and the post-study achievement was 75 percentage that higher than the threshold at the .01 level.

Table 1 The results of the comparative analysis of the students' children steam education learning achievement. Guangxi Peixian University of first-year students in preschool education major by using the 5E Instructional Between before and after school.

test score	n	$\overline{x}$	S.D.	df	t
before school	36	7.03	3.03	35	18.43
After school	36	23.62	3.45		

** Statistic significance at the .01 level, t (0.01;35) =2.45

Table 1: It shows that the students' children steam education learning achievement of after school is higher than before school. ($\overline{x}$ = 23.62) and Statistically significance at the .01 level which related the hypothesis.

Table 2 The results of the comparative analysis of the students' STEAM education learning achievement. University first year by using 5E Instructional Model between after school and 75 percentage of the criteria.

test score	n	full score	threshold score	$\overline{x}$	S.D.	(%)	t
After school	36	30	22.50	23.60	3.45	78.73	9.77

** Statistical significance at the .01 level, t (0.01;33) =2.4448.

Table 2: It shows that the students' children steam education learning achievement of after school is higher than the criteria of 75%. (78.73) and Statistically significance at the .01 level which related the hypothesis.

Table 3 The results of Satisfaction Assessment of Guangxi Peixian University Preschool education first year Students using of 5E Instructional Model with the activity set children's science guidance

Article No.	List	satisfaction level		Interpret
		$\bar{x}$	S.D.	
1	Teachers have the ability to transfer knowledge.	4.79	0.63	the most
2	Teachers organize learning activities to do at the fun.	4.88	0.32	the most
3	Teachers use the normally polite manner and easy to understand.	4.76	0.55	the most
4	Teachers give students the opportunity to ask questions.	4.68	0.83	the most
5	Teachers suggested making the practice less activity at the close.	4.91	0.37	the most
6	Students use the learning materials in learning activities to do at the performance.	4.32	1.18	a lot
7	Learning materials encourage students to understand the content and learn faster.	4.12	1.47	a lot
8	Learning materials help students to be able to learn on their own.	4.47	1.24	a lot
9	Learning materials are appropriate to the activities and contents.	4.50	0.85	a lot

Table 3 The results of Satisfaction Assessment of Guangxi Peixian University Preschool education first year Students using of 5E Instructional Model with the activity set children's science guidance (Continue)

Article No.	List	satisfaction level		Interpret
		$\bar{x}$	S.D.	
10	Teachers use the learning materials that fit the Company's due to this you find that you leave teaching.	4.74	0.78	the most
11	Learning activities by making the students have fun.	4.38	1.19	a lot
12	The students participate in learning activities to do at the time.	4.44	1.12	a lot
13	The content included in the learning activities is interesting.	4.65	0.84	the most
14	Learning opportunities for students to express their opinions during the course of the study.	4.35	1.19	a lot
15	The duration of the learning activities for each content is appropriate.	4.76	0.64	the most
	total	**4.59**	**0.88**	**the most**

Table 3: It shows that students are satisfied. Using 5E Instructional Model in conjunction with a series of activities children's science guidance overall in all aspects is the teacher teaching media learning activities. The mean was 4.59 standard deviation was 0.88 which resulted in the satisfaction level at the highest level.

Discuss the results

The results of 5E Instructional Model with activity packs on STEAM education learning achievement and satisfaction on Children's scientific activity guidance were as follows:

1. The students are satisfied using 5E Instrctional Model in conjunction With Children's scientific activity guidance overall in all aspects is the teacher teaching media in terms of learning activities, the mean was 4. 59, which resulted in the highest level of satisfaction, possibly due to the process of organizing learning activities that were applied from Slavin Slavin. (1995) with the stage of learning management is Teacher informs how to organize learning activities and review previous knowledge. There is teaching practice by teachers explaining the content. There is a grouping of assorted abilities. and 5E Instrctional Model together with Children's scientific activity guidance. It allows students to interact between the strong students and the weak students. Group members help each other. Students get excited by the competition. fun learning with a set of activities. It is a teaching media created by teachers, consisting of various materials and other elements for learners to study and perform activities on their own. And in accordance with Sukanya Yamklebe. (2016) researched on the development of a learning activity 5E Instrctional Model together with strategies to promote the ability to design activity. The main purpose of this stage is to improve students' skills by questioning, reviewing and practicing. Teachers inspire students to use new concepts to solve related new problems or new phenomena, give appropriate time and space to think, and guide students to summarize through participation in discussion and collaborative communication.

2. The learning achievement of Guangxi Peixian University preschool education first year students who received the 5E Instructional Model together with the activity set on Children's scientific activity guidance had higher learning achievement after school than before with statistical significance at the .01 level and the post-study achievement was statistically higher than 75 percentage at the .01 level, which was in accordance with the set assumptions. This is because learning management 5E Instrctional Model form with Learning Activities Set on Children's scientific activity guidance, design and evaluation of early childhood science education activities on the basis of the students completing the previous attraction stage, the students are very

familiar with the topic of this class, and they are also full of interest in it, so they began the exploration activity of this class. This class inquiry activity is mainly carried out through independent inquiry and group cooperation. Students complete the inquiry tasks by finding relevant materials and reading text. The class was divided into six groups, with each group member actively participating in the classroom inquiry activities. (2) Exploration content: A. Common methods of early childhood science education include general methods and special methods. Design and evaluation of early childhood science education activities. At this stage, students can freely allocate time, quickly browse the text content and consult relevant information, and find out the inquiry tasks (the common methods of early childhood science education include general methods and special methods), lasting 10 minutes. After that, it took 7 minutes to complete the second exploration task (the design and evaluation of early childhood science education activities) on the basis of their own active exploration and information access. Through independent inquiry and group discussion, they constantly improve their own answers and inquiry results, to lay a solid foundation for the presentation of the later interpretation stage. In the process of exploration and discussion, the teachers play the role of collaborator, encourage students to explore actively, to constantly patrol, observe and understand the needs of students, master their ideas and progress, to enhance confidence. For individual difficult groups or individuals, but to help the students clear goals, and encourage students to explore actively, have practiced in making problems in the worksheet until they gain knowledge and understanding of the content Along with studying using 5E Instructional Modell, learners have to set common goals and help each other within the group. And students have exchanged knowledge with each other within the group. Smart students will explain to weak students by leading a knowledge about the concepts like What is early childhood science education, and how does the role of early childhood science education play as a field of early childhood STEAM education application, the discipline nature, connotation and meaning. Let's study again so that all members of the group have equal knowledge, each of which gives their group a higher progression score. Which group has the highest group progress score? That group will be rewarded. to endorse and commend which reinforces students' enthusiasm for learning. (Bybee, R., W. , 2014). As a result, students have higher learning achievement scores after

studying higher than before and after school exam scores above the specified threshold Consistent with the research of Kamonchanok Senkaew. (2017) researched on the study of mathematics learning achievement by using the 5E Instructional Model of Guangxi Peixian University preschool education major of first year students was significantly higher than before at the .05 level and after the learning management. The 5E collaborative technique was significantly higher than the 75% threshold at the .05 level and was consistent with Chamaiporn Rangsiyanupong. (2016) Development of learning achievement, group working behavior and attitude towards learning children steam education. about the probability of students in Guangxi Peixian University of preschool education major by using the 5E Instructional Model, the results showed that the improvement scores during the study were respectively higher. and the achievement was higher than the threshold of 70%, and the score after school was significantly higher than before at the .05 level, and corresponds to Vaughan. (2010) conducted a study. There was a statistically significant difference between pre- and post at the 0 .1 level.

Summary

1. The use of problem-based Instrctional Modells should be provided to be flexible and appropriate, taking into account the different aspects of the learner's knowledge for the benefit of the student's development to its full potential.

2. Teachers should carefully study the learning management process using the problem as a base. to be used to manage learning effectively. Teachers can design a variety of activities, especially creating an atmosphere for preparing students before learning. Teachers should encourage students to link their knowledge to new situations so that they know the source of the content they are studying, which will be good for the teaching.

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