STEM education project-Based and Robotic Learning Activities impacting on creativity and Attitude of grade 11 Students in KhonKaenWittayayon School.

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Abstract. This research aims to 1) To study the creativity abilities of the students who have been provided with the STEM education project-based learning and Robotic activities. 2) To study the effects of the STEM education project-based learning and Robotic activities on the students' attitudes. The target group was the Grade 11 students of KhonKaenWittayayon School. The study was conducted in the first semester of the academic year 2017. The 92 students were selected by purposive sampling. Research instruments included 9 lesson plans STEM approach, Evaluate creativity, attitudes questionnaire. The result found that 1. The creativity of the students in the STEM education Project-Based Learning and Robotic Activities was highest level in the Fluency (average 26.80, SD = 2.56) and Flexibility (average 25.04, SD = 2.72). At the high level in the Initiatives (average = 23.82, SD = 2.04), and thoughtfulness (average = 21.78, SD = 2.42) 2. The attitude of grade 11 Students After Learning STEM education Project-Based Learning and Robotic Activities was all high Level

1. Introduction

The world of education has changed dramatically in the 21st century. Knowledge acquisition tools are more important than knowledge content. The advancement of communication technology enables learners to find their own knowledge from various sources [13]. The key to facing change and the challenge is the quality of people. In the present age of education, children are encouraged to develop their lifelong learning abilities [16]. According to the aforementioned problem, it leads to a crisis which is not how bad the students score on the exam but that they are not capable of analyzing [9]. Students do not truly understand the lessons since they try to remember But have no idea how the lessons can be used in real life. Students are not able to connect their knowledge to the big picture [9]. When students encounter problems that are different from the classroom or have to do tests that have never encountered such problems, and can not solve the problem. However if the students have learned from the actual experience, practice, doing, think, have a continuous learning and discover self-knowledge, which can be applied or solved in real life. This will lead to self-development. Project-based learning is a process of seeking knowledge or search for the answer to what the students want to know or doubt in various ways. It is a way of learning that students choose to study according to their own interests or groups. It's a mutual decision, until the production can be used in the real life. [12]. Office of STEM education is Integration of integrated teaching across disciplines. Science (S), Technology (T), Engineering (E), and Mathematics (M), with the emphasis on nature and interdisciplinary teaching approach that are supported by a large number of research.

According to the problem and importance, researchers as teachers are interested in STEM learning styles to integrate in the course Knowledge Creation and Independent Education (IS1-2) in order to study creativity and Attitude of Grade 11 Students, KhonKaenWittayayon School.
1.1. Purposes
To study the creativity abilities of the students who have been provided with the STEM education project-based learning and Robotic activities.
To study the effects of the STEM education project-based learning and Robotic activities on the students' attitudes.

1.2. Target group
Target group used in this study are Grade 11 students in Khonkaen Wittayayon School. The 92 students in the first semester of the academic year 2017 were selected by purposive sampling.

1.3. Research Plan
One Group Pretest Posttest Design [11]. was used as a guideline for conducting the research. The pretest was administered by researcher and the treatment was provided during the 1st semester After the treatment section the post test was administered to evaluate the understanding with the following pattern.

| Group | Pre-test | Technique | Post-test |
|-------|----------|-----------|-----------|
| E     | T1       | X         | T2        |

When E represents the target audience
X represents the learning activities of the researcher created by the researcher.
T1 represents the student's grades before class.
T2 represents student's grades after class.

1.4. Research tools
The instruments used in the study were the research instruments.
1. A plans of the learning activities of the project of the full school education project of the Grade 11 students and the test of learning achievement evaluating the basic knowledge on research methodology.
2. Creativity assessment form of Grade 11 students were evaluated in four aspects: fluency, flexibility, Initiative, and thoroughness.
3. The Attitude Test of Grade 11 Students.

Table 1. Research Framework

| independent variable | dependent variable |
|----------------------|--------------------|
| Learning Management for Grade 11 students is as follows. | 1. Creativity |
| Step 1: Intro STEM education. | 2. Attitude |
| Step 2: Improve Critical thinking from model. | |
| Step 3: Review the concept | |
| Step 4: Create and develop | |
| Step 5: Presenting than improvements. | |

2. Data collection
The researcher collected the data manually as follows:
1. Pre-test Grade 11 students using the basic achievement test, knowledge, research methodology. A total of 10 items were taken and checked for grade point average.
2. Conduct learning activities in full education with Grade 11 students. There are 10 plans for 18 periods using the creative assessment record in every lesson.
3. At the completion of the learning management of 18 class periods, the test of achievement(posttest) was administered and had students answer their attitude and satisfaction questionnaires were used to collect the data.
4. All data were analyzed using statistical methods. As discussed in the statistical section used for data analysis.
5. Summary of data analysis.
3. Data analysis

1. Analyze creativity using the creative evaluation form to the group, then summarize the results in the table.
2. Analyze students' attitudes using answer in the assessment of individual attitudes then summarized in the table.

The analysis of data

Table 2. Creative ability

| Creativity   | Average | SD   | Level |
|--------------|---------|------|-------|
| Fluency      | 26.80   | 2.56 | highest |
| Flexibility  | 25.04   | 2.72 | highest |
| Initiative   | 23.82   | 2.04 | high   |
| Thoughtfulness | 21.78  | 2.42 | high   |

From Table 2, it was found that the creativity scores of the students who received the project-based learning activities were as follows. The average score of the first aspect was 26.80 (SD = 2.56) which is at the highest level. The average score of the second aspect was 25.04 (SD = 2.72), when considering the criteria, which is at the highest level. The 3rd aspect is initiative. The average score was 23.82 (SD = 2.04) which is at high level and the 4th aspect is thoughtful. The average score was 21.78 (SD = 2.42) when considering the criteria. It is at a very high level. The results show that the students have creative ability have been found as high and very high.

Figure 1. student Achievement.

Student Attitude

Table 3. Attitude of students towards learning activities in the project.

| Student Attitude | Number of students | Most agree | Agree | Not sure | Disagree | Strongly disagree | Total score | Average |
|------------------|--------------------|------------|-------|----------|----------|-------------------|-------------|---------|
| 1. Attitude of interest |                    |            |       |          |          |                   |             |         |
| 1.1 Research is a new pursuit of knowledge. | 78                 | 12         | 2     | 0        | 0        | 444               | 4.83        |
| 1.2 Experimenting, I always like to find new knowledge and solve problems. | 60                 | 26         | 6     | 0        | 0        | 422               | 4.59        |
| 1.3 Friends spend time in the library, I feel tired. | 3                  | 14         | 25    | 32       | 18       | 324               | 3.52        |
| 1.4 Keeping up with the news is a good thing. | 80                 | 8          | 4     | 0        | 0        | 444               | 4.83        |
| 1.5 I like to observe while experimenting. | 70                 | 16         | 6     | 0        | 0        | 432               | 4.70        |
| Average          |                    |            |       |          |          |                   | 413.20      | 4.70    |
| 2. Rational attitude |                  |            |       |          |          |                   |             |         |
From Table 3, it was found that the mean of attitude of students in Grade 11 after learning project was full. The fourth highest mean of attitudes toward generosity and generosity was 4.73 on the basis of the criteria. The average level of satisfaction was 4.70 (mean 4.70). Acceptance of reasoned conclusion (mean of 4.70) was based on the criteria. This is a very good level and reason (average 4.65). Holds a very good level.
4. Discussions

According to the study, the STEM education project-based activity and Robotic activities affects creative thinking and attitude of Grade 11 Students, KhonKaenWittayayon School. The results can be discussed as follows.

1. Grade 11 students who have been provided with project-based learning activities. Have a very high level of creativity. The creativity with the highest scores was the average of 26.80, SD = 2.56, and the flexible idea (average 25.04, SD = 2.72). Initiatives (mean = 23.82, SD = 2.04) and thorough thinking (mean = 21.78, SD = 2.42) were based on the assumptions set by the researcher. This is probably because of project learning in each lesson plan, there are 5 steps to develop creative thinking students, especially in the second step. This is a remarkable step in creativity because students must create their own unique works and show their originality. In creating and developing, we can express our creativity in every aspect. Since students have to take every step of the way to create a piece of work in accordance with the given problem, Gupta (1981, 29) [7], states that creating a problematic situation for a teacher. It encourages students to use their ideas and interests. Tassaporn Prutcholatan (1974; From [10]). in other words, show that scientific creative is initiative fluency in thinking and flexibility of problem solving by using scientific process skills and Sompunya Sripakananon (1992; from [1]). that the ability of the person to express many ideas which is to create something that exists to the new model and that is not recreated with others. In thinking, basic knowledge and scientific process will be used. This ability consists of a streamlined thinking, flexible thinking and initiative used to solve the problem or find answers. So, it can be seen that scientific creativity has the same meaning as general creativity. That is the thought process. And the effect is different. Scientific creativity requires scientific process skills effectively to create intellectual development, problem solving and new knowledge discovery. Which corresponds to the meaning of science, the body of knowledge and process of science inquiry. The process of creative thinking. Kitiphum Lertkittikulyotin (2007) studied the ability to solve problems and creativity in science using the science and technology project of the students in the eighth grade. Students taught by using the science and technology projects have the ability to solve scientific and creative sciences. Is .01 significantly higher.

2. Student Attitude After the project was completed, the highest mean of attitudes is generosity. The acceptance of the rational conclusion is based on the assumption that the project-based learning activity can improve the attitudes of students in the Grade 11 to be better. This is because each step of the project learning activity is fully encouraged students to complete the group process. Students are required to exchange knowledge within the group. The attitude of generosity. In the second and third stages of project-based learning, there are so many searches which cause the attitude of interest of knowing and when the exchange of learning occur. Therefore, the attitude of accepting the rational conclusion and reasoning.

5. Suggestion

1. The learning activities of the project should focus on how to access and evaluate each activity before class in order to give students a sense of the importance of making a portfolio, group activities, answering questions, and projects.
2. Teachers play an important role in encouraging them in Learning activities of the project. Students should be encouraged by question or problematic situation and receiving continuing suggestions to result in curious and self-learner.
3. Teachers should create a learning environment that allows learners to be free in their learning, thinking and practice to stimulate their thinking processes in many way.
4. The learning activities of the project focus on group work. To achieve the purpose, teachers must focus on the importance of working in a very group. Some activities may cause students to have different opinions. Teachers need to guide the students to think about the value of the good and the bad. Then share the ideas and choose the best idea.

5. In project-Based Learning Activities, there are many activities in the learning plan. Teachers will see the ability of different students, try to let the students express themselves. And instruct the students to see their abilities. However, in some activities, some students did not always collaborate especially brainstorming. Teacher should ask students to brainstorm their ideas in a paper and then organize them into groups. Teachers may motivate to grade each group. In the manner of accumulating points. And award the highest scoring group in each learning activity.

6. The media and research resources are important to organize learning activities. Teachers should provide sufficient media, materials and resources. This will result in effective activities. To effectively

7. Presentation will give the student to show their potential and be confident in presentation which will make them proud of themselves and develop a learning habit.

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