



Developing STEM Education Learning Activity of Making the Lighting Shop Signs

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Developing STEM Education Learning Activity of Making the Lighting Shop Signs

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Abstract. The paper will clarify STEM education learning activity of making the lighting shop signs. The STEM education learning activity will be developed based on Sutaphan and Yuenyong (Sutaphan and Yuenyong 2019) the context-based STEM education learning approach. The activity will start with the Identification of the social issue of design a lighting shop sign to promote marketing. The issue enables students to design a lighting shop sign that increases customer motivation. the lesson plan will provide activities regarding the 7 stages of Sutaphan and Yuenyong (Sutaphan and Yuenyong 2019) the context-based STEM education in order to scaffold students to practice knowledge for designing some technology prototypes or products through the engineer design process. For making something related to light sign, the lesson plan will provide students a chance to practice the integration of knowledge. These knowledges include Physics (e.g. circuit design), mathematics (e.g. calculation skills, measurement skills), arts (e.g. creative label image), Business (e.g. build something that can attract customers), and so on. This paper may have implications for designing STEM education learning activities.

Keywords: STEM education,

1. Introduction

In the 21st century, society is changing rapidly. It is an era of digital technology development. Globalization enabling people to access information and allows people in the present era to have the opportunity to apply information to the maximum benefit. That's why people are competing in the use of information in conjunction with today's skills. thus leading students to build new knowledge be creative have problem-solving skills properly.

In the field of science education, it is necessary to modify the teaching of science to have scientific process skills and develop students' competency by learning in the 21st century. can enable learners to solve problems systematically Able to make decisions based on reliable information and verifiable testimony. (Commission 2560) In addition, the 10th National Economic and Social Development Plan (2007-2011) pointed out the need to change the focus on quality development. People in Thai society are virtuous and knowledgeable. along with performance Basic skills and knowledge needed to sustain life that will sustainably affect the country. (Thailand 2551). That's why teachers should provide instruction for learners to use skills and knowledge. to be able to solve problems in daily life.

Because science is relevant to every day in everyday life. But education cannot expose students to science in the society they meet. Therefore, the scientific community has consulted to lead science. The address in the classroom is linked to outside the classroom. so that students can

see the importance of science more using the name of the teaching management concept that Science and Technology and Society (STS approach), as STS will be able to encourage students to learn the nature of science and to encourage students to study science for a lifetime.

Therefore, to keep up with the times in the 21st century, new skills are required for student survival. And to link the nature of science-based teaching and learning that takes into account the possibilities or the reality of the student's own society the researcher therefore studied the management of learning in stem. By teaching stem can promote students thinking and problem-solving skills. Bring together the concept of science, technology and society (STS approach) together under the name STEM learning management studies a quest in context, helping to solve real-world problems. The steps are divided into 7 steps: 1. Identification of social issue stage, 2. Identification of potential solution stage, 3. need for knowledge stage, 4. Decision - making stage, 5. Development of prototype or product stage 6. Test and evaluate the solution and 7. Socialization and completion decision stage.

2. Developing STEM Education Learning Activities

Developing stem education learning activity of making the lighting shop signs will bring students to practice integrated knowledge among physics, mathematics, art, and business in order to design their products of lighting shop signs. Physics concepts may include circuit design, Ohm's law, operation of the LED, resistor, and basic measurement skills. Mathematics may include slope measurement skills; Arts include creative design and presentation of their lighting shop signs. And, the business includes Marketing principles (4P). The lesson plan of lighting shop signs STEM Education learning activity was developed on the concept of Context-based STEM education learning approach which the STEM education learning activities should provide not only the ways of investigation and solving problem but also a real-world problem solving. Regarding on Sutaphan and Yuenyong (Sutaphan and Yuenyong 2019), he context-based STEM education learning approach included (1) Identification of social issues, (2) Identification of potential solution, (3) Need for knowledge, (4) Decision-making, (5) Development of prototype or product, (6) Test and evaluation of the solution, and (7) Socialization and completion decision stage.

The lesson plan could be heighthed as the table 1

STAGE	ACTIVITY
1. Identification of social issues	1.Social Issue: Creating beautiful shop light signs used for advertising purposes. 2. Teachers raise the issue “How can you make shop light signs that can attract customers?” 3) PRODUCT: shop light signs that can attract customers and circuit design of shop light signs.
2. Identification of potential solution	1) Students research patterns and the knowledge that will be used to design signs. 2) The students choose a method that will be applied to the design from which they have searched.

	3) Students write knowledge that they need to study to create a fire sign.
3. Need for knowledge	<p>1) The students surveyed the store that designed the light signs. 2) Students may research more information on the internet. Based on the information gathered, the students now have many considerations to build their idea of making shop light signs.</p> <p>PHYSICS – circuit design, Ohm's law, operation of the LED, resistor and basic measurement skills MATHEMATICS – calculation and measurement skills ARTS – creative label image Business – marketing</p>
4. Decision-making	<p>1) . Students as a group will present their idea in front of the whole class 2). Non-presenters will give comments, ask questions to further refine the idea 3). Each group will be asked to refine and finalize their experiment design before starting to develop their product</p>
5. Development of prototype or product	<p>Students will be guided with the following questions during 1. How does the appearance of the light sign make it attractive to consumers? What is the strength of students to be able to attract consumers?</p> <ol style="list-style-type: none"> 1. How to make a light sign to be attractive to the consumer, the student's favorite, can it convey to the consumer immediately understand that What kind of business is our business? 2. How to make light signs to be attractive to consumers Of students designed to be able to see within a distance of about how many meters 3. How many LEDs are required for 1 letter? 4. How does the cost of light signs make them attractive to consumers? How much does it cost in total? 5. Where should the students be placed? 6. How to make an attractive light sign? What are the elements of the student's favorite consumer? 7. Such elements How can they work together?
6. Test and evaluation of the solution	1) The teacher has the students show how to test the light plate to make it more attractive to the consumers and the students. Whether it can be accomplished with a goal or not with a head
7. Socialization and completion decision stage	1) Each group will make a video clip to present their light sign. Explain information for making lighting signs and with electric circuit

3. Conclusion

This paper shared the ideas of developing STEM learning activities through making the lighting shop signs STEM education based on context based approach. The 7 stages of Sutaphan and Yuenyong (Sutaphan and Yuenyong 2019) context based STEM education teaching approach could guide ideas of developing learning activities from social issues to develop products. making the lighting shop signs STEM Education Learning Activity will allow students using applying scientific and other knowledge for designing the lighting shop signs, and provided the context of instruction that requires solving a real-world problem or task through teamwork. As Students' products of lighting shop signs, students will have also the chance to apply their scientific and other knowledge for creative problem solving in context of engineers, technology, or entrepreneurship (Sutaphan and Yuenyong 2019)

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