

Applying the Engage, Explore, Explain, Elaborate, and Evaluate Procedure in STEAM Education for Primary Students: A Sample with the Topic “My Green Garden”[†]

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Abstract: STEM education has been a topic of interest in many countries around the world. Many STEM research studies have been conducted; however, most of them focus on middle-school students and high-school students. At the primary level, STEAM education is known as an advanced mode of STEM education, which is highly integrated between science, technology, engineering, arts, and mathematics. This study proposes a procedure of organizing primary-school students’ learning activities in STEAM education as an approach to help students experience positive emotions and stimulate passion, thereby developing the capacity of problem solving and creativity for students—one of the common competencies emphasized in the General Education Program 2018 in Vietnam. The procedure of organizing STEAM education activities in this study is close to the 5E procedure, but it is flexibly applied to suit the psycho-physiological characteristics of primary-school students in Vietnam. This research was conducted under the project title “Developing STEM education in a number of schools in Lang Son province to meet the new general school program” according to the cooperation document between the University of Education—Thai Nguyen University with the Department of Education and Training of Lang Son Province, No. 77/HT-SGD and DTL-S-DHSPTN, dated 10 January 2020. The trial of this study was conducted at eight primary schools in Lang Son, Vietnam, with the theme “My green garden” in teaching nature and society in grade 1. Through observing the students’ participation in learning activities, evaluating the learning products made by those students, and collecting comments and feedback from teachers about the procedure of organizing the learning activities, it can be initially seen that the students actively participated in learning activities with joyful feelings, ready to cooperate with each other to complete assigned tasks, and that the students’ creativity was clearly expressed through many unique ideas.

Keywords: STEAM; primary school; 5E procedure



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1. Introduction

1.1. Common Issues in STEM and STEAM Education

Entering the twenty-first century, STEM has emerged as an effective educational method, equipping learners with interdisciplinary knowledge and skills that are related to each other within the fields of science, technology, engineering, and math. Instead of approaching each subject separately, STEM connects the learning objects of these subjects based on situations associated with high practice [1] helping to solve complex problems relevant to the context of the changing world [2]. When researching STEM, many researchers have pointed out the outstanding advantages of this educational method, such as helping learners to develop problem-solving competency and increasing learners’ creativity [3].

STEM education is understood as an interdisciplinary approach to the fields of science, technology, engineering, and mathematics, in which the learning content is linked

to practice based on a series of teaching activities which are interactive and active. In the current trend of STEM development, STEAM is a newer integrated trend, linking artistic activities in correlated relationships with the fields of science, technology, engineering, and mathematics. STEAM's philosophy revolves around the following concepts: STEAM is the result of the combination of science and technology interpreted through technical and artistic elements, and this combination is based on relevant mathematical elements [2]. The artistic content integrated into STEAM education can include many factors, such as the aesthetics of the artistic products created by students; humanity in communication, behavior, and coordination with each other to solve learning problems associated with practice; and sociality integrated through activities. The letter "A" (art) in STEAM education is an important element and an indispensable part of STEAM education. It represents language arts, social studies, aesthetic arts, and music. STEAM education helps to promote learners' creative thinking through discovering art [4]. STEAM education can be considered as a transformation of STEM education, creating a way to organize students' learning activities based on highly practical problems through experience and discovery, and significantly contribute to the development of emotional values and problem-solving skills that are critical and flexible. One of the goals of STEAM education is to develop learners' ability to create and innovate [2]. In STEAM education, the difference between each student is the factor that promotes learning [5,6]; the learners' creativity is supported and encouraged [6–8]; their interdisciplinary thinking is enhanced [3] and learners are stimulated to apply science, technology, engineering, and math into their work and life [9].

In STEAM education, learners can interact more with each other; students participating in STEAM topics not only simply form their understanding of science, but above all, they can connect interdisciplinary knowledge to form and develop a cultural behavioral ability, thereby responding to the changes and developments within society [2,4,8].

1.2. STEAM Education for Primary-School Students in Vietnam

In primary teaching in Vietnam, STEM has only been approached by schools and teachers recently. In 2013, the Vietnamese Ministry of Education and Training launched interdisciplinary movements in schools, mainly middle and high schools. In December 2018, when the General Education Program was enacted, STEM was a term that was emphasized and interested in the curriculum from primary to junior high school and high school [10–12]. In the General Education Program, the following is emphasized: "Implementing integrated education, especially the integration of science, technology, engineering, and math (STEM education); integrated education in environmental protection; promoting the economical and efficient use of energy; preventing natural disasters; adapting to climate change; and meeting the requirements of sustainable development in society" [10]. In particular, at the primary level, STEAM has a lot of potential because the curricula in mathematics, nature and society, science, information technology, and technology were built in an open and practical way, creating favorable conditions and facilitating schools and teachers to build STEAM topics on the basis of integrating interdisciplinary activities between science, technology, engineering, arts, and math to solve problems associated with everyday life.

Lower primary students are aged 6 to 8 years old; this is the transitional period from preschool to primary. Due to the change in the learning environment, they usually have certain changes in terms of their psycho-physiology, with the following common features: (1) Body: their high-level nervous system is improving in terms of function, and their bodies are also on the rise in terms of height and weight. Most students in this age group enjoy active games and physical activities. (2) Consciousness: the students' thinking is gradually shifting from action visualization to figurative and abstract thinking; intellectual games are also gradually being interested and noticed. (3) Language: gradually improving, but the ability to attain information through images is faster and more accurate through texts; at this age, students are more interested in experiential learning and field learning than traditional classroom-learning activities. (4) Personality: their stance is not stable;

they do not have selective receptive skills, so they are easily affected and changed by their surrounding objects [13].

From a number of psycho-physiological characteristics of primary-school students, it can be seen that, for them, learning activities based on manipulating objects through practice, experiments, and exploration play an important role. These learning activities not only attract students to participate, but also stimulate their creativity, curiosity, and problem-solving capacity. When students approach and learn through STEAM, they will have the opportunity to learn and explore science through light and highly attractive learning activities, thereby developing their cooperation, communication, and creative thinking abilities in solving practical problems.

1.3. The 5E Procedure in STEAM Education

5E stands for five words beginning with letter “E”: engage, explore, explain, elaborate, and evaluate. This procedure is suitable and advantageous for teaching science and STEM or STEAM education [8,9]. It was invented in 1987 by Dr. Rodger W. Bybee and his colleagues in the Biological Sciences Curriculum Study (BSCS) in the US. This is a constructivism-based model in which students mobilize their existing knowledge and experiences to experience and form ideas and build new knowledge [7,14]. The Bybee group’s 5E model was inherited and developed from the learning cycle of Myron Atkin and Robert Karplus [6]. Based on this model, the learning process of biology is undertaken according to a unified logic. From those biology lessons, the 5E model is continued to be developed and applied in many other disciplines, including math, engineering, and technology. So far, there have been many studies in many different countries showing the effectiveness of the 5E model in STEM education [6,15].

In STEAM education, the 5E model can be understood in association with the five steps of the students’ learning process (Figure 1) [15], in which the following takes place:

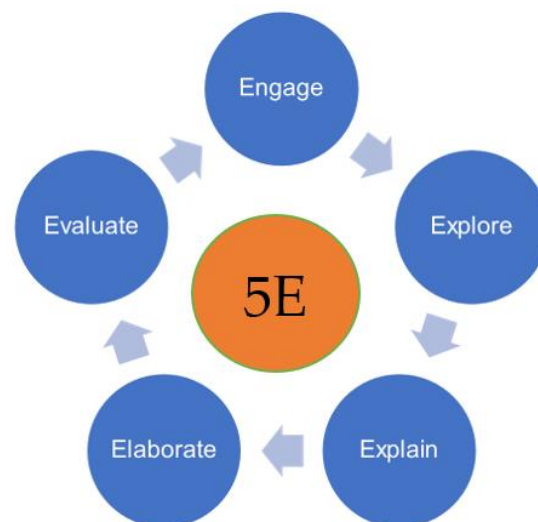


Figure 1. The 5E procedure.

Engage: This is the beginning stage of the 5E-based learning process. In this step, the teacher poses a situation, a question, or a problem to arouse students’ curiosity so that they can connect and mobilize existing knowledge and learning experiences to solve the problem.

Explore: students are encouraged to participate in the experience to propose measures, come up with ideas and plan an investigation, and collect information to solve the problems raised in the previous step.

Explain: At this stage, students mobilize their own knowledge and skills to investigate, explore, and prove proposed ideas related to STEAM educational topics. During this stage,

the teacher's engagement with questions and instructions can guide learners to understand more deeply the STEAM topics being studied.

Elaborate: At this stage, students share the results and knowledge they have gained. Through the presentation and sharing of results and the implementation of ideas, the students' knowledge is confirmed, and scientific knowledge is formed and developed.

Evaluate: This is the last stage in the 5E procedure. At this stage, students are encouraged to assess themselves, to re-evaluate the process of participating in the activity, and gain scientific knowledge about the STEAM topic; at the same time, the teacher can also evaluate them by observing group activities and assessing their learning products to acquire an overview of their progress.

2. Methodology

2.1. Target Group

The goal of this study is to find out how appropriate it is to use the 5E procedure in STEAM education for Lang Son primary students; what effects can be brought to students' teamworking ability and creativity; and the feasibility of applying the 5E procedure in STEAM education for different students in various places with different living standards and competences; or whether it can only apply to those who live in cities with high living standards, thereby pointing out recommendations for teachers when applying the procedure in organizing STEAM educational activities for primary-school students in Lang Son in particular and in Vietnam in general.

2.2. Methods of Inquiry

In order to achieve the goals set, the research team designed the theme My green garden for students in grade 1 (nature and society) following the 5E procedure, including 5 steps: (1) engage; (2) explore; (3) explain; (4) elaborate; and (5) evaluate. This topic was deployed to teach students in grade 1 on the basis of applying a combination of teaching methods, including group discussion and problem detecting and solving.

My green garden (grade 1) [10] was conducted in 2 periods; the main objectives of the topic were that, after the lesson, the students should be able to achieve the following:

- Draw and annotate the external parts (stem, roots, leaves, flowers, fruits) of a plant;
- Tell about the color, shape, and size characteristics of some common plants;
- Design and create a model of a green garden;
- Develop a love for nature and one's surroundings;
- Develop creative thinking.

The students' learning progressed according to the 5 steps of the 5E procedure as follows:

Step 1: The teacher asks students to move to the school garden and observe the trees in the school garden in groups of 4 to 6 students to answer the following questions: What are the names of the plants you observe? What are their sizes and colors? What external organs do those plants have? After that, the teacher asks the students to draw the observed plant and annotate its external parts on the observation sheet and to share it with their friends in the group.

Step 2: The teacher asks the students to come up with questions and answers on how those plants are organized and planted in the yard, and assigns the following task: With recycled or natural materials, design the model of a green garden.

Step 3: The teacher asks the students to work in groups to design and implement the concept of a green garden model. The teacher instructs the students to create models of green plants from clay, colored paper, glue, recycled materials, etc. Then, they are instructed to arrange the plant models into cardboard or foam, creating paths, decorative lights, entertainment, and relaxation corners on their green garden models.

Step 4: The teacher asks the students to report and share the results of their group work. Each group can introduce the plants that they have created; how they decorated it; and how they would feel if they could play in that garden.

Step 5: The teacher asks the students to self-assess what they have learned in the topic by stating the activities they have participated in and the activities they enjoyed most, coloring the appropriate emotional faces after learning the subject.

After organizing the teaching process according to the above 5 steps, the research team conducted a survey to evaluate the feasibility of the 5E model when applied to teaching STEAM in nature and society for lower-primary-school students, and answer the questions outlined in Section 2.1 of this article.

My Green Garden was taught experimentally in 12 classes of 6 schools in 3 regions with students from different living standards. Each class was divided into 4 to 6 groups. Those who participated in the observation of the STEAM lesson included 31 teachers of grade 1; 28 teachers of grade 2; 10 academic leaders; and 8 managers and members of the research team. They had their own observation sheets. At the end of the lesson, the research team took their ideas, interviewed them, and asked the students to carry out a self-assessment to evaluate their level of excitement as well as their average scores of their group work and products after participating in the STEAM lesson.

3. Research Findings

3.1. Information about the Experiment

Subjects: 358 students in grade 1 from 6 schools in 3 areas with different levels of living standards and educational quality within Lang Son province, a northern mountainous province of Vietnam where many ethnic minority groups live. Compared with the general educational level of students in Vietnam, those in Lang Son seem to have a lower quality of education. The living conditions of students in different areas are significantly different; most students are shy when participating in learning activities.

Area 1: 138 students (74 boys and 64 girls) from 4 classes in grade 1 at Hoang Van Thu primary school and Chi Lang primary school in Lang Son city. These schools have favorable conditions for educational development, located in the center of Lang Son city; the students' level of awareness is relatively equal, with good educational conditions and quality.

Area 2: 122 students (62 boys and 60 girls) from 4 classes in grade 1 at a primary school in the Tu Mich commune (Loc Binh district, Lang Son province) and another primary school in the Long Dong commune (Bac Son district, Lang Son province). These schools are of moderate conditions, located in districts which are about 100 km from the center of Lang Son city; the students' cognitive level is average; the facilities and the quality of the teachers may ensure minimum learning needs.

Area 3: 98 students (47 boys and 51 girls) from 4 classes in grade 1 at Chau Son primary school (Dinh Lap district, Lang Son province) and Thien Thuat primary school (Binh Gia district, Lang Son province). These schools are located in highland districts along the Vietnam–China border, in disadvantaged areas of Lang Son province, occupied by a more than 95% proportion of ethnic minorities (Tay, Nung, Dao, San Chi); the students have unequal cognitive levels, and there is a shortage of infrastructure conditions and facilities.

Trial teaching period: 3 February 2020 to 10 February 2020. At this time, students in grade 1 already had the ability to read short sentences, but their writing ability was limited; it took them 2 or 3 min to write a short sentence, which is one of the students' limitations that teachers need to consider to design appropriate learning activities for their STEAM education.

The trial teaching period was specifically implemented as follows:

On 3 February 2020 and 4 February 2020, the research team met the students and teachers of grade 1 in person to study and evaluate the students' cognitive levels and living conditions, and to observe the classroom and school garden to design a STEAM lesson and develop an appropriate teaching plan.

On 5 February 2020, the research team completed the design of a teaching plan for the topic *My green garden*.

On 6 February 2020 and 7 February 2020, the research team met and discussed with the teachers who were in charge of the experimental lessons about the teaching plan on the

topic of *My Green Garden*, thereby consulting homeroom teachers and first-grade academic leaders from primary schools in 3 areas in Lang Son city.

On 10 and 11 February 2020, the research team met the students of the experimental classes from 3 areas in Lang Son city and asked them to prepare necessary supplies to study the theme *My Green Garden*, such as colored paper, cardboard, clay, foam board, and other recycled materials.

On 13 and 14 February 2020, the research team and teachers who were responsible for the experimental lesson prepared equipment to teach the theme *My Green Garden*, and designed observation sheets, evaluation sheets, and questionnaires, which would be used while the students were participating in activities to evaluate the effectiveness of STEAM topic teaching after the end of the lesson.

From 17 February to 19 February 2020, 12 teachers organized the teaching of STEAM to students in 3 different areas of Lang Son with the theme *My green garden* (time: 70 min) under the observation of a number of teachers, the first-grade academic leader, and the managers of the Lang Son Department of Training and Education.

3.2. The Results of the Experimental Lessons

Students: * Pre-lesson: In the preparation phase, prior to the participation of learning “*My Green Garden*”, the students brought a number of materials in preparation for the lesson. When they were directly interviewed with some questions, such as “Are you curious about the learning content in today’s topic?” and “What do you anticipate to be doing in this topic?”, many students happily replied, “I am very curious and I am eager to learn; I really enjoy learning with these materials; I’m wondering what the teacher will organize for us to do with these materials”. Based on the students’ voluntary preparation for the learning materials of the topic, as well as their responses and enthusiastic attitude before the lesson, the authors noticed that the designed STEAM topic attracted and evoked their curiosity and excitement before they actually took part in the lesson.

During the lesson (following the 5E procedure):

The first step of the procedure aimed at raising the topic and encouraging students learn about plants in the school garden, thereby forming a visual of the plants’ outer parts and a feeling of love for trees and the environment. In this step, the students were excited to work in groups and observe as assigned by the teachers; the process was full of fun; the students worked in groups with high cooperation and discipline; and there was no confusion, disturbance, or disorder. When the teacher asked the students to discuss and share the results of learning about the plants in the school garden, the students in groups boldly presented; all groups showed the signal that they wanted to present by raising their hands, and a group of students even picked up yellow leaves, fallen leaves, and dry branches of special shapes for teachers and other students to observe.

When it came to the step of designing the model under the theme of *My Green Garden*, all the students in the groups participated enthusiastically, expressing their emotions, and showing high concentration and great excitement.

The products that students made in their *My Green Garden* theme not only showed their creativity but also their artistic ideas. The products were made from many different materials: yogurt boxes, clay, foam, colored paper, plastic spoons, etc. (Figure 2). The plants created by the students came in a variety of different colors and shapes. They were held upright with clay, bottle caps, and candlestick glue. There were three groups that even created fruits and flowers with clay, colored paper, and white foam; there were green plants plugged inside plastic caps, imitating plant pots. There was a group that used colored paper to drop into a small plastic cap, presenting that they were the lotus (an aquatic plant with flowers and leaves floating on a water surface). Thus, the trees were not only freely shaped and recreated by students, but also decorated and arranged in different ways, forming a beautiful campus. There was a case where a group of students put small plastic spoons (used to eat yogurt) next to their created green trees. This made the team curiously ask them about the idea. The students excitedly replied, “It is a fountain and I want to have

a beautiful fountain in my green garden". The students' response surprised the research team, because at first, everyone in the research group thought they were light poles. After the students' answer, it could be seen that their thinking about the issue in the lesson had been expanded a lot with creative ideas, arising from what they observed in practical life and expressed with their own moods and emotions.



Figure 2. Some of the students' work on the *My Green Garden* theme.

When presenting the product, all groups made a very clear presentation about the parts of a plant (roots, stems, and leaves) and clearly expressed their ideas of the model *My Green Garden* as their dream of a green world.

In general, when implementing their models, each group worked at a different speed, but they all managed to complete and demonstrate their ideas well. At the same time, by observing the presentation of the model product, the teachers could also clearly assess the goal that this STEAM topic was aimed at through product modeling, speech, and the students' collaborative activities while they participated in the lesson.

Besides observing to assess the students' interest and creative problem-solving abilities when participating in the 5E model lessons with a STEAM topic, the research team also used student self-assessment, peer assessment between groups, and teacher assessment forms. The contents of those forms are shown in Tables 1–3.

Table 1. Self-assessment form.

Full Name:					Group:				
1. Put an X under the box that expresses your feeling after learning the topic My Green Garden									
Really happy		Happy			Ok		Unhappy		
2. Put an X under the box that shows the mark you think you deserve when learning this lesson.									
10	9	8	7	6	5	4	3	2	1

Table 2. Peer-assessment form (in the same group).

Full Name:			Group:		
No.	Full Name	Participating	Supporting	Being Creative	Total
	Maximum score	5	3	2	10
1	Tran Thu An				
2	Nguyen Tu				
3	...				

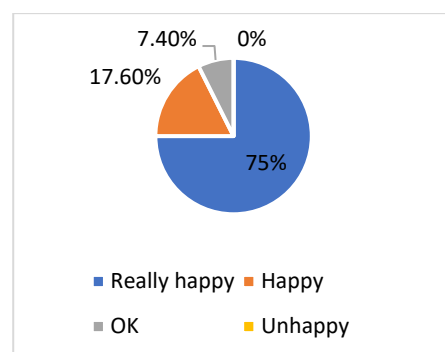
Table 3. Teacher assessment form.

No.	Criteria	Maximum Score	Score
1	Draw and annotate the parts of a plant observed	1	
2	Figure out the main characteristics including colors, shapes, and sizes of several plants in the school garden	1	
3	Present the idea of the model My Green Garden	2	
4	Prepare enough materials to make a model	1	
5	Complete the model of a green garden	2	
6	Feasibility and creativity of the model	2	
7	Clearly present about the group's model	1	
Total		10	

To evaluate the results of the trial teaching on the theme My Green Garden for students in grade 1 in three different areas in Lang Son City, the research team synthesized two groups of results: (1) results on the emotions assessed by the students themselves (item 1, Table 1); as well as (2) the average three-point results (rounded to one decimal place) for each student using the self-assessment form (item 2, Table 1); the peer-assessment scores of students in the same group (Table 2); and the teachers' assessment scores for each student (Table 3). The evaluation results are ranked according to four levels: excellent completion (9.0–10 points); good completion (7.0–8.4 points); completion (5.0–6.9 points); no completion (under 5.0 points). The evaluation results are shown in Table 4 and Figures 3 and 4.

Table 4. The results of experimental teaching.

Emotion	Result		Average	Result	
	Number of Students	Percentage		Number of Students	Percentage
Really happy	269	75	8.5–10	221	61.8
Happy	63	17.6	7.0–8.4	105	29.3
OK	26	7.4	5.0–6.9	32	8.9
Unhappy	0	0	Under 5.0	0	0

**Figure 3.** Students' self-assessment results.

Besides evaluating the general result, the research team made a comparison among three areas of Lang Son city in terms of the interest and average scores after the experimental lessons. The results are shown in Figures 5 and 6.

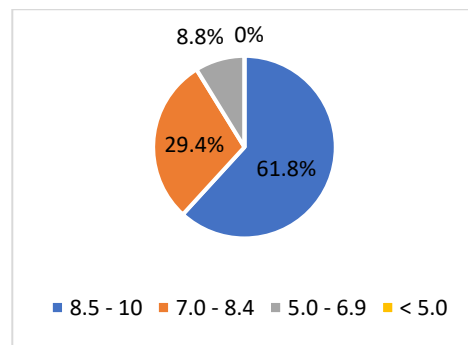


Figure 4. Students' average scores.

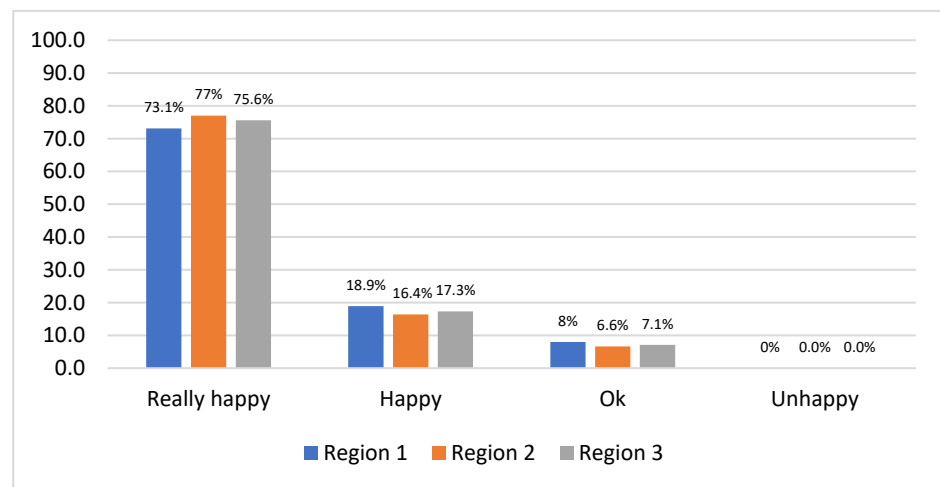


Figure 5. Results of evaluating students' emotions (in 3 different experimental areas).

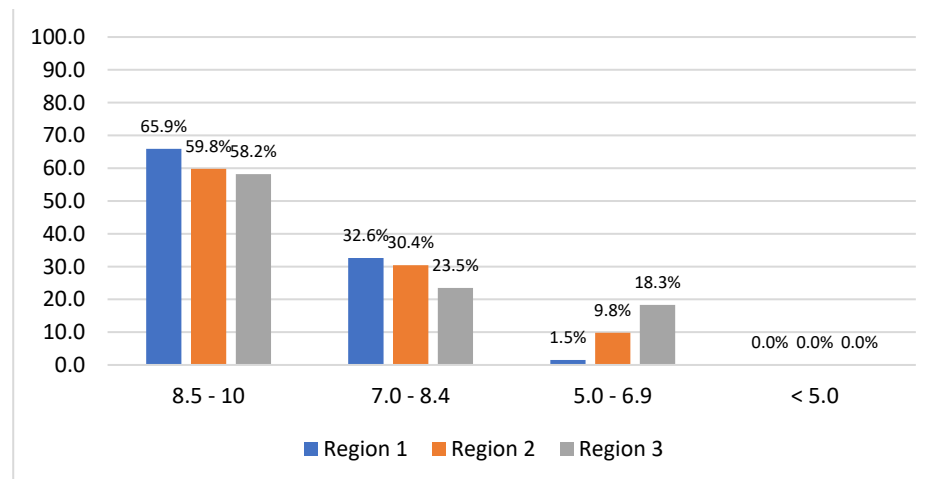


Figure 6. Results of students' average scores in 3 different experimental areas).

Looking at the results shown in Figure 5, we can see that there is no significant difference in the emotions of the students from the three different areas when participating in the lessons; the difference rate only ranges from 1% to 3%. The results in Figure 6 show that there is a slight difference in the students' average score while participating in the lessons. Students in area 1 had an excellent completion rate that was 7 to 8% higher than those of the other areas; the figure for good completion was 2% to 3% higher than those in sectors 2 and 3; and the figure for no completion was lower than those of the other two areas. We studied the criteria in the teacher evaluation form assessing group

performance according to Table 3 that are related to this score. The results showed that the average score of students in area 2 and area 3 was lower than that of area 1 due to a number of reasons: students in areas 2 and 3 did not receive points, or even had deductions, in terms of presenting and expressing their ideas about the model of My Green Garden (due to limited Vietnamese language and not much flexibility or courage). In addition, we devised more questions for the managers and teachers at the pilot schools in areas 2 and 3, such as What is the biggest change you have seen in students in this class? The results showed that 31/31 teachers recognized that the students had a good spirit, a cheerful attitude, and an excitement during the activities; 30 out of 31 teachers appreciated that their students made significant changes when working in groups and presenting their products to the class, presenting more clearly and confidently; and 31 out of 31 teachers in area 2 and area 3 said that they were surprised by their students' green garden models.

Looking at Table 4 and Figures 3–7, it can be said that the students were really interested in participating in the activities under the STEAM topic (92.6% of students were really happy or happy). In addition, the students' average scores were rather high (61.8% of students achieved excellent completion; 29.3% of students achieved good completion; 8.9% of students achieved completion). No students were assessed with No completion.



Figure 7. Photos of students' learning activities.

Beside evaluating the students, the research team asked 77 teachers who observed the lessons in the 12 pilot classes for their opinions and evaluation with regard to the feasibility and possibility of applying the 5E procedure into STEAM education for grades 1, 2, and 3 in primary schools. The teachers' questionnaire was designed as follows (Table 5):

Table 5. Teachers' questionnaire.

Question	Level			
	(1)	(2)	(3)	(4)
How can applying the 5E procedure into STEAM education help students achieve a lesson's objectives?	Not good ☐	Normal ☐	Good ☐	Very good ☐
What is your opinion about the feasibility of applying the 5E procedure into organizing activities of STEAM education for lower primary grades?	Unfeasible ☐	Normal ☐	Feasible ☐	Highly feasible ☐

The results of the questionnaire are shown in Figure 8.

Looking at Figure 8, it can be seen that using the 5E procedure to organize STEAM educational activities would be effective and highly feasible; 100% of the teachers rated the effectiveness and feasibility at level 3 and 4, and no teachers chose level 1 or 2. Besides the questionnaire, the research team also interviewed teachers who observed the lessons about the students' level of positivity and thinking ability when participating in the STEAM educational theme compared with the traditional teaching organization. The in-depth interview questions were What expresses students' ability to communicate cooperatively when using the 5E process in STEAM education? What expresses students' creativity and hardworking? What expresses students' interest in participating in the lesson? What

products were made after the lesson? Here are several comments made by the teachers: “In my opinion, students participated enthusiastically and more creatively than they did in the conventional classes.” (N.T.V.A—Academic leader of grade 1); “I am surprised about the students’ creativity expressed in the products” (T.H.T and H.T.T—teachers of grades 1 and 2); “They are wonderful!” (G.T. N—manager) (Figure 9).

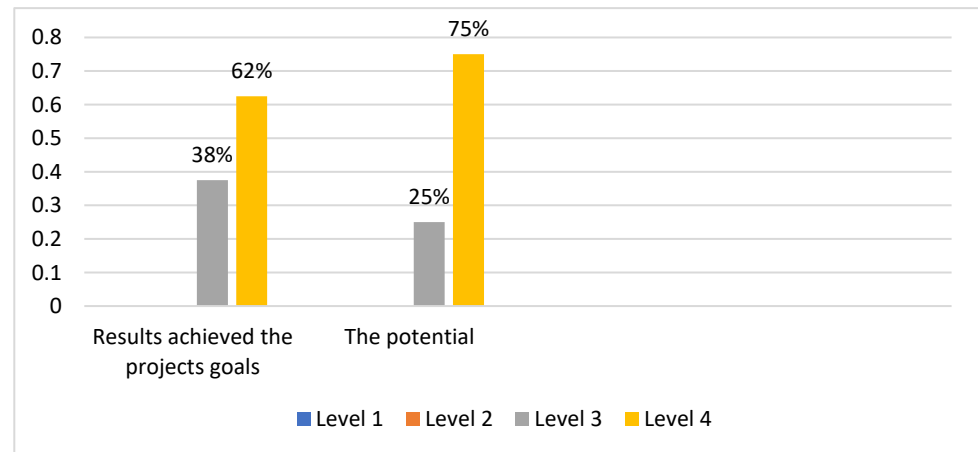


Figure 8. The results of teachers’ questionnaire about the feasibility of the application of the 5E procedure into organizing STEAM educational topics.



Figure 9. Teachers expressing their opinions after the lesson.

In addition, the research team also surveyed the teachers about the difficulties they would face when implementing and expanding this STEAM model in primary schools. Many teachers expressed their concerns about a number of issues, such as the training and expansion of the 5E model in STEAM education for primary school teachers; training students to develop autonomy in preparing materials when learning STEAM; building and arranging school-year plans to set an appropriate amount of time for organizing STEAM educational topics; and managing large-sized classrooms. Also, many teachers proposed setting up Facebook pages; organizing online training sessions for primary school managers and teachers; and setting up groups of teachers in the same grade at a school to support each other to prepare materials to organize STEAM educational activities.

4. Conclusions

From the procedure of implementing the abovementioned research, some conclusions can be made as follows:

- The 5E procedure in STEAM education can be organized in five steps: engage, explore, explain, elaborate, evaluate;
- The use of the 5E procedure in organizing STEAM educational activities for primary students is reasonable and feasible. It can be adopted into the teaching process for primary students from different areas with a wide variety of levels and teaching conditions;

- The use of the 5E procedure in teaching STEAM educational topics not only evokes students' interests but also contributes towards motivating their creativity, developing their teamworking ability, and attaching educational contents with daily problem-solving skills;
- The 5E procedure can be used to organize STEAM educational activities for primary-school students to meet the goals of developing students' personalities and competencies under Vietnam's new General Training Program.

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