Steams-Based Entrepreneur Curriculum Development by Empowering Local Potential for Elementary Students

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Abstract. This study aims to develop a curriculum model of entrepreneurship curriculum based on Science, Technology, Art, Engineering, Mathematics, and Society (STEAMS) by empowering local potential in Kebumen Elementary School and its application to grow the entrepreneurial spirit of students in Kebumen Elementary School. This research is a Research and Development (R&D) research. The development model follows the Four-D model (Define, Design, Develop, Disseminate). The subjects in this study consisted of 8 elementary schools in Kebumen. The instruments used were test sheets, observation sheets, interview sheets, and questionnaire sheets. Data analysis techniques in this study used quantitative qualitative analysis. The results showed that: 1) The development of an entrepreneurial curriculum model based on STEAMS by empowering local potentials to foster the entrepreneurial spirit of elementary school students was successfully implemented; 2) How to foster students' entrepreneurial spirit by compiling syllabus, lesson plans, student worksheets, teaching materials, media, learning resources, and facilities and infrastructure in an integrated manner in product-based learning, extracurricular activities, and habituation; 3) STEAMS-based entrepreneurship learning can foster the entrepreneurial spirit of elementary school students. It recommends practitioners, researchers and stakeholders to empower entrepreneurship with STEAMS in elementary school.

Keywords: steams, entrepreneur curriculum, local potential

1. Introduction

The 2013 curriculum is the curriculum currently used by the Indonesian state to face the era of industrial revolution 4.0 which requires students to think critically, creatively, collaboratively, and communicatively. The industrial revolution demands the quality of human resources. Entrepreneurship education is one of the important efforts that must be carried out in the era of the industrial revolution 4.0. Cultivation of entrepreneurial values should be instilled from an early age to be able to form a strong entrepreneurial character since childhood [1].

The cultivation of entrepreneurship needs to be done from an early age and continues to be developed until high school [2]. To introduce entrepreneurial values from an early age is one of the most important efforts in shaping the character of future generations. Therefore, entrepreneurial learning in children is more directed to mental changes in children so that entrepreneurship education will form a strong character of children such

as being creative, disciplined, critical, able to solve problems, able to communicate, appreciate the time, control themselves, and so on [3].

Basic level entrepreneurship education is important in developing reasoning and problem-solving skills, transferring knowledge, and building the foundation of entrepreneurship at the stages of life where good practices are instilled [4]. It was also explained that the goal of entrepreneurship education is to develop an entrepreneurial spirit gradually, starting during children's basic education and then, strengthening this spirit at higher levels of education. The implementation of entrepreneurship education at the primary school level has been recommended for developed and underdeveloped countries. The relevance of this suggestion has been recognized by countries such as Nigeria, where the integration of entrepreneurship into the basic curriculum has been seen as a way to reduce unemployment and promote economic and social growth in societies[4].

The success of entrepreneurship education includes not only an entrepreneurial curriculum but also cultural changes, structural modification within schools, and the implementation of creative action. Besides, the participation of school authorities and teachers is important for this success. Furthermore, government and private support are also very helpful in developing entrepreneurship education[4].

Based on observations and interviews with teachers in a preliminary study in several elementary schools in Kebumen, the findings are a low entrepreneurial spirit with a percentage of 38.75%. Students who have aspirations to become an entrepreneur are only around 33.34%. The impact of this finding is that as much as 98.38% is expected to have an entrepreneurship-based curriculum model that can be applied in primary schools. The results of observation during learning do not emphasize the aspects of entrepreneurship so that students lack competitiveness. Students are more likely to be users than creators. The skills developed are more focused on communication and collaboration skills, while critical thinking skills and problem-solving as well as creativity and innovation are less developed optimally. Development of local potential is minimal in learning, aspects of making work in learning are only focused on the subjects of Art, Culture, and Craft.

The diversity of local potentials in Kebumen should be able to encourage the community to develop and innovate local potentials. One way to preserve local culture and natural wealth is to integrate the regional potential into the contents of the education curriculum. Integrating local potential into effective education curriculum content can develop students' entrepreneurial character. The entrepreneurial learning model based on local potential can increase the creativity of students in doing business [5,6]. The STEAM approach is the right approach in improving entrepreneurial skills to create output in real terms [1]. The STEAM approach can encourage students to understand each component of STEAM in each learning to produce reliable entrepreneurs in the future [7]. Followed STEM/STEAM is an educational concept and system used to develop the skills needed by children and young people to be successful in the 21st century and contribute to innovative development. On the other hand, STEM becomes an increasingly important part of basic literacy knowledge about economics [8].

Based on the background above, it is necessary to develop an entrepreneurship curriculum based on STEAMS by empowering local potential to develop the entrepreneurial spirit of students in elementary schools.

2. Methodology

This research is a research and development that develops a model of entrepreneurship curriculum based on STEAMS by empowering local potential to develop the entrepreneurial spirit of students in Kebumen Elementary School. This development uses the Four-D model proposed by Thiagarajan, Semmel, and Semmel [9]. This model consists of 4 stages of development, namely Define, Design, Develop, and Disseminate. The instrument used was divided into two, namely data collection instruments and learning instruments. Data collection instruments in the form of test sheets, questionnaire sheets, and observation sheets. While the learning instrument consists of a curriculum consisting of a syllabus, Learning Implementation Plan, and Student Worksheets. The validity and reliability of the test instruments were analyzed using Rasch modeling which resulted in a question reliability level of 0.95 and one items that was declared invalid / needed to be corrected.

The model was developed and validated learning device by experts and practitioners. Entrepreneurship education model validation and test questions in this study conducted by seven validator comprising 1 validator expert and 8 practitioners have considered competent in the field of research that researchers discussed. Besides that, there were 16 teachers in the primary schools where the study responded to the developed curriculum. The number of the respondent in the small field testing of this research are 66 students from 3 elementary schools in Kebumen and the large field are 152 students from 5 elementary schools. Sampling was done with a purposive sampling technique, namely by considering schools that have implemented the 2013 curriculum and are located in cities, villages, mountains, and coastal areas.

The data analysis technique uses descriptive quantitative. The effectiveness test of the STEAMS-based entrepreneurship curriculum using the Posttest-Only Control Design. Hypothesis testing is analyzed using the Mann-Whitney U test provided that if the p-value is less than 0.05 then there is a difference between STEAMS-based entrepreneurship learning with conventional learning in developing the entrepreneurial spirit of elementary school students.

3. Results

Entrepreneurship curriculum development products based STEAMS by developing the local potential are in the form of a set of curriculum drafts that include an Introduction Chapter containing the foundations and principles of curriculum development, and Educational Objectives Chapter, a Vision, Mission, and School Objectives, a Curriculum Structure and Content Chapter, a Core Competency Chapter and Basic Kempotency, STEAMS Based Integrated Thematic Learning and Entrepreneurship Chapters, Scientific Approaches, and Authentic Assessment, Educational Calendar Chapters, and Closing Chapters.

The products are then tested by experts and practitioners. This testing of experts and practitioners proves the feasibility of the products that have been developed. The results of the expert and practitioner's assessment indicate that this curriculum is suitable for use in elementary schools. The feasibility assessment component includes the accuracy in the preparation of all curriculum components and the accuracy in choosing an entrepreneurial curriculum implementation strategy. The results of the validation of experts and practitioners states that the product developed is feasible for use. But some things need to be revised, for example, entrepreneurship curriculum development that is carried out should not overlap with arts subjects in schools, determining the allocation of time must be considered during entrepreneurship learning. Also, the choice of language that is not suitable for elementary students and the use of attractive pictures and illustrations needs to be added, and the message conveyed must be adjusted to the basic needs of school students. This input material is used as the basis for the implementation phase of the STEAMS-based entrepreneurship curriculum.

The results of implementing the STEAMS-based entrepreneurship curriculum will be explained below:

3.1. Implementation of STEAMS-Based Entrepreneurship Vision and Mission

STEAMS-based entrepreneurship curriculum has a vision: The realization of students who are skilled, pious, noble character, and have an entrepreneurial spirit based on STEAMS by empowering local potential. The mission to be achieved 1) provide the basics of faith and piety towards God Almighty, 2) Cultivating circumcision and congregation prayers, 3) Familiarizing 5 S (smile, greetings, greetings, courtesy, and courtesy), 4) Applying attitude disciplined, creative, innovative, critical, productive, and communicative in learning, 5) Creative and Entrepreneurial Products program, 6) Organizes interesting and fun learning, 7) Develops noble character values, and 8) Empower parenting learning.

Based on the results of observations and interviews with the headmaster and teachers have shown support for the achievement of the vision and mission of the variables and aspects that support entrepreneurship. The Principal stated that he was very interested and happy if the local government imposed this Entrepreneurship Curriculum with all the consequences that had to be prepared/given. This is because the Entrepreneurship Curriculum directs students to be creative and productive in learning. Students do not feel bored in learning and inspire creativity to be able to utilize the local potential of the region so that it becomes a valuable product to be appreciated and sold. Entrepreneurship education that is properly formed and developed will generate interest and shape entrepreneurial creations [2]. So that students will get used to productively creating works based on the potential of the existing area. Through entrepreneurship education, students not only get theories about entrepreneurship but also apply the concept to the real world[10].

3.2. STEAMS Based Entrepreneurship Curriculum Material

Indicators of entrepreneurship are integrated into all subjects starting from 4th-grade elementary school. Entrepreneurship subjects are held in 2 hours of meetings per week. Thematic learning material is adjusted to the syllabus of the development of the Entrepreneurship Curriculum with an emphasis on entrepreneurial character. The character of entrepreneurship is implemented in every basic competency that is applied. Table 1 is the curriculum structure developed.

Table 1. Entrepreneurship Curriculum Structure

No	Subject	Allocation of Study Time Weekly					
		I	II	III	IV	V	VI
	Group A						
1	Religious Education and Characteristics	4	4	4	4	4	4
2	Pancasila Education and Citizenship	5	5	6	5	5	5
3	Indonesian Language	8	9	10	7	7	7
4	Mathematics	5	6	6	6	6	6
5	Natural Sciences	-	-	-	3	3	3
6	Social Sciences	-	-	-	3	3	3
	Group B						
1	Cultural Arts and Crafts	4	4	4	3	3	3
2	Physical Education Sports and Health	4	4	4	3	3	3
3	Regional Languages	2	2	2	2	2	2
4	Entrepreneurship	-	-	-	2	2	2
	Number of Time Allocations Week	32	34	36	40	40	40

Table 1 show entrepreneurship education in grade in elementary school. As for classes 1,2 and 3, the focus is on entrepreneurship habituation.shows that entrepreneurship indicators are integrated with all subjects starting from 4th. However, in implementing entrepreneurship education it is also carried out in an integrated manner in other subjects.

3.3. Strategies for Implementing STEAMS-Based Entrepreneurship Curriculum

The application of a local potential based entrepreneurship curriculum with the STEAMS approach in elementary school uses a learning model that emphasizes the project. Some learning models that have been applied are Scientific Reading Based Project (SRBP), and Project-Based Learning (PjBL). The SRBP and PjBL models are applied to thematic learning and entrepreneurship subjects, to emphasize the character of entrepreneurship. Learning methods applied include discussion, questions and answers, assignments, demonstrations, experiments, and projects. In the initial learning activities, the entrepreneur's success story from the area was introduced. By providing examples of successful people, it can motivate someone to detect opportunities and generate business ideas and be more confident in their abilities[11].

Students are trained to design innovative products based on local potential. The design that was developed, for example, made mending woven nanodevices that are usually used to make mats, then made hotel slippers decorated with beads and hemp ropes. Completion of local potential based products is carried out in schools with group collaboration. Students are validators package products and provide labels. The packaged products are then presented by students in front of the class. Students are trained to sell products to the school community. Presentation activities are carried out with the aim that students are brave, confident, and able to communicate to offer products to others. The proceeds of the sale are given to students as an additional allowance. Entrepreneurship education is learning that involves elements of activities in a production-based learning approach and can develop entrepreneurial characters such as communication skills and teamwork[12].

The main impact of the application of the entrepreneurship curriculum with the STEAMS approach is the difference in learning achievement test scores between the treatment and control classes. The treatment class got a better score than the control. Even though they come from various regions in Kebumen district, the scores of test scores were not too significant between cities, villages, and coastal treatment classes. In the research, there are findings that there is a relationship between innovation, entrepreneurship, and STEM education. STEM education can develop the skills, knowledge, and competencies required for innovation, and the creation of competitive advantage in a knowledge-based economy[13].
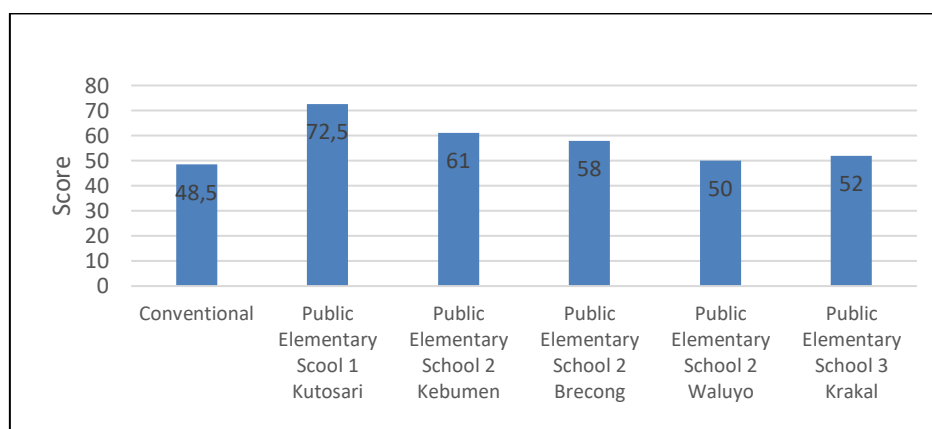

Figure 1. The Average Score of Entrepreneurial Learning

Based on Figure 1 shows the average score of entrepreneurship learning tests. The results show that the average score in schools that use STEAMS-based entrepreneurship learning is higher than in conventional schools. Public elementary school 1 Kutosari shows the highest average among other schools. This is because the school has been doing entrepreneurial activities, namely making salted eggs. Besides that, activities during learning have developed entrepreneurial values such as communication skills, responsibility, creativity, and others. Entrepreneurship education requires cultural changes that lead to the development of entrepreneurial character[4].

The result of the statistical difference test using the Mann-Withey U test shows that there is a difference between the control class and the experimental class in both the small field test and the large field test.

Table 2. Summary of Mann-Whitney U test results for a small field scale

Test Statistics

	Small Scale Test Value
Mann-Whitney U	128.500
Wilcoxon W	281.500
Z	-3.498
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: model

Table 2 shows that there is a difference between the control class and the experimental class in both the small field test.

Table 3. Summary of Mann-Whitney U test results for a large field scale

Test Statistics

	broad scale test value
Mann-Whitney U	137.500
Wilcoxon W	290.500
Z	-3.333
Asymp. Sig. (2-tailed)	.001

a. Grouping Variable: model

Table 3 shows that there is a difference between the control class and the experimental class in both the large field test.
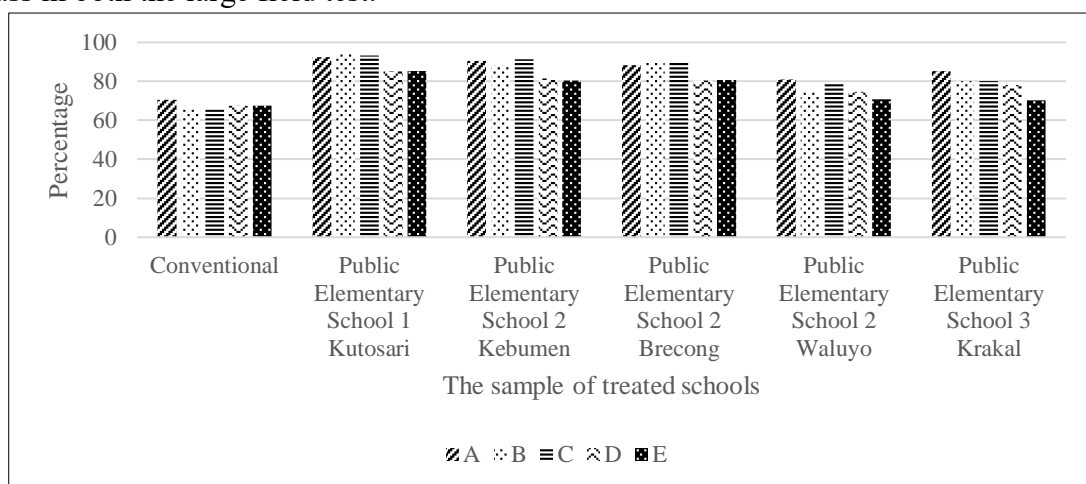

Figure 2. The character of entrepreneurship developed in the sample elementary school

The impact of accompanying the application of the entrepreneurship curriculum with the STEAMS approach through SRBP and PjBL models is the skills of teamwork, communication, independence, self-confidence, critical thinking, and creativity. This result is similar to the research of Safitri & Mukminin that through entrepreneurship

learning activities can develop self-confidence, independence, and good teamwork[10]. The results of research from Gonzales which explains that entrepreneurship education programs through STEAMS education have a positive impact on the perception of individual entrepreneurial opportunities, entrepreneurial environmental awareness, and self-efficacy[14]. To form individuals who have entrepreneurial skills, a learning environment must be created and teachers who as educators must have entrepreneurial skills. In this case, the STEAMS approach is learning that can be used to shape the entrepreneurial environment for both teachers and students[14].

Description: A: Communication, B: Cooperation, C: Confidence, D: Independence, E: Creative thinking

Figure 2 shows students in all elementary schools in the study sample able to communicate well. This can be seen when working on projects together to make products with local potential. Students can divide each task and there is communication during group activities. Entrepreneurship education can develop good communication and teamwork skills[12]. A communication statement is done by directing students to work together to make a product and market it.

3.4. Assessment of Learning Outcomes

Learning outcomes in STEAMS-based entrepreneurship learning include three domains, namely cognitive aspects, attitude aspects, and aspects of skills. In addition to these three domains, each entrepreneurial learning also produces a product that makes it as a result of the student's final achievements. Students work hard in doing assignments to produce products.

This is evident based on the results of the questionnaire, as many as 97.80% of students have an attitude that is not easy to give up in doing an assignment. To develop an attitude of being able to read opportunities properly students can read literature such as in the mass media, TV, and the internet, as well as observe conditions in the surrounding environment. While the effort in setting targets to be achieved, students need to always be directed to write down any targets that will be achieved every day, then students are directed to evaluate each target that has been achieved and targets that have not been achieved. For example, when selling a product, the target achieved is to be able to sell all the products that have been made. However, when there are products that don't sell, students need to be directed to make an evaluation.

The last aspect is the attitude of taking risks. This attitude is developed in every learning by providing an opportunity for students to give arguments/opinions without fear if the answers are wrong, allowing students to try to make products without fearing that products made will fail, and not easily discouraged when products are made not according to expectations. For example, when students practice selling products, some products are not sold, so students are directed to always be enthusiastic and evaluate why products are not sold.

STEAMS-based entrepreneurship learning is very capable of developing attitudes towards problem-solving skills. Entrepreneurship education will have an impact on economic development, the key is through STEM education[13]. STEM education can

develop skills such as problem-solving skills, analysis and project planning skills, mathematical skills for measurement and calculation, cooperation and communication skills, leadership skills, and technical skills for problem-solving. This problem-solving activity was developed by providing a surrounding phenomenon such as teachers displaying several local potential products that are feasible and not suitable for sale. Then the students identify the product and analyzing what to do to make the product attractive and can be sold[13].

The STEAMS-based entrepreneurship curriculum can develop communication skills, cooperation, creativity, and innovation, the ability to solve problems, create opportunities, and dare to take risks. The result of STEAMS is to produce students who dare to take risks, are not easily discouraged, are actively involved in learning, persist in solving problems, increase collaboration, and work creatively with interesting and fun. Some of these opinions explain that the STEAMS approach is appropriate/appropriate to develop entrepreneurial spirit students include creative and innovative, willing to work hard, good at solving problems, able to read and take advantage of opportunities properly, and dare to bear risks[15].

Local potential can be used as a learning resource that can be applied in STEAMS learning. This study uses several types of local potential Kebumen that are adapted to entrepreneurial material, such as genitri seeds that are made accessories (necklaces, bracelets, prayer beads, key chains, hair clips), teak tree dust and wood branches used as decoration in making places pencils, pandan leaves materials made into hotel slippers, and agricultural grain used as decoration in making piggy banks. This is supported research by Tahir & Hasan which results in the finding that learning using local wisdom can produce entrepreneurial competencies of students higher than those not using local knowledge learning[6].

In addition to maximizing the local potential of the region, the STEAMS approach in learning entrepreneurship is supported by using the Project-Based Learning and Scientific Reading Based Project (SRBP) models. This is supported in a study by Darmawan & Soetjipto explaining that the PjBL model can increase entrepreneurial interest and learning outcomes and generate positive responses from students[16]. Besides, the PjBL model can improve students' creative thinking abilities[17]. The ability to think creatively is one of the characteristics of entrepreneurship. The next learning model is the Scientific Reading Based Project (SRBP) model, this model is applied by focusing on reading activities of scientific literature. After reading, students are directed to make a project. This model is appropriate to be used in developing student entrepreneurship because through reading scientific literature, students can find a solution to the problems given by the teacher. After finding a solution from the scientific literature, students make a project as a real solution to solving a problem.

STEAMS approach in learning entrepreneurship can develop the entrepreneurial spirit of students better than conventional learning. The final results of STEAM are to produce students who have an attitude that is not easily discouraged. Through the project model, students are required to make a product that is interesting and worth selling. To make a product, students discuss determining the product to be made. Therefore, the attitude of

working hard can drive to produce innovation[15]. The attitude of working hard is positively related to the orientation of innovation in entrepreneurial learning. In addition to hard work, the discipline has a positive relationship with innovation. It was also explained that innovation requires a strategic plan that is systematic and hard work, and individuals who value discipline and hard work believe that by being innovative, a person can succeed in business/entrepreneurship[18].

STEAMS-based entrepreneurship learning can encourage students to have problem-solving skills. Observation analysis results show that students' problem-solving skills in STEAMS-based entrepreneurship learning are better than conventional learning. This is because in every STEAMS-based entrepreneurship learning meeting students are allowed to analyze the problems given by the teacher. Problem-solving ability positively influences innovation behavior and perceptions of opportunities in entrepreneurship. It was also explained that problem-solving skills were the key to innovative attitudes in responding to rapid changes with the ability to find alternatives and predict an outcome[19].

The ability to read opportunities for individuals becomes very important in entrepreneurship. The ability to read opportunities is how to find and take advantage of creative opportunities that create new values and benefits and are the ultimate goal of entrepreneurship education. Individuals who can read opportunities have better abilities in carrying out an innovation[19]. The behavior of innovation becomes a determinant in the ability to read opportunities for the better. It was also explained that through entrepreneurship learning can improve the ability to read opportunities innovatively[19]. Based on the results of the observational analysis, the ability to read student opportunities in STEAMS-based entrepreneurship learning was developed by reading various literature, for example, the internet, mass media, the surrounding environment, and TV/radio.

Being brave in taking risks is one of the outcomes in STEAM learning. One of the final results of STEAM is to produce students who dare to take risks. A risk-taking attitude is closely related to the success achieved. Individuals who dare to take risks will be more able to get success than individuals who are afraid to make an innovation[15].

4. Conclusions

The results showed that the STEAMS-based curriculum development by empowering local potential can be implemented in the elementary school. This STEAMS-based curriculum can develop the entrepreneurial spirit of students such as communication skills, cooperation, self-confidence, creativity, and innovation, ability to create opportunities, ability to solve problems, and dare to take risks. However, it is necessary to have congruence between entrepreneurship subjects and other subjects so that entrepreneurial character is always stuck every day. Besides, the role of parents and society is very important in developing entrepreneurial products that have been made by students.

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