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Development of STEAM-Based Cooperative Learning Model to Increase Student Learning Motivation in Public Elementary Schools in Brebes District, Brebes Regency

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A B S T R A C T

This study aims to develop and assess the effectiveness of two innovative educational models to enhance student learning motivation and achievement. The first focuses on designing a STEAM-based cooperative learning model to improve students' learning motivation in Public Elementary Schools in Brebes District, Brebes Regency. Through a Research and Development (R&D) approach, the study identifies issues such as conventional teacher-centered methods, lack of STEAM integration, unstructured collaboration, and assessment misalignment. Findings indicate a significant improvement in students' motivation, shown by the increase in the experimental class mean score from 52.8000 to 75.0000, supported by statistical analysis (t = 61.562, sig = 2.446 ≥ 0.05), proving the model's effectiveness. The second part of the study develops a website-based science learning parenting model for broken home students at SMPN 2 Tanjung Brebes. Using the ADD development model, the research addresses the high demand for interactive, accessible, and curriculum-aligned learning media. The website integrates tools like Google Sites, Drive, and Forms, and based on validation and student responses (94% "Very Positive") as well as improved learning outcomes, the model is deemed effective and feasible for supporting science learning and increasing student involvement.

Keywords: *Development of STEAM-Based Cooperative Learning Models, Student Learning Motivation*
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INTRODUCTION

The purpose of this study is to describe the results of the analysis of the need for the development of a STEAM-based cooperative learning model to increase student learning motivation in State Elementary Schools in Brebes sub-district in Brebes Regency and to develop the design of a STEAM-based cooperative learning model to increase student learning motivation in State Elementary Schools in Brebes sub-district in Brebes Regency and to describe the effectiveness of developing STEAM-based cooperative learning models for increase student learning motivation at State Elementary School in Brebes sub-district in Brebes Regency.

One of the main factors that greatly affects the achievement of learning goals is the learning process. The achievement of learning goals will be influenced by the strategies used by teachers during the teaching and learning process. Cooperative learning is one of the most frequently used learning models in education in Indonesia. According to the cooperative learning paradigm, students must work closely with diverse peers to master a particular topic and achieve anticipated competencies in a subject. This learning model is commonly used in various ways, starting from to exploring information known by students, there is no exposure to the material whether students understand and remember the material or not, and lastly edutainment as a means of learning while playing so that this model can be applied according to the needs of the teacher (Nurkhasanah, et al., 2019)

The cooperative learning model is effective learning that can give rise to cognitive strategies that can apply their knowledge in real life. Effective teachers will use different strategies when preparing for learning to achieve learning objectives. The application of strategies and the way students learn to use strategies is a way to ensure that the content and skills taught or practiced are accessible to all students.

The cooperative learning model is expected for students to be able to understand the concepts in the material taught by teachers in learning which causes the flow of information to be faster and limitless so that students are motivated to learn. In the world of education, we often encounter several problems that we often carry out learning activities that are centered on teacher activities only, not on students, most teachers play a dominant role, so that teachers function as learning resources and hold authority in learning activities (teacher centered). By seeing the reality in the field like that, the government made an Independent curriculum, there are characters that will be instilled in the students contained in the profile of Pancasila students, namely faith and devotion to YME and noble character, independence, mutual cooperation, global diversity, critical reasoning, and creativity. which aims to prevent teachers from holding a dominant role. Indirectly, students are required in learning to be creative and independent. But the reality is that there are still many schools that find it difficult to implement the Merdeka curriculum. STEAM-based learning (Science, Technology, Engineering, Art, and Mathematics) is currently the main educational orientation in many developed countries. STEM or STEAM learning as an integrated learning process both intracurricular and extracurricular. This is intended so that students can improve critical reasoning and creative thinking, and be able to present the right solutions to the problems they face, especially those related to the world of science, crafts, and even engineering. In Indonesia, the concept of a STEAM-based learning approach has also received a breath of fresh air. Internalization of the STEAM approach can be found in the 2013 curriculum.

STEAM is a learning that combines knowledge (*science*), the use of technology (*technology*), the ability to apply knowledge and technology in practical life (*engineering*), presentation in other forms that are interesting and beautiful (*art*), and the ability to calculate and similar knowledge (*mathematical*)) (Darmadi, Budiono, & Rifai, 2022). There is an addition of "A" in STEM representing that the arts and humanities are considered transdisciplinary learning processes that are able to increase diverse participation in science, technology, engineering, and mathematics (STEM).

According to Wanasek (2024), there are important points in STEAM, namely STEAM learning does not contradict STEM, but rather enriches and expands its scope. STEAM learning is a curriculum philosophy that empowers science teachers to develop *a humanistic* vision in 21st century education. STEAM learning facilitates creative space for teachers in various fields to work together to develop an integrated curriculum. STEAM learning on a simple scale can be designed and implemented by innovative teachers. STEAM educators can take inspiration from project-based learning. STEAM learning involves students in the learning process.

In carrying out teaching and learning activities in the field of education, teachers should do it by considering the use of models that are in accordance with the characteristics of the material being taught. The choice of learning methods and models will greatly affect the quality and outcomes of learning. Development, improvement and changes made in learning are needed for the learning system to be good.

The cooperative learning model is Learning model which prioritizes student cooperation in learning activities. As stated the cooperative learning model is type Learning which prioritizes student cooperation in learning activities. As stated by Thabroni (2021), cooperative learning refers to a learning method in which students work together in small groups and help each other in learning. Complementing the explanation above, according to Rusman et al, (2024) Cooperative learning is a form of learning in which students learn and work in small groups collaboratively with a heterogeneous group structure. This means that the study groups that are arranged must be diverse and indiscriminate.

In relation to the diversity of groups in the cooperative learning model, the thing that can be done to ensure this is to carry out a randomization system in determining groups. Student collaboration in learning can encourage joint inquiry and dialogue, development of thinking skills and social skills (Nugraha, Rahmad Agung & Ardyanti 2019). In essence, don't let students form their own groups so that heterogeneous conceptions can be applied well. In the world of education, cooperation skills are important things that must be implemented in learning, both inside and outside of school. Cooperation can accelerate learning goals, because basically a learning community always has better results than a few individuals who study alone. As the saying goes, two heads are better than one head, which can be interpreted that with cooperation, students can develop confidence, increase life experience and increase social interaction that will help students in living their lives in the future. But in reality, the problem faced today is that student cooperation is not optimal. The problem is that they go to school, but the way they learn is limited to listening to the teacher's information and not trying to understand the content of the field of study taught by the teacher, and at the time of the exam they re-reveal the content of the field of study that they have memorized. Such learning is a way that fails to achieve the goal of learning in the true sense. Learning that is only oriented to learning outcomes will certainly have a less positive impact on students because students will tend to be individualistic, less tolerant, and far from the values of togetherness. We can also see other phenomena happening to students today. They consider that exciting activities are outside of class hours. This is because they feel burdened when they are in class, especially if they have to deal with boring subjects. They will cheer if they hear the announcement of going home early because there is a teacher's meeting, cancellation of exams or teachers not teaching due to illness, and so on.

Thus, the learning method using the learning styles of audio (hearing), visual (sight or image), and kinesthetic (deeds) of students can increase students' mastery of the material given because students will do and feel their own experiences as learning for themselves. Therefore, a teacher needs learning innovations so that students are excited, motivated to learn, and enthusiastic about learning at school. If they are happy when they enter the class, they will definitely find it easy to follow the subject. Therefore, teachers play a very important role in the success of learning, so teachers are required to use varied learning methods and strategies so that students do not experience boredom in receiving material in class. Many teaching methods are used by teachers, but no one learning method is better than another. Each method has advantages and disadvantages. The shortcomings of one method can be covered by other teaching methods, so that teachers can use several teaching methods in carrying out the teaching and learning process. However, for the selection of a teaching method, it is necessary to pay attention to the characteristics of the material presented, the learning objectives, the available time, and the number of students as well as other matters related to the teaching and learning process.

Student learning motivation is an important factor that affects the success of students. One of the factors that can affect students' learning motivation is the learning method carried out by teachers. Teachers have an important role in creating a fun learning environment and motivating students to learn well. Therefore, it is very important to have a learning method carried out by teachers.

Cooperative learning is a teaching strategy that allows small groups of students to work together on a task together. The parameters often vary, as students can work together on a variety of problems, from simple math problems to large tasks such as proposing environmental solutions at the national level. Students are sometimes individually accountable for their part or role in the task, and sometimes they are held accountable as a whole group. (Lewis, 2019).

Each member of the group has equal responsibility for the results to be achieved on the given task. Therefore, each member will help each other, have motivation for the success of the group, so that each individual will have the same opportunity to contribute to the success of the group. The assessment system is also carried out for the group and each group will

receive a reward, if the group is able to show the required achievements. The essence of cooperative learning is the occurrence of positive development and interdependence between group members, so that there is mutual help between students who have adequate abilities and students who have inadequate abilities. In cooperative learning, more emphasis is placed on student cooperation in completing the tasks assigned by the teacher to students, so that in addition to students increasing their knowledge or increasing their achievements, social interaction communication and student cooperation will also be created and increased.

Cooperative learning is able to improve students' cognitive and affective skills simultaneously. Some of the benefits and advantages of cooperative learning are that students who are taught with and in cooperative structures will obtain higher learning outcomes, Students who participate in cooperative learning will have higher self-esteem attitudes and greater motivation to learn.

With STEAM-based cooperative learning it is expected not only to teach abstract theory, but to connect it with practical applications in everyday life. Students see how scientific, technological, engineering, art, and mathematical concepts are used to solve real problems and create innovative solutions. Thus cooperative learning with the STEAM approach creates an interactive, meaningful, and student-centered learning environment, which can ultimately significantly increase students' motivation to learn. In this study, the researcher developed a STEAM-based cooperative learning model in social studies learning in elementary schools

METHOD

The model used in this study is a type of research and development or Research and Development (R and D), which aims to develop a new product or improve an existing product or even to produce a specific product, and test the effectiveness of the product. This type of research is different from other educational research because the goal is to develop products based on trials and then revised until they produce products that are suitable for use. Kenton (2024) stated that development research is a process used to develop and validate products used in education and learning and this research is a concept of research and development that is very closely related to innovation.

This research and development resulted in a STEAM-based cooperative learning design (Science, Technology, Engineering, Art, and Mathematics) to increase student learning motivation at State Elementary Schools in Brebes district, Brebes Regency. To find out the motivation to learn, the researcher conducted a pretest before conducting the research and a posttest after being treated to both groups. To determine the level of student motivation, the researcher used questionnaires at the beginning and end of the treatment. These research steps or development processes consist of a study of the research findings of the product to be developed, developing the product based on these findings, conducting field trials according to the context in which the product will be used, and revising the results of the field test. This means that the findings in the field are then transformed into a product so that it can be used for the desired achievement.

The definition of development research according to Seels & Richey in Setyosari (2019) is a systematic study to design, develop and evaluate programs, processes and learning outcomes that must meet the criteria of consistency and effectiveness internally. The products produced in development research include teacher training materials, learning materials for students, learning media to facilitate learning, learning systems and others. According to Rayanto (2020), the form of development of a development research does not only consist of learning hardware, but also includes the software, visual and audio materials, and programs or packages that are a combination of various parts.

From various existing development research models, the researcher chose to use the ADDIE (Analysis, Design, Development, Implementation and Evaluation) model in this study. The selection of this model is based on the consideration that this model is developed systematically and based on the theoretical foundation of learning design. This model is

programmed with a systematic sequence of activities in an effort to solve learning problems related to learning resources that are in accordance with the needs and characteristics of students

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FINDINGS AND DISCUSSION

The findings in this study are seen from the analysis of the need for the development of a STEAM-based cooperative learning model to increase student learning motivation in State Elementary Schools in Brebes District, Brebes Regency, the analysis is based on Problem Identification, Problem Identification is a Conventional Learning Method. Teaching is still teacher-centered with lecture or memorization methods, less involving collaborative activities and creative exploration. It can be exemplified in the field such as passive students, minimal group interaction, and not challenged to think critically. Lack of Integration of STEAM in the Curriculum, Separate learning between disciplines (science, art, technology, etc.) without a pleasant applicative context. It can be said that what happens in the field is that students do

not see the relevance of the material to real life, so that learning motivation decreases. Low Student Collaboration, Group activities are often unstructured, leading to dominance of a few students or conflicts between members. This can be exemplified in the field is that students who are shy or lack confidence tend not to participate actively, Assessments are not in accordance with the characteristics of Cooperative Learning, Assessments still focus on individual results, not the process of collaboration or creativity. This can be exemplified in the field is that students are not motivated to cooperate because grades are only taken from individual exams.

As for the Needs of Students and Teachers, seen from the Student Needs, students need learning materials that are interactive, contextual, and based on STEAM projects, structured collaborative activities that trigger the involvement of all students (role-playing, group projects), Strengthening soft skills such as communication, problem-solving, and creativity. While Teacher Needs is a clear module guide to implementing a STEAM-based cooperative model, including sample activities and assessment rubrics, Training on the use of simple technologies (e.g.: basic 3D design applications, science experiment tools). Strategies for managing heterogeneous groups (students with different abilities). Analysis of the need for the development of a STEAM-based cooperative learning model to increase student learning motivation in State Elementary Schools in Brebes District, Brebes Regency also looks at School Needs where STEAM supporting facilities (science experiment tools, creative materials, access to basic technology) Policies that support collaborative learning (flexible scheduling, open learning spaces).

CONCLUSIONS

The results of the study show that the design of the STEAM-based cooperative learning model can increase the learning motivation of students in State Elementary Schools in Brebes District, Brebes Regency, this can be seen from the mean of the control class and the experimental class where there is an increase or increase from the mean of the control class of 52.8000 to an increase in the mean of the experimental class of 75.0000. so it can be said that the design of a STEAM-based cooperative learning model can increase the learning motivation of students in State Elementary Schools in Brebes District, Brebes Regency. The results of the study also show that the development of a STEAM-based cooperative learning model is effective in increasing student learning motivation in State Elementary Schools in Brebes District, Brebes Regency, this Based on the t value in this study, the t value was obtained as 61.562 with a sig of 2.446 which means ≥ 0.050 (2,446≥0.050). with a GIS of 2,446 with a greater probability of 0.05, thus the development of a STEAM-based cooperative learning model is effective in increasing the learning motivation of students in State Elementary Schools in Brebes District, Brebes Regency.

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