

IMPLEMENTATION OF STEAM-BASED SCIENCE LEARNING TO IMPROVE STUDENT LEARNING OUTCOMES ON THE MATERIAL PROPERTIES OF LIGHT CLASS IV-A

DI MI AMIRUDDIN

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Abstract: This research discusses the application of STEAM-based IPA learning models (Science, Technology, Engineering, Art, and Mathematics) to improve the learning outcomes of class IV-A learners at MI AmiruddinBlendren. The purpose of this study is that after the implementation of this STEAM learning model will be able to improve students' learning outcomes on the material properties of light. This study used descriptive qualitative methods, with the subject of class IV-A MI research AmiruddinBlendren year in the odd semester of the 2021/2022 school year with a total of 32 learners consisting of 17 boys and 15 girls. Data collection in this study is to use the pre-test and post-test scores of learners. The results of this study are an increase in student learning outcomes from pre-test and post-test questions. With the improvement of student learning outcomes in this learning material, it is expected for all teachers to innovate and find a suitable learning model so that students do not feel bored in every learning.

Keywords: IPA Learning, Learning Outcomes, Learning Models

INTRODUCTION

Education in the era of globalization as it is today requires schools to be able to print learners who are not only cognitively smart but also in skills. We cannot deny that in the era of globalization with the rapid development of the era, the role of education becomes very important in preparing students to have 21st century skills. Learners often know information earlier than their teachers. Therefore, teachers are required to follow the latest developments regarding strategies, approaches or methods in the learning process.

In Unesco research (2017), Education continues to progress according to the needs and developments of the times. Many learning methods that developed led to the 4.0 era and welcomed the era of 5.0 all learning methods in accordance with the development of 21st century learning (Unesco, 2017). The quality of Indonesian education is currently still not as expected compared to other developed countries. Assistant Director General for education of the United Nations Educational, Scientific and Cultural Organization (UNESCO), Qian

Tang, at the launch of the Global Education Monitoring (GEM) Report 2016 in Jakarta stated, "The education quality gap is still an obstacle for many countries, especially Indonesia". From the explanation of UNESCO data shows that the country of Indonesia is already far behind other developing countries.

To help the quality of education in Indonesia, one of them is by improving the quality and skills of teachers with this is expected to change the quality of education in Indonesia to be better than before. As an effort to improve the quality of education, there needs to be a strong foundation to achieve these learning goals.

A hands-on learning approach is perfect when used to prepare future generations. This learning approach cannot be separated from the involvement of the child's direct environment that can be used as a learning object. In essence, this learning aims to enable children to be able to empower their own current environment and can start early. In the 2013 curriculum, the strategies used include a scientific approach with problem-based learning models, discovery learning and project-based learning. There are three things that the curriculum will achieve, namely, character, competence and literacy. In terms of character, it is expected that learners are able to face the ever-changing environment.

IPA is a science related to how to find out about nature systematically, so that IPA is not only a mastery of a collection of knowledge in the form of facts, concepts, or principles but also a process of discovery (Permendiknas, No. 22 of 2006). Natural Sciences (IPA) or science at the Madrasah Ibtidaiyah (MI) level is one of the most important subjects to learn. Because in science education can be one of the best provisions for students in facing various challenges in the future. Students' literacy skills can also be improved through IPA learning for MI students by using steam learning models (Science, Technology, Engineering, Art, and Mathematics).

MI teachers experience problems in IPA learning due to lack of media, facilities and pre-facilities in the development of science and the variety of teachers' understanding in understanding the concepts of science around children. For this reason, media, facilities and pre-facilities in child development in

Indonesia are easy and cheap and science learning tools for science concepts around children that can be one of the references of MI teachers in learning.

One of the learning innovations that can be used is the use of steam approach in IPA learning in MI. The STEAM approach (Science, Technology, Engineering, Art and Mathematics) is one of the new learning approaches in the 21st Century (Mu'minah, and Suryaningsih, 2020).

Learning through the STEAM approach invites learners to be active including technological literacy literacy. In accordance with 21st century learning, one of which is related to the use of technology. 21st century learning applies learning skills & innovation, information skills, media and technology (digital literacy). STEAM is a learning model that is currently increasing in popularity, to give greater relevance to IPA learning in MI, teachers can use this STEAM-based learning model. The reason is, this learning model discusses the world and real problems for students. Things that must be known by MI teachers related to the application of learning models.

STEAM-based IPAs are as follows:

- a. Learning should focus on a real issue or problem.
- b. Activities must be inquisitive, hands-on and open-ended.
- c. Learning models must be developed with the engineering design process so that students are always encouraged to be creative.
- d. Learning models must apply science, as well as mathematics creatively, effectively, and contextually.

In fact, during the initial observation on September 16, 2021 in class IV MI AmiruddinBlendren, it can be stated that the phenomenon of learning implementation that occurs is that teachers in teaching IPA learning are still less creative and active and teachers also do not know about the IPA learning model that is suitable to be applied in class IV and still lack of understanding of teachers about steam learning models.

In connection with the above, researchers are interested in conducting research on "Implementation of STEAM-Based Science, Technology, Engineering, Art, and Mathematics) Learning To Improve Student Learning Outcomes On Class IV Light Properties Materials at MI AmiruddinBlendren" in learning Theme 5 Pahlawanku IPA Content.

RESEARCH METHODS

The research method used in this research is through descriptive studies with a qualitative approach, because the problem is related to humans who are fundamentally dependent on observation. In qualitative research the instrument is a person or human instrument, that is, the researcher himself. To be able to become an instrument, researchers must have a wide supply of theory and insight, so that they are able to ask questions, analyze, photograph and construct the social situation being studied to be clearer and meaningful. To gain a broader and deeper understanding of the social situation of education studied, the data collection technique is triangulation, which is to use various data collection techniques combined / simultaneously. Data analysis is inductive based on facts found in the field and then constructed into hypotheses or theories.

This research was carried out during the odd semester of the 2021 school year which aims to see the effectiveness of implementing the use of STEAM (Science, Technology, Engineering, Art, and Mathematics) learning materials for light properties and their relationship in class IV learners at MI Amiruddin.

In qualitative research some descriptions are used to find the principles and explanations that lead to inference. The main objectives in qualitative research are, first, describing and revealing (to describe and explore) and secondly, describing and explaining (to describe and explain).

As for this research, research methodology is used using a qualitative approach with descriptive character with the intention of:

1. Get an overview or shadow about the effectiveness of STEAM-based IPA learning during the pandemic in mi Amiruddin fourth grade students.

2. The data obtained makes it possible to answer all the problems mentioned above.

RESULTS AND DISCUSSIONS

In this study, researchers chose the theme of 5 heroes of mine sub theme 1 struggle of the heroes of the material properties of light and its relationship with the sense of sight as research material material. Researchers will provide an understanding of the properties of light and its interrelationships and invite students to practice it. Before trialing students, researchers validate learning devices first to experts, to find out how feasible this learning model is.

The first step taken by researchers is to test the practicality of STEAM-based IPA learning devices. The researcher asked for help from class IV-A and one colleague to assess the researcher's performance during the learning. The results of the practicality trial of this STEAM-based IPA learning device obtained an average score of 3.45 which belonged to the practical category and was worthy of trial to students of class IV-A MI AmiruddinBlendren.

In the next step, researchers tested the validity of STEAM-based IPA learning devices to validators to find out how valid this STEAM-based learning model is if applied to class IV-A MI learner AmiruddinBlendren. The results of the device validity test obtained a score of 3.5 for RPP, Syllabus 3.56, and questionnaire test of 3.38 with valid categories and can be used to the next stage.

For the next step, researchers conducted a test of the effectiveness of learning devices by providing a questionnaire test of students' response to steam-based IPA learning models. Where students are asked to provide answers to the questions listed on the questionnaire, in addition, students are given pre-test questions and also post-tests to find out how far the learners understand the material of light properties and their relationship.

In giving the pre-test question, students are only given material by researchers with lecture methods, students only listen and then conclude the material they get themselves and answer the questions that exist in the pre-test

questions that have been given by the researcher. The value obtained on this pre-test question is less than the Maximum Completion Criteria (KKM) determined by the researcher, which is 43.9. After knowing the value obtained by students is not satisfactory, researchers provide material on the properties of the light using a STEAM-based learning model. It is hoped that after the implementation of the STEAM-based IPA learning model, it will be able to improve students' learning outcomes on light properties.

Researchers repeat the learning material of the properties of light and play a learning video about the material to learners. After that, learners are asked to practice the material as exemplified in the learning video. With this learners will be interested and do not feel bored at the time of learning. Learners will be more active and will more easily understand the material because not only the theory they get, but also they have practiced it directly and associated the practice with real life.

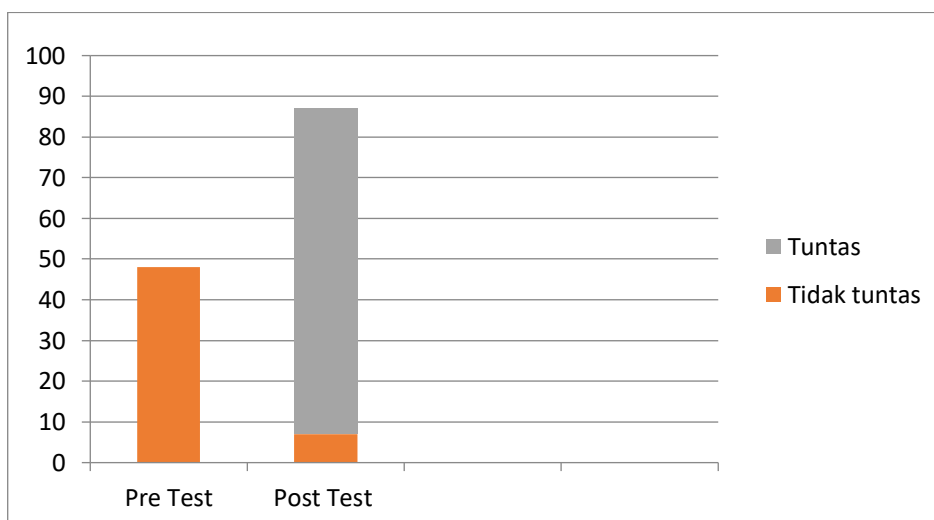
In the scientific point of view, learners are given an explanation of the various properties of light and identify them one by one. The technological point of view on this learning learners are given learning materials for the properties of light through interactive learning videos to increase students' curiosity in this learning. Engineering in learning the properties of this light learners are given information about the technique of making color discs, where the color disc is likened to the sun. For the art point of view in this learning, learners are asked to create a work, namely a color disc that will later be assessed by researchers as a group task. And for the point of view of mathematics in this learning learners are asked to measure the length and width of the color disc.

After the experiment, students were given post-test questions by researchers, to find out how improved students' understanding and learning outcomes they obtained after the application of STEAM-based learning models on light properties materials. The increase in the value of students this time has met the Maximum Completion Criteria (KKM) that has been determined by researchers, which is 79.2. This is due to the implementation of a suitable IPA learning model that will affect the learning outcomes of learners.

Steam learning model can help students to make it easier to adapt to this sophisticated era. In this day and age, the necessary skills are critical thinking, communication, collaboration, problem solving and digital literacy. With the application of STEAM-based learning, learners do not only memorize materials so as to cause boredom. But prefer HOTS (Higher Order Thinking Skills) which is more centered on solving problems.

Through the results of this study showed that the STEAM-based IPA learning model has a positive impact on improving the learning outcomes of class IV-A MI Amiruddin learners. Whereas before the implementation of this learning model, the learning outcomes of learners were very low and did not meet the predetermined KKM. This can be seen from the bar diagram below:

STUDENT OUTCOME COMPLETION GRAPH
CLASS IV-A MI AMIRUDDIN BLENDREN



Picture. 1 Graph of Learning Outcome Value

From the graph above, it can be known that the improvement in learners' learning outcomes is caused by the learning model, which from the learning model learners will be motivated to learn the properties of light and learners can identify it. In addition, if teachers carry out learner-centered learning, they will be able to solve the problems they face, build student independence, and will foster critical thinking in everyday life. **CONCLUSIONS**

Based on the results of the research and discussion above, it can be concluded:

1. The practicality of STEAM-based IPA learning devices obtained an average score of 3.45 which is included in the practical category and deserves to be tested to students of class IV-A MI AmiruddinBlendren.
2. Validity of STEAM-based IPA learning devices assessed by validators to find out how valid this STEAM-based learning model is if applied to class IV-A MI learner AmiruddinBlendren. The results of the device validity test obtained a score of 3.5 for RPP, Syllabus 3.56, and questionnaire test of 3.38 with valid categories and can be used to the next stage.
3. The effectiveness of this STEAM-based IPA learning device can be seen from the increase in the value of learners' learning outcomes who originally tested the pre-test question to get an average score of 43.9 increased to 79.2 this is due to the implementation of a suitable IPA learning model that will affect students' learning outcomes.

REFERRAL LIST

Anjasari, Novia .*Kesiapan Guru Terhadap Penerapan Pembelajaran STEM (Science, Technology, Engineering, Mathematics)* (Survei pada Guru TK Se Kecamatan Gunungpati Kota Semarang). Skripsi Universitas Negeri Semarang

Humairah Amir, Rifqah. Efektivitas Model Pembelajaran STEAM (Science, Technology, Engineering, Art, Mathematics) dalam pembelajaran IPA Konsep Sumber Energi Pada Siswa Kelas IV SD Pertiwi Makassar. Skripsi Universitas Muhammadiyah Makassar

Ismail Fajri. 2014. *Evaluasi Pendidikan*. (Palembang: Tunas Gemilang Press). 38

Komariah Aandan Djam'an Satori. *Metodologi Penelitian Kualitatif* . Bandung. Alfabeta. 2017

Nana Sudjana. 2009. *Penilaian Hasil Proses Belajar Mengajar*. (Bandung: Remaja Rosdakarya). 22

Nazir, Muhammad. (1986). *Metode Penelitian*. Bandung : Remaja Rosdakarya

Nia Anggraini. 2011. *Ta'dib (Jurnal Pendidikan Islam)*. (Palembang: Fakultas Tarbiyah IAIN Raden Fatah). 6

PratamaAditia, Rizky.
*AnalisisKemampuanBerpikirKreatifSiswaMelaluiPembelajaran Model PJBL
DenganPendekatan STEAM dalamMenyelesaikanMasalahMatematika.*
SkripsiUniversitas Islam NegeriSunanAmpel Surabaya

Purwanto. 2013. *EvaluasiHasilBelajar.* (Yogyakarta: PustakaPelajar). 44

RahmawatiAulia, Beatrica. *ImplementasiPembelajaranBerbasis STEAM
dalamMenumbuhkanKeterampilanBerpikirKritis di SD My Little Island Malang.*
SkripsiUniversitas Islam NegeriMaulana Malik Ibrahim Malang

Sugiyono (2015). *MetodologiPenelitianKombinasi (Mix Methods).* Bandung.
Alfabeta

SulistyoBasuki 2006. *MetodePenelitian.* Jakarta: WedatamaWidya Sastra
danFakultasIlmuPengetahuanBudayaUniversitas Indonesia