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Increasing Science Learning Interest in Class VIII SMPN 2 Mataram through STEM Teaching Aids Making Practice

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ABSTRACT

Natural Sciences (IPA) learning at the junior high school level still faces the problem of low student learning interest due to the dominance of conventional learning and limited practicum facilities. This community service activity aims to increase the interest and motivation to learn science for grade VIII students of SMPN 2 Mataram through the practice of making STEM-based teaching aids (Science, Technology, Engineering, and Mathematics) in business and energy materials. The activity will be carried out in November 2025 by involving grade VIII students as the main participants. A total of 32 grade VIII students were involved in this activity. The implementation method includes the introduction of business and energy concepts, the practice of making simple teaching aids in groups, and evaluation through learning interest questionnaires and reflective discussions. The results showed that students were actively involved in the process of designing, manufacturing, and testing props, and showed high enthusiasm and participation during the learning process. The practice of making STEM-based props helps students understand the concepts of business and energy in a more concrete and contextual way. Quantitative analysis of the learning interest questionnaire showed an increase in the average student interest score from 2.81 before the activity to 3.52 after the activity on a four-point Likert scale, indicating an improvement in students' interest in learning science. Based on the results of the evaluation, this activity has been proven to have a positive impact on increasing students' interest and motivation to learn science. Thus, the practice of making STEM-based teaching aids can be an effective and sustainable alternative to innovative learning to improve the quality of science learning at the junior high school level, even with limited laboratory facilities.

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Introduction

Natural Science (IPA) learning at the junior high school level requires an approach that not only emphasizes mastery of concepts, but also the relationship between science and real life and its application in problem solving [1]. STEM Approach (*Science, Technology, Engineering, and Mathematics*) is one of the relevant learning strategies because it integrates various disciplines in learning activities that are contextual and applicative [2]. Through this approach, students are encouraged to learn science not just as a theory, but as an exploratory process that involves designing, manufacturing, and testing a simple product [3].

One form of implementation of the STEM approach in science learning is through the practice

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of making simple props. This activity allows students to be directly involved in the learning process, starting from understanding concepts, designing tools, to observing the results of their work [4]. A learning experience that is *hands-on* and *minds-on* proven to be able to increase understanding of concepts while fostering students' curiosity and interest in science learning [5].

Facts in the field show that the interest in learning science of junior high school students is still relatively low [6]. Many students consider science to be a difficult, abstract, and less interesting subject due to the dominance of conventional teacher-centered learning methods [7]. The lack of variety of learning activities that actively involve students leads to low participation and motivation to learn, especially in grade VIII students [8]. This condition is also found at SMPN 2 Mataram, where science learning still does not fully utilize practicum activities and making teaching aids optimally [9].

However, previous community service and educational programs related to STEM have generally focused on theoretical introduction or teacher-centered innovation, while there has been no practical STEM-based activity specifically directed at increasing students' interest in learning science through hands-on teaching aid construction at SMPN 2 Mataram.

The limited number of laboratory facilities and practicum tools is still one of the main causes of the lack of experimental activities in schools, so teachers tend to return to lecture-based learning and written assignments that do not provide a deep learning experience for students[10]. The learning pattern that is dominated by theoretical explanations without the support of practicum activities makes students lose the opportunity to build a direct understanding of concepts through observation and experiments [11]. In fact, various studies show that low-cost practicum tools and activities can be designed by utilizing simple materials and equipment that are easy to obtain, while still supporting STEM-based science learning in a meaningful way [12]. For example, a smartphone-based fluorescence microscope or a simple spectrophotometer resulting from a STEM project shows that an assembled practicum tool can be used effectively in learning when designed as an engineering and inquiry project, even if the school's laboratory facilities are limited [12].

The practice of making STEM props provides opportunities for students to learn actively, creatively, and collaboratively [13]. Through this activity, students not only understand science concepts, but also develop critical thinking, problem-solving, and creativity skills [14]. In addition, direct involvement in the process of making props can foster a sense of pleasure and pride in one's own work, which ultimately has a positive impact on the interest in learning science [15].

Interest in learning is an important factor that affects learning success. Students who have high interests tend to be more focused, active, and have internal motivation to learn. Therefore, innovative efforts are needed to create an interesting and meaningful science learning experience. The practice of making STEM-based props is one of the strategic alternatives to answer these challenges.

Based on this description, this activity is designed to increase the interest in learning science of grade VIII students of SMPN 2 Mataram through the practice of making STEM props. This activity is expected not only to increase students' interest in science learning, but also provide a learning experience that can be applied sustainably by teachers and students in the learning process at school.

Method

This service activity was carried out at SMPN 2 Mataram in November 2025 by involving grade VIII students as the main participants of the activity. This activity aims to increase students' interest and motivation to learn science subjects through the practice of making STEM-based teaching aids on business and energy materials that are exploratory, contextual, and fun. This approach was chosen to provide a hands-on learning experience that integrates science, technology, engineering, and mathematics concepts in a single set of learning activities.

The material raised in this activity focuses on the concept of business and energy, including the definition of business, kinetic energy and potential energy, changes in the form of energy, and the principle of energy conservation. The material was chosen because it has a close relationship with everyday phenomena and can be contextualized through the creation of simple props, such as an inclined plane, a simple pulley, or an energy conversion model that students can design and assemble using materials that are easily available in the environment around the school.

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The implementation of the activity began with the introduction of basic business and energy concepts as well as STEM principles that are relevant to the props to be made. Next, students were divided into several small groups to carry out the practice of making props collaboratively. At this stage, students are accompanied by the implementation team in designing, assembling, and testing the props made, as well as observing the relationship between force, displacement, and energy changes that occur during the experiment process. This activity is designed to encourage students' active involvement in critical thinking, discussion, and problem-solving in groups.

To clarify the procedure of the service activity, a simple flow diagram was prepared to describe the stages systematically, including: (1) preparation and coordination with the school; (2) introduction of business and energy concepts and STEM principles; (3) group division and design of teaching aids; (4) practice of assembling and testing STEM-based props; (5) observation and discussion of experimental results; and (6) evaluation and reflection. This flow diagram is intended to provide a clear and structured overview of the implementation stages of the community service activity.

The evaluation of the activity was carried out through the provision of questionnaires on students' learning interests and motivation before and after the activity, as well as reflective discussions to obtain direct feedback from the participants. The evaluation data were used to identify changes in students' interest and motivation to learn science, especially in business and energy materials, after participating in community service activities. The results of the evaluation are used as a basis for the improvement and development of similar service activities in the future, as well as empirical evidence that the practice of making STEM-based teaching aids on business and energy materials can increase students' involvement and interest in learning in science learning.

The questionnaire instrument used consisted of learning interest and motivation indicators, including students' curiosity, attention during learning, enthusiasm in participating in activities, willingness to ask questions, and persistence in completing tasks. The questionnaire was arranged using a Likert scale with four response options, namely strongly agree, agree, disagree, and strongly disagree, to measure the level of students' learning interest and motivation quantitatively.

Data analysis was conducted using both quantitative and qualitative techniques. Quantitative data obtained from the pre- and post-questionnaires were analyzed descriptively by calculating the mean score and percentage increase to identify changes in students' interest and motivation levels. Qualitative data were obtained from reflective discussions and field observations during the activity, which were analyzed through data reduction, categorization, and interpretation to strengthen the quantitative findings and provide a comprehensive description of students' responses to the STEM-based teaching aid practice.

Result and Discussion

Results

Community service activities were carried out at SMPN 2 Mataram in November 2025 by involving grade VIII students as the main participants. This activity is focused on the practice of making STEM-based teaching aids on business materials and energy as an effort to increase students' interest in learning science. The implementation of the activity runs according to the stages that have been planned, including the introduction of concepts, the practice of making props, as well as the evaluation and reflection of learning.

Figure 1. Implementation of STEM-based teaching aids making practicum

In the core stage of the activity, students are divided into small groups to practice making simple props, such as tilted plane models and energy change props. This activity encourages students to be actively involved in the process of designing, assembling, and testing props using materials that are readily available. During the activity, students showed high enthusiasm, actively discussed, and worked together in groups. This

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condition indicates an increase in student participation and interest in science learning, especially in business and energy materials.

After the props are completed, students test and observe the business concept and the energy changes that occur. Students are asked to observe the relationship between force, displacement, and energy and discuss the results of these observations. Through these activities, students gain hands-on learning experiences that help them understand concepts that were previously considered abstract.

Based on the results of the learning interest questionnaire, the distribution of students' interest scores before the activity was dominated by the low and moderate categories. After participating in the STEM-based teaching aid making practice, the distribution of scores shifted toward the moderate and high categories, indicating an overall improvement in students' interest in learning science. This change reflects a positive impact of hands-on STEM activities on students' learning interest.

The change in students' learning interest before and after the activity is further illustrated through a comparison graph. The graph shows an increase in the average learning interest score after the implementation of the activity compared to the pre-activity condition. This visual representation confirms that the practice of making STEM-based teaching aids contributes to a measurable improvement in students' interest in learning science, particularly in business and energy materials.

Figure 2. Discussion on the implementation of STEM-based teaching aids manufacturing practices

Discussion

The results of the service activities show that the practice of making STEM-based teaching aids on business materials and Energy has a positive impact on the interest of science learning for grade VIII students of SMPN 2 Mataram. Learning that involves students directly in the process of designing and testing props creates a more meaningful learning experience than conventional learning [16], [17].

The applied STEM approach allows for the integration of science concepts with critical thinking, creativity, and problem-solving skills. Students not only understand the concepts of effort and energy theoretically, but are also able to relate them to real phenomena observed through the props created. This is in line with the purpose of service activities that emphasize contextual and applicative learning [18], [19].

The increase in students' interest in learning is reflected in their activeness during the activity, both in group discussions, the process of making props, and during learning reflection. The collaborative activities carried out also help develop students' communication and cooperation skills. This condition shows that STEM-based science learning is able to increase students' cognitive and affective engagement simultaneously [20].

Use of simple props from easily obtainable materials prove that the limitation of laboratory facilities is not the main obstacle in creating quality science learning. This activity model can be used as an alternative by teachers to implement STEM-based science learning in a simple and sustainable manner in schools [21].

Despite the positive outcomes, several limitations were encountered during the implementation of the service activities. One of the main limitations was the limited time available for the activity, which restricted the depth of discussion and the opportunity for students to further refine and optimize the props they created. In addition, variations in students' initial understanding and technical skills affected the pace of group work, requiring more intensive guidance from the implementation team in certain groups.

Another limitation was related to the availability and uniformity of materials used for making the props. Although simple and easily obtainable materials were utilized, differences in material quality sometimes influenced the performance of the props produced. This condition indicates that material preparation and standardization need to be carefully considered to ensure more consistent experimental results.

On the other hand, several factors contributed to the success of the activity. The use of hands-on and

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collaborative learning strategies encouraged active student participation and increased learning motivation. The relevance of the business and energy materials to everyday phenomena also helped students connect abstract concepts with real experiences, making the learning process more meaningful.

In addition, the guidance and facilitation provided by the service implementation team played an important role in supporting students during the design, assembly, and testing stages of the props. Support from teachers and the school environment also contributed to the smooth implementation of the activity. These factors collectively strengthened the effectiveness of STEM-based teaching aid practices in increasing students' interest in learning science.

Conclusion

Community service activities carried out at SMPN 2 Mataram in November 2025 through the practice of making STEM-based teaching aids in business materials and energy went well and achieved the set goals. This activity is able to increase the interest and motivation of science learning of grade VIII students through direct involvement in the process of designing, making, and testing simple props that are contextual and applicative. STEM-based learning encourages students to be more active, enthusiastic, and collaborative, while helping them understand the concepts of venture and energy more concretely. In addition, this activity also contributes to developing students' critical thinking skills, creativity, and problem-solving. By utilizing simple materials, the practice of making STEM-based teaching aids has been proven to be an effective and sustainable alternative to innovative learning to improve the quality of science learning at the junior high school level.

However, this activity still has several limitations, including the limited time available for implementation, which restricts the depth of exploration of the material, as well as differences in students' initial abilities that affect the uniformity of learning outcomes. In addition, the availability and quality of materials used for making teaching aids also influence the optimal results of the activities. Therefore, it is recommended that future community service activities allocate a longer implementation time, involve more varied science topics, and be supported by more structured guidance and standardized materials. Further activities may also integrate digital technology or follow-up mentoring to strengthen the sustainability and impact of STEM-based learning on students' interest and learning outcomes.

Suggestion

It is recommended that science learning in junior high schools implement the practice of making STEM-based teaching aids in a sustainable manner by utilizing simple materials, as well as developing similar activities in other materials through collaboration between teachers and universities to increase students' interest in learning.

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References

[1] R. I. Irfan and Y. Arifin, 'Enhancing Foreign Speakers' Satisfaction in Learning Indonesian Language with a Gamified Multiplatform Approach', *Informatics*, vol. 12, no. 1, p. 11, Jan. 2025, doi: 10.3390/informatics12010011.

[2] İ. Dökme and Z. Ş. Hancıoğlu, 'Three-stage robotic STEM program ignites secondary school students' interest in STEM career and attitudes toward science', *Educ. Inf. Technol.*, vol. 30, no. 9, pp. 12079–12100, June 2025, doi:10.1007/s10639-025-13318-w.

[3] R. C. Y. Yeung, D. Sun, and C. H. Yeung, 'Integrating drone technology in STEM education: Curriculum, pedagogy and learning outcomes', *Educ. Inf. Technol.*, vol. 30, no. 10, pp. 14237–14272, July 2025, doi: 10.1007/s10639-025-13368-0.

[4] A. Görgülü Arı and G. Meço, 'A New Application in Biology Education: Development and Implementation of

Journal of Contextual Science Education Service
e-ISSN. 3046-7918
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pp. 1-7
https://jurnalpasca.unram.ac.id/index.php/jppik/index

Arduino-Supported STEM Activities', *Biology*, vol. 10, no. 6, p. 506, June 2021, doi: 10.3390/biology10060506.

[5] J. Chen and C. Liu, 'Developing an Interdisciplinary Hands-On Learning Activity With the 6E Model to Improve Students' STEM Knowledge, Learning Motivation and Creativity', *J. Comput. Assist. Learn.*, vol. 41, no. 3, p. e70031, June 2025, doi: 10.1111/jcal.70031.

[6] J. R. N. Sadera, R. Y. S. Torres, and D. V. Rogayan. Jr., 'Challenges Encountered by Junior High School Students in Learning Science: Basis for Action Plan', *Universe. J. Educ. Res.*, vol. 8, no. 12A, pp. 7405–7414, Dec. 2020, doi: 10.13189/ujer.2020.082524.

[7] P. S. Shrestha, T. T. Perlman, and S. R. Shaver, 'Addressing Learning Difficulties in Junior High School Physics Education: Insights for Curriculum Development and Teaching Strategies', *J. Educator Science. And Hum.*, vol. 12, no. 2, pp. 108–120, May 2023, doi: 10.35335/jiph.v12i2.35.

[8] R. Sy, C. Nimor, J. Etcuban, and R. Argate, 'Activity-Based Strategy in Teaching Earth Science among Junior High School Students in Philippines', *Asian Rev. Soc. Sci.*, vol. 11, no. 2, pp. 1–7, Oct. 2022, doi: 10.51983/arss-2022.11.2.3139.

[9] A. Syahputra, R. D. Harahap, and I. Safitri, 'An Analysis of Student Learning Challenges in Elementary School Science Subject', *J. Education J. Has. Researcher. And study. Bid Library. Educators. Teaching and Learning*, vol. 8, no. 1, p. 237, Feb. 2022, doi: 10.33394/jk.v8i1.4508.

[10] A. M. Chengere, B. D. Bono, S. A. Zinabu, and K. W. Jilo, 'Enhancing secondary school students' science process skills through guided inquiry-based laboratory activities in biology', *PLOS ONE*, vol. 20, no. 4, p. e0320692, Apr. 2025, doi: 10.1371/journal.pone.0320692.

[11] V. Velarde, F. Casado-Barragán, M. Thamar, V. F. Rands, and A. A. Gonzalez, 'Home-based laboratory experiences during COVID-19 pandemic in undergraduate biochemistry students', *Front. Educ.*, vol. 7, p. 965438, Nov. 2022, doi: 10.3389/feduc.2022.965438.

[12] M. A. Schaefer, H. N. Nelson, J. L. Butrum, J. R. Gronseth, and J. H. Hines, 'A low-cost smartphone fluorescence microscope for research, life science education, and STEM outreach', *Sci. Rep.*, vol. 13, no. 1, p. 2722, Mar. 2023, doi: 10.1038/s41598-023-29182-y.

[13] W. Sumarni and S. Kadarwati, 'Ethno-Stem Project-Based Learning: Its Impact to Critical and Creative Thinking Skills', *J. Educator. Indonesian IPA.*, vol. 9, no. 1, pp. 11–21, Mar. 2020, doi: 10.15294/jpii.v9i1.21754.

[14] X. Weng, T. K. F. Chiu, and M. S. Y. Jong, 'Applying Relatedness to Explain Learning Outcomes of STEM Maker Activities', *Front. Psychol.*, vol. 12, p. 800569, Jan. 2022, doi: 10.3389/fpsyg.2021.800569.

[15] S. Suherman, T. Vidákovich, M. Mujib, H. Hidayatulloh, T. Andari, and V. D. Susanti, 'The Role of STEM Teaching in Education: An Empirical Study to Enhance Creativity and Computational Thinking', *J. Intell.*, vol. 13, no. 7, p. 88, July 2025, doi: 10.3390/jintelligence13070088.

[16] Hryhorii Skovoroda University in Pereiaslav and I. Truskavetska, 'Use of STEM-technologies in the educational process for teaching natural sciences', *Soc. Pedagogy Theory Pract.*, no. 2, pp. 131–137, 2024, doi: 10.12958/1817-3764-2024-2-131-137.

[17] V. T. Ha, L. H. Chung, N. V. Hanh, and B. M. Hai, 'Teaching Science Using Argumentation-Supported 5E-STEM, 5E-STEM, and Conventional Didactic Methods: Differences in the Learning Outcomes of Middle School Students', *Educ. Sci.*, vol. 13, no. 3, p. 247, Feb. 2023, doi: 10.3390/educsci13030247.

[18] V. T. Ha, L. H. Chung, N. V. Hanh, and B. M. Hai, 'Teaching Science Using Argumentation-Supported 5E-STEM, 5E-STEM, and Conventional Didactic Methods: Differences in the Learning Outcomes of Middle School Students', *Educ. Sci.*, vol. 13, no. 3, p. 247, Feb. 2023, doi: 10.3390/educsci13030247.

[19] M. T. Hebebci and E. Usta, 'The Effects of Integrated STEM Education Practices on Problem Solving Skills, Scientific Creativity, and Critical Thinking Dispositions', *Participate. Educ. Res.*, vol. 9, no. 6, pp. 358–379, Nov. 2022, doi:

Journal of Contextual Science Education Service
e-ISSN. 3046-7918
Vol. 4, No. 1, February 2026
pp. 1-7
https://jurnalpasca.unram.ac.id/index.php/jppik/index

10.17275/per.22.143.9.6.

[20] K. Wiyono, K. Sury, R. N. Hidayah, N. Nazhifah, I. Ismet, and S. Sudirman, 'STEM-based E-learning: Implementation and Effect on Communication and Collaboration Skills on Wave Topic', *J. Researcher. Pengemb. Educators. Fig.*, vol. 8, no. 2, pp. 259–270, Dec. 2022, doi: 10.21009/1.08208.

[21] H. Nasbey, T. P. Nurdiansyah, A. F. Kurniawan, A. Samsudin, A. Fadlan, and D. Harjunowibowo, 'Innovation of Spectroscope Teaching Aid in Physics Learning: STEM Integration for Enhancing Conceptual Understanding of Light', *J. Phys. Conf. Ser.*, vol. 3139, no. 1, p. 012105, Nov. 2025, doi: 10.1088/1742-6596/3139/1/012105.