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Utilization Wisdom Local Coast as Context STEM-Based Science Learning in Junior High Schools throughout Tegal Regency

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Abstract
Implementation The Independent Curriculum encourages teachers to plan learning that can direct participant educate For Study more broad and deep through environment surrounding areas . Teachers are required For Can develop device learning specifically teaching materials that can accommodate need Study participant educate . Based on results observations and interviews conducted , obtained data that science teachers in Tegal Regency still difficulty in compile teaching materials . This community service activity aims to provide structured training related to the development of teaching materials, integration of local wisdom, and the STEM approach to partners, namely the MGMP IPA Tegal Regency. The community service activity consists of three stages, namely preparation, implementation, and evaluation. The results of the activity showed that the teachers were enthusiastic and provided positive *feedback* on the community service activities carried out. The teachers were helped by the training because it increased their knowledge related to local wisdom and the STEM approach, then gained direct experience in compiling teaching materials and LKPD.

Keywords: *teaching materials, local wisdom, STEM approach, science learning*

INTRODUCTION

Teachers play an important role in the world of education that is responsible for delivering knowledge to students in schools. Teachers play a role in achieving one of Indonesia's national goals, namely to educate the nation's life. The challenges for teachers today are not only limited to understanding and ability in conveying concepts, skills and abilities are needed in compiling and planning learning. Learning planning is the initial stage in selecting learning strategies so that learning objectives can be achieved.

Along with the development of the times, the characteristics of students at each level of education are increasingly diverse. Seeing this condition, learning activities cannot be carried out only focusing on teacher explanations *(teacher centered)* with textbook media owned by students. Learning needs to be done more broadly and deeply. This is in line with the applicable education curriculum.

Currently, education in Indonesia implements the Independent Curriculum, where students are given freedom in learning. The flexibility in the Independent Curriculum requires teachers to design learning that involves the surrounding environment to broaden students' understanding, especially in the science learning group.

Science learning is carried out in an integrated manner by connecting three disciplines, namely physics, chemistry, and biology (Sari & Afrizon, 2022) . All three can be learned by students through the surrounding environment, because science is essentially a science that studies phenomena in the universe (Ilhami, 2019) . Not only natural phenomena, students can also learn science through their social and cultural environment. This learning strategy is known as local wisdom-based learning.

Local wisdom is an idea, belief, rule, and dimension that is born and developed in a society (Rahmatih *et al.* , 2020) . Local wisdom values can be integrated into science learning so that they provide an explicit impact that can be felt by students and the wider community (Foa *et al.* , 2024) . The results of research by Rini (2023) show that the application of science learning based on local

wisdom can improve students' critical thinking skills. The implementation of science learning based on local wisdom can improve students' learning outcomes (Saputri & Desstya, 2023) and students' cognitive abilities (Gustalia & Setiyawati, 2023) .

Tegal Regency is one of the areas in Central Java Province that has a variety of local wisdom. The potential of local wisdom includes the Sea Alms Tradition, Tourist Tradition, Randengan Culture, Bamboo Weaving Art, Pinang Climbing Tradition, Moci Tradition, Prepengan Tradition, Wayang Golek Cepak, and so on. These various local wisdoms can be integrated with science learning materials that can improve students' understanding. Contextual learning by involving the surrounding environment will provide a broad and deep understanding of concepts for students.

Integration of local wisdom in learning can be done through the preparation of learning tools such as teaching materials. Teaching materials are one of the learning tools used as a guideline for teachers and students in implementing learning.

The preparation of local wisdom-based learning devices is more effective than the direct integration of local wisdom in student learning activities. This is because the teaching materials contain learning activities, material descriptions, and learning evaluations, so that they can direct students to learn independently.

Several studies related to the development of local wisdom-based teaching materials have provided positive results. Local wisdom-based teaching materials can improve student literacy (Primasari *et al.* , 2021) , student cognitive abilities (Fitriani *et al.* , 2019) , and student learning outcomes (Pohan *et al.* , 2023) . In addition to local wisdom, in compiling teaching materials, appropriate learning approaches can be integrated. The appropriate learning approach to be applied in science learning is the STEM approach.

The STEM approach encourages students to be able to solve real-life problems by integrating aspects of *science, technology, engineering,* and *mathematics*. The purpose of the STEM approach itself is to train students in using the knowledge and skills they have in solving a problem (Muttaqiin, 2023) . The STEM approach in science learning helps students collect data through experimental activities that utilize technology to prove a scientific concept (Yasifa *et al.* , 2023) . The implementation of the STEM approach in science learning can be done in various ways, one of which is through learning tools in the form of teaching materials (Hoerunnisa *et al.* , 2024) . However, the results of interviews and observations showed that most science teachers in Tegal Regency still had difficulty in compiling content in teaching materials.

Teachers have difficulty in compiling teaching material content in accordance with the learning approach used. The teaching materials compiled do not yet display the learning strategies used, they are still limited to material descriptions and practice questions. This is one of the causes of low student learning motivation. In addition, some teachers tend to use textbooks available in the library rather than compiling teaching materials that are in accordance with the learning design.

Based on the problems that have been explained, there needs to be training and empowerment that can provide provisions for science teachers in Tegal Regency in compiling teaching materials. This training focuses on compiling teaching materials by utilizing coastal local wisdom and the STEM approach. The integration of local wisdom was chosen because learning that involves the surrounding social and cultural environment makes it easier for students to understand the concept of science learning. This is supported by the potential of diverse coastal local wisdom in Tegal Regency. Meanwhile, the STEM approach can help students solve real problems in their environment.

METHODS

The training activity for the preparation of STEM-based teaching materials and the utilization of coastal local wisdom is a community service activity with participants being junior high school science teachers who are members of the Tegal Regency Science MGMP. In detail, the method used is structured training on teaching material development techniques, integration of local wisdom, and the STEM approach to partners, namely teachers who are members of the Tegal Regency Science MGMP. The community service activity was carried out for three months starting from May-July 2024. The community service activity consists of three stages, namely preparation, implementation, and evaluation.

The preparation stage is carried out to prepare the technical aspects of community service. The implementation stage consists of three activities, namely the dissemination of STEM-based digital science teaching materials with the utilization of local wisdom, training in preparing teaching materials, and training in preparing LKPD. The third stage is an evaluation carried out to determine the achievement of community service objectives through a SWOT analysis.

RESULTS AND DISCUSSION

Community service activities carried out at SMP Negeri 1 Slawi are explained based on three parts of the activities that have been carried out, including:

Preparation Stage

The preparation stage is carried out by the internal community service team to prepare the technical implementation of the service, division of tasks and those responsible and the coordination system in the field. Then to be continued with socialization to public through MGMP manager .

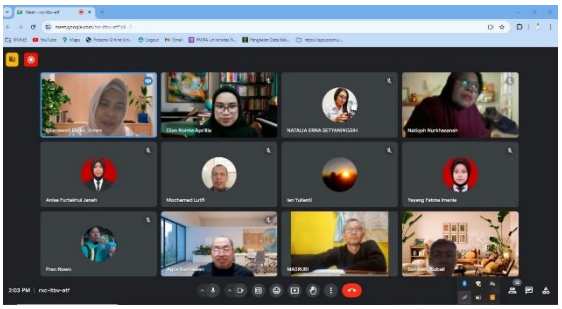

Figure 1. Stage preparation

Stage Implementation

Stage implementation covers all the solution that has been designed by team proposer together partners . Coordination to start program planning , activities This implemented through *Focus Group Discussion* (FGD) between team devotee with Chairman of the Tegal Regency MGMP , Mr. Agus Kurniawan , M.Pd. Implementation devotion to society that has done arranged based on Table 1 below This .

Table 1. Implementation activity devotion public

Activity	Activity Results	Executor
Dissemination of STEM-based digital science teaching materials with local wisdom content	Improving teachers' understanding of the importance of STEM and the involvement of local coastal contexts in science learning.	Dr. Ellianawati and Dr. Bambang Subali, assisted by Anisa F. J, Yayang F. I, and Dina AWWL
Mini project to prepare STEM-based science teaching materials containing local coastal wisdom	Improving teacher skills in compiling STEM-based Grade 7 Science teaching materials containing local wisdom of the Tegal Regency Coast	Dr. Ellianawati and Dr. Pratiwi Dwijananti, assisted by Anisa F. J, Yayang FI, and Murni.
Mini project for compiling STEM-based science worksheets containing local coastal wisdom	Improving teacher skills in compiling STEM-based 7th grade science LKPD containing local wisdom of the Tegal Regency Coast	Dr. Ellianawati and Dr. Ian Yulianti, assisted by Anisa F. J, Yayang FI, and Miranti S.

The parties involved and potential resources related to community service activities include the principal of SMPN 1 Slawi (the place of service), MGMP IPA Tegal Regency, and science teachers.

Management activities are handled by both parties. The partner provides management responsibility for providing training venues, coordinating teachers and permits to schools, forming cluster-based working groups, coordinating the 7th grade science topics of the Merdeka Curriculum, and helping to monitor the performance of participating teachers. The community service team is responsible for organizing training materials and activity accommodation such as food, activity honorariums and online training facilities.

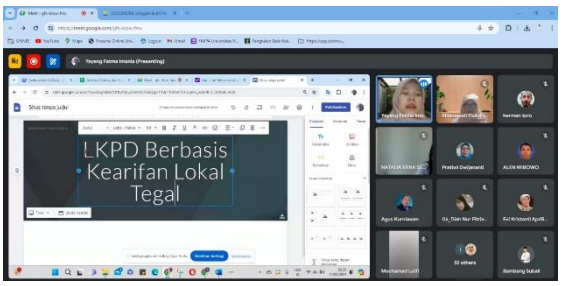

Figure 2. Stage implementation

Stage Evaluation

Evaluation done in a way together with involving partners , where in matter This team devotion and MGMP Tegal Regency carried out SWOT analysis of activities devotion public for lecturers who have done , compiled reports and plans act carry on .

Results of activities devotion to public through training utilization wisdom local in context STEM - based science learning in Tegal Regency , namely : (1) teachers understand the importance of STEM and engagement context local coast in science learning ; (2) skilled teachers in compile STEM -based science teaching materials contain wisdom local Coast Tegal district ; (3) skilled teachers in compiling STEM- based science LKPD containing wisdom local Coast Tegal district .


Figure 3. Evaluation stage

CONCLUSION

The community service activities carried out by the Semarang State University community service team with the Tegal Regency Science MGMP partner were well organized. The three stages that were part of a series of community service activities were well implemented and received positive responses from the science teachers participating in the training. The teachers felt helped by the training, they gained additional knowledge related to the integration of coastal local wisdom and the STEM approach as well as experience in compiling teaching materials and LKPD.

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