

POTENTIAL OF USING LOCAL WISDOM IN MATHEMATICAL PROBLEM POSING E-MODULE: A NEED ANALYSIS

Ni Made Intan Kertiyani^{1*}, Ulfa Lu'luilmaknun², Syahrul Azmi³

^{1*}Matemathics Education, University of Mataram

²Matemathics Education, University of Mataram

³Matemathics Education, University of Mataram

*Corresponding author

intan@unram.ac.id^{1*}

ulfa_1@unram.ac.id²

syahrulazmi.fkip@unram.ac.id³

Abstract

Problem posing become one of the essential skills to promote in class. Meanwhile, there is still limited research on electronic teaching materials that integrated local wisdom to enhance student problem posing. The aim of this research is to investigated the perception of teacher about problem posing and the need to include local wisdom in electronic module. This research is descriptive research. The teachers who have implemented and have not implemented the teaching material to foster problem posing in Lombok Island, Indonesia become the subject of this study. The data was collected by questionnaire and interview. The questionnaire contains subject's perception about problem posing and their need to integrate local wisdom in e-module. The data was analyzed by statistic descriptive and qualitative method. The majority of teachers believe that students need to enhance their problem posing skill. Furthermore, they require educational resources based on local wisdom, such as the Rinjani Geopark, to strengthen that skill. The findings of this study recommended that the development of an e-module to promote problem posing could be the next area of investigation..

Keywords: *problem posing, local wisdom, need analysis, teaching material, e-module.*

Abstrak

Kemampuan mengajukan pertanyaan (*problem posing*) menjadi salah satu kemampuan yang perlu dimiliki siswa di kelas. Namun, studi mengenai bahan ajar elektronik yang memfasilitasi pengembangan kemampuan ini masih terbatas. Penelitian ini bertujuan untuk menginvestigasi persepsi guru mengenai kemampuan *problem posing* dan kebutuhan mengenai bahan ajar elektronik untuk meningkatkan kemampuan ini dengan mengintegrasikan kearifan lokal di Pulau Lombok, Indonesia. Penelitian ini merupakan penelitian deskriptif. Subjek penelitian adalah guru yang sudah dan belum pernah mengajar menggunakan bahan ajar yang berorientasi pada peningkatan kemampuan *problem posing*. Data diperoleh dari kuisioner dan wawancara. Kuisioner berisi pertanyaan untuk menggali persepsi subjek mengenai *problem posing* dan kebutuhannya mengenai bahan ajar elektronik yang mengintegrasikan kearifan lokal. Data dianalisis menggunakan statistika deskriptif dan metode kualitatif. Mayoritas subjek guru meyakini bahwa siswa perlu meningkatkan kemampuan *problem posing*-nya. Lebih jauh, mereka memerlukan sumber belajar berdasarkan kearifan lokal seperti Geopark Rinjani untuk memperkuat kemampuan tersebut. Selanjutnya, konstruksi bahan ajar elektronik untuk meningkatkan kemampuan ini menjadi potensi studi yang dapat diteliti.

Kata kunci: *problem posing, kearifan lokal, analisis kebutuhan, bahan ajar, modul elektronik.*



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INTRODUCTION

Problem posing is the skill to ask relevant question based on the situation. Silver and Cai divide this skill into three categories, namely pre solution posing, within solution posing and post solution

posing (Silver and Cai, 2005). Pre-solution posing, students ask questions based on the information provided (Silver and Cai, 1996). Meanwhile within solution posing allow students to make sub problem in order to solve the main problem. If student make question by modify the data from solved problem, it classified as post solution posing (Cai and Hwang, 2020). In Indonesia, this skill must be mastered by student because one of the steps in scientific approach used in classroom learning includes asking suitable question based on the data given (Haenilah et al., 2021).

Problem posing contributes to increase students twenty-first century skill. Researches indicates that problem posing in classroom enhances student critical thinking skills (Supandi et al., 2020; Toheri et al., 2020). When thinking critically, students will use the trigger event as the starting point. In this case, sub question from problem posing activity will lead as the trigger event for student (Kertiyani et al., 2022).

Problem posing also helps students enhance their problem-solving skill (Cahyani et al., 2020). This skill assists students in becoming better problem solvers. In problem posing within solution activity, students actively offer simpler questions as a strategy for solving the primary problem given by the teacher. It facilitates students to build their own knowledge (Dwita, 2020). Once the problem solved, students might ask another challenging question comparable to the previous solvable problem to improve their skills and enhance their understanding (McDonald and Smith, 2020).

Numerous research has been conducted in the topic of problem posing, including theory of problem posing, the relation of problem posing and another skill, student and teacher problem posing level, and learning design to enhance problem posing. One of the next prospective research areas in this subject is the development of problem posing teaching materials (Kertiyani et al., 2023).

Electronic teaching materials are instructional resources that contain electronic content, such as e-books, e-learning, and e-modules (Sriwahyuni et al., 2021). This instructional material has an advantage of providing clearer vision of the subject, which aids in easy comprehension (Rijal and Azimi, 2021). Student will have more experience to explore the illustration such as geometry object and graph.

There are several researches which focused on the development of problem posing electronic teaching material. Kurniasih, Hidayah and Asikin construct mathematics learning material through games that facilitate student to ask question. This study was focus in elementary school (Kurniasih et al., 2020). In junior high school level, study form Auliya develop teaching material using Microsoft Mathematics, with a focus on problem posing post-solution (Auliya et al., 2019). In the view of prospective teacher development skill at university level, there is construction of learning design in geometry area to foster problem posing ability (Nuriyatin and Widadah, 2020). From those study, there are limited research that focus to develop problem posing module for senior high school students.

Furthermore, the presentation of teaching materials has an impact on learning. Contextualized instructional materials can help students learn more effectively (Haka et al., 2020). This teaching tools offer cultural and regional potential that are more specialized than textbooks (Gayatri et al., 2018; Guswari and Rifai, 2019). Learning with local wisdom context allow student to study from relevant situation to their daily life and make them have deeper comprehension on local problem (Fitri and Izzatin, 2019; Irhasyuarna et al., 2022). However, many parts of local wisdom are missing from most instructional materials in Indonesia (Abadi et al., 2018).

One of the studies that integrating local wisdom to problem posing teaching material are the study from Kuncoro and Wena (Kuncoro and Wena, 2019). They use the materials to build the traditional home such as the log as the object of mathematical issue. However, the subject of that study is engineering students. The study was not designed for seniors in high school.

Lombok Island, on the other hand, includes the Rinjani Geopark, one of the world's geoparks dedicated to preserving geological history, wildlife, and cultural diversity for the benefit of the community. Many aspects of the Rinjani Geopark are still lacking from mathematics teaching materials, both print and electronic. Recognizing this gap, this study focuses on analyzing the need for electronic modules as teaching material based on the local wisdom of the Rinjani Geopark to increase problem posing skills in high school students. The findings of this study can be used as the babs foundation to construct instructional materials to promote problem posing, with Rinjani Geopark serving as the problem theme.

METHOD

This research is descriptive research. The senior high school mathematics teacher on Lombok Island is the subject of this study. To acquire different perspectives, the subject was separated into two groups: three teachers who had already implemented the problem-solving material and three teachers who had never done that activity before. Data was collected through questionnaires and interviews. The questionnaire provides their perspectives on problem solving and the necessity to incorporate local wisdom into an e-module as teaching material. In this case, local wisdom refers to the Rinjani Geopark, which is located on Lombok Island. The interview was conducted to capture the subject's perceptions that were not captured in their questionnaire's answer. The data was analyzed by statistic descriptive and qualitative method. The analysis focuses on the frequency with which teachers use e-module to improve student's problem posing skill, e-module which use local wisdom, the need of problem posing module in instructional activity, and the need to use local wisdom in that teaching material.

RESULT AND DISCUSSION

The summary of analysis of teacher frequency in using e-module problem posing and local wisdom is presented in Table 1.

Table 1.*The Summary Results of Teacher Frequency in using e-Module Problem Posing and Local Wisdom*

Subject	Name of subject	The frequency of teaching using problem posing module	The frequency of teaching using e-module that contain local wisdom
Group 1: Teacher who already implement problem posing module	Teacher A	1	0
	Teacher B	1	0
	Teacher C	2	0
Group 2: Teacher who never been implementing problem posing module	Teacher D	0	0
	Teacher E	0	0
	Teacher F	0	0

Table 1 displays that teacher in group 1 already teach using problem posing material at least once. According to interview, the material was taught in math logic and trigonometry. Meanwhile, all the teachers both in group 1 and group 2 have never experienced teaching with local wisdom.

The study also looked at teachers' perceptions of problem posing, their need for an e-module on problem posing, and local wisdom as the context of study. The results of the analysis are shown in Table 2. According to Table 2, both groups of teachers who have never used the problem posing module and those who have already implemented it agree that students need to enhance their problem posing skills. One teacher is hesitant about the need for issue posing improvement since he does not know much about problem posing. After discussing about problem posing with researcher, the teacher agreed that problem posing is vital for enhancing other abilities such as critical thinking and problem solving. It becomes one of the most crucial skills to foster in the classroom. Furthermore, he agrees that he needs teaching material based on local wisdom to develop student problem posing skills, as local wisdom may be more relevant to students than the situation portrayed in the textbook that is typically utilized in school. This is aligned with the findings of (Gayatri et al., 2018; Guswari and Rifai, 2019) who noted that student regional problems can become more contextual for students in that region.

Table 2.*The Summary Results on Teacher Perception on Problem Posing and Local Wisdom in Teaching Material*

Subject	Name of subject	In your opinion, do you need to improve the skills of the students you teach with?	In your opinion, is there a need for content regarding local wisdom such as the Geopark of Rinjani to be included in the teaching materials used in class?	Do you need teaching materials based on the wisdom of the Geopark of Rinjani to improve problem posing skills for use in your class?
Group 1: Teacher who	Teacher A	Yes	Yes	Yes

Subject	Name of subject	In your opinion, do you need to improve the problem posing skills of the students you teach with?	In your opinion, is there a need for content regarding local wisdom such as the Geopark of Rinjani to be included in the teaching materials used in class?	Do you need teaching materials based on the wisdom of the Geopark of Rinjani to improve problem posing skills for use in your class?
already implement problem posing module	Teacher B	Yes	Yes	Yes
	Teacher C	Yes	Yes	Yes
	Teacher D	Maybe	Yes	Maybe
Group 2: Teacher who never been implementing problem posing module	Teacher E	Yes	Yes	Yes
	Teacher F	Yes	Yes	Yes

The teachers also state their perception on why they need teaching material which contain local wisdom to improve problem posing skill. The reasons are classified as presented at Table 3.

Table 3.

The Reasons of Teacher Need Teaching Material Which Contain Local Wisdom to Improve Problem Posing Skill

The Advantage for	Name of subject
Teacher	<ul style="list-style-type: none"> Teachers are aware their students comprehension Teachers can prepare teaching materials that suit students' abilities.
Students	<ul style="list-style-type: none"> This helps students formulate challenging questions and design solutions to existing problems. It is necessary for students to get used to asking questions Improving students' problem posing abilities has significant benefits on creative thinking, critical thinking, deeper understanding of the material and problem-solving abilities Provide relevance to students Enrich learning with concrete case studies

According to Table 3, the teachers responded that they require teaching materials that integrate local wisdom in the strengthening of student problem posing skills for two reasons: the benefits to both the teacher and the students. In their opinion, teaching material such as e-module will enable the teacher to be aware of their students' knowledge and will be able to develop teaching materials that are appropriate for the students' capacities. This result indicates that the majority of the teacher already recognize about the positive impact of problem posing to boost another skill. It is in line with the research from (Supandi et al., 2020; Toheri et al., 2020) which stated that this problem posing skill can improve problem solving and critical thinking skill.

Meanwhile, for student, teaching materials can assist students in constructing difficult questions and designing solutions to those difficulties. This benefit can be utilized for post-solution posing. (Cai and Hwang, 2020) states posing post solution accommodate students need to pose another problem from the solvable question. It helps student to make more difficult questions with complex situations than the preceding question.

Tabel 3 also displays that teacher believe that teaching material to fostering problem posing skill is able to facilitating student to formulate suitable question according to their understanding, improving their skill to ask question, able to provide relevance examples for student. This findings is consistent with Leavy and Hourigan that stated to develop skill, teacher need to select suitable questions to reformulating given problems to make student become better questioner (Leavy and Hourigan, 2020). Teaching material are able to accomodate students to develop suitable question according to their understanding.

Table 3 also inform that in the local wisdom context, learning by incorporating local content into teaching materials can provide relevance to students. It facilitates students to generate local identity, understand local problems, relate them to the global context, enrich learning with concrete case studies, and maintain local cultural heritage (Irhasyuarna et al., 2022; Usmeldi and Amini, 2020). This increases student motivation, understanding and engagement while also contributing to the maintenance of regional culture and heritage.

CONCLUSION

According to the findings and discussions, the majority of teachers believe that students need to enhance their problem posing skill. They also agree that local wisdom should be incorporated into educational materials, such as e-module. Furthermore, they require educational resources based on wisdom, such as the Rinjani Geopark, to strengthen that skill. This requirement is based on their understanding of the benefits of such educational material for both teachers and students. The findings of this study imply that developing teaching materials to encourage problem posing could be the next area of development.

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