

INCREASE STUDENT CREATIVITY THROUGH A PROJECT BASED LEARNING MODEL ASSISTED BY LOCAL WISDOM ON VIBRATIONS AND WAVES MATERIAL CLASS 8 MTs

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Abstract. This study aims to determine the increase in creativity ability of grade 8 students of Madrasah Tsanawiyah (MTs) after being given learning using a project-based learning (PjBL) model assisted by local wisdom. The research conducted was pre-experiment with a one-shot case study design. This research was carried out at MTs with class VIII research subjects totaling 31 students. Data collection techniques use observation sheets of student creativity. The data analysis carried out is descriptive quantitative. The results showed that there was an increase in creativity after being given the application of the Project Based Learning model assisted by local wisdom in grade VIII.1 students. This is evidenced by the results of the observation sheet that the creativity of students at each meeting has increased, namely in the first meeting the observation results were 58% in the creative enough category, the observation results of the second meeting 78% in the creative category, the observation results of the third meeting 88% in the very creative category and the observation results of the fourth meeting 97% in the very creative category. From the data obtained, it can be seen that at each meeting, the level of creativity of grade 8 MTs students always increases after using a project-based learning model assisted by local wisdom, especially on vibration and wave materials. The project-based learning model can also be used in other more interesting lessons to obtain better results.

Keywords: creativity, PjBL assisted by local wisdom

INTRODUCTION

In this 21st century, the learning process is expected that students can have the ability to find learning information from various sources quickly, think analytically and creatively, be able to formulate and solve problems, have high creativity and be able to work together to solve a problem (Habibah et al., 2023). Educators are also expected to innovate with technological advances and local wisdom to support learning (Astriani, 2020). Thus, in increasingly sophisticated technological advances, the value of local wisdom does not disappear. Therefore, efforts can be made to overcome these problems by educators choosing appropriate learning models and collaborating with existing local wisdom. The learning model that suits these problems is by applying a project-based learning (PjBL) model assisted by local wisdom. This is in accordance with the results of the research conducted (Azizahwati et al., 2023), which found the most effective learning model used at the junior high school level is the PjBL model, which can strengthen problem-solving skills, critical thinking skills, scientific literacy skills, concept understanding, critical thinking skills, and student creativity.

Project Based Learning is an innovative and contextual learning model related to the daily lives of students, through activities that give students the freedom to explore, plan learning activities, carry out collaborative projects, and ultimately produce products (Riski et al., 2019). The application of PjBL in learning can increase

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cooperation and cohesiveness between students, and can increase critical thinking and student learning motivation (Noviana & Komariah, 2022). Project-based learning is a learning model where students are directly involved in making projects so that they get real experience. This project-based learning model can encourage the growth of creativity, independence, responsibility, confidence, critical thinking and analytical skills in students (Hairunisa et al., 2019). Creativity is one of the potentials that students must have and needs to be developed from an early age. Creativity is the ability to provide new ideas that are neatly arranged and in accordance with circumstances to achieve goals and produce work (Sari & Angreni, 2018). Creativity does not have to make something new that has never existed, but students can try to make something existing develop and become something new and different from others (Asni et al., 2018).

The PjBL model is able to collaborate on several students' abilities, namely abilities in the fields of science, mathematics, and literacy simultaneously. While local culture as a learning base is carried out to raise local wisdom in learning so that it can be known by students (Dasmo et al., 2022). Currently, there are not many concepts of local wisdom that are integrated with subjects in schools (Taufiq et al., 2020). We must continue to maintain local wisdom so that it can be preserved by generations, especially students (Salvifah, 2021). In science learning, it is taught contextually, for example, by linking the local wisdom of each region with science. Thus, science learning becomes very useful for students and the community (Dasmo et al., 2022). One form of local wisdom that can be connected with science learning is playing traditional games and musical instruments. Traditional games and musical instruments are relatively simple but provide tremendous benefits if we explore the meaning of the game in depth (Dani et al., 2022).

Traditional games and traditional musical instruments have many benefits, one of which is that they can train the creativity of students, bring students closer to nature, develop social intelligence, develop motor skills, and so on. In addition to many benefits, traditional games and traditional musical instruments also contain learning concepts, especially in science learning. Science learning concepts found in games and traditional musical instruments can help educators deliver learning to students (Dani et al., 2022). Vibration and waves are one of the science materials studied by class VIII in the even semester in junior high school or equivalent. Vibration and wave are important concepts in the science learning curriculum and are concepts that are often encountered by students applying them in everyday life. Vibration and wave materials were chosen because this material is one of the science materials that explains the working concepts of *gondang* and *tambourine*. In accordance with the research conducted (Bektiarso et al., 2023). In *tambourine* musical instruments, there are physical concepts, namely the concepts of sound, momentum, and vibration. *Gondang* is a local wisdom originating from Rokan Hulu regency (Pratama et al., 2022) which is in accordance with the research conducted at Rokan Hulu. Project-based learning combined with local wisdom can produce meaningful learning for students and can increase student creativity. Creative and innovative project-based learning requires students to produce a product (Retnowati et al., 2019).

METHOD

This research used a descriptive quantitative research approach with experimental methods, namely pre-experimental. With a one-shot case study research design, that is, pre-experimental research that only uses one group, namely the experimental group, with subjects selected sober. One experimental group was given treatment and then observed (Ariyatun, 2021). This research was conducted in grade

8 with 31 students in MTs in the even semester of the 2022/2023 academic year. The implementation time is in May-September 2023.

Table 1. One-shot case study design pattern

Subject	Treatment	Observation
VIII.1	X	O

The data collection technique in this study used observation sheets of student creativity filled in by two observers during the learning process. The following aspects of indicators are assessed on the student creativity observation sheet.

Table 2. Observation indicators

Number	Aspect Indicators	Sub Indicators
1.	Fluency	Ability to generate ideas for designing projects quickly The ability to generate ideas or ideas that are varied / unique
2.	Flexibility	Ability to develop ideas into project designs Adaptability in groups
3.	Originality	The ability to create unique projects without impersonating other groups Ability to produce unique/interesting projects
4.	Elaboration	The ability to add decoration to projects becomes more interesting Ability to respond and answer questions Ability to present and present data in front of the class

Measure the creativity ability of individual students using the formula:

$$P = \frac{x}{y} \times 100\%$$

The formula above explains that P is the creativity of each individual learner, X is the total score obtained by the individual, and Y is each individual's maximum score. The criteria for creativity are adapted from (Zativalen et al., 2022).

Table 3. Creativity criteria

Percentage (%)	Creativity Criteria
81-100	Very Creative
61-80	Creative
41-60	Quite Creative
21-40	Less Creative
1-19	Not Creative

RESULTS AND DISCUSSION

This data is the result of observations made by two observers during the learning process. The learning process is certainly in accordance with the RPP and LKPD that have been prepared. At the 1st meeting, the students made a simple pendulum project; at the 2nd meeting, they made a simple small gondang project; at the 3rd meeting, they made a simple little big gondang project; and at the 4th meeting, they made a simple tambourine project. The tools and materials used to make the project are items that are around that can be used such as used paralons, used cardboard, rubber, wood and others. The results obtained for each indicator during learning can be seen in Table 4.

Table 4. Observations of student creativity

Meeting	Fluency (%)	Flexibility (%)	Originality (%)	Elaboration (%)	Average Score (%)	Categories Creativity
1st Meeting	57,82	57,05	59,67	57,39	57,98	Quite Creative
2nd Meeting	76,61	78,83	78,83	79,97	78,56	Creative
3rd Meeting	84,87	86,89	88,1	92,47	88,08	Very Creative
4th Meeting	94,75	96,97	97,37	97,98	96,76	Very Creative
Average Score (%)	78,51	79,93	80,99	81,95	80,35 %	Very Creative
Categories Creativity	Creative	Creative	Very Creative	Very Creative		

Table 4 shows the result of observations of student creativity conducted by two observers during learning. The data obtained above means that students have been able to bring up indicators of creativity during learning. Learning with the PjBL model assisted by local wisdom lasted for 4 meetings. The chart obtained for each indicator during learning can be seen in Figure 1.

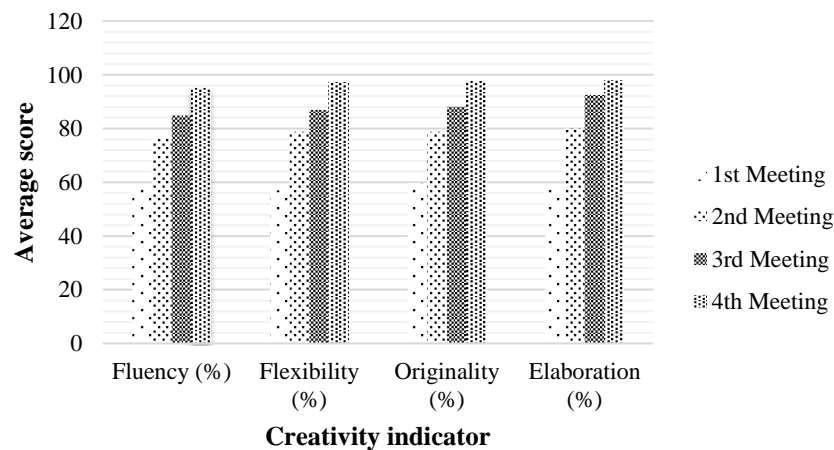
**Figure 1. Observation chart**

Figure 1 shows a chart of the results of the observation sheet of student creativity each indicator in each meeting has increased. Explanations for each creativity indicator at each meeting will be explained below:

1. Fluency

Fluency is the ability to generate diverse ideas, be it in how to solve problems, answer questions or generate ideas for one answer (Paramita et al., 2023). In this study, the fluency indicator assessed is divided into 2 sub-indicators, namely: a) the ability to generate ideas in designing projects quickly, b) the ability to produce ideas or ideas that vary. The assessment carried out is in a predetermined score category. The fluency indicator chart during learning in this study can be seen in Figure 1.

At the first meeting, the results of observations of student creativity on the fluency indicator (fluency) amounted to 58% in the category of quite

creative. This indicates that some students at the first meeting are still in the low category, and some other students in the category are quite capable of producing varied ideas. When the learning process takes place in class, some students seem to be active in conveying their ideas and ideas, and also some are seen leading their respective groups to complete the projects they are doing, and some others only follow the direction of their friends, this is because students are still shy in expressing their ideas or ideas and also this project-based learning (PjBL) learning method assisted by local wisdom is new for students.

In the second meeting, the results of observations of student creativity on fluency indicators (fluency) amounted to 76% in the creative category. This indicates that students at the second meeting are on average quite capable of producing varied ideas. When the learning process takes place some students seem to be more active in expressing ideas in the group, students also seem to be actively asking about the project made, what to do in working on the project, how to solve problems in working on the project, in what way to do the project and students can complete the project in a way they find themselves and students seem to have begun to adapt to the learning model project-based learning (PjBL) assisted by local wisdom. As revealed by Santoso et al., (2014) in his research, individuals who are said to be in the creative category are individuals who can show the answer in different ways of solving (flexible) even though they are limited or not fluent.

In the third meeting, the results of observations of student creativity on fluency indicators (fluency) amounted to 85% in a very creative category. In the learning process, most students have been able to produce varied ideas and also some of the students actively ask the teacher and their peers. In addition, students look active and discuss in groups, where students can always express their ideas, answers and ideas based on the knowledge they have so as to create solutions to the problems faced in working on projects. This is because students seem to have adapted well to the project-based learning (PjBL) learning model assisted by local wisdom used and the projects carried out also have a pattern that is almost the same as the project carried out in the previous meeting.

In the fourth meeting, the results of observations of student creativity on the fluency indicator (fluency) amounted to 95% in the very creative category. In the learning process, students as a whole are able to produce varied ideas / ideas, students are more active in discussing in groups, students are more active in asking questions and students are able to work together to complete projects or be able to solve problems making projects in groups. This is because students have adapted well to the project-based learning (PjBL) learning model assisted by local wisdom.

2. *Flexibility*

Flexibility is commonly referred to as adaptability in groups (Riski et al., 2019). Flexibility refers to the ability of students to solve problems in a variety of different ways, as well as the ability of students to ask a problem or question that can be solved in various ways. In this study, the flexibility indicator assessed is divided into two sub-indicators, namely: a) the ability to develop ideas into project designs, b) adaptability in groups. The assessment carried out is in a predetermined score category.

In Figure 1.4 can be seen that at the first meeting the results of observations of student creativity on the flexibility indicator (flexibility of

thinking by 57% in the category of quite creative. This indicates that some students at the first meeting are still in the low category and some other students in the category are quite capable of developing ideas into project designs. When the learning process takes place in class, some students seem to be active in developing ideas into project designs, some are seen leading their respective groups to develop project designs that are being worked on, some others only follow the direction of their friends, and some students are able to provide responses and answers to a question about the project being worked on. This is because students are still hesitant to develop ideas for their project designs and this project-based learning method assisted by local wisdom is new for students.

In the second meeting, the results of observations of student creativity on the flexibility indicator (flexibility of thinking) amounted to 79% in the creative category. This indicates that students at the second meeting are on average of quite capable of developing ideas into project designs. When the learning process takes place some students seem to be more active in developing ideas into project designs, students also seem to actively ask about the projects made, students can try to find ways to complete projects in the way they find and students seem to have begun to adapt in groups and also with project-based learning models assisted by local wisdom.

In the third meeting, the results of observations on the creativity of students on the flexibility indicator (flexibility of thinking) amounted to 87% in the category of very creative. In the learning process, most students are able to develop ideas into project designs and some of the students are also able to adapt to their groups. Students seem to be active in group discussions to try to find ways to develop varied ideas for completing the projects they are working on. This is because students seem to have adapted well to the project-based learning (PjBL) learning model assisted by local wisdom used and the projects carried out also have a pattern that is almost the same as the projects carried out in the previous meeting.

In the fourth meeting, the results of observations of student creativity on the flexibility indicator (flexibility of thinking) amounted to 97% in the category of very creative. In the learning process, students as a whole are able to develop ideas into project designs, students are more active in discussing in groups, students are more active in asking questions and are able to answer questions by producing more than one answer or varied answers. This is because students have adapted well to the project-based learning model assisted by local wisdom.

3. *Originality*

Originality is commonly referred to as the ability to generate new ideas. Originality is the ability to generate new ideas, and approaches that have never existed or been done before (Riski et al., 2019). In this study, the originality indicators assessed are divided into two sub-indicators, namely: a) the ability to create unique projects without imitating other groups, b) the ability to produce unique / interesting projects. The assessment carried out is in a predetermined score category.

In figure 1. above, it can be seen at the first meeting the results of observations of student creativity on the originality indicator of 59% with the category of quite creative. This indicates that some students at the first meeting are still in the low category and some other students are in the category of being quite capable of producing unique/interesting projects. When the

learning process takes place in class, some students seem to be active in working together to produce unique / interesting projects. It is seen that the group leader leads their respective groups to complete the project they are working on, and some others only follow the direction of their friends. At this meeting, it seemed that students were still not adapting to the project-based learning (PjBL) learning model assisted by local wisdom because it was still new to students.

In the second meeting, the results of observations of student creativity on the Originality indicator (Authenticity) amounted to 79% in the creative category. This indicates that students at the second meeting on average are quite capable of producing projects with their own unique / interesting ideas. When the learning process takes place some students seem to be more active in collaborating in making projects, students also seem to be actively asking about the projects made, students can try to express and try various ideas to complete projects and students seem to have begun to adapt to the project-based learning model (PjBL) assisted by local wisdom.

In the third meeting, the results of observations of student creativity on the Originality indicator (Authenticity) amounted to 88% in a very creative category. In the learning process, most students are able to produce unique/ interesting projects, and the resulting projects are the work of the group without imitating friends. Students seem to be active in discussions and group cooperation, students are able to express and try various ideas in completing their projects, both by asking researchers, observers, and their group mates to find new ideas or ways to make the project more interesting and the resulting project is from group thinking itself. As Wiyono (2018) stated that the important thing in creativity is not just discovering something new that has never existed before; the resulting product of creativity is something new for oneself and not necessarily something new for others or for the world. that, the important thing in creativity is not just discovering something new that has never existed before; the resulting product of creativity is something new for oneself and not necessarily something new for others or for the world. At this meeting, students also seemed to have adapted well to the project-based learning model assisted by local wisdom used and the projects carried out also had a pattern that was almost the same as the projects carried out in the previous meeting.

In the fourth meeting, the results of observations of student creativity on the Originality indicator (Authenticity) amounted to 97% in a very creative category. In the learning process, students as a whole are able to produce unique/ interesting projects, and the resulting projects are the work of the group without imitating friends. Students seem to be able to discuss and cooperate well in expressing and trying various ideas in making their projects more unique and students have adapted well to the project-based learning model assisted by local wisdom used.

4. *Elaboration*

Elaboration is the ability of students to develop and enrich ideas about a situation or other things, making them more complete and clear so as to improve the quality of the ideas themselves (Paramita et al., 2023). In this study, the Elaboration indicators assessed were divided into three sub-indicators, namely: a) the ability to add decorations to the project to be more attractive, b) the ability to respond and answer questions, and c) the ability to

present and present data in front of the class. The assessment carried out is with a predetermined score category.

In Figure 1, it can be seen that at the first meeting the results of observations of student creativity on the elaboration indicator (elaboration) of 57% in the category of quite creative. This indicates that some students at the first meeting are still in the low category and some other students are in the quite creative category. When the learning process takes place in class, some students seem to be active in working together to produce and decorate projects to be unique/ interesting, some students are able to respond and answer questions quite well and students are able to explain the results of their projects in front of the class but only one person in the group dares to convey the results of their projects. At this meeting, it seemed that students were still not adapting to the project-based learning model assisted by local wisdom because it was still new to students.

In the second meeting, the results of observations on student creativity on the elaboration indicator (elaboration) amounted to 80% in the creative category. When the learning process takes place in class, some students seem to be active in working together to produce and decorate projects to be more unique / interesting, students are able to present the results of their projects in front of the class but not all group members are willing to take turns in explaining the results of their projects and some students are able to respond and answer questions well and students seem to have begun to adapt to the project-based learning model Assisted by Local Wisdom.

In the third meeting, the results of observations of student creativity on the elaboration indicator (elaboration) amounted to 92% in the category of very creative. When the learning process takes place in class, most students seem to be active in working together to produce and decorate projects to be more unique / interesting, students are able to present the results of their projects in front of the class and all group members take part in presenting project results and students are able to respond and answer questions very well. At this meeting, students also seemed to have adapted well to the project-based learning model assisted by local wisdom used and the projects carried out also had a pattern that was almost the same as the projects carried out in the previous meeting.

In the fourth meeting, the results of observations of student creativity on the elaboration indicator (elaboration) amounted to 98% in the category of very creative. When the learning process takes place in class, all students seem to be active in working together to produce and decorate projects to be more unique / interesting, students are able to present the results of their projects in front of the class and all group members take part in presenting project results very well and students are able to respond and answer questions very well. At this meeting, it was seen that students had adapted very well to the project-based learning model, assisted by local wisdom.

Figure 4 depicts that this research on the creativity indicator of each meeting has increased. In increasing the creativity of students, of course, there are inhibiting and encouraging factors. In the research process, there are several things that hinder the creativity of students, namely: 1) social relations between group members, in one group at the beginning of the meeting, it was found that some students were reluctant and shy to mingle in their groups, and some students would only work if there were friends or group leaders telling them to work. This is in line with research conducted

by Amrullah et al., (2018) that, there are several things that can inhibit the creativity of students, one of which is a social environment that is not supportive and not supportive; 2) Not sure of yourself in expressing his opinion. In one group, there were some students who wanted to express their opinions but felt unsure of their own opinions, so they just followed what the group wanted. To overcome this, namely by providing encouragement and space for these students to think and no longer feel hesitant in expressing and developing their opinions in the group. This is in accordance with research conducted by Amrullah et al., (2018). It also explains the supporting factors of student creativity, one of which is to provide encouragement and the existence of spaces where students can develop their creative thinking, such as private rooms, rooms for group discussions, experimental rooms, and social interaction spaces (such as cafes and parks) will have a positive impact on the development of creativity; 3) Time constraints. In working on projects, students are only given time in one meeting to complete one project, so students feel rushed in completing their projects, and the tools and materials used are all provided limited, this makes students unable to be too free in determining and choosing tools and materials that suit what they want.

In addition, in this study, there are several factors that support creativity to increase, namely the opportunity given to students to generate and develop their own ideas in making projects (Asni et al., 2018), encouragement and motivation not to give up on projects and not to be shy in expressing questions and answers to be conveyed, and means in the form of tools and materials even though they are not too varied.

CONCLUSION

The implementation of the Project Based Learning model assisted by local wisdom on vibration and wave materials can increase student creativity. This can be seen from the results of the percentage of observation sheets at each meeting increasing, and the final percentage obtained during learning was 80% in the very creative category. In the implementation of learning using the Project Based Learning model assisted by local wisdom on vibration and wave material, it can be seen that the response of students is more enthusiastic and more active in the learning process, so that learning using the Project Based Learning model assisted by local wisdom has been carried out well. This can also increase the creativity of students in learning and their knowledge of the local wisdom around them.

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