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THE APPLICATION OF PROJECT BASED LEARNING (PjBL) MODEL ON STUDENT LEARNING OUTCOMES OF BIODIVERSITY MATERIAL

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ABSTRACT

The purpose of this study was to see the application of the PjBL model on student learning outcomes of biodiversity material in class X SMAN 19 Medan. This research used pre-experiment with one group pretest-posttest design. The sample was taken by random sampling technique, namely class X-8. Data collection to measure learning outcomes used multiple choice questions and observation sheets. The results showed an increase in cognitive learning outcomes with n-gain 0.62 (medium category), as well as affective and psychomotor outcomes in the good category. In conclusion, the application of theh PjBL model is able to improve cognitive, affective and psychomotor learning outcome.

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INTRODUCTION

Education serves to improve human resources in order to compete in the era of the industrial revolution 5.0 (Muliani et al. 2021). One of the criteria that can be used as an indicator of educational success is student learning outcomes (Adirestuty, 2017). Learning outcomes are a form of whether or not a learning objective is achieved (Mutiaramses et al. 2021). Students' success in learning can be measured through cognitive, affective and psychomotor improvements marked by high scores and their activeness in participating in learning activities. (Ulfah & Arifudin, 2021). Bloom stated that when evaluating learning outcomes, it must cover three domains, namely cognitive, affective and psychomotor (Nurhidayati & Sunarsih, 2013).

Based on UNESCO data, the quality of education in Indonesia is still alarming, which in 2017 was ranked 108th (Giantara, 2019). Meanwhile, from the 2017 ASEAN region education ranking data report, Indonesia was ranked 5th out of 9 countries (Solihati et al. 2018). Some studies say that low student learning outcomes are still a major problem in learning biology. The low student learning outcomes in biology learning are due to some materials considered difficult because they are abstract, giving the impression that learning biology is learning that is difficult to understand (Insyasiska et al. 2015). Some studies say there are various factors that result in low student learning outcomes, some of which are learning activities that still focus on the teacher which makes students less active and their scientific attitudes do not develop (Panjaitan, 2019).

The observation at SMAN 19 Medan showed that the learning process was still teacher-centered and there was a lack of student involvement during the learning activities. An interview with the biology teacher of class X obtained information that the students' learning outcomes in biology have not reached the KKTP, as evidenced by the odd semester exam results, where only 15 students (45%) reached KKTP and 18 students (54%) did not reach KKTP. And information was obtained that the teacher had not conducted affective and psychomotor assessments. While from the results of the analysis of learning tools, it shows that the learning model designed in the teaching module uses the PBL model, but this model has not been applied effectively in learning. If these problems are not resolved immediately, it can cause learning to become monotonous so that it will affect student learning outcomes. (Nesi & Akbiarek, 2018). And if affective and psychomotor assessments are not carried out, then teachers will lack information about students' affective and skills, so that the collected assessments become incomplete, meaningless and the learning process does not achieve good results. (Imtihan et al. 2017; Janawi, 2019; Dewi, 2021).

Based on the above problems, an alternative learning model is needed to improve learning outcomes. According to Azzahra et al. (2023) the PjBL model is able to improve student learning outcomes in biology lessons. The PjBL model is a model that utilizes projects as a method to achieve knowledge, attitudes and skills. The main focus of this model lies in student activities in designing, analyzing, creating and presenting projects based on real experiences (Banawi, 2019). Based on research conducted by Herdiana (2023), this model can improve students' cognitive abilities. Not only improving cognitive abilities, the PjBL model can also improve affective and psychomotor abilities (Lailatunnahar, 2021; Indrayani, 2022). It can be proven that the PjBL model is able to encourage students to think critically in completing tasks given by the teacher, students memorize material and apply it in real situations through project work, where the attitude of cooperation, how to communicate and creativity between students will increase through project work (Supiandi & Julung, 2016; Kurniawan et al., 2023).

The PjBL model has been proven to be able to improve student learning achievement in biology lessons (Simangunsong et al., 2022). This happens because this model has advantages, namely it can encourage students' enthusiasm for learning, create a supportive learning environment because learning is based on real problems and make learning activities fun (Jagantara et al., 2014; Riastuti in Riastuti & Febrianti, 2021). According to Moursund in Farihatun & Rusdarti (2019), the PjBl model also has other advantages, namely (1) Improving practical skills and organizing projects, (2) Improving communication skills, (3) Improving collaboration, (4) Improving skills to find and obtain information and (5) Teaching students how to utilize the knowledge they have learned in their daily activities. Based on this description, the PjBL model is very appropriate if applied to biology learning. However, there are still few studies that measure affective and psychomotor abilities by utilizing the PjBL model. Based on the explanation above, the purpose of this study is to determine the application of the PjBL model on student learning outcomes of biodiversity material class X at SMAN 19 Medan.

METHOD

The research was conducted at SMAN 19 Medan located at Jl. Seruwai No.1, Sei Mati, Kec. Medan Labuhan, Medan City, North Sumatra. This study used pre-experiment with one group pretest-posttest design. The population included all X grade of SMAN 19 Medan as many as 420 students. This study only used one class as the sample which was determined by randomization. Data collected in this study using cognitive tests in the form of multiple choice options totaling 25 questions and affective and psychomotor observation sheets. Data analysis used the n-gain test.

RESULTS AND DISCUSSION

The results of cognitive assessment before learning and after learning are shown in Table 1.

Table 1. Comparison of Cognitive Learning Outcomes

Cognitive Score	
Pretest Avergae	**Posttest Average**
50.2	**81.2**

Based on Table 1, it appears that the average posttest is higher, this indicates a significant difference between the two averages. So, it is concluded that the PjBL model can improve students' cognitive learning outcomes.

Affective assessment results are shown in table 2.

Table 2. Affective Learning Outcomes

Aspects Observed	Average	Criteria
Honesty	81.4	Good
Discipline	85.7	Good
Responsibility	86.8	Good
Courtesy	80.5	Good
Confidence	83.4	Good

Based on Table 2 above, all aspects observed showed “Good” results with an average of 80.5 to 86.8. It can be seen that the responsibility aspect is the aspect with the highest average, while the courtesy aspect is the aspect with the lowest average. The results of the psychomotor assessment are presented in Table 3.

Table 3. Psychomotor Learning Outcomes

Aspects Observed	Average	Criteria
Planning Ability	80.5	Good
Implementation Ability	84.7	Good
Project Results	87.5	Good

Based on Table 3 above, it can be seen that each aspect analyzed shows “Good” results with an average of 80.5 to 87.5. It can be seen that the project result aspect is the aspect with the highest average, while the planning ability aspect is the aspect with the lowest average.

The results of the n-gain test on student learning outcomes are shown in table 4.

Table 4. Results of N - Gain

Class	*Pretest*	*Posttest*	N-Gain Score	Citeria
X - 8	50.2	81.2	0.62	Medium

The results of Table 4, show an increase with an N - Gain value of 0.62 which includes moderate criteria. This proves an increase in students' cognitive learning outcomes regarding biodiversity material.

According to the results obtained, the application of the PjBL model resulted in improved learning outcomes in all three aspects. In the cognitive aspect, the increase occurred because students became more active in discussions, students could deepen their understanding of the material and connect it to real situations and from working on projects students could more quickly learn the material. In accordance with the results of research by Fahadah et al. (2021) the PjBL model can improve student learning outcomes because the PjBL model prioritizes the core concepts of the material, students are involved in solving problems and relevant tasks, encouraging students to learn independently and produce their own work.

The assessment of affective learning outcomes shows that all of the aspects observed by students have good grades. When learning takes place they have shown honest aspects, such as students are required not to copy other people's work without exposing the source, provide reports on the progress of the project being done honestly, and are willing to admit mistakes made. This is because the PjBL model requires students to speak honestly, where in the process of working on projects students will be actively involved, given freedom of opinion so that students are more aware of the importance of honesty. This is in accordance with the advantages of the PjBL model, namely the PjBL model can shape students' scientific attitudes such as thoroughness, honesty, responsibility and creativity.

In addition to the honest aspect, students have also shown aspects of discipline in learning such as dressing neatly, following the predetermined project schedule, doing and collecting assignments on time. This happens because the PjBL model requires students to manage time well and comply with applicable rules. Likewise with the responsibility aspect, it can be seen from the high involvement of students in completing the project. This is because the PjBL model requires students to learn independently and cooperate with a group of friends, which can

teach students that they have their respective roles in the group. In line with research conducted by Nisa et al. (2017) which says that the PjBL model is able to encourage students to be independent in completing the tasks that have been given, students are expected to be active in finding information, cooperating with friends in completing tasks, discipline in doing tasks and from this learning their attitude of responsibility and motivation will increase.

The politeness aspect is also seen during the learning process, such as the way students communicate with the teacher and their group mates, respecting and appreciating others. This happens because the PjBL model encourages students to show mutual respect and communicate well. Likewise, the aspect of self-confidence is seen when students present the results of their projects such as students are required to express opinions, ask and answer questions. Setiawan & Yanti (2019) stated that the PjBL model is able to improve cognitive learning outcomes by fostering enthusiasm, self-confidence, courtesy, tolerance, collaboration and mastery of material as expressed in their research.

Assessment of psychomotor learning outcomes is also carried out, where psychomotor learning outcomes are closely related to cognitive and affective learning outcomes. Psychomotor assessment is produced through project-making activities carried out by students. Based on the observation results, it shows that the overall psychomotor assessment of students is classified as good. In the aspect of implementation ability, a higher average was obtained than the first aspect, because students already have a better understanding of the stages that must be done to complete the project. While the highest aspect is seen in the final result of the project, because students can bring out their creativity in making dry herbarium as desired. Related to this, it is concluded that the PjBL model can also improve students' psychomotor abilities. In accordance with the research of Fajarwati et al. (2017) stated that there was an effect of the PjBL model on students' psychomotor skills, where the increase in psychomotor skills in the experimental group was higher. The increase occurred because the PjBL model gave students the opportunity to develop psychomotor skills through making projects. This agrees with Maisyarah & Lena (2022) who say that the PjBL model is very appropriate to use to develop various student skills.

Based on the data obtained, it shows that the application of the PjBL model can improve the learning outcomes of these three aspects. Based on the results of the N-Gain test obtained, there was a cognitive increase in students before treatment and after treatment which was 0.62 with moderate criteria. This agrees with the research of Mahanal et al. (2010) that the PjBL model proved effective in improving learning outcomes and student attitudes, especially in biology lessons. Also in accordance with the results of the analysis of Hikmawati et al. (2018) which states that cognitive abilities, affective and psychomotor abilities can increase if using the PjBL model.

According to Aisyah & Rosnita (2021), the stages in the PjBL model encourage students to be active so that learning activities are more meaningful, they can apply the knowledge they have learned, help them complete tasks and obtain optimal cognitive learning outcomes. According to Thomas (in Rahayu et al., 2020) the PjBL model is a learning model that invites students to do a project. The final step of project work can help students achieve C6 level cognitive abilities, namely creating. (Insyasiska et al., 2015). The application of the PjBL model, can create a supportive and pleasant environment, can encourage students to be more active, increase cooperation between them, improve student discipline and foster a sense of responsibility in students (Nisa et al., 2017). The PjBL model can also improve students' psychomotor skills, where students will actively participate in project making activities and students will also present the results of making their projects, so that from the application of the PjBL model students can improve their psychomotor skills (Eliza et al., 2019; Kurniawan et al., 2023).

CONCLUSION

The conclusion of this study shows that the application of the PjBL model can improve student learning outcomes in all three aspects. The n-gain value of 0.62 (medium category) was obtained. Assessment of affective and psychomotor learning outcomes showed that all aspects observed were in good criteria. Suggestions that can be made are that future researchers are expected to develop observation instruments for biology or other subjects.

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