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Efforts to Improve High School Students' Activities and Learning Outcomes on the Human Reproductive System Material with the Implementation of Problem Based Learning Assisted by "*GenzB*"

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Article Info	Abstract
	The purpose of this study was to improve student activity and learning outcomes, to determine the implementation of learning and the relationship between activity and learning outcomes in the human reproductive system material using the "*GenzB*" assisted PBL model. This study used an experimental method with a One Group Pre-Post Design. The sample of this study was class XI 1 and XI 2 at SMA Negeri 1 Cikarang Timur. Data collection techniques were by using test techniques including giving pretest posttest questions, and non-test techniques including student activity observation sheets, learning implementation observation sheets and student response questionnaires. The results showed an increase in student activity in each meeting in both experimental classes, namely 66%, 70%, 73% for the average experimental class 1, then 61%, 66%, 71% for experimental class 2, student learning outcomes with N-*Gain* for both classes were 0,62 (moderate) and 0,60 (moderate), person correlation value of 0,406 with a fairly strong interpretation, learning implementation that obtained a very good category and positive student responses to learning. Based on the research data, it can be concluded that the use of the "*GenzB*" assisted PBL model is able to increase student activity and learning outcomes, achieve good implementation and there is a relationship between student activity and learning outcomes in the human reproductive system material.

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INTRODUCTION

The use of appropriate learning models in the teaching and learning process is an effective effort in maximizing the delivery of material, because the accuracy of the model used helps students understand the material well. On the other hand, the inaccuracy of this learning model results in students being late in understanding the information conveyed. The process that occurs in learning activities directs students to the ability to associate information with everyday life so that skills are formed in solving a problem. Various activities that occur during the teaching and learning process have an effect on improving students' abilities. Education is not only directed at making students smart, but also shaping character and making humans skilled and innovative in their lives. In other words, education is a place to achieve prosperity and produce a quality advanced generation (Suja'i, 2023).

Information obtained in learning activities becomes a space for students to gain new knowledge. Misinformation obtained results in a state of misinterpretation or misconception. In this regard, the delivery of information in the learning process must be delivered properly, especially in learning that studies various processes such as the human reproductive system. The results of the 2017 SDKI stated that there are still many school-age adolescents who do not understand and underestimate the importance of maintaining the health of reproductive organs. This is because some groups consider that the delivery of human reproductive system learning is still taboo to convey so that this is one of the factors in the lack of information and knowledge regarding the importance of maintaining the health of human reproductive organs (Dalam et al., 2023).

The achievement of learning is supported by the implementation of a learning model, learning media and the type of approach used by the teacher during the learning process. So that teachers are required to be skilled in choosing the right solution so that the continuity of learning runs smoothly. *Problem Based Learning* (PBL) is considered an effective model because it develops critical thinking skills such as thinking activities, communication, and connections to solve problems. In addition, the PBL learning model can encourage students to be more active in participating in class activities, making it easier for students to obtain information from various sources related to science, ultimately facilitating understanding of concepts and improving their thinking skills, improving understanding of the material and improving and influencing student learning outcomes (Yulistiana & Setyawan, 2020).

According to Syarifudin *et al.*, (2021), the learning model used supports student learning outcomes. One of the learning models that can improve student learning outcomes is PBL. Their research found that the application of this model improves student learning outcomes with an average percentage increase. The results of this study also support research conducted by Nur *et al.*, (2023) which states that the application of the PBL model improves students' understanding of certain concepts and ideas. This increases students' desire to learn new things. In addition, the problem-solving model helps students improve their critical thinking skills, which results in better learning outcomes. The use of the right model must also be supported by the use of media to facilitate the process of obtaining information. Media can be used to implement the learning process, according to Kusmaryati *et al.*, (2022).

The use of "*GenzB*" as multimedia in this study facilitates the learning process because it can be accessed at any time. The use of "*GenzB*" is carried out as an effort to optimize the implementation of the PBL model to improve student activity and their learning outcomes. Multimedia is considered a very useful tool for conveying information because it can adjust the use of sound, video, objects, and text in one or more slides (Puspita et al., 2020). According to Kudsiyah & Harmanto (2017), multimedia not only makes lessons easier, but also helps students make greater contributions, namely the formation of two-way communication between students and students and students with the media.

RESEARCH METHOD

This study uses a quantitative approach through the experimental method and uses the *One Group Pre-Post design*. In this study, two experimental classes were used, and there was no control class. This study involved two experimental classes, namely 47 students in experimental class 1 and 46 students in experimental class 2 which were conducted in the even semester from March 4 to March 28, 2024 on the Human Reproductive System material at SMA Negeri 1 Cikarang Timur, located on Jl. Raya Citarik Pangupukan, Rt. 11 / Rw.6, Jatibaru Village, East Cikarang District, Bekasi Regency, West Java. The

results of student activities in the study were calculated using the following formula:

Student name $= \frac{score\ obtained}{maximum\ score}$ x 100%

Table 1. Student Activity Assessment Criteria

Assesment Criteria	Information
5 = 90 – 100	Verry Good
4 = 70 – 89	Good
3 = 50 – 69	Enough
2 = 30 – 49	Less
1 = 10 – 29	Verry Less

(Haris dan Jihad2013:130)

Student learning outcomes are obtained from students' pretest and posttest scores and then analyzed using the normalized Gain (N-*Gain*) test with the aim of determining the increase in student learning outcomes after being given treatment. The calculation of the N-*Gain* score is presented in the formula:

$$< g > = \frac{<Sf> - <Si>}{100 - <Si>} x 100\%$$

Keterangan: *g* = N-*Gain*, *Sf* = *Posttest* score, *S* = *Pretest* score

Table 2. N-*Gain* Score

N-*Gain* Value	Categories
$g > 0,7$	High
$0,3 \leq g \leq 0,7$	Medium
$g < 0,3$	Low

(Sukarelawan *et al.*, 2024)

The achievement of student activity scores and student learning outcomes with the PBL learning model assisted by "*GenzB*" were then analyzed to determine whether there was a relationship between the two with the following criteria:

If, Sig < 0.05, then correlated

If, Sig > 0.05, then not correlated

Table 3. Interpretation of Correlation Coefficient Value *r*

Interval Koefisien	Hubungan
0,80 – 1,000	Verry Strong
0,60 – 0,799	Srtong
0,40 – 0,599	Vairy Strong
0,20 – 0,399	Low
0,00 – 0,199	Verry Low

(Sugiono, 2013)

RESULTS AND DISCUSSION

The results of the study include observations of activities during the learning process, pretest and posttest scores for each class, the implementation of the PBL model with "*GenzB*" and student responses and the relationship between activities and student learning outcomes on the use of the PBL model with "*GenzB*" on the human reproductive system material. The results of student activity scores are presented in the following table 4.

Table 4. Results of Student Activities in Both Experimental Classes in 3 Meetings on the Human
Reproductive System Material with PBL Assisted by "*GenzB*"

Type Activities	Sub Activities	Percentage (%)					
		XI-1			X1-2		
		P1	P2	P3	P1	P2	P3
Visual Activities	A1	65	69	73	61	64	72
	A2	66	69	74	63	66	70
Oral Activities	A1	67	69	73	61	67	70
	A2	64	69	70	62	66	70
Writing Activities	A1	66	69	72	61	67	72
	A2	65	69	73	61	65	72
	A3	64	69	72	58	66	70
Mental Activities	A1	68	74	77	60	65	72
	A2	67	74	76	60	67	72
	A3	69	72	76	62	67	71
	A4	67	70	72	61	68	71

Based on table, student activities in three meetings for class XI-1 (Experimental Class 1) and class XI-2 (Experimental Class 2) obtained the following results. XI-1 in the first meeting obtained an average score for each activity, respectively, namely 65.5%; 65.5%; 65% and 67%. The second meeting obtained an average score, respectively, namely 69%; 69%; 69%; 72.5%. The third meeting obtained an average score, respectively, namely 73.5%; 71.5%; 72.3%; 75.2% in the four types of activities observed including Visual Activities, Oral Activities, Writing and Mental Activities.

Class XI-2 in the first meeting obtained average scores of 62%; 61.5%; 60% and 61% respectively. The second meeting obtained average scores of 64.5%; 66.5%; 66%; 66.7%. The third meeting obtained average scores of 71%; 70%; 71.3%; 71.5% respectively in the four types of activities observed including Visual Activities, Oral Activities, Writing Activities and Mental Activities. The increase in the types of student activities at each meeting is presented in the figure below.
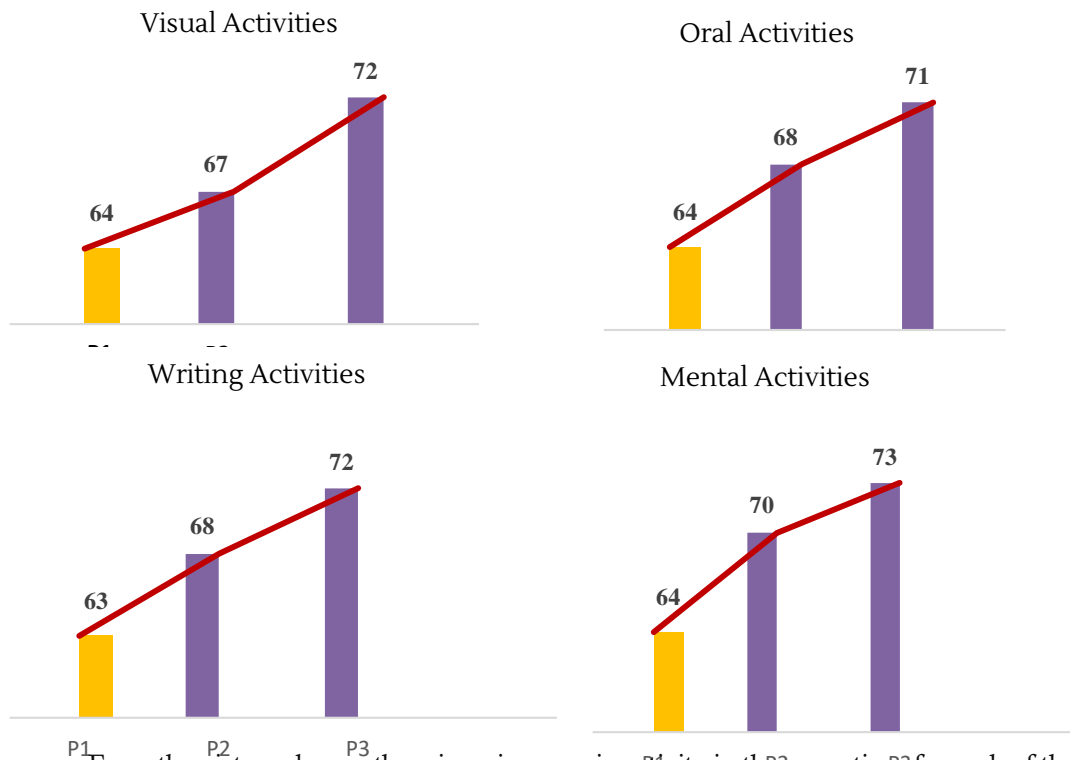
From the picture shown, there is an increase in activity in three meetings for each of the four types of activities carried out in both experimental classes. The ability of students to adapt to the "*GenzB*" assisted

PBL learning model causes this increase. The PBL model is presented with "*GenzB* " presenting various problems regarding the human reproductive system material that can be analyzed by students, learning materials and quizzes equipped with practice questions that encourage student activity. The features of the *"GenzB"* assisted PBL learning approach provide progress in the teaching and learning process because they contain the necessary materials and references (Poerwanti & Mahfud, 2018).

The use of learning models and student activities in learning is one of the factors in improving student learning outcomes. This statement is in line with the results of Abidin's research (2019) which states that there are several factors that influence learning outcomes, such as learning models, learning media, and student activities during the learning process. The increase in student scores after implementing the *"GenzB"* assisted PBL learning model can be seen from the increase in posttest scores. This proves the findings of Setiana *et al.*, research (2019) which states that learning models and multimedia can encourage student participation in the learning process, which ultimately improves student learning achievement. Then the acquisition of student learning outcomes was analyzed with N-*Gain* used to calculate the increase in student learning outcomes after implementing the *GenzB* assisted PBL model on the human reproductive system material.

Table 5. Student Learning Outcomes With N-Gain In Both Experimental Classes on the Human Reproductive System Material With "*GenzB*'" Assisted PBL

Class	Low Value	Hingh Value	Average Value		*N-gain*	Criteria
			Pretest	*Posttest*		
XI-1	50	100	61	84	0,62	Medium
XI-2	40	95	54	82	0,60	Medium

Based on the results presented, it is known that there was an increase in student learning outcomes in both experimental classes. This statement can be observed and seen from the difference in values obtained during the pretest and posttest. K1 obtained a difference of 50 and 55 for K2. The initial conditions before the implementation of the *"GenzB"* assisted PBL model proved that the learning outcomes were still low as shown in the pretest results. After the *"GenzB"* assisted PBL learning model was implemented, the learning outcomes increased as shown in the posttest results. The increase in student learning outcomes was due to "*GenzB*" as a supporting tool for implementing the PBL model presenting material that is linked via links so that students find it easier and more practical when they are going to study, understand and read the material in certain circumstances. Activities in learning are related to the learning outcomes obtained by students. This relationship is caused by the use of the PBL learning model with *"GenzB"* which is shown in the following table.

Table 6. Results of Correlation Product Moment of Student Activity and Learning Outcomes in Both Experimental Classes with *"GenzB"* Assisted PBL

Correlations					
Student Activities			**Student Learning Outcome**		
Pearson correlation	Interpretation	Value Sig	*Pearson correlation*	Interpretation	Value Sig
0,406	Vairy Strong	0,00	0,406	Vairy Strong	0,00

Based on the table presented, it is obtained that student learning outcomes and student activities have a sig value of 0.00 and have the same *pearson correlation* value of 0.406. The results obtained state that there is a relationship between activities and student learning outcomes because the Sig value obtained is 0.00 <0.05. Then for the *pearson correlation* value, it obtains a value of 0.406 with the interpretation of the

relationship being in the criteria of being quite strong and the direction of the relationship is positive because the *pearson correlation* value is positive. Referring to this statement, it can be shown that student activities are positively related to student learning outcomes with the degree of correlation relationship being quite strong, which means that the more activity increases, the learning outcomes will also increase.

The *pearson correlation* value obtained of 0.406 states that there is a fairly strong relationship between activities and student learning outcomes in a positive direction. In line with Busrial's research (2022) which explains that student activities are related to the acquisition of student learning outcomes. The acquisition of the *pearson correlation* value in this study states that there is a correlation including the relationship between activities and student learning outcomes with the statement that the more student activity increases, the learning outcomes obtained will also increase. Through good learning activities, students are able to obtain good learning outcomes. Conversely, obtaining good learning outcomes is also due to increased activity. Student activity is related to the learning outcomes obtained by students, this statement supports Lestari's research (2020) which states that the increase that occurs is caused because the two learning factors have a relationship that influences each other. This is because learning activities can develop creativity in understanding material, remembering material, mastering material, analyzing material and expressing opinions which will later be able to improve learning outcomes for students (Nuraini et *al.*, 2018).

CONCLUSION

Based on the results of the analysis and discussion, it is concluded that the Problem Based Learning learning model with *GenzB* on the human reproductive system material is effective in increasing student activity and learning outcomes. This is indicated by an increase in student activity in each meeting and the acquisition of a person correlation value of 0.406.

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