

## Learning Ownership PBL Approach Enhancing Concept Understanding on Student

Sitoresmi Prabaningtyas<sup>1</sup>, Ulfi Risqillah<sup>2</sup>

<sup>1,2</sup> Department of Biology, Faculty of Mathematics and Natural Science, University of Malang, Indonesia

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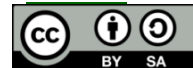
PBL

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### ABSTRACT

Through a process known as "Learning Ownership," students actively engage in the educational process and gain an understanding of the context, goal, and application of the material they have studied. The abilities and routines needed to acquire ownership are quite adaptable and can be used in any type of learning setting. Aim of this study was to unveil the effect of learning ownership-PBL model on students' concept understanding. The sampling technique used on this research was the random sampling technique that consisted of 2 group: the control group use PBL model and the experimental group uses learning ownership-PBL model. For learning ownership parameter, we use a questionnaire consisting of 33 questions and for critical thinking parameter use multiple choice consisting of 10 questions. The test used is an independent sample T-test and Spearman test to see correlation between learning ownership and critical thinking skill. The analysis revealed that student in experimental group have learning ownership and concept understanding score improvement higher than PBL model alone in all indicators. The learning ownership-PBL is moderately correlated and significantly increase students concept understandings. Thus, we conclude that learning ownership-PBL can increase student concept understandings.

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### Corresponding Author:

Sitoresmi Prabaningtyas,

Department of Biology, Faculty of Mathematics and Natural Science, University of Malang, Indonesia Biology Education, University of Jember

Jalan Semarang 5, Malang 65145, Indonesia

Email: [sitoresmi.prabaningtyas.fmipa@um.ac.id](mailto:sitoresmi.prabaningtyas.fmipa@um.ac.id)

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## 1. INTRODUCTION

Education is an effort to humanize humans. Humanizing humans means making people aware that humans can choose and act without neglecting their obligations (Christiana, 2013). Education, in its implementation, not only focuses on students' success in solving a problem but also helps students find the true meaning of why they have to solve the problem. In the classroom, teachers are not only obliged to direct students to solve a problem, but teachers must make students aware of why they must learn and complete their learning well. This can be realized by teachers helping students to feel ownership of their learning (*Learning Ownership*). In cultivating *Learning Ownership* in students, teachers must explain students' rights and obligations in the classroom. Students are not only required to carry out their obligations, but they also have rights to their classes.

Learning ownership is a student's sense of ownership and responsibility for their learning and an understanding of the importance of learning (Cycle, 2021). Learning Ownership consists of 9 components, namely motivation and engagement, goal orientation and self-direction, self-efficacy and confidence, metacognition and self-monitoring, and persistence (Conley & French, 2014). Students who have learning ownership are more motivated to learn (Coutts, 2019), can make decisions independently (Patall et al., 2010), assess their abilities (Cycle, 2021), identify short and long-term goals (Coutts, 2020), determine learning strategies, monitor learning outcomes, and evaluate each outcome (Chan et al., 2014). Learning ownership can help students better master and extend knowledge concepts and make it easier for students to assimilate information (Fisher & Frey, 2010). Learning ownership in students is implemented to develop mindset and build problem solving skills to increase student engagement in learning to achieve learning goals (Blackwell et al., 2007). Engagement helps students to increase learning achievement (Danks, 2019) and improve life skills, one of which is critical thinking skills (Lv et al., 2022). Someone who has learning ownership has the independence to prepare what is needed to achieve the

desired outcomes (Durall et al., 2020). Research reports that Learning Ownership increases student motivation and independence in physics courses (Enghag & Niedderer, 2008). Learning independence is related to learning regulation, learning strategies (Heikkilä & Lonka, 2006), and motivation (Mustofa et al., 2019). Learners who have independence can determine effective learning strategies (Setiani & Wijaya, 2020), have motivation to learn (El-adl & Alkharusi, 2020), and monitor their learning process (Wang, 2011). Learning independence is related to students' ability to master the concept of learning material (Edi, 2018; Maulani, 2019; Mulyarosa & Rahmawati, 2019). Research reports that as students' level of independence increases, their ability to understand the concept also increases (Nurlia et al., 2017).

Concept understanding is important in cell material. Cell material is given from simple concepts to more complex ones. One concept with another concept is continuous and inseparable, so it requires good concept understanding skills to connect one concept with the concept being studied. The lack of concept understanding among students often leads to misconceptions (Dewi & Ibrahim, 2019). Research shows that cell material is one of the materials that are difficult to understand (Çimer, 2012) and complicated, and because students need to understand concepts related to life phenomena related to structure, function, and regulation (Aditya & Indana 2022; Suryanti et al., 2019). Based on the results of the needs analysis conducted on July 27, 2023 on 28 students of class XII who have taken the cell material, it shows that 82% of the students have not achieved the minimum completeness. The low level of concept understanding among students is believed to be related to the lack of implementation of Learning Ownership in learning. Research indicates that Learning Ownership can improve student performance (Chan et al., 2014), including improving Student Directed Learning (SDL) skills such as critical thinking skills (Du Toit-Brits, 2022). An interview conducted with one of the biology teachers at SMAN 1, Waru Pamekasan, revealed that Learning Ownership has never been applied in the school, so the level of student Learning Ownership is also low. The results of the preliminary study using a questionnaire showed that as many as 80% of the students had low Learning Ownership. In order to develop Learning Ownership in students, they need to be supported through the use of appropriate learning models, namely student-centred learning.

The definition of student-centred learning is learning in which students have the authority to determine what and how learning is done in the classroom (Roger, 1983 in (TEAL Center staff, 2012). Students can determine how to learn and effective strategies that can increase their motivation to learn (Moffett and Wagnerr, 1992). The role of the educator here is that of a facilitator. The meaning of facilitator in this case is that educators carry out the learning in accordance with the wishes of the students. In addition, educators also have an obligation to observe students because each student has different talents, motivations, desires, confidence (Mentz & Lubbe, 2021). By looking at these categories, teachers will later get an overview in conducting appropriate learning so that students feel they have rights in learning, feel valued, which will have an impact on increasing learning motivation (Wang, 2023), desire (Du Toit-Brits, 2018a), and their independence in learning (McCombs and Whistler, 1997). One of the student-centred learning models that is consistent with learning ownership is the problem-based learning (PBL) learning model (Edström & Kolmos, 2014).

In this study, the learning ownership approach was combined with the problem-based learning (PBL) model. This learning model, which is based on problems or cases related to everyday life, was developed with the aim of helping students deepen their understanding of concepts (Azidin, 2017; Juenda et al., 2017; Hardiyanti, 2022), improve their ability to find relationships, and apply knowledge, creativity, and responsibility in solving problems (Ghaemi & Potvin, 2020). Several studies have also reported that the PBL model can stimulate students' critical thinking skills (Klegeris, 2021; Mutia & Darussyamsu, 2021; Sujianti et al., 2022), an ability that can help students acquire knowledge, find solutions to given problems (Paul & Elder, 2006; Ghaemi & Potvin, 2020), and participate well in learning activities (Shcheglova et al., 2019; Lv et al., 2022; Li et al., 2023). In addition, another study reported that PBL helps to increase students' sense of ownership in learning, especially in problem formulation (Edström & Kolmos, 2014). On the other hand, the application of PBL through a learning contract that includes the learning ownership stage has been proven to increase students' independence and responsibility (Rahmat & Aziz, 2012).

Based on the strengths of PBL and the potential of Learning Ownership in improving student quality reported separately, a study was conducted on a student-centred Learning Ownership approach (Learning Ownership-PBL) that can strengthen the potential in improving concept understanding.

## 2. RESEARCH METHOD

This research was a quasi-experimental one. The study was conducted from August to September 2023 at SMAN 1 Waru Pamekasan. The research population was grade XI consisted of 115 students. The random sampling technique was carried out picked up 56 students evenly divided into 2 groups of 28 students each. The control group was taught in PBL model and the experimental group was taught in learning ownership-PBL model. The research instrument consisted of questionnaire and multiple choice.

The questionnaire consisting 33 items design to assess learning ownership comprised 9 dimentions. These dimensions encompassed motivation, engagement, goal orientation, self-direction, self-efficacy, self-confidence, metacognition, self-monitoring, and persistence (Conley & French, 2014). the multiple choice instrument consisting 10 questions to asses concept understanding comprised 3 indicators: (1) analyze , (2) evaluate, (3) create (Greenstein, 2012).

Data collection involved pre-test and post-test assessments administered before and after the treatment, respectively. The test used is an independent sample T-test in IBM SPSS Statistics 15 software. Furthermore, correlation tests using Pearson test were conducted to determine the correlation between concept understanding and learning ownership.

### 3. RESULT AND DISCUSSION

The average of Learning Ownership of students in the experimental group (Learning Ownership -PBL) was 18.82 with std. deviation of 6.38 while the control group (PBL) was 5.57 with std. deviation 3.86 (Figure 1). Based on the results of the data obtained shows that there are differences in the average learning ownership of students. Differences in results can also be seen in the average score of each Learning Ownership indicator which shows that the Learning Ownership scores of the experimental group (Learning Ownership-PBL) is higher than the control group (PBL) in all indicators (Figure 2). Based on the results of the Independent Sample T-test, the Sig value was obtained. (2-tailed)  $0.00 < 0.05$ . Sig value.  $<0.00$  indicates that there is a significant difference between the experimental group and the control group (table 3). The average score of the two groups indicates that the Learning Ownership of students who use the Learning Ownership-PBL learning model is better than students who use the PBL learning model.

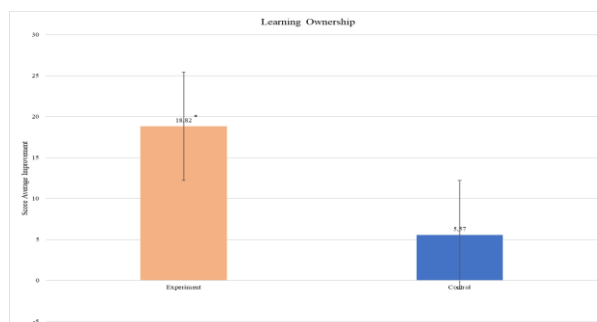


Figure 1. Average students' learning ownership score

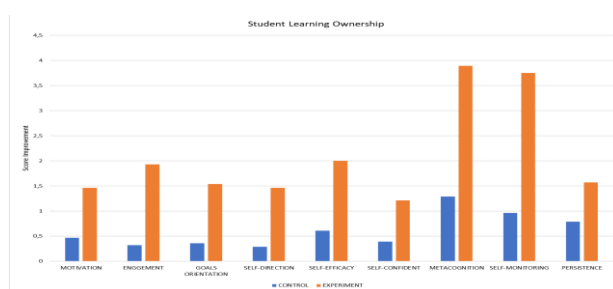


Figure 2. Average students' learning ownership score per indicator

Table 1. Summary of independent sample T-test students learning ownership

		Independent Samples Test								
		Levene's Test for Equality of Variances			t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
LEARNING_OWNERSHIP	Equal variances assumed	3.827	.056	9,391	54	.000	-13.250	1.411	-16.079	-10.421
	Equal variances not assumed			9,391	44.412	.000	-13.250	1.411	-16.093	-10.407

Based on the research results, it was found that students' Learning Ownership in the experimental class was better than the control class. This shows that the Learning Ownership PBL model affects the level of students' Learning Ownership in all indicators. The Learning Ownership-PBL model in the experimental class consists of 7 phases: 1) power process, 2) management process, 3) orienting students to the problem, 4) organizing students to learn, 5) helping students to conduct investigations, 6) presenting work, 7) analyzing and evaluating the learning process. The fundamental difference from the usual PBL model is that in the Learning Ownership PBL learning model there are 3 processes that can help bring about learning ownership, namely the power process, the management process and the learning process (Enghag & Niedderer 2008). Power process is an activity where students are given the right (opportunity) to determine the implementation of the lesson they want along with the responsibilities (obligations) they must complete (Enghag & Niedderer 2008). In this activity, an agreement was made with the students about the implementation of the lesson. Students are asked to fill in a questionnaire with 3 questions, namely a) what kind of class do you want, b) what activities do you want to implement in the classroom, c) what kind of classroom atmosphere do you want? This activity will arouse the students' desire to be more involved and enthusiastic in carrying out the lesson (Patall et al., 2010). Research shows that when students are given the right to make decisions, they value the class more, are more enthusiastic, and are better prepared to carry out learning activities (Coutts, 2019; Thibodeaux et al., 2019). Giving decisions means that students have rights in learning and are not only obliged to follow the teacher's instructions. The first thing to do for this process to take place is to listen to students' wishes and give positive feedback on the wishes they have given and provide important input so that learning activities can be conducted in accordance with the agreement that has been reached (Chan et al., 2014). This activity will motivate students to learn more (Coutts, 2020).

The Power Process can not only increase student motivation, but also student engagement and goal orientation. This is evidenced by the results of the study, which show that motivation, engagement, and goal orientation of students in the experimental group have a higher increase than in the control group (Figure 1). According to the research, students who are given treatment in the form of giving them rights in determining the implementation of the lesson have a high level of engagement (Coutts, 2019). Giving students the opportunity to play an active role in learning increases their sense of competitiveness, teaches them valuable skills such as setting and achieving goals (goal orientation), and helps them develop independence (Uphold & Hudson, 2012). In addition to being given rights (opportunities), students are also given responsibilities in the form of obligations that they must fulfil in learning. These obligations must be given by the teacher and agreed upon with the students. This obligation will help the students to determine the goals that they need to achieve. Students who understand what they need to accomplish show that they are goal oriented. Goal orientation shows that they have desires that they must achieve in accordance with the responsibilities (obligations) that have been determined and agreed upon by the teacher (Mercer-Mapstone et al., 2017).

Management process is an activity in which students determine for themselves how the responsibilities (obligations) regarding the tasks given by the teacher will be completed practically with maximum results (Enghag & Niedderer 2008). In this phase, students are asked to write an essay about the plan that will be prepared, organizing the plan, determining good strategies to achieve the set goals. This essay consists of 3 points namely preparation, implementation and evaluation (Durrall et al, 2020). This activity will be successful if there is support from the teacher where the teacher will see the essay and ask whether what students have written is successful or experiencing obstacles. This process can help guide students to build self-direction, metacognition, self-monitoring (Cornell & Forrestal, 1971). Preparation involves preparing students to achieve predetermined goals. Things that need to be written in the form of long term plans, short term plans, learning strategies that can support and tools that can help students. Good preparation can help students self-direct to stay on track with the plans they have set (Carroll et al., 2020). In controlling learning to stay on track, students need to monitor all the activity plans they have set, which will ultimately have an impact on increasing self-monitoring in students (Azatova, 2021). Performance and evaluation can help improve students' metacognition (Son et al., 2020) and self-monitoring (Azatova, 2021). Performance is the execution of the preparation that has been made. Evaluation is an activity that measures whether performance is good or not. If the performance is not as expected, it is necessary to evaluate what and why the performance is not good and how to solve it next. This activity can help improve students' metacognition (Son et al., 2020). Students will re-evaluate the previous plan, find out what caused the failure, and develop a much better and more capable strategy. Figure 1 shows that self-direction, metacognition, and self-monitoring increased significantly more in the experimental class than in the control class. In fact, the management process not only affects metacognition, self-monitoring, and self-direction, but also affects students' self-efficacy (Mazzeti et al., 2020) and self-confidence (Carrol et al., 2020). When students have a mature learning strategy and plan, they are confident that they will complete the learning well and maximally. Students readily and confidently present the results of their work in class. This is also evidenced by the fact that self-efficacy and self-confidence were higher in the experimental class than in the control class (Figure 1).

Learning Process is an activity where students can share the obstacles they have encountered in learning and the solutions they have found to overcome these obstacles (Enghag & Niedderer 2008). In this activity, students share, one by one, what obstacles they experienced and how they overcame them. Other students will provide input and even additional solutions. It takes a lot of self-confidence to express obstacles because students tend to be shy and feel that the obstacles, they have been not a big deal compared to their classmates. The teacher's input is also very important for the success of this phase because it can increase the students' self-confidence. Thus, this activity can help to increase students' self-confidence (Akbari & Sahidzada, 2020). This can be seen in Figure 1, which shows that the self-confidence of the experimental group is higher than the control group. Students who are able to overcome obstacles and find solutions show that they have good metacognition (Stanton et al., 2021). In addition, the ability to continue finding solutions without giving up shows that students have a high level of persistence (Yang & Ogata, 2023). Students are constantly evaluating and developing new ideas and strategies to support their learning. This is evidenced by the results of the research data, which show that the increase in scores on the metacognition and persistence components is higher for the experimental group than for the control group (Figure 1).

The average increase in students' concept understanding score of the experimental group (Learning Ownership-PBL) was 42.86 with a std. deviation of 19.56, while that of the control group (PBL) was 24.29 with a std. deviation of 13.72 (Figure 3). The difference in the results is also seen in the average value of each indicator of concept understanding, which shows that the concept understanding value of the experimental group (Learning Ownership-PBL) is higher than the control group (PBL) in all indicators (Figure 4). Based on the results of the data obtained, it shows that there is a difference in the average value increase of students' concept understanding. Furthermore, in order to see the significance of the difference between the experimental group (Learning Ownership-PBL) and the control group (PBL), an Independent Sample T-test was conducted. Based on the results of the Independent Sample T-test, the Sig. (2-tailed)  $0.00 < 0.05$ . The Sig.  $< 0.00$  indicates that there is a significant difference between the control group and the experimental group (Table 3).

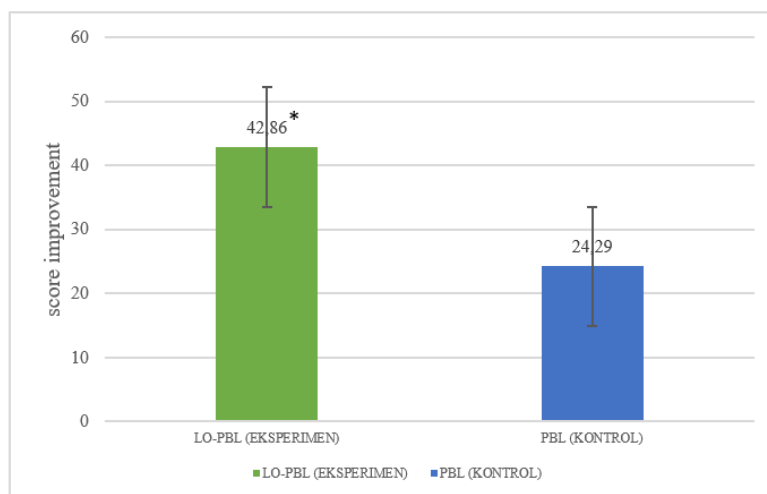


Figure 3. Average students' understanding score



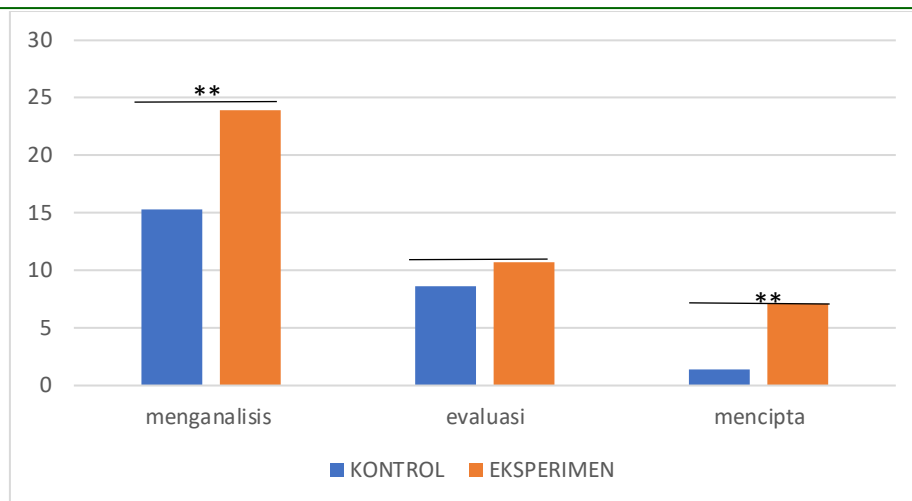


Figure 4. average students understanding concept in all indicators

Table 2. Summary of independent sample T-test students understanding concept

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Understanding the concept	Equal variances assumed	2.023	.161	-4.107	54	.000	-18.571	4.522	-27.637	-9.506
	Equal variances not assumed			-4.107	48.347	.000	-18.571	4.522	-27.661	-9.482

The increase in students' concept understanding in the experimental class (LO-PBL) is higher than in the control class (PBL), which shows that the Learning Ownership-PBL learning model has an effect on increasing students' concept understanding (Figure 3). This is because LO-PBL uses an approach that incorporates the learning ownership process. In the previous explanation, the LO-PBL learning model has a power process stage that can make students more motivated to learn. Students who use the LO-PBL learning model have higher motivation than students who use the PBL learning model (Figure 2) Motivation is something that can move or encourage students to learn or master learning materials. Students who are highly motivated are more interested, actively involved, and take initiative in the learning process. Research shows that students with high motivation tend to have better mastery/understanding of concepts than students with low motivation (Yusuf, 2016). In the experimental classroom (LO-PBL), students have a positive view of the task, i.e. they believe that they are capable of doing a certain task or job, are more responsible, and try to find effective ways to complete the task successfully. Conversely, without motivation, students will not be interested and serious in participating in learning. When in class, the control group (PBL) became grumpy and tended to be passive. In contrast, the experimental group (LO-PBL) was much more enthusiastic in class. With motivation, students will do their best and prepare various positive strategies to achieve success in learning.

Motivation is closely related to metacognition (Ossa et al., 2023). Metacognition plays an important role in improving students' concept understanding. Concept understanding is the ability in which students understand the material, not just memorize it, and can re-explain the acquired material in their own language by using relevant and accurate learning resources (Faye, 2014). Concepts in biology, especially material about cells, are not easy to understand because there are several terms that are difficult to understand and chemical processes that require a good understanding. In order to understand this material, strategies and tactics are needed to make the material easy to understand. The strategies and tactics chosen and prepared by the students mean that the students already have metacognition in themselves. Thus, it can be said that motivation and metacognition affect the improvement of students' concept understanding. Relevant research shows that motivation and metacognition simultaneously affect the improvement of cognitive learning outcomes of biology students FMIPA Makassar University (Bahri & Corebima, 2015).

Motivation and metacognition will not work without hard effort and persistence that is owned by the students. Students with high persistence will work hard without giving up to achieve the set goals (Yang & Ogata, 2023). Research shows that persistence has a high contribution of 75.69% to the learning outcomes of students of SMAN 102 Jakarta on ecosystem material (Miarsyah et al., 2016).

Table 3. Correlation between concept understanding and learning ownership

Correlation	Significance Value	Coefficient Value	5% Rate	Information
Learning Ownership – critical thinking skill	0.002	0.490	0.05	Medium Correlation

Learning ownership has a positive and moderate correlation (Jabnabillah et al., 2022) with understanding concept, as evidenced by the correlation test results of 0.49. The data show that concept understanding have a correlation coefficient of 0.490, respectively (Table 4.6 and Table 4.7). Based on the interpretation of the correlation coefficient, Learning Ownership gives an influence of 49% on concept understanding, the rest is influenced by other factors not examined in this study. The data results show a positive and unidirectional correlation. According to the research, students with high levels of concept understanding and critical thinking skills have high levels of learning ownership. Relevant research proves that learning ownership not only positively influences concept understanding and critical thinking skills, but also influences the development of other life skills needed by individuals (Coutts, 2019; Cannata et al., 2019). Given the importance of learning ownership, several countries have implemented learning ownership at different levels of education, such as America (The National Center on Scaling Up Effective Schools, 2014; Cannata et al., 2019; Inez & Guerrero, 2019), which has implemented learning ownership at the high school level, while Australia (Coutts, 2019) and Malaysia (Rahmat and Aziz 2012) have implemented it at the university level. These countries are ranked much higher than Indonesia which is ranked in the bottom 11 (OECD, 2023). According to Conley & French (2014), learning ownership must be possessed by secondary school students as a form of preparation for entering university.

#### 4. CONCLUSION

Based on result, we conclude that learning ownership-PBL model can increase students concept understanding better than PBL model alone This can be seen through the results of the average score increase in the learning ownership-PBL group obtained 48.86 higher than the PBL model which obtained an average score of 24.29. The average results of each indicator of concept understanding in the learning ownership-PBL model group also have a higher average increase in value than PBL alone. The implementation of learning ownership-PBL in school suggested to be important, yet required a careful consideration regarding the student's character.

#### 5. ACKNOWLEDGEMENT

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#### 6. REFERENCES

- Aditya, R. F. & Indana, S. (2022) 'Analysis of Science Literation Indicators in Cell Materials in Student Handbooks', 11(1), pp. 148–154.
- Akbari, O & Sahidzada, J. 2020. "Students' self-confidence and its impacts on their learning process. *American International Journal of Social Science Research* 5 (1): 1-15.
- Azatova, S. 2021. "I control my own english learning : developing self regulation in elementary ell using self-assessment and explicit strategy instruction. *Teflin Journal* 32 (2) : 183-213. DOI: <http://dx.doi.org/10.15639/teflinjournal.v32i2/183-213>
- Azidin. (2017). Penerapan model *Problem Based Learning* pada pelajaran biologi untuk meningkatkan kompetensi dan kemampuan berpikir kritis siswa kelas X SMA Negeri 4 BauBau. *Sang Pencerah* 3 (2) : 19-29.
- Bahri, A., & Corebima, A. D. (2015). The contribution of learning motivation and metacognitive skill on cognitif learning outcome of students within different learning strategies. *Journal of Baltic Science Education* 14 (04) : 487-499.
- Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development*, 78(1), 246–263. doi:10.1111/j.1467-8624.2007.00995.x
- Cannata, M., Redding, C., & Nguyen, T. D. (2019). "Building Student Ownership and Responsibility: Examining Student Outcomes from a Research-Practice Partnership." *Journal of Research on Educational Effectiveness* 12 (3): 333–62. <https://doi.org/10.1080/19345747.2019.1615157>.

- 
- Carroll, P., Brinol, P., Petty, R. E., Ketcham, J. 2020. "Feeling prepared increase confidence in any accessible thoughts affecting evaluation unrelated to the original domain of preparation". *Journal of Experimental Social Psychology* 89 : 1-15. <https://doi.org/10.1016/j.jesp.2020.103962>
- Chan, E., Kristall J., Graham-Day., Virginia, A., Ressa, M. T. P., & Moira, K.(2014). "Beyond Involvement: Promoting Student Ownership of Learning in Classrooms." *Intervention in School and Clinic* 50 (2): 105–13. <https://doi.org/10.1177/1053451214536039>.
- Christiana, E.(2013). "Pendidikan Yang Memanusiakan Manusia." *Humaniora* 4 (1): 398. <https://doi.org/10.21512/humaniora.v4i1.3450>.
- Çimer, A. (2012). *What makes biology learning difficult and effective : S tudents ' views*. 7(3), 61–71. <https://doi.org/10.5897/ERR11.205>
- Conley, D. T., & Elizabeth M. F.(2014). "Student Ownership of Learning as a Key Component of College Readiness." *American Behavioral Scientist* 58 (8): 1018–34. <https://doi.org/10.1177/0002764213515232>.
- Coutts, L.(2019). "Empowering Students to Take Ownership of Their Learning: Lessons from One Piano Teacher's Experiences with Transformative Pedagogy." *International Journal of Music Education* 37 (3): 493–507. <https://doi.org/10.1177/0255761418810287>.
- Coutts, L.(2020). Increasing motivation and ownership of learning through students as partners : the importance of transparency and belonging. Proceeding of the 23<sup>rd</sup> International Seminar Of The ISME Commission on The Education of The Professional Musician (CEPROM). 185-204
- Cycle, Accelerated Learning.(2021). "2021 Learning Acceleration Resources," 1–2.
- Danks, A.(2019). "Learning Ownership: A Framework to Enhance Educational Programs and Support Transference of Skills from K-12 to Postsecondary," 1–22.
- Dewi, S. Z., & Ibrahim, T. (2019). Pentingnya Pemahaman Konsep Untuk Mengatasi Miskonsepsi Dalam Materi Belajar IPA di Sekolah Dasar. *Jurnal Pendidikan Universitas Garut*, 13(1), 26–31. <https://journal.uniga.ac.id/index.php/JP/article/view/823>
- Dural, E., Leinone, T., Virnes, M., Gros, B. (2020). Ownership of learning in monitoring technology. *Interaction Design and Architecture(s)*(45) : 133-154. DOI: 10.55612/s-5002-045-006.
- Du Toit-Brits, C. 2018a. "The Educator as a Self-Directed Learner and Agent." *Tydskrif vir Geesteswetenskappe* 58(2): 376–386. <https://doi.10.17159/2224-7912/2018/v58n2a11>.
- Du Toit-Brits, C. (2022). Exploring the importance of a sense of belonging for a sense of ownership in learning. *South African Journal of Higher Education* 36 (5) : 58-76. <https://dx.doi.org/10.20853/36-5-4345>.
- Edström, K., & Kolmos, A.(2014). "PBL and CDIO: Complementary Models for Engineering Education Development." *European Journal of Engineering Education* 39 (5): 539–55. <https://doi.org/10.1080/03043797.2014.895703>.
- Edi, E. (2018) 'Pengaruh Konsep Diri dan Kemandirian Belajar terhadap Penguasaan Konsep Matematika', *Alfarisi*, 1(3), pp. 251–258.
- Enghag, M., & Niedderer, H.(2008). "Two Dimensions of Student Ownership of Learning during Small-Group Work in Physics." *International Journal of Science and Mathematics Education* 6 (4): 629–53. <https://doi.org/10.1007/s10763-007-9075-x>.
- El-adl, A. and Alkharusi, H. (2020). 'Relationships between Self-Regulated Learning Strategies, Learning Motivation and Mathematics Achievement, Cypriot Journal of Educational Sciences, 2020'. *Eric - Ejl246489*, 15(1), pp. 104–111. Available at: <https://eric.ed.gov/?q=learning+strategies&id=EJ1246489>.
- Faye, J. (2014). *The Nature of Scientific Thinking : On Interpretation, Explanetion, and Understanding Jan*. New York : Palgrave Macmillan.
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- Fisher, D., & Frey, N. (2010). Releasing responsibility: Giving students ownership of learning. *Educational Leadership*, 66(3).
- Ghaemi, R. V., & Potvin, G.(2020). "Students' Perspective: Does Problem-Based Learning Increase Ownership of One'S Education?" *Proceedings of the Canadian Engineering Education Association (CEEAA)*, 1–7. <https://doi.org/10.24908/pceea.vi0.14128>.
- Hardiyanti, D. (2022). Penerapan model *Problem Based Learning* (PBL) untuk meningkatkan pemahaman konsep dan hasil belajar siswa sekolah dasar pada pembelajaran IPA. *Jurnal Pendidikan dan Konseling* 4 (4) : 3135-3143.
- Heikkilä, A. & Lonka, K. (2006) 'Studying in higher education: Students' approaches to learning, self-regulation, and cognitive strategies', *Studies in Higher Education*, 31(1), pp. 99–117. doi: 10.1080/03075070500392433.
- Inez, G., & Guerrero, G.(2019). *Ownership Of Learning Through Task-Based Teaching In A Group Of High School Students At A Public School*. Tesis diterbitkan, Medellin : Magister Universidad Pontificia Bolivariana.
- Jabnabillah, F., & Margina, N. (2022). "Analisis korelasi pearson dalam menentukan hubungan antara motivasi belajar dengan kemandirian belajar pada pembelajaran daring. *Jurnal Sintaks* 1 (1) : 14-18.
- Juenda, L. A., Djumhana, N., Rengganis, I. (2017). Penerapan model *problem based learning* untuk meningkatkan pemahaman konsep IPA kelas IV. *Jurnal Pendidikan Guru Sekolah Dasar* 11 (1) : 38-51.
- Klegeris, A.(2021). "Mixed-Mode Instruction Using Active Learning in Small Teams Improves Generic Problem-Solving Skills of University Students." *Journal of Further and Higher Education* 45 (7): 871–85. <https://doi.org/10.1080/0309877X.2020.1826036>.
- Li, W., Huang, J. Y., Liu, C. Y., Tseng, J. C. R., Wang, S. P. (2023). A study on the relationship between student' learning engagements and higher-order thinking skills in programming learning. *Thinking Skills and Creativity* 49 (101369). <https://doi.org/10.1016/j.tsc.2023.101369>.
- Lv, S., Chen, C., Zheng, W., & Zhu, Y.(2022). "The Relationship Between Study Engagement and Critical Thinking Among Higher Vocational College Students in China: A Longitudinal Study." *Psychology Research and Behavior Management* 15 (October): 2989–3002. <https://doi.org/10.2147/PRBM.S386780>.
- Maulani, E. (2019). 'Pengaruh Kemandirian Belajar dan Sikap Ilmiah terhadap Pemahaman Konsep Biologi ( Survei Pada SMA Swasta di Jakarta Selatan )'. *Jurnal Pendidikan MIPA*, 2(3), p. 239.
- Mazzeti, G., Polucci, A., Guglielmi, D., Vannini, I. 2020. "The impact of learning strategies and future orientation on academic success : the moderating role of academic self-efficacy among italian undergraduate students. *Education Science* 10 (134) : 1-12. doi:10.3390/educsci10050134
- McCombs, B. & Whistler, J. (1997). *The learner- centered classroom and school: Strategies for in- creasing student motivation and achievement*. San Francisco: Jossey-Bass Publishers.
- Mentz, E. & Lubbe, A. (eds.), 2021, 'Learning through assessment: An approach towards Self-Directed Learning', in NWU Self-Directed Learning Series Volume 7, pp. i–286, AOSIS, Cape Town.
- Mercer-Mapstone, L., Dvorakova, S. L., Matthews, K. E., Abbot, S., Cheng, B., Felten, P., & Swaim, K. (2017). A systematic literature review of students as partners in higher education. *International Journal for Students as Partners*, 1(1). <https://doi.org/10.15173/ijasp.v1i1.3119>
- Miarsyah, M., Putrawan, I. M., Hermadianti, D. 2016. Hubungan antara ketekunan (*persistence*) dengan hasil belajar biologi : studi korelasional terhadap siswa kelas XMIA di SMA Negeri 102 Jakarta. *Biosfer : Jurnal Pendidikan Biologi (BIOSFERJPB)* 9 (2) : 29-36.
- Moffett, J., & Wagner, B. J. (1992). *Student-centered language arts, K-12*. Portsmouth, NH: Boynton/Cook
-

Publishers Heinemann.

- Mulyarosa, N. and Rahmawati, E. Y. (2019) 'Peran Gaya Belajar dan Kemandirian Belajar terhadap Pemahaman Konsep', *Diskusi Panel Nasional ...*, 0812(80), pp. 253–260. Available at: <http://www.proceeding.unindra.ac.id/index.php/DPNPMunindra/article/view/583>.
- Mustofa, R. F., Nabiila, A. & Suharsono, S. (2019) 'Correlation of Learning Motivation with Self Regulated Learning at SMA Negeri 1 Tasikmalaya City', *International Journal for Educational and Vocational Studies*, 1(6), pp. 647–650. doi: 10.29103/ijevs.v1i6.1750.
- Mutia, S. J., & Darussyamsu, R.(2021). "Pengaruh Model Pembelajaran Problem Based Learning Terhadap Kemampuan Berpikir Kritis Siswa Dalam Pembelajaran Biologi." *Prosiding ...* 1: 987–96.
- Nurlia, N. *et al.* (2017). 'Hubungan Antara Gaya Belajar, Kemandirian Belajar, dan Minat Belajar dengan Hasil Belajar Biologi Siswa'. *Jurnal Pendidikan Biologi*, 6(2). doi: 10.24114/jpb.v6i2.6552.
- OECD (2023), PISA 2022 Results (Volume I): The State of Learning and Equity in Education, PISA, OECD Publishing, Paris, <https://doi.org/10.1787/53f23881-en>.
- Ossa, C. J., Rivas, S.F., & Saiz, C. 2023. Relation between metacognitive strategies, motivation to think, and critical thinking skills. *Front. Psychol.* 14:1272958. doi: 10.3389/fpsyg.2023.1272958
- Patall, E. A., Harris, C., & Susan, R. W.(2010). "The Effectiveness and Relative Importance of Choice in the Classroom." *Journal of Educational Psychology* 102 (4): 896–915. <https://doi.org/10.1037/a0019545>.
- Paul, R & Elder, L. (2006). *The Miniature Guide to Critical Thinking Concepts and Tools*. The Foundation for Critical Thinking.
- Rahmat, R. A. A. O. K., & Aziz, N. A.(2012). "Stimulating Learning Ownership to Engineering Students via Learning Contract." *Asian Social Science* 8 (16): 57–64. <https://doi.org/10.5539/ass.v8n16p57>.
- Setiani, S. & Wijaya, E. (2020) 'The Relationship Between Self-Regulated Learning With Student Engagement in College Students Who Have Many Roles', 478(Ticash), pp. 307–312. doi: 10.2991/assehr.k.201209.045.
- Shcheglova, I., Koreshnikova, Y., Parshina, O. (2019). The role of engagement in development of critical thinking in undergraduates. *Educational Studies Moscow* 1 : 264-289. DOI: 10.17323/1814-9545-2019-1-264-289.
- Son, L. K., Furlonge, N. B., Agarwal, P. K. 2020. "Metacognition : How To Improve Students' Reflection on Learning. Columbia University : Kling Enstein Center.
- Stanton, J. D., Sebesta, A. J., Dunlosky, J. 2021. "Fostering metacognition to support student learning and performance". *CBE-Life Science Education* 20 : 1-7. DOI:10.1187/cbe.20-12-0289.
- Sudjana, N. (1991). *Pembinaan Dan Pengembangan Kurikulum di Sekolah*. Bandung: CV. Sinar Baru.
- Sujianti, N. P. I. K., Widiartini, N. K., & Sudirtha, I. G.(2022). Pengaruh Model Pembelajaran Problem Based Learning (PBL) Terhadap Hasil Belajar Metodologi Penelitian Ditinjau Dari Kemampuan Berpikir Kritis Mahasiswa. *Jurnal\_ep* 12 (2): 167–78.
- Suryanti, E. (2019). 'Identifikasi Kesulitan Mahasiswa Dalam Pembelajaran Biologi Molekuler Berstrategi Modified Free Inquiry'. *Perspektif Pendidikan dan Keguruan*, 10(2), pp. 37–47. doi: 10.25299/perspektif.2019.vol10(2).3990.
- TEAL Center staff. (2012). "Student-Centered Learning (pp. 1-3)." "TEAL Center Fact Sheet No. 6.
- The National Center on Scaling Up Effective Schools.(2014). "Developing Student Ownership and Responsibility in High Schools." *Peabody College*.
- Thibodeaux, T., Harapnuik, D., Cummings, C. (2019). "Students perception of the influence of choice, ownership, and voice in learning and the learning environment. *International Journal Of Teaching and Learning in Higher Education* 31 (1) : 50-62.

Uphold, N., & Hudson, M. (2012). Student-focused planning. In D. W. Test, *Evidence-based instructional strategies for transition* (pp. 55–78). Baltimore, MD: Paul H. Brookes.

Wang, L. (2023). The impact of students-centered learning on academic motivation and achievement : a comparative research between traditional instruction and student centered approach. *Journal of Education, Humanities and Social Science* 22 : 346-353.

Wang, T. H. (2011). ‘Developing Web-based assessment strategies for facilitating junior high school students to perform self-regulated learning in an e-Learning environment’. *Computers and Education*, 57(2), pp. 1801–1812. doi: 10.1016/j.compedu.2011.01.003.

Yang, A. C. M., & Ogata, H. 2023. “Evaluation and modeling of students’ persistence and wheel-spinning propensities in formative assessments”. *Smart Learning Environments* 10 (63) : 1-15. <https://doi.org/10.1186/s40561-023-00283-5>