



## Problem-Based Learning In The Era Of Globalization: Developing Global Skills And Digital Literacy In Learners

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Article history		Abstract
Submission	: 2024-08-06	This study aims to enhance global skills and digital literacy regarding the growth and development of living organisms among high school students by implementing the Problem-Based Learning (PBL) model. This research employs a classroom action research design with quantitative and qualitative data analysis. Data analysis yielded global skill scores of 84.75 (Cycle I), digital literacy scores of 85.17 (Cycle I), global skill scores of 88.28 (Cycle II), and digital literacy scores of 90.16 (Cycle II). The results of the statistical analysis using the t-test also show a significant difference in the global skills variable ( $0.026 < 0.05$ ) and digital literacy ( $0.002 < 0.05$ ) across both learning cycles. These results indicate improved global skills and digital literacy among the students. Based on the research findings, implementing the PBL model is necessary to address the globalization era, particularly in fostering students' global skills and digital literacy.
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### 1. INTRODUCTION

Learning is a lifelong process that extends beyond formal institutions, encompassing various forms of structured and unstructured learning to help individuals realize their potential. Instructors play a vital role in imparting knowledge and designing programs to develop essential skills (Chueh & Kao, 2024). Continuous learning is essential for individual and national progress in the globalization era, which is marked by rapid changes and abundant information. This shift from reliance on natural resources to prioritizing human resource quality as a competitive advantage presents challenges in enhancing human resources, particularly in Indonesia's national learning systems (Lestari, 2018). Therefore, enhancing education is key to strengthening the country's global competitiveness.

Quality and sustainable education is an essential key to enhancing the competitiveness of human resources, enabling them to compete, cooperate, and synergize in addressing the challenges of globalization (Istiarsono, 2016; Kholillah et al., 2022). The importance of education also lies in

preparing individuals for global competition. Education is crucial in equipping individuals with the knowledge, skills, and character needed to compete in the global market (Fitrayadi, 2016; Humaeroh & Dewi, 2021). Quality education also plays a vital role in building an advanced, cultured, and noble-charactered society in the era of globalization through the inculcation of moral values and national character (Dewi et al., 2022; Sakti, 2020; Tranggono et al., 2023). Therefore, education is the foundation for building a resilient and dignified society.

The general observation of students indicates that they face numerous challenges in developing adequate digital literacy skills. A lack of understanding of technology and the effective use of digital tools can hinder students' learning progress and complicate technology integration in education. During observations of students in Class XI E-4 at SMA Negeri 3 Malang, several issues were identified: insufficient awareness of online safety, limited understanding of information validity, inadequate skills in searching for and processing information, dependency on social media with uncontrolled access, and a lack of creative skills in technology use.

Global skills challenges were also noted, particularly a lack of communication skills when interacting with individuals from different cultural backgrounds. Students often do not understand prevailing cultural norms or feel too shy to engage with those from different cultures. This results in limitations in building strong and inclusive interpersonal relationships, difficulties understanding others' perspectives, and potential conflicts or misperceptions due to a lack of cultural understanding.

One of the determinants contributing to the suboptimal quality of education in Indonesia is the low level of digital literacy among the population. Statistical data indicates that only about 62% of Indonesia's population possesses digital literacy skills, which is relatively low compared to the ASEAN average of 70%. A comparison with South Korea reveals a significantly higher digital literacy rate of 95% (Muliani et al., 2021; Silvana & Darmawan, 2018). The lack of digital literacy and global skills can negatively impact individuals, society, and the nation (Dewi et al., 2021). Social impacts such as risky internet behaviors and the spread of unclear sources of information (Livingstone, 2008; Muslimin & Idul, 2020) can lead individuals to be trapped in false narratives, which then give rise to a new psychological phenomenon known as Fear of Missing Out (FOMO), where social media users feel anxious if they cannot keep up with the latest developments on these platforms (Fauziah, 2021). Unethical behaviors among school students, such as cyberbullying, body shaming, and Intellectual Property Rights (IPR) violations, are significantly influenced by adolescents' lack of digital literacy (Terttiaavini & Saputra, 2022).

The implementation of the Problem-Based Learning (PBL) model has a positive correlation with the improvement of digital literacy skills and global skills, as PBL encourages students to actively search for, evaluate, and utilize digital information in solving complex problems, while also developing collaboration, cross-cultural communication, and critical thinking skills essential in a global context. This study examines the development of digital literacy and global skills among high school students by implementing the Problem-Based Learning model.

## 2. METHOD

This study is a classroom action research (CAR) that follows the framework proposed by Kemmis and Taggart (Arikunto, 2012). This framework organizes the CAR process into four stages within a single cycle: planning, action implementation, observation, and reflection. The research was conducted over two repeated cycles in the biology subject, focusing on the growth and development of living organisms. The action and observation activities were carried out simultaneously, meaning that observation was conducted concurrently with the implementation of the action. The research occurred at SMA Negeri 3 Malang from April to June 2023. The sample was determined through a purposive sampling technique. Data were collected from Class XI Science E-4 of SMA Negeri 3 Malang, consisting of 34 students, 13 males and 21 females.

The research was conducted through two cycles of activities, with each cycle consisting of one session. Each cycle comprises four main stages: planning, action, observation, and reflection. The planning stage involved an in-depth analysis of the issues arising in Biology learning for Grade XI Science E-4 at SMA Negeri 3 Malang. This stage also included an evaluation of students' attitudes and a review of relevant literature. Based on this analysis, a lesson plan and the instruments for data collection, including a questionnaire aimed at evaluating the improvement of global skills and digital literacy during the learning process, were developed.

The Problem-Based Learning (PBL) model was implemented during the action stage as part of the adopted teaching strategy. According to (Arends, 2012), PBL involves five phases: (1) Presenting an initial problem to students, (2) Coordinating student research activities, (3) Supporting independent and collaborative investigation, (4) Formulating and presenting the results, and (5) Analyzing and evaluating the problem-solving process. In the observation stage, the implementation of the learning process was analyzed using observation guidelines by the observers. The success of the intervention was evaluated based on the improvement of students' problem-solving skills. The problems solved by the students reflected the challenges faced in real-world contexts.

The learning outcomes of students' problem-solving abilities can be observed through the scores of questionnaires filled out by the students. The questionnaire results are gathered by completing surveys on global skills and digital literacy, which refer to (Greenstein, 2012). The global skills questionnaire consists of five indicators and seventeen statements. Meanwhile, the digital literacy questionnaire consists of six indicators, encompassing twenty-one statements with 'yes' or 'no' options. The questionnaire grids are depicted in Tables 1 and 2 below.

Table 1. Global Skills Questionnaire Grid

No	Indicator	Statement
1.	Global issues	1,2,3
2.	Cultural understanding	4,5,6
3.	Contribute to global society	7,8,9,10
4.	Perspective taking	11,12,13,14
5.	Equity and equality	15,16,17

Table 2. Digital Literacy Questionnaire Grid

No	Indicator	Statement
1.	Finds	1,2,3
2.	Using multiple sources	4,5,6,7
3.	Selects	8,9,10,11
4.	Evaluates	12,13,14
5.	Consider the source and effect of the message	15,16,17,18
6.	Use to produce original work	19,20,21

In the reflection stage, an analysis is conducted on the achievement of improved learning outcomes by students in each learning cycle, and emerging constraints are identified based on observation results. This research's success indicators are established to enhance students' problem-solving abilities using PBL while integrating global skills and digital literacy. Quantitative data from the global skills and digital literacy questionnaire are analyzed using descriptive statistics with SPSS version 22 to determine the achieved percentage. Subsequently, data analysis is performed using a t-test to test hypotheses, assuming the data are typically distributed..

### 3. RESULTS AND DISCUSSION

Based on the analysis of the questionnaire, it is evident that students' global skills in learning using the Problem-Based Learning (PBL) model have improved over two cycles. The improvement encompasses all indicators, including global issues, cultural understanding, contribution to the global community, perspective-taking, equity, and equality. The global issues indicator shows the highest increase, from 68.63 to 80.39. However, other indicators do not exhibit significant improvement. The significant improvement in indicators related to global issues is due to students being accustomed to dealing with problems frequently occurring in their surroundings. This is evident in the first stage of Problem-Based Learning (PBL), problem orientation. They are trained to recognize issues, analyze them, and subsequently seek solutions based on their knowledge. The measurement results of students' global skills are illustrated in Figure 1.

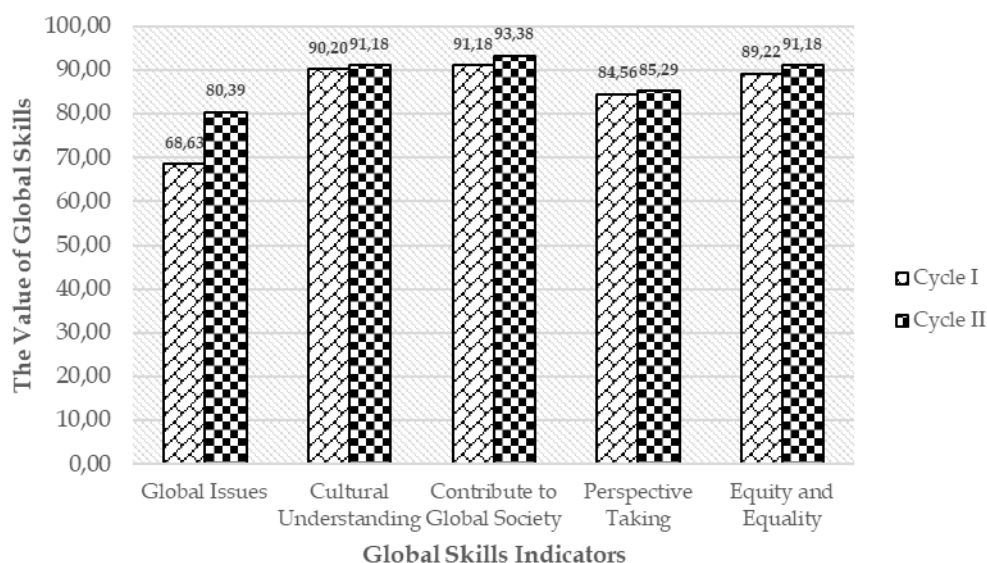


Figure 1. Data on Global Skills of Students

The measurement data of digital literacy among students also demonstrate improvement in each cycle. The analysis results indicate that improvement occurs across all indicators. The most significant improvement is observed in the evaluation indicator, with scores in cycle I at 74.51 and cycle II at 83.33. This is attributed to one of the stages in Problem-Based Learning (PBL), namely conducting investigations. Students have shown the ability to verify authors and sources of information and recognize biases in the information obtained. This allows them to develop critical thinking skills and make informed decisions based on valid facts, leading to improved outcomes. Meanwhile, other indicators show no significant improvement. The measurement results of students' digital literacy are presented in Figure 2.

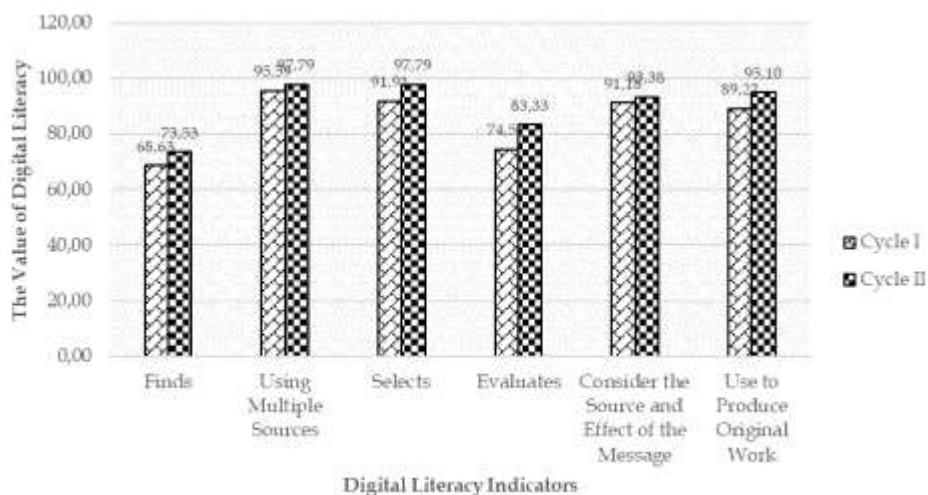


Figure 2. Student Digital Literacy Data

Implementing the PBL model in both learning cycles indicates the emergence of students' global skills and digital literacy. This is evidenced by the assessment results and questionnaire sheets regarding the global skills and digital literacy filled out by the students. In the second cycle, the students' global skills and digital literacy increased, as indicated by nearly all students choosing the option 'yes,' resulting in a generally high total score among the students. The quantitative results regarding improving students' global skills can be observed in Figure 3.

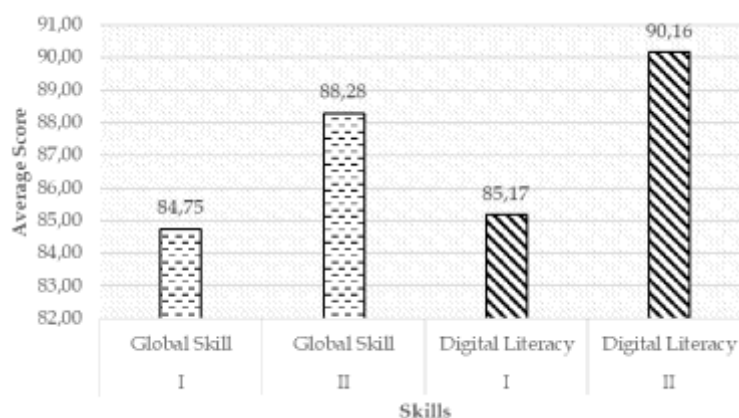


Figure 3. Average Global Skills and Digital Literacy Scores in Each Learning Cycle

Based on descriptive analysis, it has been found that there has been an improvement in students' global skills and digital literacy. The next step is to conduct a hypothesis test using the t-test. The results of the normality prerequisite test using Shapiro-Wilk are presented in Table 3.

Table 3. Normality Test of Global Skills and Digital Literacy Data

Tests of Normality						
	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Global Skills—Cycle I	0.114	34	0.200*	0.949	34	0.111
Global Skills—Cycle II	0.148	34	0.055	0.939	34	0.056
Digital Literacy—Cycle I	0.131	34	0.149	0.956	34	0.184
Digital Literacy—Cycle II	0.132	34	0.139	0.942	34	0.069

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The prerequisite test for the Global Skills assessment yielded data with a normal distribution, indicated by the significance values of  $0.111 > 0.05$  and  $0.056 > 0.05$  for Global Skills and  $0.184 > 0.05$  and  $0.069 > 0.05$  for digital literacy. Once the assumptions for the t-test were met, the analysis proceeded with a Paired Sample t-test, and the results are presented in Table 4 below.

Table 4. Paired Sample T-test Results for Global Skills and Digital Literacy

Paired Samples Test								
	Paired Differences			95% Confidence		t	Df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	Interval of the Difference				
				Lower	Upper			
Global Skills	-3.470	8.65583	1.48446	-6.490	-.4504	-2.33	33	0.026
Digital Literacy	-4.970	8.43688	1.44691	-7.914	-2.026	-3.43	33	0.002

In the analysis employing the Paired Sample t-test, the obtained Sig. (2-tailed) values were  $0.026 < 0.05$  for the global skill variable and  $0.002 < 0.05$  for the digital literacy variable. These results indicate a significant difference between Cycle I and Cycle II.

Learning using the Problem-based Learning (PBL) model in cycles I and II is conducted by referring to the prepared teaching modules. PBL is chosen for its perceived ability to guide learners in the globalization era. Reforms in the education sector are necessary to accommodate the changes brought about by globalization. These reforms include developing a more holistic and flexible education system so learners can adapt effectively to a democratic global society (Mudiono, 2016; Sakti, 2020). In this context, educational design should guide learners in exploring their potential naturally and developing them creatively while upholding the values of freedom, togetherness, and

responsibility. Furthermore, education aims to produce graduates who have a deep understanding of their society, including the factors influencing their lives in the community they inhabit.

The initial step in learning begins with the teacher creating a learning context that allows learners to develop their learning potential optimally. Preliminary activities must be carried out in learning activities (Sari, 2023). In the preliminary activities, the teacher presents an introductory video to arouse the learners' learning enthusiasm. The instructional video should be consistent with the material and essential competencies introduced by the teacher (Prasutri et al., 2019).

In the subsequent phase of core activities, teachers present a real-world problem outlined in the Participant Worksheet, which students in groups then analyze to formulate the issues to be addressed and their solutions. This is crucial for familiarizing students with global issues present in their surroundings. This theory is supported by research findings indicating a significant improvement in global issue indicators in global skills. During this phase, the teacher's role entails acting as a facilitating agent, always ready to provide assistance and accommodate students according to their preferences, capabilities, and potential (Sadulloh, 2019). Students search for learning resources under the teacher's guidance, directing them to seek reference learning sources beyond those listed in PowerPoint slides using gadgets. To search for online learning resources, the teacher assists students in using keywords in information search engines such as Google.

Furthermore, information obtained from search engines must be accountable and not based on hoax news (Fauziah, 2021). Accountable news sources, for instance, are derived from online articles in journals or proceedings, whether national or international. This is further supported by research findings showing the highest score improvement in digital literacy in the evaluating indicator, indicating that students carefully select learning resources to aid in the problem-solving process.

To further develop digital literacy among students, teachers conducted an online post-test using Google Forms, which could be completed by students and simultaneously fostered their motivation to engage with evaluation tasks. The enhancement of global skills and digital literacy throughout the learning cycle occurred due to implementing Project-Based Learning (PBL). This is corroborated by previous research indicating that applying PBL models in Biology lessons can enhance students' understanding of biological concepts and 21st-century skills crucial for their future development (Juanda & Bandung, 2016).

Based on the research findings, it is evident that implementing PBL (Problem-Based Learning) is a crucial step in enhancing digital literacy and global skills among learners in this digital era. With this model, learners grasp fundamental concepts and cultivate their abilities to solve problems, think critically, and collaborate effectively. Through PBL, learners are given opportunities to confront real-world challenges that test their skills in accessing, evaluating, and wisely utilizing information within a global context. Therefore, implementing PBL is about creating a more engaging learning environment and laying a solid foundation for learners to navigate the evolving complexities of the digital world successfully.

#### 4. CONCLUSION

Based on the data analysis, using Problem-Based Learning (PBL) can potentially enhance students' global skills and digital literacy in learning about Growth and Development in Living Organisms. The analysis results indicate that global skills reached 84.75 in the first cycle, whereas digital literacy reached 85.17 in the same cycle. In the second cycle, global skills experienced an increase to 88.28, while digital literacy reached 90.16. The results of the statistical analysis using the t-test also show a significant difference in the global skills variable ( $0.026 < 0.05$ ) and digital literacy ( $0.002 < 0.05$ ) across both learning cycles

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