

The Effect of Using The Wizer.Me Platform On Students' Learning Outcomes and Digital Literacy In Eukaryotic and Prokaryotic Cell Material In Grade XI At SMA YP HKBP 1 Pematangsiantar

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Abstract.

This study aims to determine the effect of using the Wizer.me platform on students' learning outcomes and digital literacy on eukaryotic and prokaryotic cells in Grade 11 at SMA YP HKBP 1 Pematangsiantar. A quantitative approach with an experimental method and a pretest-posttest control group design was used. The sample consisted of 60 students, 31 from Class XI-3 as the experimental group and 29 from Class XI-4 as the control group, selected through purposive sampling. The instruments were a multiple-choice test to measure learning outcomes and a questionnaire to assess digital literacy. Learning outcomes were analyzed with an independent samples t-test, while digital literacy was analyzed based on questionnaire percentages. The control class's average score increased from 57.75 on the pre-test to 82.58 on the post-test, while the experimental class's average increased from 63.38 to 89.83 after using Wizer.me. The hypothesis test yielded a significance value of $0.000 < 0.05$, so H_0 was rejected and H_a was accepted. Students' digital literacy in the experimental class reached an average of 98%, in the "very good" category. Thus, the use of Wizer.me had an effect on student learning outcomes and supported students' digital literacy on the cell material.

Keywords: Wizer.me; Learning Outcomes; Digital Literacy; Eukaryotic Cells and Prokaryotic cells.

I. INTRODUCTION

The development of the modern world has brought major changes in many aspects of life, especially education. Education is one of the main factors in improving the quality of human resources and the progress of a nation, so the Indonesian government continues to improve educational quality through operational assistance, the teacher professional education program (PPG), and teacher certification (Varihah et al., 2024). Education is also understood as a process that brings change for the better, especially in the way of thinking, from not knowing to knowing (Silaban, 2022).

Along with the times, 21st-century education has changed rapidly, especially in the use of technology. Educational technology provides easy access to information without limits of space and time (Putra et al., 2023). Various digital platforms, in the form of applications and websites, have been widely used to support learning; their use not only helps teachers deliver material more variedly but also encourages students to learn independently and increases interaction in learning (Zuhri et al., 2024). Teachers are required to choose learning media that suit students' needs (Miftah & Rokhman, 2022), and the media used should be relevant to students' habits, as they are already familiar with digital devices.

One biology topic that is quite challenging is eukaryotic and prokaryotic cells. This topic discusses differences in the structure and function of cells that are so small they cannot be observed directly without a microscope. When laboratory facilities are limited, students usually study the material only through pictures or teachers' explanations, so learning tends toward memorization (Maulana et al., 2026). Based on observations and interviews at SMA YP HKBP 1 Pematangsiantar, learning is still dominated by textbooks and only occasionally uses learning media. This makes students less active, easily bored, and less focused, which affects their learning outcomes. This is reflected in the Mid-Semester Exam (UTS) results of four Grade XI classes with 113 students, in which only 53 students reached the Minimum Mastery Criteria (KKM), as shown in Table 1.

Table 1. Mid-Semester Exam Scores of Grade XI Students at SMA YP HKBP 1 Pematangsiantar

No	Class	KKM	Students Passing KKM	Students Not Passing KKM	Number of Students
1	XI-1	75	15	10	25
2	XI-2	75	18	10	28
3	XI-3	75	10	21	31
4	XI-4	75	10	19	29
	Total		53	60	113

Source: school data (processed by the researchers)

Table 1 shows that only 46.90% of students passed and 53.09% did not, so students who have not reached the KKM outnumber those who have. To address this, digital learning media such as Wizer.me can be an alternative. Wizer.me allows teachers to create interactive online worksheets that can be accessed via computers, laptops, and smartphones, combining text, images, video, and interactive quizzes that can increase student engagement. In addition, its use has the potential to develop students' digital literacy, namely the ability to understand information, use technology, and interact in digital environments. The school provides wifi and allows students to bring smartphones, but the use of digital media such as Wizer.me has not yet been implemented optimally.

Several previous studies support this potential. Riska et al. (2025) reported that the use of Wizer.me had a significant effect on improving the biology learning outcomes of Grade X students at MAN 2 Bone, Idyawati et al. (2022) found Wizer.me effective for natural science in Grade XI of senior high school, and Apriani et al. (2026) stated that Wizer.me-based E-LKPD was categorized as very practical and feasible to use. However, studies examining the effect of Wizer.me on both learning outcomes and digital literacy in eukaryotic and prokaryotic cell material at the senior high school level remain limited.

Research Problems and Objectives

The research problems are how the use of the Wizer.me platform affects (1) learning outcomes and (2) digital literacy of students on eukaryotic and prokaryotic cell material at SMA YP HKBP 1 Pematangsiantar. Accordingly, this study aims to determine the effect of using the Wizer.me platform on students' learning outcomes and digital literacy on this material. The hypotheses tested are H_a : there is an effect of using Wizer.me on students' learning outcomes, and H_0 : there is no effect of using Wizer.me on students' learning outcomes (Sugiyono, 2023).

Wizer.me in Learning

Wizer.me is an interactive learning platform for creating electronic worksheets (E-LKPD) with comprehensive features, including automatic scoring (Safitri, 2022; Sobri et al., 2022). Kaliappen et al. (2021) described it as a digital platform for creating online worksheets with various question types and automatic scoring. Its characteristic lies in diverse student activities that can be supplemented with audio or video (Kumalasari, 2021). The platform can also be used to create worksheets, daily evaluations, remedial work, and homework (Putri, 2021). The available question types include essay, multiple choice, fill-in-the-blank, labeling images, matching, tables, sorting, drawing, discussion, reflection, and word search. Its advantages include attractive displays, support for images, audio, and video, access through various devices, and the ability for teachers to see scores directly. Its disadvantage is that the use of Wizer.me is strongly affected by internet connection speed.

Learning Outcomes and Digital Literacy

Learning outcomes are the competencies or abilities achieved by students after the teaching and learning process, covering the cognitive, affective, and psychomotor domains (Wulandari et al., 2021). Digital literacy is a combination of skills in reading, writing, understanding, and conveying information using various forms of digital media. It is not limited to technical mastery of devices but includes the cognitive ability to evaluate information as well as ethical and social awareness in its use (Ghozali et al., 2024; Sitompul, 2022). Digital literacy activities are expected to motivate students to take part in learning and to improve creative thinking (Asyari & Dewi, 2021).

Eukaryotic and Prokaryotic Cell Material

The cell is the smallest structural and functional unit of living things, and the term “cell” was first proposed by Robert Hooke in 1665 (Sarumaha, 2021). Based on the presence of a nuclear membrane, cells are divided into prokaryotic cells, which lack a nuclear membrane, and eukaryotic cells, which have one (Anisa, 2021). Eukaryotic cells have membrane-bound organelles such as the nucleus, mitochondria, endoplasmic reticulum, Golgi complex, lysosomes, and peroxisomes, as well as non-membrane organelles such as ribosomes, centrioles, microtubules, and microfilaments. Prokaryotic cells, such as bacteria and blue-green algae, have only ribosomes as organelles and lack mitochondria.

II. RESEARCH METHOD

This study used a quantitative approach with an experimental method to determine the effect of the independent variable (treatment) on the dependent variable under controlled conditions (Sugiyono, 2023). The design was a Pre-test Post-test Control Group Design, in which two groups were selected based on certain considerations and each was given a pre-test to see the initial condition before treatment. Class XI-3 was assigned as the experimental class (learning with Wizer.me) and Class XI-4 as the control class (conventional learning). The study was conducted at SMA YP HKBP 1 Pematangsiantar, Jalan Gereja No. 26, Kampung Kristen, Siantar Selatan, Pematangsiantar, North Sumatra, in the odd semester of the 2026/2027 academic year (July–September 2026) over four meetings.

The population was all Grade XI students, totaling 113 students in four classes. The sample was determined using purposive sampling based on the grouping of classes into excellent and regular classes. Regular classes were chosen because the researcher was already familiar with the learning characteristics and student conditions through the Field Experience Program. The final sample was 60 students: 31 from Class XI-3 (experimental) and 29 from Class XI-4 (control). The independent variable was the Wizer.me platform, while the dependent variables were students' learning outcomes and digital literacy.

Learning outcomes were measured with a multiple-choice test (pre-test and post-test) with five answer options at cognitive levels C1 to C4, scored 1 for a correct answer and 0 for an incorrect one. The initial instrument consisted of 30 items tried out on Grade XII students who had already studied cell material. Item quality was tested through validity (item-total correlation), reliability (Cronbach's Alpha), discriminating power, and difficulty level using SPSS 25 (Arikunto, 2021). Digital literacy was measured with a questionnaire of 15 indicators on a 1–5 Likert scale administered to the experimental class and calculated as a percentage of the maximum score, with the categories: 81–100 very active, 61–80 active, 41–60 fairly active, 21–40 less active, and 0–20 very less active (Arikunto, 2021).

Data analysis included a normality test (Shapiro-Wilk), a homogeneity test (Levene, Based on Mean), and hypothesis testing using the Independent Sample T-Test at a significance level of 0.05. If the significance value (2-tailed) was < 0.05 , H_0 was rejected and H_a was accepted.

III. RESULTS AND DISCUSSION

Implementation of Learning

In the experimental class, the first meeting was used to introduce the study and administer the pre-test. Subsequent learning began with orientation to a contextual problem, namely why antibiotics can inhibit bacteria without damaging human body cells, to build curiosity about the differences between the two cell types. The researcher then explained the learning objectives, introduced how to access and complete activities on Wizer.me, guided students during the work, and drew conclusions together with them. In the control class, learning used lectures, question and answer, and assignments. At the end, both classes took a post-test consisting of 20 multiple-choice items covering C1 to C4.

Instrument Test Results

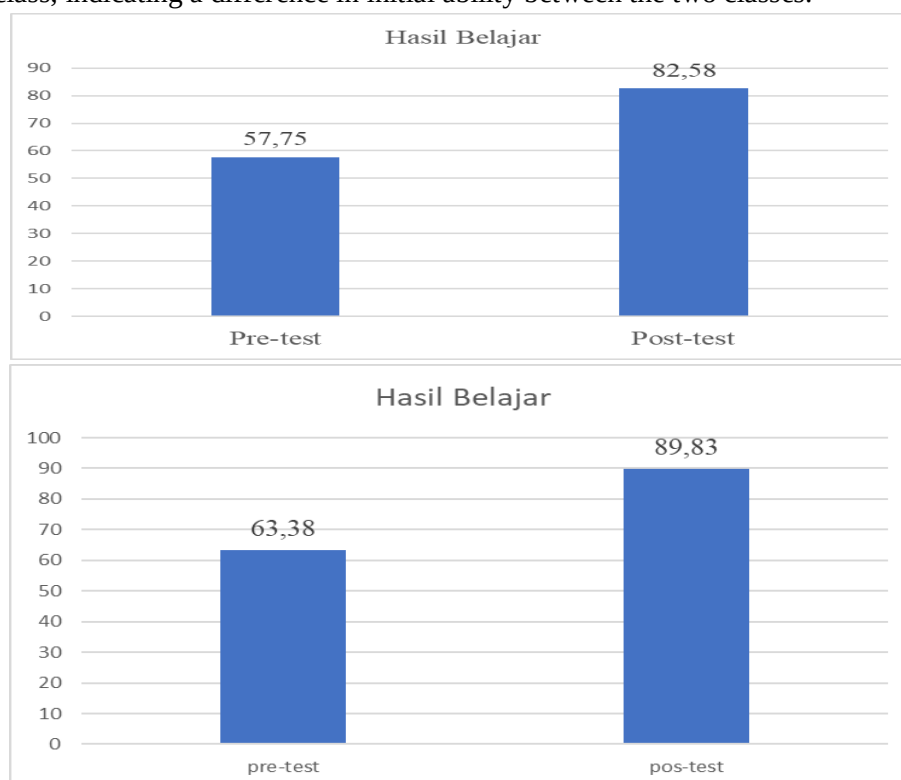
The results of the try-out of 30 items are shown in Table 2. A total of 20 items were declared valid and used as the research instrument, while the other 10 were invalid and not used. The Cronbach's Alpha value of 0.805 shows that the instrument is reliable.

Table 2. Summary of Learning Outcome Instrument Test Results (30 Items)

Test	Result	Remarks
Validity	20 items valid; 10 items invalid	Valid items were used
Reliability	Cronbach's Alpha = 0.805	Reliable
Discriminating power	13 good; 7 fair; 10 poor	No "very good" category
Difficulty level	1 difficult; 11 moderate; 18 easy	20 items accepted; 10 rejected

Learning Outcomes

Learning outcome data were obtained from the pre-test and post-test in both classes. The graph shows that the average scores of both classes increased after learning, with the post-test average of the experimental class higher than that of the control class. The pre-test average of the control class was also lower than that of the experimental class, indicating a difference in initial ability between the two classes.



The Shapiro-Wilk normality test in Table 4 yielded significance values of 0.130 (control pre-test), 0.069 (control post-test), 0.128 (experimental pre-test), and 0.059 (experimental post-test). All are greater than 0.05, so the data are normally distributed. The homogeneity test (Based on Mean) yielded a significance value of 0.000 (Levene Statistic = 25.117; df1 = 3; df2 = 116), which is smaller than 0.05, so the variances of the two classes are not homogeneous.

Table 4. Shapiro-Wilk Normality Test Results

Data	Statistic	df	Sig.
Control pre-test	0.944	29	0.130
Control post-test	0.934	29	0.069
Experimental pre-test	0.947	31	0.128
Experimental post-test	0.935	31	0.059

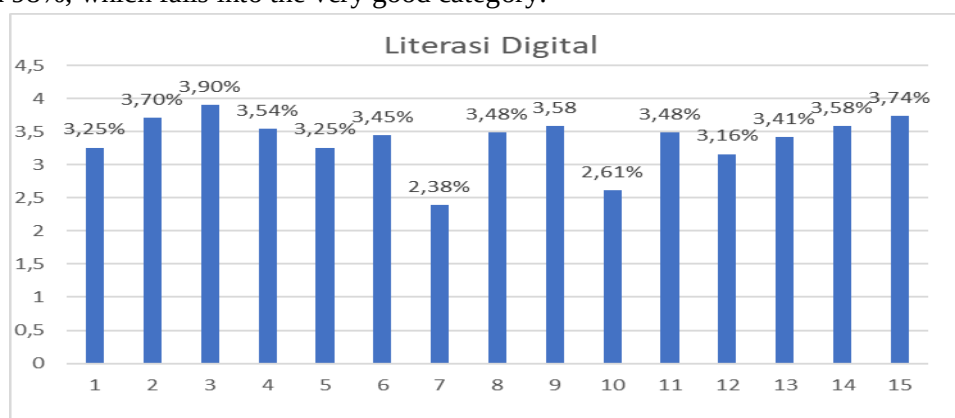
The Independent Sample T-Test results are presented in Table 5. The significance value (2-tailed) is 0.000 in both rows, smaller than 0.05. Thus, H_0 is rejected and H_a is accepted, meaning that the use of Wizer.me has a significant effect on students' learning outcomes in eukaryotic and prokaryotic cell material.

Table 5. Hypothesis Test Results (Independent Samples Test)

Variance assumption	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error	95% CI (Lower; Upper)
Equal variances assumed	-4.716	58	0.000	-7.253	1.538	-10.331; -4.174
Equal variances not assumed	-4.726	57.996	0.000	-7.253	1.535	-10.325; -4.180

Digital Literacy

Digital literacy of the experimental class was measured using 15 indicators on a 1–5 Likert scale, covering the ability to open and log in to Wizer.me, open worksheets, understand instructions, pay attention to information sources, understand material presented through video or images, complete various question types, submit answers, protect account confidentiality, complete worksheets independently and on time, and use digital technology for learning. The indicator with the highest average was the ability to open the worksheet given by the teacher (3.90), followed by the ability to submit answers and to use digital platforms to improve knowledge (3.58 each). The indicators with the lowest averages were the ability to create tasks using the Wizer.me application (2.38) and keeping accounts and passwords confidential (2.61). Overall, students' digital literacy reached 98%, which falls into the very good category.



Discussion

The Effect of Wizer.me on Learning Outcomes

The results show that both classes improved, but the improvement in the experimental class was greater. The control class's average rose from 57.75 to 82.58, while the experimental class's rose from 63.38 to 89.83. The post-test average difference of 7.253 points was tested with the Independent Sample T-Test and yielded a significance value of $0.000 < 0.05$, so the use of Wizer.me affects learning outcomes. This finding can be explained by Wizer.me's characteristics, which give students the opportunity to be more actively involved: students study the material, work on various types of questions, and receive feedback on their work rather than only receiving the teacher's explanation. These activities help students understand and remember the material, including cell material, which is abstract because its objects cannot be observed directly.

This result is in line with previous studies. Idyawati et al. (2022) reported that Wizer.me was effective for natural science in Grade XI of senior high school, with a post-test score of 80.5 higher than the pre-test score of 61.75. Riska et al. (2025) found that game-based learning assisted by Wizer.me had a significant effect on the biology learning outcomes of Grade X students compared with the lecture model. Nisa (2024) reported that interactive Wizer.me-based E-LKPD on the ecosystem topic produced an N-Gain of 0.70 with a significance of 0.000, and Apriani et al. (2026) stated that Wizer.me-based E-LKPD was categorized as very practical and therefore feasible to use.

The Effect of Wizer.me on Digital Literacy

Digital literacy plays an important role in technology-based learning because students are not only receiving information from teachers but are also required to obtain, understand, and process information using technology (Ghozali et al., 2024). In learning with Wizer.me, students opened worksheets, understood the material, worked on various question types, and submitted answers digitally following the teacher's

instructions. The experimental class obtained an average digital literacy percentage of 98% in the very good category, so the use of Wizer.me supports students' ability to use digital technology during learning. However, the indicators of creating tasks with the application and keeping accounts confidential received relatively low scores, so they need attention through teacher guidance. It should also be noted that digital literacy was measured only in the experimental class and therefore cannot be compared with the control class.

IV. CONCLUSION

This study examined the effect of using the Wizer.me platform on students' learning outcomes and digital literacy in eukaryotic and prokaryotic cell material in Grade XI at SMA YP HKBP 1 Pematangsiantar, with a sample of 60 students. The results show that the control class's average score increased from 57.75 to 82.58, while the experimental class's increased from 63.38 to 89.83. The Independent Sample T-Test yielded a significance value of $0.000 < 0.05$, so H_0 was rejected and H_a was accepted, meaning that Wizer.me affects students' learning outcomes. The digital literacy of the experimental class reached 98% in the very good category.

Students are expected to be more active and responsible and to use digital information sources wisely. Teachers can use Wizer.me as an alternative learning medium in biology by giving clear instructions and providing guidance during learning. This study has limitations because it was conducted at one school with a limited, purposively selected sample, and digital literacy was measured only in the experimental class. Future research is advised to expand the scope to other materials and schools and to measure digital literacy in both groups.

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