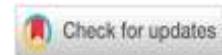




The effect of using electronic practicum worksheets on students' understanding of digital literacy



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ABSTRACT

This research aims to determine the effect of implementing the Electronic Practicum Worksheet with Google Sites on the Digital Literacy Abilities of Class X High School Students in Palembang City on Virus Material. This research was carried out at Senior High School in Palembang. This research method is quasi-experimental with a non-equivalent control group design. Sampling in this study used a purposive sampling technique so that class X.IPA.6 was selected as the experimental class and X.IPA.10 as the control class. Instrument analysis in this research used the IBM SPSS Statistics 25 for Windows program and the Microsoft Excel application. The instrument used in this research was multiple choice questions on a digital literacy test. The research results show that the implementation of an Electronic Practicum Worksheet with Google Site has a significant effect on students' digital literacy test results. Apart from that, the implementation of electronic practice worksheets with Google Site can improve students' digital literacy skills.

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INTRODUCTION

The learning process through practicum also requires teaching materials. The teaching materials used in practical activities are called student worksheets. Students' worksheet is one of the teaching materials containing material, summaries, and implementation procedures that refer to basic competencies and indicators that students must achieve (Ernawati, et al., 2018). Many students' worksheets which are usually in the form of printed teaching materials have changed to digital form or are also known as students' worksheets which can be used using mobile phones smartphones and even computers (Mispa, et al., 2022). Based on research conducted by (Isfahani, 2020), namely using the students' worksheet model in the form of 3D Pageflip in guided inquiry learning which has the advantage of improving analytical skills such as problem-solving processes in everyday life.



Researchers can apply this in the form of multimedia-based electronic practicum worksheets using the Google Site. The reason Google Site was chosen as an innovative form of teaching material was because its use was quite easy compared to using other applications. Google Site is used by researchers to insert electronic practicum worksheets with additional images, videos, digital site links, and others (Islamiah, 2021). The use of digital-based practicum worksheets is very important to improve the quality of education, especially in students' digital literacy. Students are not only required to be able to use electronic practicum worksheets using Google Sites well, students must also understand all important aspects related to digital literacy, especially digital literacy competencies according to Hague & Payton (2010) on digital literacy components which explain that there are eight components of digital literacy, including Functional Skills and Beyond, Creativity, Collaboration, Communication, The Ability to find and select information, Critical Thinking and Evaluation, Cultural and Social Understanding, and E-safety.

The material that will be studied in this practicum is Virus Material. Students will carry out practical activities, namely analyzing the characteristics of viruses and their role in phenomena that occur in the environment around where they live. This material will be easier if studied by utilizing information via the internet using Google Site which is used as teaching material in the form of electronic practical worksheets that can be used to upload various viral learning videos, several digital site links such as online games, and interesting learning applications. to support an interesting and non-monotonous learning process (Novelia & Dheni, 2022). The e-LKP can better describe the analysis of students' digital literacy abilities by using various features that highlight digital literacy activities in the learning process.

Based on the description above, researchers need to research "The Effect of Implementing Electronic Practicum Worksheets on the Digital Literacy Abilities of Class X High School Students in Palembang City." It is hoped that this can see the effect of implementing electronic practicum worksheets using Google Sites on students' digital literacy.

RESEARCH METHODS

Research Design

This research used a quasi-experimental method with a nonequivalent control group design, namely that the experimental class was given treatment in the form of doing a practicum using the Google Site with electronic practicum worksheets, while the control class used conventional worksheets. The research design is presented in Figure I.

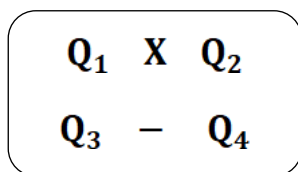


Figure I. Nonequivalent Control Group Design Research Design

The research procedures to be carried out are divided into 3 stages, namely the preparation stage, the data collection stage, and the final research stage. The research results were then analyzed descriptively using the Microsoft Excel application.

Population and Samples

This research uses a purposive sampling method. The subjects of this research were all 10 classes of class X Science semester I of Senior High School in Palembang City. A total of two classes were selected as the experimental class and the control class which met the supporting

criteria for using e-LKP in the classroom. The experimental class chosen was class X.6 with 34 students, while the control class chosen was class X.10 with 33 students.

Instruments

The test consists of two types, namely the initial test (pre-test) and the final test (post-test). The test material is in the form of digital literacy knowledge questions which aim to determine students' knowledge regarding digital literacy. The pretest questions consist of 25 multiple-choice questions regarding digital literacy skills using 8 indicators of digital literacy skills adapted from the 2015 Pustekom Kemdikbud Question Bank (Hague & Payton, 2010). The test is distributed online via the Google Form platform to students. Meanwhile, the final test or post-test will be carried out at the end of the learning process.

Procedures

The research procedures to be carried out are divided into 3 stages, namely the preparation stage, data collection stage, and data analysis stage. The preparation stage consists of the research proposal preparation stage, the research instrument preparation stage, and the research instrument validation stage. The second stage consists of data collection, consisting of interviews with Biology Teachers regarding learning, Pre-Test, followed by practical activities on Virus Material using the Google Site with an Electronic practicum worksheet and ending with a Post-Test. In the final stage of the research, data analysis was carried out obtained from the results of digital literacy tests for experimental class and control class students.

Data Analysis

The data analysis technique used in this research uses the IBM SPSS Statistics 25 for Windows program and the Microsoft Excel application. Data analysis consists of normality tests, homogeneity tests, hypothesis tests, N-Gain Score tests, and descriptive analyses of digital literacy test results.

RESULTS

In this research, an analysis was carried out on the initial and final digital literacy abilities of students from the experimental class and control class. The Pre-Test was carried out before the treatment was given, while the Post-Test was carried out after both classes were given the treatment. The results of the descriptive analysis of the Pre-Test and Post-Test are presented in Figure 2 and Figure 3.

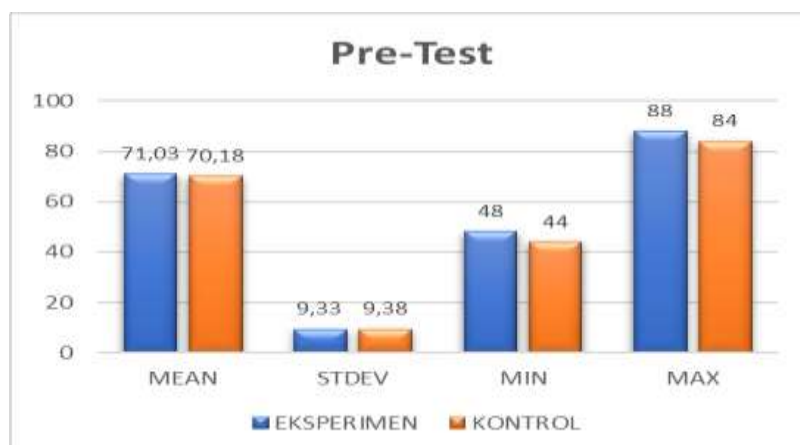


Figure 2. Graph of Pre-Test Results for Experimental Class and Control Class

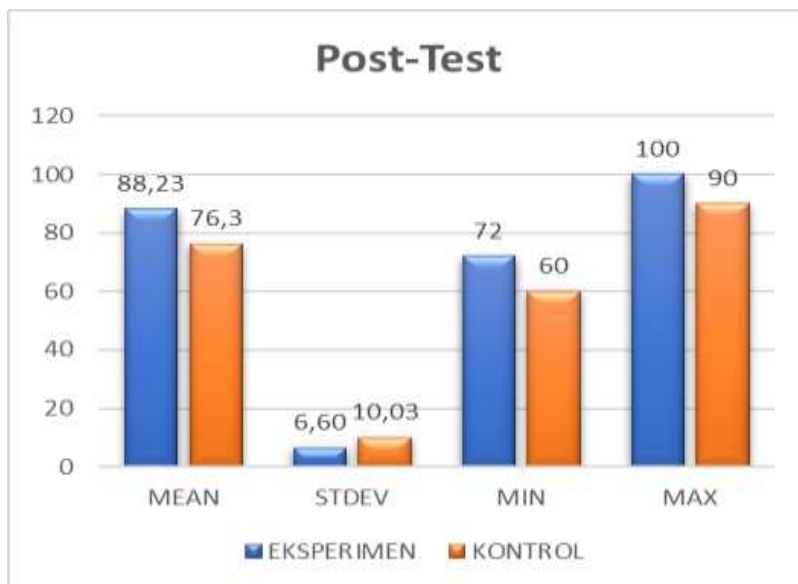


Figure 3. Graph of Post-Test Results for Experimental Class and Control Class

Table I. Hypothesis Test Results and N-Gain Analysis

Test	Experimental Class	Control Class
Hypothesis	.000	.003
N-Gain	55.61	17.18
Category	Influential and quite effective	Not effective

The difference in the average Pre-Test score for the experimental class and the control class is only 1.12. Meanwhile, the difference in the average Post-Test scores for the experimental class and control class was 11.93. A comparison of the Pre-Test results in the experimental class in Figure 3 shows a difference of 17.2. In the control class, the Pre-test and Post-Test results showed a difference of only 6.2. This shows that the digital literacy test results of students in the experimental class improved more than those in the control class.

The results of the analysis carried out on hypothesis testing in Table I show that the sig value is $0.000 < 0.05$, which means the hypothesis can be accepted. Furthermore, in the N-Gain analysis, it was found that the results in the experimental class were 55.61%, which means they were in the quite effective category, while the results in the control class were 17.18%, which was in the ineffective category. This shows that the application of e-LKP with Google Site on viral material is quite effective in increasing students' understanding of digital literacy.

Apart from that, there are results of observations of each observer were analyzed descriptively to see the differences in the results of the digital literacy skills of the students of the two classes. The results of the observational descriptive analysis are presented in Figure 4.

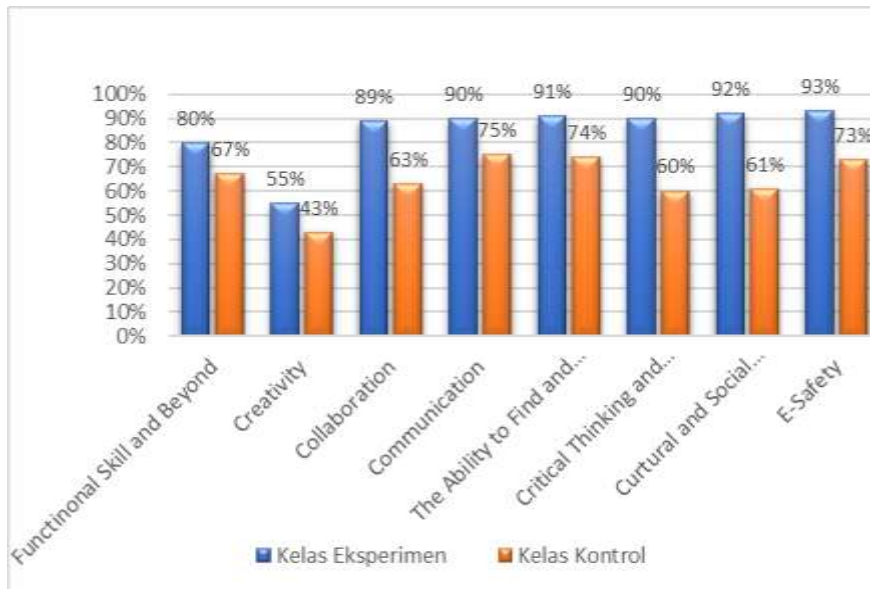


Figure 4. Graph of Observation Results of Digital Literacy Ability in Experiment Class and Control Class

Based on Figure 2. The percentage of each indicator of digital literacy ability has a significant difference. The E-Safety indicator is the indicator with the largest percentage with a very high category, namely the experimental class 93% and the control class 73%, while the Creativity indicator is an indicator with a low category including other indicators, namely the experimental class is 55% and the control class is 43%.

DISCUSSION

The effect of implementing electronic practical worksheets with Google Site on viral material practicum shows an increase in the Pre-Test and Post-Test results. In Figures 2 and 3, a comparison of the Pre-Test and Post-Test results in the experimental class shows a difference of 17.2. Meanwhile, in the control class, the Pre-test and Post-Test results showed a difference of only 6.2. The digital literacy test results of students in the experimental class improved more than those in the control class. This shows that the use of e-LKP with Google sites influences the increase in students' digital literacy. Other research also reveals that students can use electronic worksheets as a learning resource at school (Ernawati et al., 2018). On the other hand, increasing students' digital literacy skills can occur during the online learning process (Hariati, 2021) and can improve students' cognitive abilities (Amelia et al., 2023; Rusdan & Mulya, 2023). This is because learning material and increasing cognitive understanding using information technology requires digital literacy skills (Ayu Arsari, 2022; Dinata, 2021; Emosda & Annisa, 2020; Rosmia & Suziani, 2019). Some say the cause is because there is a positive linear relationship between understanding digital literacy and the level of digital literacy competency (Seputro, 2020). Apart from that, teachers also have a role in improving students' digital literacy skills. A teacher's digital literacy also influences and impacts the skills of their students (Cosby et al., 2023). On the other hand, teachers have prepared themselves well with ICT tools and facilities, which is one of the main factors for the success of technology-based learning (Ghavifekr & Rosdy, 2015; Hanifah Salsabila et al., 2020; Lestari, 2018; Ratheeswari, 2018).

The use of Google Site with electronic practicum worksheets to improve students' understanding abilities and the effectiveness of learning materials is very influential in terms of student learning outcomes before and after using Google Site, which is in line with research conducted by (Harani, et al., 2022). This is in line with the fact that the existence of student worksheets which should follow standards, be electronic-based, support learning models, can train 21st-century skills: critical thinking, collaboration, creativity, and communication (Maulana & Sopandi, 2022). The digital display of a worksheet also influences the learning process itself (Melati et al., 2019).

Figure 4 shows that there are differences in students' digital literacy skills between the experimental class and the control class based on the results of observations made especially on the E-Safety indicator which has the largest percentage in the very high category, namely the experimental class 93% and the control class 73%. This is because the experimental class tends to open a safe website. After all, the site has been embedded in the Google Site for electronic practice worksheets and students will focus on opening a safe website related to learning. Students in the control class freely open the website to assist them in working on activity sheets during the learning process. The Creativity indicator is an indicator with a low category among other indicators, namely the experimental class is 55% and the control class is 43%. This shows that the creative ability in the form of making posters in the experimental class is higher than in the control class because the experimental class gets treatment using an e-LKP with a Google Site in which a poster maker application and an assignment link are available. This is in line with the fact that using a Google Site that meets the feasibility and efficiency aspects, can also improve students' cognitive skills (Bangun et al., 2022). Apart from that, by observing students' digital abilities, other things can be measured using an individual competency framework related to information, communication, content creation, security, and problem-solving (Nada & Sari, 2020).

CONCLUSION

Based on the results of research conducted, it shows that the digital literacy test results of students in the experimental class have increased more than those in the control class, so it can be concluded that the application of e-LKP with Google Site on viral material has influenced increasing students' understanding regarding digital literacy. In addition, the implementation of electronic practice worksheets with Google Sites can improve students' digital literacy skills, especially on the E-Safety indicator seen from the results of observations in the class. Based on this research, it can be seen that practical worksheets can be used as a guide as well as teaching material which not only helps in applying concepts to biological material but can also influence students' literacy skills.

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REFERENCES

- Amelia, R., Zaini, M., & Arsyad, M. (2023). The Quality of Electronic Student Worksheet on the Protists Concept to Improve Critical Thinking Skills at the High School Level. *Islamic Journal of Integrated Science Education (IJISE)*, 2(1), 61–69. Retrieved from <https://doi.org/10.30762/ijise.v2i1.903>
- Ayu Arsari, M. H. A. (2022). The Importance of Digital Literacy to Enhance Students' Ability in



- English Language. *Jambura Journal of English Teaching and Literature*, 3(1), 12–18. Retrieved from <https://doi.org/10.37905/jetl.v3i1.13939>
- Bangun, R. H., Sitompul, J., & Fibriasari, H. (2022). Google Sites as Learning Media in the Material Development of Advanced Reading Comprehension. *International Journal of Research and Review*, 9(7), 519–525. Retrieved from <https://doi.org/10.52403/ijrr.20220756>
- Cosby, A., Fogarty, E. S., & Manning, J. (2023). Digital Literacy and Digital Self-Efficacy of Australian Technology Teachers. *Education Sciences*, 13(5). Retrieved from <https://doi.org/10.3390/educsci13050530>
- Dinata, K. B. (2021). Analisis Kemampuan Literasi Digital Mahasiswa. *Edukasi: Jurnal Pendidikan*, 19(1), 105. Retrieved from <https://doi.org/10.31571/edukasi.v19i1.2499>
- Emosda, E., & Annisa, V. (2020). Digital Literacy Skills on the Generation of Digital Immigrants. *Proceeding of International Conference on, November*, 5–6. Retrieved from <https://jurnal.umj.ac.id/index.php/ICSS/article/view/6443>
- Ernawati, M., Yuni, E., & Malik, A. (2018). Pengembangan Lembar Kerja Peserta Didik Elektronik Berbasis Proyek pada Materi Termokimia di Kelas XI SMA. *Journal of The Indonesian Society of Integrated Chemistry*, 10(1), 9–16. Retrieved from <https://doi.org/10.22437/jisic.v10i1.5306>
- Ghavifekr, S., & Rosdy, W. A. W. (2015). Teaching and learning with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science*, 1(2), 175–191. Retrieved from <https://doi.org/10.21890/ijres.23596>
- Hague, C., & Payton, S. (2010). *Digital Literacy Across the Curriculum*. Futurelab.
- Hanifah Salsabila, U., Irna Sari, L., Haibati Lathif, K., Puji Lestari, A., & Ayuning, A. (2020). Peran Teknologi Dalam Pembelajaran Di Masa Pandemi Covid-19. *Al-Mutharahah: Jurnal Penelitian Dan Kajian Sosial Keagamaan*, 17(2), 188–198. Retrieved from <https://doi.org/10.46781/al-mutharahah.v17i2.138>
- Hariati, P. (2021). Implementation of Digital Literacy toward Pandemic Situation. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, 4(2), 2920–2926. Retrieved from <https://doi.org/10.33258/birci.v4i2.2001>
- Isfahani, S. (2020). *Pengaruh LKS 3D PageFlip dalam Pembelajaran Guided Inquiry terhadap Kemampuan Menganalisis Siswa MA Materi Suhu dan Kalor*.
- Islamiah, I. N. (2021). Efektivitas Penggunaan Media Pembelajaran Google Site dalam Meningkatkan Minat Belajar Siswa pada Mata Pelajaran Akidah Akhlak di MTsN 4 Jombang. *Skripsi. Surabaya: Universitas Sunan Ampel Surabaya*.
- Lestari, S. (2018). Peran Teknologi dalam Pendidikan di Era Globalisasi. *Edureligia: Jurnal Pendidikan Agama Islam*, 2(2), 94–100. Retrieved from <https://doi.org/10.33650/edureligia.v2i2.459>
- Maulana, Y., & Sopandi, W. (2022). Needs Analysis of Electronic Student Worksheets to Practice 4C Skills. *Jurnal Basicedu*, 6(1), 602–611. <https://doi.org/10.31004/basicedu.v6i1.2044>
- Melati, P., Yulkifli, & Fauzi, A. (2019). Validity of student worksheet based on problem-based learning model assisted by practical tools with digital display. *Journal of Physics: Conference Series*, 1185(1). Retrieved from <https://doi.org/10.1088/1742-6596/1185/1/012057>
- Mispa, R., Prahata Putra, A., & Zaini, M. (2022). Penggunaan E-Lkpd Berbasis Live Worksheet pada Konsep Protista terhadap Hasil Belajar Peserta Didik Kelas X Sman 7 Banjarmasin. *Jurnal Pendidikan Indonesia*, 3(1), 2134–2145. Retrieved from <https://doi.org/10.36418/japendi.v3i1.478>
- Nada, E. I., & Sari, W. K. (2020). Digital Literacy Analysis of Chemistry Education Students in

- Using the ChemDraw Application. *JKPK (Jurnal Kimia Dan Pendidikan Kimia)*, 5(3), 293. Retrieved from <https://doi.org/10.20961/jkpk.v5i3.46441>
- Novelia, L. A., & Dheni, D. R. (2022). *Prosiding Seminar Nasional Pendidikan Kimia 2022 Desain Media Pembelajaran Berbasis Google Site Pada Materi Ikatan Ion*. 262–271.
- Ratheeswari, K. (2018). Recent Trend of Teaching Methods in Education" Organised by Sri Sai Bharath College of Education Dindigul-624710. *India Journal of Applied and Advanced Research*, 2018(3), 45–47. Retrieved from <https://www.phoenixpub.org/journals/index.php/jaar>
- Rosmia, A. R., & Suziani, M. (2019). *Digital Literacy in the Use of Technology-based Information System*. 214(Ices 2018), 11–13. Retrieved from <https://doi.org/10.2991/ices-18.2019.3>
- Rusdan, M., & Mulya, D. B. (2023). The Effect of Using Live Worksheet-Based Electronic Worksheets to Measure Cognitive Learning Outcomes. *Edunesia: Jurnal Ilmiah Pendidikan*, 4(3), 983–998. Retrieved from <https://doi.org/10.51276/edu.v4i3.481>
- Seputro, A. (2020). Hubungan Antara Pemahaman Literasi Digital Dan Tingkat Kompetensi Literasi Digital Pada Mahasiswa SI Universitas Negeri Yogyakarta. *LEKTUR Jurnal Ilmu Komunikasi*, 3(1), 38–48.