International Journal of Teaching and Learning (INJOTEL) e-ISSN: 3025-8308
Vol. 1 No. 2, October 2023, pages: 161~170

SIZE EFFECT OF HYBRID LEARNING ON STUDENTS' SCIENCE LITERACY

Ni'mah Wahyuni*
Lecturer of PGSD, FKIP, Madako Tolitoli University, Indonesia
Corespondensi author email: nimawahyuni@umada.ac.id

Achmad Ridlowi
Lecturers of Education Management, Faculty of Tarbiyah, STAINU Pacitan, Indonesia

Dharma Gyta Sari Harahap
Lecturers of PGPAUD, FKIP, Universitas musamus Merauke, Indonesia

Tomi Apra Santosa
Civil Engineering Lecturers, Academy of Engineering Adikarya, Indonesia

Abdul Rahman
Lecturer in Social Education Sciences, FKIP, Sebelas Maret University

Abstract

This study aims to determine the effect size value of hybrid-based learning on science literacy students. This type of research is meta-analysis research. The data sources in this study came from 12 national and international journals published in 2018-2023. The search process data sources through Google Scholar, ERIC, and ScienceDirect databases. The word The keywords for the data search are "hybrid learning" and "student science literacy". Technique techniques were direct observation through journal databases and documentation. Analysis of data by calculating the effect size value of the entire research analyzed. analyzed. The results of this study conclude that the average effect size value of size (ES = 0.82) high criterion. This finding shows that hybrid learning has a significant effect on students' science literacy.

Keywords: Hybrid Learning, Learning, Effect Size, Science Literacy

INTRODUCTION

Science literacy is an ability that students must have in facing the industrial revolution 4.0 (Putranta et al., 2020; Vandegrift et al., 2020; Rahman et al., 2023). Science literacy has an important role for students to solve a problem in the field of science (Alatas &; Fauziah, 2020; He et al., 202; Fakhriyah et al., 2017; Lim & Kim, 2021). Furthermore, science literacy helps students in understanding the phenomena that occur in life (özkan, 2021; Sutiani et al., 2021). Students who have science literacy will be more creative and innovative in learning (Islami &; Nuangchalerm, 2020).

In reality, the level of science literacy of students in Indonesia is still relatively low (Oktarina et al., 2021; Suharyat et al., 2023; Nurtamam et al., 2023; Zulkifli et al., 2022; Elfira et al., 2023). This result can be seen from the 2018 *Programme For International*

Student Assessment (PISA) showing that the science literacy score of students in Indonesia is 396 which is ranked 71 out of 78 countries (Ichsan et al., 2023; Rahman et al., 2023; Suryono et al., 2023). This shows that the level of science literacy of Indonesian students. Furthermore, students' low science literacy is due to a more teacher-centered learning process (Anggreni et al., 2020; Suhirman et al., 2020; Santosa et al., 2021). Not only that, the selection of inappropriate learning models and methods can affect students' science literacy (Anugrah et al., 2021; Sofianora et al., 2023; Juleha et al., 2019). Therefore, there needs to be a learning model that can encourage students' science literacy.

Hybrid learning is a learning model that can encourage students' science literacy in learning. The hybrid based learning model is (Natale et al., 2021; Hamna et al., 2022). Hybrid learning is a learning model carried out online via the internet (Jahanifar &; Masnavi, 2023; Mahardika et al., 2021). Hybrid learning models can help improve student understanding and learning outcomes (Kumaş, 2022). Utomo et al., (2023) that the hybrid learning model can improve students' critical thinking skills in learning.

Research (Prismana, 2021; Aini & Yasid, 2022) Hybrid learning can improve students' understanding in the face of revolution 4.0 and students' higher-order thinking skills in learning. Furthermore, Nurdiansah et al., (2021) said hybrid learning can encourage students' science prsoes ability in learning. The *hybrid learning* model helps students learn more creatively. The gap in this study is that many studies on hybrid-based learning models have not yet illustrated the effect of hybrid learning size on students' science literacy. Therefore, based on these problems, this study aims to determine the value of *the effect size of hybrid based learning* on students' science literacy.

RESEARCH METHOD

The This research is a type of meta-analysis research. Meta-analysis is a type of research that collects and analyzes data from previous research that can be analyzed quantitatively with statistics (Rahman et al., 2023; Supriyadi et al., 2023; Chamdani et al., 2022; Suharyat et al., 2022). Data sources in the meta-analysis come from 12 national and international journals published in 2018-2023. The process of searching for data sources through Google Scholar, ERIC and ScienceDirect databases. Data search keywords are "hybrid learning" and "student science literacy", "the effect of hybrid learning on science literacy". The inclusion criteria in this study are publications published in 2018-2023, having hybrid learning experimental classes and conversional model control, publications indexed by SINTA and Scopus, and having values t, f and r.

According to Borenstein & Hedges (2009) the steps in meta-analysis research consist of problem formulation, data collection, data coding, data analysis and interpretation. Furthermore, analyze the data in this study by calculating the effect size

of the entire study with the help ofa Comprehensive Meta-Analysis (CMA) application version 3.0. The formula used to calculate the effect size value can be seen in Table 1.

Table 1. Effect Size Formula

Statistical Data	Formula
Average value on one group	$ES = \frac{\bar{x}_{post} - \bar{x}_{pre}}{SD_{pre}}$
Average scores in each group	$ES = \frac{\bar{x}_{Exsperiment} - \bar{x}_{Control}}{SD_{Control}}$
Mean and Standard deviation values in each group (two groups of postes-pretest)	$ES = (\frac{(\bar{x}_{post} - \bar{x}_{pre})_E - (\bar{x}_{post} - \bar{x}_{pre})_c}{SD_{preC} + SD_{preE} + SD_{postC}}$
Chi square	$ES = \frac{2r}{\sqrt{1-r^2}}$; r=$\sqrt{\frac{x^2}{n}}$
t-count	$ES = t\sqrt{\frac{1}{n_{experiment}} + \frac{1}{n_{Control}}}$
P-Value	JSAP 8.5.0

Source : Becker &; Park in (Khoiri, 2019; Hidayatullah & Wulan, 2022)

Furthermore, the effect size criteria in this study are guided by (J. Cohen, 1988), can be seen Table 2.

Table. 2 Effect Size Value Criteria

Effect Size	Criterion
0 ≤ ES ≤ 0.20	Low
0.20 ≤ ES ≤ 0.80	Medium
ES ≥ 0.80	High

Source : (Cohen et al., 2007; Borenstein & Hedges, 2009)

RESULT AND DISCUSSION

From the results of database searches through Google Scholar, ERIC, and ScienceDirect obtained 113 journals related to hybrid learning to science literacy, only 12 journals that meet the inclusion criteria can be seen (Fig.1).

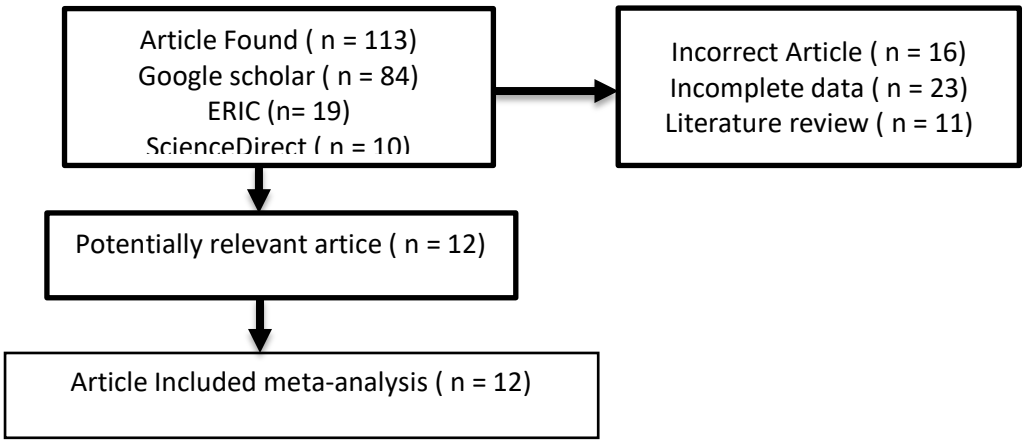

Figure 1. Article Completion Process For Meta-analysis

Journals that have met the inclusion criteria are calculated effect size values analyzed with characteristics consisting of journal code, year of publication, level of education and journal index which can be seen in Table 3.

Table 3. Effect Size of Articles That Meet the Criteria

Journal Code	Year	Education Level	Journal Index	Effect Size	Criterion
J1	2020	JUNIOR	SINTA	0.66	Medium
J2	2021	JUNIOR	SINTA	0.95	High
J3	2018	SMA	Scopus	0.79	Medium
J4	2023	SMA	Scopus	1.25	High
J5	2023	SMA	Scopus	2.14	High
J6	2021	PT	SINTA	0.82	High
J8	2022	PT	SINTA	0.46	Medium
J9	2019	PT	Scopus	1.30	High
J10	2020	SMA	Scopus	2.24	High
J11	2019	PT	SINTA	0.79	Medium
J12	2018	PT	SINTA	0.97	High
Average Effect Size				**1.12**	**High**

Based on Table 3, it explains that the average value of the effect size of the entire journal analyzed (ES = 1.12) criteria is high. These results show that the hybrid based learning model has a significant influence on students' science literacy. Research results (Put et al., 2019; Hamna et al., 2022; Pektas., 2022) stated that hybrid-based learinng has an influence on students' science literacy abilities. *Hybrid* learning can help students' learning process independently with the help of technology (Vonti &; Grahadila, 2021). Not only that, hybrid learning can improve students' process ability in learning (Farizi et al., 2022).

Research (Kulsum, 2020; Tao et al., 2020) Hybrid learning can grow students' cognitive knowledge so that it can encourage student learning outcomes and science literacy. Student science literacy has an important role for students to solve all problems that occur in the field of science (Norris &; Phillips, 2003; Jufrida et al., 2019; Deboer, 2014; Holbrook & Rannikmae, 2009). Science literacy trains students more easily to provide ideas or ideas so that they are able to provide solutions in solving problems in life (Avikasari et al., 2018). Furthermore, the application of hybrid learning provides influence at the educational level. This can be seen the value of effect size based on education level in Table 4.

Table 4. Effect Size of Hybrid Larning onEducation Level

Education Level	Effect Size	Mean Effect Size	Criterion
JUNIOR	0.66	0.805	Tall
JUNIOR	0.95		
SMA	0.79	1.605	Tall
SMA	1.25		
SMA	2.14		
SMA	2.24		
PT	0.82	0.868	Tall
PT	0.46		
PT	1.30		
PT	0.79		
PT	0.97		

Note: Junior High School = Junior High School High School = High School
PT = Higher Education

Table 4. Explaining the analysis of the effect size value based on education level, the average effect size value of the junior high school level (0.805), the mean effect *size* of the high school level (1.605) and the mean effect szie average of the PT level (0.868). The results show that the high school level has a very high influence on the application

of hybrid based learning on student science literacy. Research (Munday, 2022); states that *hybrid learning* is effective for improving student literacy at the high school level. Hybrid learring helps the student learning process more easily and effectively through computers, Smartphones, Tablets and so on. Hybrid learning can be done by teachers and students online (Wijaya &; Ydewani, 2023).

CONCLUSION

From this study it can be concluded that the average value of the szie effect (ES = 0.82) criteria is high. This finding shows that hybrid learning has a significant influence on Shiva's science literacy. Hybrid learning helps students learn more actively and innovatively by utilizing technology

REFERENCES

Aini, K., & Yasid, A. (2022). Kemampuan Berpikir Tingkat Tinggi Mahasiswa melalui Hybrid Learning. *JURNAL BASICEDU*, *6*(5), 7775–7781.

Alatas, F., & Fauziah, L. (2020). Model problem based learning untuk meningkatkan kemampuan literasi sains pada konsep pemanasan global. *JIPVA (Jurnal Pendidikan IPA Veteran)*, *4*(2), 102. https://doi.org/10.31331/jipva.v4i2.862

Anggreni, L. D., Jampel, I. N., & Diputra, K. S. (2020). Pengaruh Model Project Based Learning Berbantuan Penilaian Portofolio Terhadap Literasi Sains. *Jurnal Mimbar Ilmu*, *25*(1), 41–52.

Anugrah, V., Pramana, R., & Pudji, S. (2021). JPBI (Jurnal Pendidikan Biologi Indonesia) Learning Bryophyta : I mproving students ' scientific literacy through problem-based learning. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, *7*(1), 71–82.

Asst., S. P. (2022). HYBRID MODEL FOR THE RELATIONSHIP BETWEEN STUDENTS ' SCIENCE LITERACY LEVEL. *IJETSAR (International Journal of Education Technology and Scientific Researches)*, *7*(19), 1911–1924.

Avikasari, A., Rukayah, R., & Indriayu, M. (2018). The Influence of Science Literacy-Based Teaching Material Towards Science Achievement. *International Journal of Evaluation and Research in Education (IJERE)*, *7*(3), 182. https://doi.org/10.11591/ijere.v7i3.14033

Borenstein, M., & Hedges, L. V. (2009). *Introduction to Meta-Analysis Introduction*.

Chamdani et al. (2022). META-ANALYSIS STUDY : THE RELATIONSHIP BETWEEN REFLECTIVE THINKING AND LEARNING ACHIEVEMENT. *ERIES Journal*, *15*(3), 181–188.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences Second Edition*. LAWRENCE ERLBAUM ASSOCIATES,.

Cohen, L., Manion, L., Lecturer, P., Morrison, K., & Lecturer, S. (2007). *Research Methods in Education*. Routledge is an imprint of the Taylor & Francis Group, an informa business.

Deboer, G. E. (2014). Scienti ® c Literacy : Another Look at Its Historical and Contemporary Meanings and Its Relationship to Science Education Reform. *JOURNAL OF RESEARCH IN SCIENCE TEACHING*, *37*(6), 582–601.

El Islami, R. A. Z., & Nuangchalerm, P. (2020). Comparative study of scientific literacy: Indonesian and thai pre-service science teachers report. *International Journal of Evaluation and Research in Education*, *9*(2), 261–268. https://doi.org/10.11591/ijere.v9i2.20355

Elfira, I., & Santosa, T. A. (2023). Literature Study : Utilization of the PjBL Model in Science Education to Improve Creativity and Critical Thinking Skills. *Jurnal Penelitian Pendidikan IPA*, *9*(1), 133–143. https://doi.org/10.29303/jppipa.v9i1.2555

Fakhriyah, F., Masfuah, S., Roysa, M., Rusilowati, A., & Rahayu, E. S. (2017). Jurnal Pendidikan IPA Indonesia STUDENT ' S SCIENCE LITERACY IN THE ASPECT OF CONTENT SCIENCE ? *Jurnal Pendidikan IPA Indonesia*, *6*(1), 81–87. https://doi.org/10.15294/jpii.v6i1.7245

Farizi, S. F., Umamah, N., Saregar, A., Sari, N., Fitriasari, P., & Octaria, D. (2022). The influence of the hybrid learning model using the schoology application in basic physics lectures to improve process skills in the industrial 4 . 0 period The influence of the hybrid learning model using the schoology application in basic physics lectu. *Journal of Physics: Conference Series*, *2165*, 1–7. https://doi.org/10.1088/1742-6596/2165/1/012005

Hamna, H., Khaerul, M., & Bk, U. (2022). Science Literacy in Elementary Schools : A Comparative Study of Flipped Learning and Hybrid Learning Models. *PROFESI PENDIDIKAN DASAR*, *9*(2), 132–147. https://doi.org/10.23917/ppd.v9i2.19667

He, L., Chen, Y., Xiong, X., Zou, X., & Lai, K. (2021). Does Science Literacy Guarantee Resistance to Health Rumors ? The Moderating Effect of Self-Efficacy of Science Literacy in the Relationship between Science Literacy and Rumor Belief. *Int. J. Environ. Res. Public Health*, *18*(2243), 1–10.

Holbrook, J., & Rannikmae, M. (2009). The Meaning of Scientific Literacy. *International Journal of Environmental & Science Education*, *4*(3), 275–288.

Ichsan, Yayat Suharyat, Tomi Apra Santosa, E. (2023). The Effectiveness of STEM-Based Learning in Teaching 21 st Century Skills in Generation Z Student in Science Learning : A. *Jurnal Penelitian Pendidikan IPA*, *9*(1), 150–166. https://doi.org/10.29303/jppipa.v9i1.2517

Jahanifar, M., & Masnavi, A. (2023). هاذ لصف یمدلع سدیردت یهوژپ Hybrid Learning Environment : The Effectiveness of Simultaneous Use of Real And Virtual Experiments on Students ' Scientific Reasoning Skill. *Journal of Research in Teaching*, *11*(2), 121–127.

Jufrida, J., Basuki, F. R., Kurniawan, W., Pangestu, M. D., & Fitaloka, O. (2019). Scientific literacy and science learning achievement at junior high school. *International Journal of Evaluation and Research in Education*, *8*(4), 630–636. https://doi.org/10.11591/ijere.v8i4.20312

Juleha, S., Nugraha, I., & Feranie, S. (2019). The Effect of Project in Problem-Based Learning on Students ' Scientific and Information Literacy in Learning Human Excretory System. *J.Sci.Learn.*, *2*(September 2018). https://doi.org/10.17509/jsl.v2i2.12840

Khoiri, A. (2019). Meta Analysis Study : Effect of STEM (Science Technology Engineering and Mathematic) towards Achievement. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *9*(1), 71–82.

Kulsum, U., & Program, F. S. (2020). INDONESIAN EDUCATIONAL STUDIES (IJES). *NDONESIAN JOURNAL OF EDUCATIONAL STUDIES (IJES)*, *23*(1), 61–71.

Kumaş, A. (2022). INFOGRAPHICS AND THEIR APPLICATIONS IN THE HYBRID LEARNING PROCESS. *Acta Didactica Napocensia*, *15*(2), 230–242. https://doi.org/10.24193/adn.15.2.15

Lim, S., & Kim, D. (2021). International Journal of Educational Research Open English learners ' science-literacy practice through explicit writing instruction in invention-based learning. *International Journal of Educational Research Open*, *2*(January), 100029. https://doi.org/10.1016/j.ijedro.2020.100029

Mahardika, A. I., Adini, M. H., & M, A. S. (2021). Hybrid Learning as an Alternative for Learning to Improve Students ' Physics and Digital Literacy Competencies on The Topic of Fluid Physics. *International Journal of Innovative Science and Research Technology*, *6*(2), 66–71.

Munday, D. (2022). Hybrid pedagogy and learning design influences in a higher education context. *Studies in Technology Enhanced Learning*, *2*(2), 243–258.

Natale, C. C., Luzia, S., & Trivelato, F. (2021). Special Issue : Implications of COVID-19 on Higher Education Evidence of Scientific Literacy Through Hybrid and Online Biology Inquiry-Based Learning Activities. *Higher Learning Research Communications*, *11*(0), 33–49. https://doi.org/10.18870/hlrc.v11i0.1199

Norris, S. P., & Phillips, L. M. (2003). *How Literacy in Its Fundamental Sense Is Central to Scientific Literacy*. https://doi.org/10.1002/sce.10066

Nurdiansah, I., Makiyah, Y. S., Studi, P., Fisika, P., & Siliwangi, U. (2021). Efektivitas Modul Hybrid Project Based Learning (H-Pjbl) Berbasis Laboratorium Untuk Meningkatkan Keterampilan Proses Sains Siswa. *Urnal Pendidikan Fisika Dan Teknologi (JPFT)*, *7*(2), 104–110.

Nurtamam, M. E., Santosa, T. A., Aprilisia, S., Rahman, A., & Suharyat, Y. (2023). Meta-analysis : The Effectiveness of Iot-Based Flipped Learning to Improve Students ' Problem Solving Abilities. *Edumaspul :Jurnal Pendidikan*, *7*(1), 1491–1501.

Oktarina, K., Suhaimi, S., Santosa, T. A., & ... (2021). Meta-Analysis: The Effectiveness of Using Blended Learning on Multiple Intelligences and Student Character Education During the Covid-19 Period. *... Journal of Education ...*, *4*(3), 184–192. http://journal.ummat.ac.id/index.php/IJECA/article/view/5505%0Ahttps://journal.ummat.ac.id/index.php/IJECA/article/download/5505/pdf

ÖZKAN, U. B. (2021). Interest in Environmental Issues as a Determinant of Science Literacy: A Multinational Review with Artificial Neural Network Analysis. *FIRE: Forum for International Research in Education*, *7*(1), 115–131. https://doi.org/10.32865/fire202171232

Prismana, S. &. (2021). PENGEMBANGAN HYBRID BASED LEARNING BERBASIS STEAM MENGGUNAKAN LEARNING MANAGEMENT SYSTEM BERDASARKAN LEMBAR KERJA SISWA UNTUK MENINGKATKAN KEMAMPUAN SISWA DALAM MENGHADAPI TUNTUTAN REVOLUSI INDUSTRI 4.0. *Jurnal IT-EDU*, *06*(2), 23–31.

Putranta et al. (2020). European Journal of Educational Research. *European Journal of Educational Research*, *9*(3), 921–934.

Rahman, A., Islam, P. A., Bekasi, U. I., Ipa, P., Padang, U. N., Jambi, U., Pendidikan, M., Islam, A., Uin, F., & Bonjol, I. (2023). *Meta-Analisis : Pengaruh Pendekatan STEM*

berbasis Etnosains Terhadap Kemampuan Pemecahan Masalah dan Berpikir Kreatif Siswa. *3*, 2111–2125.

Rahman, A., Santosa, T. A., Sofianora, A., Oktavianti, F., & Alawiyah, R. (2023). Systematic Literature Review : TPACK-Integrated Design Thinking in Education. *International Journal of Education and Literature (IJEL)*, *2*(1), 65–77.

Rahman, A., Santosa, T. A., & Suharyat, Y. (2023). *The Effect of Problem Based Learning-STEM on Students ' 21st Century Skills in Indonesia : A Meta-Analysis*. *2*(1).

Santosa, T. A., Razak, A., Arsih, F., & Sepriyani, E. M. (2021). Meta-Analysis : Science Learning Based on Local Wisdom Against Preserving School Environments During the Covid-19 Pandemic. *Journal of Biology Education*, *10*(2), 244–251.

Silmi Hidayatullah*, R. W. (2022). Meta-analysis of the influence of 21st century high school students ' skills in learning physics using a guided inquiry model Meta-analysis of the influence of 21st century high school students ' skills in learning physics using a guided inquiry model. *Journal of Physics: Conference Series*, *2309 (2022*, 1–8. https://doi.org/10.1088/1742-6596/2309/1/012057

Sofianora, A., Suharyat, Y., & Santosa, T. A. (2023). *PENGARUH PROFESIONALITAS GURU MATEMATIKA DALAM MENINGKATKAN KOMPETENSI SISWA ERA REVOLUSI INDUSTRI 5 . 0 DI INDONESIA : SEBUAH META-ANALISIS*. *10*(2).

Suharyat, Y., Santosa, T. A., & Satria, E. (2023). The Effectiveness of STEM-Based Learning in Teaching 21 st Century Skills in Generation Z Student in Science Learning : A. *Jurnal Penelitian Pendidikan IPA*, *9*(1), 160–166. https://doi.org/10.29303/jppipa.v9i1.2517

Suhirman1)*, H. K. (2020). The Effects of Problem-Based Learning on Critical Thinking Skills and Student Science Literacy. *Lensa : Jurnal Kependidikan Fisika*, *8*(1), 31–38.

Supriyadi, A., Suharyat, Y., Santosa, T. A., & Sofianora, A. (2023). The Effectiveness of STEM-Integrated Blended Learning on Indonesia Student Scientific Literacy : A Meta-analysis. *International Journal of Education and Literature (IJEL)*, *2*(1), 41–48.

Suryono, W., Haryanto, B. B., Santosa, T. A., Suharyat, Y., & Sappaile, B. I. (2023). The Effect of The Blended Learning Model on Student Critical Thinking Skill : Meta-analysis. *Edumaspul - Jurnal Pendidikan*, *7*(1), 1386–1397.

Sutiani, A., Situmorang, M., & Silalahi, A. (2021). Implementation of an Inquiry Learning Model with Science Literacy to Improve Student Critical Thinking Skills. *International Journal of Instruction*, *14*(2), 117–138. https://doi.org/10.29333/iji.2021.1428a

Tao, H., Al-sulttani, A. O., Mohammed, A., Ameen, S., Ali, Z. H., Al-ansari, N., Salih, S. Q., & Mostafa, R. R. (2020). Training and Testing Data Division Influence on Hybrid Machine Learning Model Process : Application of River Flow Forecasting. *Complexity*, 1–222.

Taruh, E., Abbas, N., & Umar, M. K. (2019). European Journal of Education Studies THE INFLUENCE OF BLENDED LEARNING-BASED GUIDED INQUIRY LEARNING MODEL AND SELF EFFICACY ON STUDENTS ' SCIENTIFIC LITERACY. *European Journal of Education Studies*, *6*(6), 137–150. https://doi.org/10.5281/zenodo.3445474

Utomo, W., Suryono, W., Santosa, T. A., & Agustina, I. (2023). The Effect of STEAM-Based Hybrid Based Learning Model on Students ' Critical Thinking Skills. *Jurnal Penelitian Pendidikan IPA*, *9*(9), 742–750. https://doi.org/10.29303/jppipa.v9i9.5147

Vandegrift, E. V. H., Beghetto, R. A., Eisen, J. S., O'Day, P. M., Raymer, M. G., & Barber, N. C. (2020). Defining Science Literacy in General Education Courses for Undergraduate Non-Science Majors. *Journal of the Scholarship of Teaching and Learning*, *20*(2), 15–30. https://doi.org/10.14434/josotl.v20i2.25640

Vonti, L. H., & Grahadila, L. (2021). POTENTIALS AND PITFALLS OF THE IMPLEMENTATION OF HYBRID LEARNING IN STRUCTURE CLASS IN RELATION TO THE STUDENTS ' DIGITAL LITERACY AND LEARNING ACHIEVEMENT. *JHSS (Journal of Humanities and Social Studies)*, *05*(01), 17–21.

Wijaya, R., & Ydewani, D. (2023). Pengaruh Pemanfaatan Hybrid Learning terhadap Motivasi dan Prestasi Belajar Mahasiswa di Masa Post Pandemi. *TARGET : JURNAL MANAJEMEN DAN BISNIS*, *5*(1), 27–38.

Yayat Suharyat, Agus Supriyadi, Ichsan, Erwinsyah satria, T. A. S. (2022). Analisis Pembelajaran daring dalam pembelajaran IPA di SMA/MA di Indonesia Pasca Pandemi Covid-19: Sebuah Literatur Reviews. *Jurnal Pendidikan Dan Konseling*, *4*(5), 1860–1865.

Zulkifli Zulkifli, Agus Supriyadi, Erwinsyah Satria, & Tomi Apra Santosa. (2022). Meta-analysis: The Effectiveness of the Integrated STEM Technology Pedagogical Content Knowledge Learning Model on the 21st Century Skills of High School Students in the Science Department. *Psychology, Evaluation, and Technology in Educational Research*, *1*(2), 68–76. https://doi.org/10.55606/ijel.v1i2.32.