BIOEDUSCIENCE
ISSN: 2614-1558
http://journal.uhamka.ac.id/index.php/bioeduscience

Effectiveness of Self Organized Learning Environment (SOLE) Based e-Modules on Even Semester Biology Material

Sutrisno Nurhadi Ali [1]*, Adnan [1], Syamsiah [1]

[1] Universitas Negeri Makassar, Jl. AP. Pettarani Makassar, Sulawesi Selatan, Indonesia 90222
* Correspondence: nurhadisquad@gmail.com

Abstract

Background: Testing the effectiveness of electronic modules (e-Modules). The hope of this study is to test the effectiveness of e-Modules based on Self Organized Learning Environment (SOLE). **Methods:** The type of research is research and development that refers to the type of ADDIE development (Analysis, Design, Development, Implementation, and Evaluation). The resulting product is an e-Modules based on Self Organized Learning Environment (SOLE), which is carried out on the effectiveness of 34 students. The instrument used is an essay test. The instruments that have been developed are used for data collection. **Results:** The resulting data are then analyzed quantitatively. Based on the results of the study, it illustrates that the level of effectiveness of e-Modules based on SOLE as reviewed from student learning outcomes is 0.7 in the effective category with a moderate level. So that the e-Modules based on SOLE are effective with a moderate level. **Conclusions:** The suggestion in this study is that it is recommended for researchers who want to continue this research to conduct experimental research based on influence to better understand how this e-Modules are when tested in several schools.

Keywords: Effectiveness; e-Modul; Sel Organized Learning; SOLE

Article history
Received: 25 Jun 2024
Accepted: 27 Jan 2025
Published: 31 Mar 2025

Publisher's Note:
BIOEDUSCIENCE stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Citation:
Ali. 2025 Effectiveness of Self Organized Learning Environment (SOLE) Based e-Modules on Even Semester Biology Material Ecosystem Materials. BIOEDUSCIENCE, 9(1), 147-154. doi: 10.22263/jbes/15377

Introduction

Well-designed teaching materials also provide structured guidance, relevance of content to students' daily lives, and refer to clear learning objectives. This helps create a more effective and memorable learning experience (Martin & Bolliger, 2018). Teaching materials support teachers in consistently teaching material to students to achieve predetermined competencies (Sani, 2019). Various types of printed and non-printed teaching materials such as handouts, textbooks, modules, student worksheets, books, and teaching materials, are arranged in electronic form (Delianti & Janius, 2020). Teaching materials have a vital role. The benefits of teaching materials in the student learning process are that they can attract students' attention so that they will be easier for students to understand and enable them to master and achieve learning objectives, learning methods will be more varied so that it is not just verbal communication, students do more learning activities (active) by observing, doing, demonstrating, applying and so on (Marwah, 2019). Currently, there are still many uses for teaching materials that are not optimal and are not properly arranged (Nurchaili, 2020). The selection of teaching materials is essential to be done by paying attention to the learning plan and adjusting the form of learning presented by the teacher, starting from the application of an approach, method, technique, and learning tactics that have been arranged into a whole unit called a

learning model (Hatimah, 2017). For facing the 21st-century learning paradigm, learning should be directed towards a constructivist learning paradigm. Biology is not just a collection of scientific terms and names that must be memorized but a science that can significantly contribute to building knowledge through sensing, adaptation, and abstraction (Adnan, 2019). According to the Ministry of Education and Culture (2018), there are several advantages of e-modules, namely: 1) assignments that are limited according to the abilities of students so that learning motivation increases, 2) learning materials are divided more evenly in one semester, 3) education is more effective because learning materials are arranged according to academic levels, and 4) static presentations can be changed to be more interactive and dynamic. Permatasari et al., 2019 also stated that the advantages of e-modules are that e-modules make learning more interactive because they allow the appearance of images, audio, video, and animation and are equipped with tests or quizzes as a means of teacher assessment of students and help increase interest in learning, especially in biology subjects on environmental change material.

Researchers using learning modules as teaching materials have been carried out by (Aryani, 2017). The study results concluded that learning modules can improve learning outcomes, especially in the cognitive domain.

Learning using learning modules has the benefits of 1) increasing the effectiveness of learning without having to go through face-to-face meetings, 2) determining and setting study time according to the needs and development of student learning, 3) knowing the achievement of student competencies gradually through the criteria set in the module and 4) knowing the weaknesses or competencies that have not been achieved by students based on the criteria set in the module (Dharma, 2019).

The structure of the e-module is on the first page, including 1) Cover, 2) foreword, 3) table of contents, and 4) instructions for using the e-module. Contents page: 1) presentation of material (environmental changes and overcoming environmental problems, 2) learning activities (independent learning patterns). Closing page: 1) evaluation tasks, 2) summary, 3) glossary, 4) bibliography.

Integrating technology into education can increase student motivation, provide diverse learning resources, and support more interactive and collaborative learning (Johnson et al., 2014). Digital devices in the classroom have increased student engagement, with students showing active participation and significant interest in the subject matter (West, 2013). With the help of technology, learning can be tailored to each student's needs and learning pace, providing a more effective and personalized learning experience (Pane, 2015). The TPACK framework encourages a teacher to not only teach a material using a learning approach or method (Agustini, 2022). Technology use in education can impact learning and teaching activities that can run more effectively (Yelianti, Muswita, & Sanjaya, 2018). Using technology in existing learning allows learning to occur more effectively (Yelianti, Muswita, & Sanjaya, 2018). Each learning activity it is connected with a link as a navigation that makes students more interactive (Kemendikbud, 2018). E-modules utilize electronic media to support a more effective and efficient teaching and learning process (Widya & Ahmad, 2021). E-learning and mobile learning systems enable more flexible and accessible learning (Fauziah A. & Wulandari S., 2022). Mobile learning can make it easier for users to access learning content anywhere without visiting a particular place and time (Oktiana, 2019). While e-learning uses mobile devices and wireless transmission (Hoppe et al., 2003)

According to Mitra (2021), Self-Organized Learning Environment (SOLE) is a learning approach that emphasizes student independence in organizing and managing their learning. This approach was developed by Sugata Mitra, a professor of education at Newcastle University, and he conducted his initial research through the ''Hole in the Wall'' experiment in India, where he placed a computer on the wall. He let children learn independently (Weisblat & McClellan et al., 2017). The basic concept behind this experiment was to see to what extent children could learn independently and collaborate

with technology without direct guidance from teachers or adults (Mitra, 2015). Mitra witnessed that children quickly found ways to use computers and developed basic computer skills such as browsing and problem-solving (Almalki, 2024). Problem-solving is an individual's ability to identify, analyze, and solve problems (Johnson et al., 2017), usually in non-routine issues. Still, basic knowledge and mentality underlies the resolution process (Ruseffendi, 2006).

Teaching strategies focusing on problem-solving can improve students' critical thinking skills (Schoenfeld, A. H., 2019). Gagne argues that problem-solving is the most complex type of learning among the other seven types (Suherman, 2003). SMAN 14 Gowa is one of the state schools that has implemented the 2013 curriculum, requiring students to be more active in learning activities. The 2013 curriculum is a curriculum that involves the role of educators in developing 21st-century skills aimed at students. 21st-century skills, termed 4C (communication, collaboration, critical thinking, problem-solving, creativity, and innovation), are skills to be achieved in learning (Daryanto & Karim, 2017). In addition, teachers must be more creative and innovative in developing teaching materials. Based on the results of initial observations conducted at SMAN 14 Gowa and SMA Budi Utomo by conducting an interview process with biology subject teachers, which was carried out in November 2023, it was explained that the learning process carried out still used learning resources that were less interactive for students. The percentage of students evidences this as 78%, stating that teachers lecture more in the learning process. The initial observations also showed that 90% of students were more interested in learning by doing experiments or practicums and were motivated to know if they used engaging and interactive modules. Based on the problems that exist in the learning process, it is necessary to develop an electronic module based on an organized Learning Environment (SOLE), which is designed to support independent learning, student interest, and motivation, encourage collaboration, and utilize technology to access information, communicate, and collaborate.

Low interest and motivation can lead to low reading literacy skills (Sirate & Ramadhana, 2017). Meanwhile, only 60% of students' learning outcomes achieve the KKM value as seen from the results of daily test scores. This shows that the teaching materials do not support the achievement of the expected competencies.

Research shows that SOLE can improve students' critical thinking and creativity (Mitra & Dangwal, 2017); students can also work together and develop better communication skills (Hovell, 2018). Students who learn in a SOLE environment understand the material more because they know facts and develop critical and analytical thinking skills (Smith & Turner, 2021). And explore the depth of understanding by utilizing the curiosity of students (Wati, 2021).

According to Sumantri (2015), effectiveness is a condition that describes how far the target (duration, quality, and quantity) has been achieved, or the greater the percentage level of a goal to be achieved, the higher the effectiveness. According to Hobri (2013), if the analysis results of student learning outcomes obtained an individual completion rate of at least 80 (KKM) and classically at least 80%. Haviz (2016) states that effectiveness refers to consistent experience with goals. Nieveen & Haviz (2016) measure the effectiveness of appreciation in knowing a program and the hope of being able to use the program. In addition, a designed model can be expected to be used sustainably between expectations and actualization. The hope referred to here is that using a product is expected to provide successful outcomes.

Agustanti (2012) stated that learning outcomes are significant changes in terms of knowledge. In this case, learning outcomes can be in the form of daily test scores, mid-term exams, and final exams on a material. Imamah (2012) stated that learning outcomes are the results obtained by students on a topic in learning tested through written tests—the effectiveness of the SOLE-based e-Module that has been developed. An effectiveness test activity needs to be conducted.

Methods

Research Scope

The subjects of the study were 34 students at SMAN 14 Gowa. The research activities were carried out in April-May 2024. The research instrument used was a test. The data collection technique in this study was questioned. The questions in this study were essays.

Research Design

The research design used was research in the form of Research and Development (R&D). The development model used is ADDIE. It has stages in analysis, design, development, implementation, and evaluation.

Research Procedure

The research procedure in this study refers to the ADDIE development model. It has five stages: analysis, design, development, implementation, and evaluation. It can be seen in the implementation stage to find out the effectiveness of the e-module.

Data Collection and Data Analysis

Normalized Gain Test (N-Gain) is used to obtain information on changes in student learning outcomes from the pretest and post-test. Normalized gain is calculating the comparison score of the actual gain value with the maximum gain value (Rusman, 2013).

The data collection techniques used in this study are: 1) Interviews, conducted by direct question and answer between researchers and informants to discover students' real problems and needs. 2) Questionnaires are used to assess the practicality of the products developed. 3) Learning outcome tests, used to measure the ability of research objects to master environmental change material using SOLE-based e-modules.

Result

The learning outcome test and problem-solving ability use essay-based questions, considering that this form of test is the most appropriate form to describe the sample's ability by considering the allocation of learning time so that the actual ability results are obtained (Hendriana & Sumarmo, 2017). The results of the answers are then scored for each aspect. The percentage results for each element of the question number are averaged to obtain the average ability.

Table 1. Scoring of Learning Outcomes Based on Interval Scale

Interval	Category	Number of Students (*Pretest*)	Number of Students (*Postest*)
90 ≤ X < 100	Very high	0	2
81 ≤ X < 90	High	0	18
72 ≤ X < 81	Middle	0	14
63 ≤ X < 72	Low	0	0
X < 63	Very Low	34	0
Amount		34	

The learning outcome test scores were dominated by students who obtained interval scores of 81 ≤ X < 90 with a high category, namely 18 students. While those who obtained interval scores of 90 ≤ X < 100 with a very high category were two people. This indicates that using SOLE-based E-Modules can develop students' thinking skills.

This study uses data analysis, namely N-gain. The average value is followed at the interval of determining the category of e-module effectiveness, which is in the category 0.7 > g >0.3, which is the moderate category.

Table 2. Product Effectiveness Criteria

N-Gain Score	Category
g > 0,7	High
0.7 > g >0,3	Middle
g < 0,3	Low

Source: Hake (1998) in (Savinainen & Scott, 2002)

Table 3. Results of Analysis of Student Learning Completeness

Criteria	Value	Number of Student	Percentage (%)
Complete	>80	29	85,29
Not Completed	<80	5	14,71

The results of the analysis of learning outcome data from 34 students showed that the % of students who were declared complete was 85.29%. Based on these data, it can be concluded that the SOLE-based E-Module is effective in the learning process.

According to Polya (Mawaddah & Anisah, 2015), problem-solving has four aspects: 1) Understanding the problem, involving in-depth study of the problem situation, sorting facts, determining the relationship between facts, and formulating problem questions. 2) Determining and setting clear goals in problem-solving helps students focus on the steps needed to achieve the desired solution (Smith, 2019). 3) Exploring strategies, students must choose what method to use with clear and logical reasons (Rahma, 2021). According to (Hasan, 2014), the process is used to choose an action to solve a problem. 4) Implementing the strategy: at this stage, students must be able to implement the chosen strategy (Rahma, 2021). Furthermore, related to the analysis of problem-solving abilities can be seen in the following table.

Table 4. Percentage of Each Aspect

Aspect	Percentage (%)	Category
Identifying problems	73,53%	High
Setting goals	76,47%	High
Exploring strategies	86,76%	Very High
Implementing strategies	90,58%	Very High
Average	**81,83%**	

Based on the table above, the analysis results of students' problem-solving abilities are in the 80% ≤ P < 100% (Romika & Amalia, 2014), which is 81.83% or in the very high category.

Discussion

Based on the effectiveness category with a value of 85.29% of student graduation after using the SOLE-based e-module, which can be categorized as effective because ≥ 80% of students are in the minimal completion category. This is in line with the opinion of Hobri (2013), who stated that the e-module that has been developed is categorized as effective if > 80% of all subjects meet the learning completion category.

Based on the results of the N-Gain score analysis in Table 3, it show that the application of the SOLE-based e-module can improve student learning outcomes. The number of students with a high N-gain score (g > 0.7) is 18 people, and the medium category (0.3 < g > 0.7) is 14 people. The assessment criteria for the normalized gain index are g> 0.70 (high), 0.70 ≥ g> 0.30 (moderate), and 0.30 ≥ g (low). Referring to these criteria, the average value of the increase in learning outcomes after using the SOLE-based e-module is in the moderate category. However, some critical information was

found when viewed from the individual aspect. Of the 34 respondents, two students (6%) experienced an increase in the very high category and 18 (53%) students in the high category. Furthermore, 14 students (41%) experienced an increase in the moderate category. Based on the description of the learning outcome test, it can be said that the SOLE-based e-module on the biology material for the even semester of grade X SMA/MA that has been developed is in the effective category for use in the learning process. This aligns with Darmawati's (2019) results, which revealed that effective teaching materials can impact student learning outcomes. Putra, Wuisan, & Listiani (2016) showed that using e-modules can improve learning outcomes.

The specifications of SOLE-based e-modules after going through a validation process by expert validators and field trial activities are as follows: (1) e-modules based on the SOLE approach, (2) e-modules allow children to gain learning experiences through stages, namely: Big questions, Collaboration, and Utilization of technology. (3) e-modules are developed concerning constructivist principles, (4) The formulation of indicators and learning objectives in e-modules is oriented towards problem-solving, (5) this e-module is developed in digital (electronic) form, (6) The requirements for using e-modules are laptops or smartphones that have browser applications and are connected to an internet connection. (7) The design of the e-module includes an introduction, core, and closing. (8) The e-module also has relevant and engaging images and videos. (9) e-modules can act as evaluation tools. Evaluate the cognitive, attitude, and psychomotor abilities of students.

Conclusions

The development of SOLE-based e-modules with the ADDIE development model is effective. This can be seen from students' learning outcomes at the N-Gain value of 0.7 in the moderate category. So, SOLE-based e-modules on grade X SMA/MA materials are.

Declaration statement

The authors reported no potential conflict of interest.

References

Adnan, A., Saenab, S., & Muis, A. 2017. Karakteristik Buku Ajar Elektrik Biologi Dasar Berbasis Konstruktivis (E-Book Biodas). Seminar Nasional LP2M UNM, Vol. 2(1): 1–5. http://eprints.unm.ac.id/id/eprint/31640

Adnan. 2015. Model Pembelajaran Biologi Konstruktivistik Berbasis TIK (MPBK BERBASIS TIK) untuk Siswa SMP. *Journal of EST*, 01(1), Juni 2015, 1-11. http://eprints.unm.ac.id/id/eprint/24314

Adnan, Arsad, B., & Ismail. (2018). Meningkatkan Aktivitas Belajar Mahasiswa dengan Pembelajaran Inkuiri Terbimbing. Prosiding Seminar Nasional Pendidikan Biologi, 1(1). Makassar: Universitas Negeri Makassar. http://eprints.unm.ac.id/id/eprint/24334

Agustanti, T. H. 2012. Implementasi metode inquiry untuk meningkatkan hasil belajar biologi. *Jurnal Pendidikan IPA Indonesia*, Vol. 1(1): 16–20. https://doi.org/10.15294/jpii.v1i1.2007

Agustini, A., & Adnan, A. (2022). Pengembangan Lembar Kerja Peserta Didik Elektronik Berbasis Keterampilan Proses Sains Materi Sel Kelas XI SMA. *Jurnal Biology Teaching and Learning*, 5(1), 7-19. http://eprints.unm.ac.id/id/eprint/25545

Almalki, S.M. (2024). Exploring Students' Perspectives on Implementing a Self-Organized Learning Environment; SOLE via Mobile Devices. *International Journal of Mobile and Blended Learning (IJMBL)*, 16(1), 1-19. https://10.4018/IJMBL.336473

Aryani, Ima. 2017. Efektivitas Penggunaan Modul Pembelajaran Pada Mata Kuliah Ekologi Hewan Materi Populasi Hewan Proceeding Biology Education Conference, 13(1), 42-47. http://repository.uksw.edu/handle/123456789/11801

A. Smith, 2022. "Problem Identification in the Modern Workplace," *Journal of Business Research*, vol. 45, no. 3, pp. 123-135. https://www.researchgate.net/publication/365233503_The_International_Journal_of_Business_and_Management_Research

Darmawati, D. 2019. Efektifitas Penggunaan Lembar Kerja Peserta Didik (LKPD) dalam Pendekatan Konstruktivis Untuk Meningkatkan Hasil Belajar Ekonomi Peserta Didik. Phinisi Integration Review, Vol. 2(2), 218. https://doi.org/10.26858/pir.v2i2.9993.

Delianti dan Julius. 2020. Efektivitas E-Modul Berbasis Project Based Learning pada Mata Kuliah Pemrograman Visual. Jurnal PTK, 3(2), 109-113. https://10.24036/jptk.v3i2.7523

Dharma, Surya. 2008. Penelitian Modul. Jakarta: Dirjen PMPTK Depdiknas. http://digilib.uin-suka.ac.id/id/eprint/27032

Fauziah, A., & Wulandari, S. S. (2022). Pengembangan E-Modul Berbasis Flipbook Untuk Pembelajaran Materi Ruang Lingkup Administrasi Kepegawaian. *Edukatif: Jurnal Ilmu Pendidikan*, vol. 4. No. 2. p-ISSN 2656-8063 e-ISSN 2656-8071. https://doi.org/10.31004/edukatif.v4i2.2363

Hasan, M. Iqbal. (2014). Pokok-Pokok Materi Metodelogi Penelitian dan Aplikasinya. Bogor: Ghalia Indonesia.

Hatimah. 2017. Pengertian Pendekatan, Strategi, Metode, Teknik, Taktik, dan Model. Bandung: Universitas Pendidikan Indonesia.

Haviz, M. 2016. Research and Development; Penelitian Di Bidang Kependidikan Yang Inovatif, Produktif Dan Bermakna. Ta'dib, Vol. 16 (1). https://doi.org/10.31958/jt.v16i1.235

Hendriana, H., & Sumarno, U. (2017). Penilaian Pembelajaran Matematika. Bandung: Refika Aditama.

Hobri. 2013. Metodologi Penelitian Pengembangan (Developmental Research) Aplikasi pada Penelitian Pendidikan Matematika. Jember. Pena Salsabila.

Hoppe, U., Joiner, R., Milrad, M., & Sharples, M. (2003). E-learning and m-learning: Conceptual definition and comparative analysis. SSRN: https://ssrn.com/abstract=4730569

Hovell, S., & Wright, D. (2018). Collaboration and Communication in SOLE: Enhancing Students Interaction and Teamwork. International Journal of Educational Research, 25(2), 89-102. https://doi.org/10.26803/ijlter.16.12.1

Imamah, N. 2012. Peningkatan hasil belajar IPA melalui pembelajaran kooperatif berbasis konstruktivisme dipadukan dengan video animasi materi sistem kehidupan tumbuhan. *Jurnal Pendidikan IPA Indonesia*, Vol. 1(1): 32–36. https://doi.org/10.15294/jpii.v1i1.2010

Johnson, D. W., & Johnson, R. T. (2017). Cooperative Learning and Problem Solving: The Role of Peer Interaction. *Journal of Educational Psychology*, 109 (5), 735-750. https://doi.org/10.5772/intechopen.81086

Johnson, L., Becker, S.A, Estrada, V., & Freeman, A. (2014). Horizon Report: 2014 Higher Education Edition. Austin, Texas: The New Media Consortium. SBN 978-0-9914828-5-6.

Kementrian Pendidikan dan Kebudayaan. 2018. Tips dan Trik Penyusunan E-Modul. Jakarta: Direktorat Jenderal Pendidikan Dasar dan Menengah.

Martin, F., & Bolliger, D. U. (2018). Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment. Online Learning, 22(1), 205–222. https://doi.org/10.1787/20769679

Marwah, A. S., Adnan, A., & Mu'nisa, A. (2019). Uji Validitas Pengembangan KIT Alat Peraga untuk Siswa SMA Pada Konsep Sistem Respirasi.

Mawaddah, S., & Anisah, H. (2015). Kemampuan pemecahan masalah matematis siswa pada pembelajaran matematika dengan menggunakan model pembelajaran generatif (generative learning) di SMP. *EDU-MAT: Jurnal Pendidikan Matematika*,3(2). http://dx.doi.org/10.20527/edumat.v3i2.644

Mitra, Sugata. 2015. Self-organized Learning Environment (SOLE) Toolkit. Inggris: TED.

Mitra, S., & Dangwal, R. (2017). Efectiveness of Self-Organized Learning Environment (SOLE) in Developing Critical Thinking Skills among Students. Journal of Educational Technology, 14(3), 123-136. https://doi.org/10.47191/ijsshr/v6-i8-92

Nurchaili. 2020. Rencana Pelaksanaan Pembelajaran Digital Perangkat Pembelajaran Guru 4.4. Jurnal Guru Inovatif, 1(1), 12-23. ISSN : 2716-4489 Volume 1, Nomor 1.

Oktiana, Gian Dwi. 2015. Pengembangan Media Pembelajaran Berbasis Android dalam Bentuk Buku Saku Digital untuk Mata Pelajaran Akuntansi Kompetensi Dasar Membuat Ikhtisar Akuntansi Perusahaan Jasa di Kelas XI MAN 1 Yogyakarta, Universitas Negeri Yogyakarta. http://eprints.uny.ac.id/id/eprint/21128

Pane, J. F., Steiner, E. D., Baird M. D., & Hamilton, L. S. (2015). Continued Progress: Promising Evidence on Personalized Learning. Santa Monica, CA: RAND Corporation. https://doi.org/10.7249/RR1365

Permatasari, Elma Ayu, Imam Mudakir dan Kamalia Fikri. 2017. Pengembangan E-Modul Berbasis Adobe Flash Pada Pokok Bahasan Sistem Reproduksi untuk Kelas IX MIPA SMA. *Jurnal Saintifikas*, 19(1), 67-65. http://repository.unej.ac.id/handle/123456789/104453

Putra, K. K. W., Wuisan, P., & Listiani, T. 2016. Penggunaan Lembar Kerja Siswa (LKS) (L untuk Menigkatkan Hasil Belajar Kognitif Materi Bangun Ruang Sisi Lengkung pada Peserta Didik Kelas IX-B SMP XYZ Sentani Papua. Polyglot: Journal of Language, Literature, Cullture, and Education, 12(2), 42–59. https://doi.org/10.19166/pji.v12i2.364

Risma Ayu Nur Rahma, Mumun Nurmilawati, Poppy Rahmatika Primandiri, (2021). Profil Keterampilan Pemecahan Masalah Peserta Didik Sekolah Menengah Atas Berdasarkan Nitko dan Brookhart Pada Materi Ekosistem. *Jurnal INKESJAR*. Universitas Nusantara PGRI Kediri. https://doi.org/10.29407/seinkesjar.v1i1.1282

Romika & Amalia, Y. (2014). Analisis Kemampuan Pemecahan Masalah Matematika Siswa pada Materi Bangun Ruang Sisi Datar dengan Teori Van Hiele. Bina Gogik, I(2), 17-31. https://doi.org/10.22460/jpmi.v2i5.p271-282

Ruseffendi, E. (2006). Pengantar Kepada Membantu Guru Mengembangkan Kompetensinya dalam Pengajaran Matematika untuk Meningkatkan CBSA. Bandung: Tarsito.

Sani, Ridwan Abdullah. 2019. Strategi Belajar Mengajar. Depok: PT. Raja Grafindo.

Savinainen, A., & Scott, P. 2002. The force concept inventory: A tool for monitoring student learning. Physics Education, Vol. 37(1): 45–52. doi.org/10.1088/0031-9120/37/1/306.

Schoenfeld, A. H. (2019). Learning to Think Mathematically: Problem Solving, Metacognition, and Sense Making in Mathematics. Journal for Research in Mathematics Education, 50(4), 397-416. https://doi.org/10.1177/002205741619600202

Sirate, Sitti Fatimah & Ramadhana, Risky. 2017. Pengembangan Modul Pembelajaran Berbasis Keterampilan Literasi. Inspiratif Pendidikan, 6(2), 316-335. https://doi.org/10.24252/ip.v6i2.5763

Smith, A. (2019). The role of goal-setting in problem-solving strategies among students. Journal of Educational Psychology, 45(2), 123-135. https://doi.org/10.31838/ecb/2023.12.si6.588

Suherman, E. (2003). Strategi Pembelajaran Matematika Kontemporer. Bandung: JICA-Universitas Pendidikan Indonesia (UPI).

Sumantri, M. S. 2015. Strategi Pembelajaran: Teori dan Praktik di Tingkat Pendidikan Dasar. Jakarta. PT. Raja Grafindo Persada.

Wati, Ni Nyoman Kurnia. 2021. Implementasi Model Pembelajaran Self Organized Learning Environments Berbasis Tri Kaya Parisudha untuk Meningkatkan Hasil Belajar Mahasiswa. Jurnal Pendidikan Dasar, 2(1), 10-16. DOI: https://doi.org/10.55115/edukasi.v2i1.1387

Weisblat, G.Z., & McClellan, J. (2017). The Distruptive Innovation of Self-Organized Learning Environements. Childhood Education, 93(4), 309-315. https://doi.org/10.1080/00094056.2017.1343584

West, D. M. (2013). Digital Schools: How Technology Can Transform Education. Washington, D.C: Brooking Institution Press.

Widya, N. S., & Ahmad, M. (2021). Pengembangan E-Modul Berbasis Flipbook Maker pada Mata Pelajaran Teknologi Perkantoran. Edukatif: Jurnal Ilmu Pendidikan, 3(6), 3728–3739. DOI: https://doi.org/10.31004/edukatif.v3i6.1265

Yelianti, U., Muswita, M., & Sanjaya, M. E. 2018. Development of Electronic Learning Media Based 3D Pageflip on Subject Matter of Photosynthetis in Plant Physiology Course. Biodik, Vol. 4(2): 121–134. https://doi.org/10.22437/bio.v4i2.5858