THE ANALYSIS PROBLEM BASED LEARNING USE GOOGLE SITES APPLICATION FOR INCREASING ABILITY OF NUMERACY ON GEN Z COLLAGE STUDENTS

Labiibah Shafiyyah Yaasmin[1], Fivi Setya Lestari[2], Irma Setiawati Tri Rezeki[3]
[1,2,3]Universitas Negeri Surabaya
Alamat e-mail : [1]labiibah.23022@mhs.unesa.ac.id , [2]fivi.23036@mhs.unesa.ac.id, [3]irma.23012@mhs.unesa.ac.id

ABSTRACT

This research analyzes the application of Problem Based Learning (PBL) learning model assisted by Google Sites to improve the numeracy skills of Gen-Z collage students. This generation is known to be very familiar with technology, so the integration of digital media in learning is considered to increase their engagement and understanding. This research uses descriptive qualitative methods, data collection techniques carried out in this study are observation, interviews, questionnaires and documentation which are presented descriptively. The results showed a significant increase in collage students' numeracy skills after participating in PBL assisted by Google Sites. The application of PBL is proven to be effective for training students in problem solving and critical thinking, because it involves complex analytical processes, especially when the problems given relate to numerical data. In the context of generation Z, the utilization of Google Sites supports the enhancement of these skills, as they can easily access, collaborate and document the results of their analysis in one intuitive platform. Student responses also indicated that the use of this web-based technology can help them in understanding numeracy concepts in a deeper and more relevant way. This study concludes that the application of Problem-Based Learning assisted by Google Sites has a positive impact on the numeracy skills of Generation Z collage students. This study concludes that the application of Problem-Based Learning assisted by Google Sites has a positive impact on the numeracy skills of generation Z collage students. This approach improves students' problem-solving ability, collaboration, motivation, and numeracy skills.

Keywords: Problem Based Learning, Numeracy, Google Sites, Collage Students Gen-Z

ABSTRAK

Penelitian ini menyelidiki penerapan model pembelajaran Problem Based Learning (PBL) yang memanfaatkan Google Sites untuk meningkatkan kemampuan numerasi mahasiswa Gen-Z. Generasi ini sangat akrab dengan teknologi, sehingga penggunaan media digital dalam pendidikan dianggap dapat meningkatkan keterlibatan dan pemahaman siswa. Metode kualitatif deskriptif digunakan dalam

penelitian ini dengan metode pengumpulan data yang digunakan termasuk observasi, wawancara, angket, dan dokumentasi yang disajikan secara deskriptif. Hasil penelitian menunjukkan peningkatan signifikan pada kemampuan numerasi mahasiswa setelah mengikuti PBL berbantuan Google Sites. Penerapan PBL terbukti efektif untuk melatih mahasiswa dalam memecahkan masalah dan berpikir kritis, karena melibatkan proses analitis yang kompleks, khususnya ketika masalah yang diberikan berhubungan dengan data numerik. Dalam konteks generasi Z, pemanfaatan Google Sites mendukung peningkatan keterampilan ini, karena mereka dapat dengan mudah mengakses, berkolaborasi, dan mendokumentasikan hasil analisis mereka dalam satu platform yang intuitif. Respon mahasiswa juga menunjukkan bahwa penggunaan teknologi berbasis web ini dapat membantu mereka dalam memahami konsep numerasi secara lebih mendalam dan relevan. Penelitian ini menyimpulkan penerapan Problem-Based Learning berbantuan Google Sites memberikan dampak positif terhadap kemampuan numerasi mahasiswa generasi Z. Pendekatan ini meningkatkan kemampuan pemecahan masalah, kolaborasi, motivasi, dan keterampilan numerasi mahasiswa.

Kata Kunci: Problem Based Learning; Google Sites; Mahasiswa Gen-Z

A. Introduction

Generation Z or Gen Z is a generation that grew up in the digital age. Born between 1995 and 2010, they are the first truly “digital native” generation, having grown up with unlimited access to information and communication technology. They grew up with easy access to digital technologies such as the internet, smartphones, and social media (Daddy Setyawan et al., 2023). Because of this, Gen Z collage students have a different perspective and way of life than previous generations. They are more likely to rely on digital technology in their daily lives, including in the learning and academic process (Pratiwi et al., 2024). Their unique characteristics, which include familiarity with technology, preference for visual and concise communication, and multi-tasking ability, bring new challenges and opportunities in education (Chairunisa et al., 2024). However, this is sometimes at odds with traditional teaching methods that rely more on lectures and textbooks. As a result, many Gen Z collage students feel disconnected from the learning material, or even bored and uninterested (Ewurum et al., 2024).

On the other hand, their ability to access information quickly and widely can also be a challenge, as not all information on the internet is accurate

or useful (Kassymova et al., 2023). In facing these challenges in the era of globalization and the rapid development of science and technology, human resources of good quality are needed. Education is one of the efforts to improve the ability, quality and potential of each individual (Shafi et al., 2024). In other words, the continuous improvement and development of human resources is very important, especially in this era of globalization. The need for high quality human resources, able to develop their potential and be able to solve problems in the future (Dalton & Gerdes, 2021). However, even though they tend to be more digitally literate, collage students' numeracy skills still need to be improved to meet the needs of an increasingly data-driven era (Kassam & Subramanian, 2024).

Education has the capacity to improve human resource competencies to respond to the challenges of the 21st century. Competencies needed for the 21st century include life skills and basic abilities, especially regarding technological advances, media, and encouraging critical and innovative thinking processes (Fitriyah et al., 2021). One way that can facilitate efforts in realizing this is to foster literacy and numeracy skills among collage students, including collage students (Irfawandi & Nur, 2023). In addition to critical and innovative thinking, people must also master six basic literacies in order to increase competitiveness in facing the challenges of the 21st century, the six basic literacies include: (1) Reading and Writing Literacy, (2) Numeracy Literacy, (3) Science Literacy, (4) Digital Literacy, (5) Financial Literacy, and (6) Cultural and Civic Literacy (Anderha & Maskar, 2021).

One of the literacies that is closely related to daily life is numeracy. Numeracy includes understanding and proficiency, including (a) using various numbers and numerical symbols related to basic mathematical concepts for practical problem solving in a variety of daily life contexts, (b) analyzing information presented in various forms such as graphs, tables, charts and so on, (c) utilizing the analysis to predict and make decisions (Maralova, 2024). The definition of numeracy quoted from the Assessment and Learning Center of the Ministry of Education and Culture 2020 states that the ability to think using mathematical concepts, procedures, facts and tools to solve

everyday problems in various contexts (Ayuningtyas & Sukriyah, 2020). So, it can be said that numeracy and mathematics are two things that cannot be separated because they are two disciplines that are interconnected to facilitate solving problems faced daily, for example when shopping, planning house construction, everything requires numeracy (Musyrifah et al., 2022).

In numeracy learning activities, a learning model is also needed to achieve learning objectives. Problem Based Learning (PBL) is a learning model that focuses on solving real problems as a way to learn new concepts (Praditha et al., 2024). In this learning model, collage students are faced with real problems that they must solve, allowing them to develop their analytical and numeracy skills independently (Fathurrohman & Putra, 2024). This learning model is highly relevant in the context of higher education, especially for Gen-Z collage students who are known for their high technological skills and more interactive approach to learning. Numeracy skills, which include understanding and using mathematical concepts in everyday life, are becoming increasingly important in this digital era. Gen-Z collage students, who have grown up in a technological environment, have great potential to develop these skills through innovative learning methods (Ekaputri & Veni, 2022).

In this context, Google Sites, as a platform that enables simple and collaborative website creation, can be an effective tool to support PBL implementation (Mustika et al., 2024a). By utilizing a platform such as Google Sites, PBL can be effectively implemented to improve collage students' numeracy skills Google Sites can be used as a learning platform to support the PBL method, as it allows collage students to access learning resources, share analysis results, and collaborate with classmates (Jeyarajaguru, 2023). Thus, the implementation of PBL assisted by Google Sites is expected to be an effective solution to improve the numeracy skills of generation Z collage students (Fadilah et al., 2023). Several previous studies have shown that PBL can improve critical thinking skills and numeracy skills. The first study showed that PBL encourages active collage student engagement by presenting real-world problems, improving problem-solving and critical

thinking skills, and numeracy skills through collaborative analysis and solution development (Asri et al., 2024). Then, this is in line with further research on the use of PBL-based media which states that the use of web-based platforms such as Google Sites can increase collage student engagement and motivation to learn. This platform allows collage students to collaborate, access materials and share their results, which supports collaborative and active learning (Wirdatul Izzah et al., 2024). The last research is related to the effect of problem-based learning on numeracy skills which states that problem-based learning, which involves problem solving and data analysis, has the potential to improve collage students' understanding of numeracy concepts. This research is relevant to show that PBL can be an effective strategy to improve collage students' numeracy skills, especially for the tech-savvy Gen Z collage students (Pudjastuti et al., 2024).

PBL can fulfill Biggs' suggestion in Downing (2010) that the purpose of education in higher education is to guide students to be able to integrate their knowledge, skills, and existing contexts and use them in solving problems (Rihui Wu, 2023). Students must be able to realize planning, monitoring, and regulating their own knowledge, learning, and thinking or termed metacognitive awareness. PBL basically requires different ways of using knowledge to solve problems. This is referred to as functional knowledge which includes metacognitive processes (Shamdas et al., 2024). Therefore, theoretically reinforced by the results of Downing's research (2010), Problem Based Learning will cause faster metacognition development in students than non-PBL learning. According to Phang & Seth (2011), there are certain metacognitive skills in the steps of problem solving that really contribute to helping students solve problems (Safitri et al., 2024).

In a rapidly evolving era, numeracy has become an essential skill for collage students. Numeracy skills not only include basic abilities related to arithmetic or numerical understanding, but also require the capacity for critical thinking, data analysis, and decision formulation based on quantitative information (Adelia et al., 2024). Numeracy is particularly relevant to support collage students to adapt to an increasingly data-driven work

environment that requires deep numerical understanding. Gen Z collage students exhibit different characteristics compared to their predecessors, especially regarding their methods of information assimilation and engagement in educational contexts (Sobkow et al., 2024). Gen Z collage students are inherently familiar with technological advancements from a young age, enjoy instant access to vast information sources, and show a preference for interactive, digitally-mediated pedagogical approaches (Kumar & Mamgain, 2023). However, despite generation Z's fluency in technology, generation Z does not always possess strong numerical abilities, which is due to the dominance of digital technology in daily life that focuses more on visual and verbal information rather than numerical analytic skills (Susanti et al., 2024).

This research has a strong sense of urgency, as it seeks to address the imperative for improved numeracy skills in the context of the digital age while simultaneously aligning pedagogical strategies with the distinctive traits of the tech-savvy Generation Z through the implementation of Problem-Based Learning facilitated by Google Sites. In addition, this research has the potential to inform the creation of more innovative educational policies that prioritize the development of numeracy skills deemed critical to future collage student success. Therefore, this study titled “Analysis of the Application of Problem Based Learning Assisted by Google Sites to Foster Numeracy Skills of Gen-Z Collage students” aims to substantively contribute to the evolution of numerical instruction that is interactive and aligned with the needs of the digital generation.

B. Method

This research uses descriptive qualitative methods. Descriptive qualitative research is a type of research that emphasizes notes and is accompanied by detailed, complete sentence descriptions, and describes situations based on existing facts to support data presentation (Widad et al., 2021). This research aims to provide an in-depth description of the application of the PBL method assisted by Google Sites in fostering the numeracy skills of generation Z collage students. The location of this research is at Universitas

Muhammadiyah Surabaya, the research subjects used are 5th semester collage students totaling 20 collage students.

Data collection in this study used observation techniques, interviews, distribution of numeracy questionnaires and documentation. Observations were made to see how collage students interact and collaborate in the process of problem-based learning with the help of Google Sites. Interviews were conducted with lecturers to understand their views on the effectiveness of this method in developing numeracy skills. Questionnaires containing numeracy related questions were distributed to all 5th semester collage students to see their understanding of numeracy. Documentation data was collected in the form of assignments and projects done by collage students, RPS used, and photos during learning activities.

The collected data were analyzed using descriptive analysis techniques. This process involves collecting, grouping, and interpreting data qualitatively to get an in-depth picture of the application of PBL assisted by Google Sites.

C. Result and Discussion

Result

The findings of this study can be seen in Table 1.

Table 1. Research Results

No.	Research Aspects	Findings
1	Students' understanding of numeracy	Students understand numeracy concepts better after using Google Sites in PBL.
2	Level of student engagement	Students feel more interested and motivated in solving numeracy-based problems.
3	Impressions of Google Sites as a medium	Google Sites media is considered easy to use and facilitates collaborative problem-based learning.
4	Student participation in discussion	The increased participation of students can be seen from their activeness in group discussions and presentations .
5	Problem-based task completion	Students are able to complete numeracy tasks in a more structured and creative manner.
6	Use of technology in learning	Students more often utilize technology to find information and develop problem

		solutions.
7	Perception of PBL model	85% of students agreed that PBL helped them understand numeracy in a relevant and interesting way.
8	Satisfaction with Google Sites media	90% of students are satisfied with Google Sites because its features support interactive learning.
9	Improved numeracy skills	80% of students feel that their numeracy skills have improved after participating in this lesson.

Based on table 1. The results showed that students can understand well learning using the PBL (Problem Based Learning) model after using Google Sites, because in learning activities students are more interested and motivated in solving numeracy problems after integrating Google Sites media in learning activities, students are also actively involved in every stage of solving numeracy problems. Students seem easier to understand the concept of numeracy and more skilled in performing mathematical calculations. PBL integrated with Google Sites facilitates them in accessing various additional resources such as videos, graphs, and simulations, which provide a deeper understanding of numeracy. Google Sites as a learning media is considered effective because it is easy to use and supports interactive learning, according to the needs of Gen-Z students who are familiar with technology.

This can also be seen from the active involvement of students in student participation in discussions with their peers, students often discuss with group friends about the steps of solving problems, ask questions to lecturers, and utilize various features on Google Sites to discuss material. In completing assignments, students are able to complete numeracy tasks in a more structured and creative manner. Analysis of the students' assignments showed a significant improvement in numeracy skills. Students became more accurate in performing calculations and more able to analyze and present numerical data in the context of real problems. Based on the lecturer's reflection, students are more critical in assessing the results of the numerical analysis they make and are

able to explain the process they do in solving numerical problems.

The PBL model is very helpful for students in solving numeracy problems, this can be seen from the questionnaire results which state that 85% of students agree that PBL helps them understand numeracy in a relevant and interesting way. This can also be seen from the student satisfaction questionnaire which states that 90% of students are satisfied with Google Sites because its features support interactive learning. After applying learning by using the Problem Based Learning model assisted by Google Sites can improve students' numeracy skills, so that students not only know the basic concepts of numeracy, but students are able to solve numeracy learning problems more logically.

Discusission

Problem-Based Learning (PBL) is a learning approach that focuses on providing real problems as a stimulus for learning (Nur Ramadhanty & Muslihin, 2024). The application of PBL has proven to be effective in training collage students in problem solving and critical thinking, as it involves complex analytical processes, especially when the problems are related to numerical data. In the context of Generation Z, the utilization of Google Sites supports the enhancement of these skills, as they can easily access, collaborate and document the results of their analysis in one intuitive platform (Alifatun Ni'mah et al., 2024). Google Sites, as a web-based platform, also allows collage students to access materials from various devices, supporting the flexibility they need in their learning process (Aisyah et al., 2023).

The implementation of PBL assisted by Google Sites facilitates the collaboration of generation Z collage students who are generally accustomed to the use of technology in their daily lives (Podik, 2017). Google Sites allows collage students to access shared tasks, share analysis results, and provide direct feedback to each other. This engagement contributes to strengthening numeracy skills as collage students have the opportunity to correct and improve the accuracy of their calculations based on peer feedback (Vinh, 2020). Collaboration in PBL structured with the help of technology is in line with previous research which states that problem-based methods can improve

collaboration competencies and critical thinking skills in processing numerical data (Shinta et al., 2024).

Generation Z collage students tend to be more interested in interactive and technology-based learning methods (Annuš et al., 2023). Through the integration of PBL and Google Sites, materials are presented digitally and easily accessible, providing a more dynamic and engaging learning experience for collage students. This motivation and active participation is very important in the numeracy learning process, as they are more likely to do independent exploration of numerical problems when they feel interested and challenged. This result is in line with studies showing that the use of technology-based platforms in learning can increase collage student engagement and motivation (García-López et al., 2023).

This improvement in numeracy skills shows that the application of PBL assisted by Google Sites is able to provide contextual and meaningful numeracy learning for Generation Z collage students (Hafizh et al., 2024). PBL places collage students as active problem solvers, while Google Sites supports the presentation of material in a systematic and accessible way so that they can learn more deeply and independently(Da Silva et al., 2024). Numeracy, as an analytical skill, can be improved by integrating technology as collage students have more opportunities to practice calculations, data interpretation and problem solving. These findings support the importance of technology integration in numeracy learning to address the needs of generation Z who have a preference for interactive digital learning (Mustika et al., 2024).

E. Conclusion

The application of Problem-Based Learning assisted by Google Sites has a positive impact on the numeracy skills of Generation Z collage students. This approach improves students' problem-solving ability, collaboration, motivation, and numeracy skills. This research highlights the importance of adapting learning methods to the characteristics of digital natives, where the use of technology is a key element in creating a conducive learning environment that suits their needs. The application of PBL assisted by Google Sites can be an effective learning model in improving numeracy skills in higher education,

especially in curricula that require a problem-based approach. Lecturers can be trained to use Google Sites as a learning medium, so that they can optimize the implementation of PBL with digital platforms that support collaboration and open access. Educational institutions need to consider the integration of appropriate technology to support learning according to the needs of Generation Z, especially in the field of numeracy.

This study has limitations, including the limited scope and relatively short duration of implementation. For further research, it is recommended that the study be conducted over a longer period of time and cover a wider sample so that the results obtained are more generalizable. In addition, further studies can examine the effectiveness of other technology-based PBL in improving numeracy competencies in various disciplines.

DAFTAR PUSTAKA

Adelia, V., Putri, R. I. I., & Zulkardi. (2024). A systematic literature review: how do we support students to become numerate? International Journal of Evaluation and Research in Education, 13(3), 1816–1824. https://doi.org/10.11591/IJERE.V13I3.26849

Aisyah, St., Syarifuddin, S., & Triana, Y. (2023). Development of learning media using google sites to improve students' abilities. Socius : Jurnal Pendidikan Dan Pembelajaran Ilmu Pengetahuan Sosial, 12(1). https://doi.org/10.20527/JS.V12I1.16115

Alifatun Ni'mah, Eka Syovi Arianti, Suyanto Suyanto, Shidqi Hamdi Pratama Putera, & Ahmad Nashrudin. (2024). Problem-Based Learning (PBL) Methods Within An Independent Curriculum(A Literature Review). Deleted Journal, 2(4), 165–174. https://doi.org/10.61132/SINTAKSIS.V2I4.859

Anderha, R. R., & Maskar, S. (2021). PENGARUH KEMAMPUAN NUMERASI DALAM MENYELESAIKAN MASALAH MATEMATIKA TERHADAP PRESTASI BELAJAR MAHASISWA PENDIDIKAN MATEMATIKA. Jurnal Ilmiah Matematika Realistik (JI-MR, 2(1).

Annuš, N., Takáč, O., Štempeľová, I., & Dancsa, D. (2023). Z and alpha generation teaching methods: digitalization of learning material. International Journal of Advanced Natural Sciences and Engineering Researches, 7(4), 224–229. https://doi.org/10.59287/IJANSER.704

Asri, I. H., Jampel, I. N., Putu Arnyana, I. B., Suastra, I. W., & Nitiasih, P. K. (2024). Profile of Problem Based Learning (PBL) Model in Improving Students' Problem Solving and Critical

Thinking Ability. KnE Social Sciences. https://doi.org/10.18502/KSS.V9I2.14898

Ayuningtyas, N., & Sukriyah, D. (2020). Analisis pengetahuan numerasi mahasiswa matematika calon guru. Delta-Pi: Jurnal Matematika Dan Pendidikan Matematika, 9(2), 237–247.

Chairunisa, H., Sahara, S., Karimah, M., Lubis, W. M., Gultom, D. V., & Limayasi, C. N. (2024). Strategi Komunikasi Pendidikan untuk Meningkatkan Kualitas Pendidikan di Era Gen Z. El-Mujtama: Jurnal Pengabdian Masyarakat , 4(5). https://doi.org/10.47467/elmujtama.v4i5.3146

Da Silva, J. J. G., De Oliveira, M. L., & Da Silva, W. (2024). Aprendizagem Baseada em Projetos e Problemas (ABP): Uma Abordagem para o Desenvolvimento de Competências no Século XXI. RCMOS, 1(1). https://doi.org/10.51473/RCMOS.V1I1.2024.573

Daddy Setyawan, R., Hijran, M., & Rozi. (2023). Implementasi Digital citizenship untuk Kalangan Gen Z Mahasiswa Pada Mata Kuliah Pendidikan Kewarganegaraan. Jurnal Dimensi Pendidikan Dan Pembelajaran, 11(2), 270–279. http://journal.umpo.ac.id/index.php/dimensi/index

Dalton, T., & Gerdes, J. (2021). Creating an Immersive and Active Educational Experience for Generation Z: Adapting the Introductory Information Technology Course for Digital Natives. SIGITE 2021 - Proceedings of the 22nd Annual Conference on Information Technology Education, 59–60. https://doi.org/10.1145/3450329.3478316

Ekaputri, Y. N., & Veni, V. (2022). Pencapaian kompetensi literasi numerasi siswa dengan model problem based learning. Jurnal Kepemimpinan Dan Pengurusan Sekolah, 7(3), 394–399. https://doi.org/10.34125/KP.V7I3.853

Ewurum, N., Obi-Aso, N., & Emoh, F. (2024). Predictors of Student Apathy amongst Generation Z. Journal of African Real Estate Research, 8(2), 1–20. https://doi.org/10.15641/JARER.V8I2.1366

Fadilah, A. N., Sutirna, S., & Haerudin, H. (2023). effect of problem-based learning model assisted by Google Site on the students' mathematical concept understanding ability. Union: Jurnal Ilmiah Pendidikan Matematika, 11(2), 184–190. https://doi.org/10.30738/UNION.V11I2.13273

Fathurrohman, F. L., & Putra, H. D. (2024). Problem-based learning with scaffolding to improve numeracy literacy of junior high school students. Mapan, 12(1), 132–146. https://doi.org/10.24252/MAPAN.2024V12N1A9

Fitriyah, I. J., Affriyenni, Y., & Hamimi, E. (2021). Efektifitas Model Pembelajaran Inkuiri Terbimbing untuk Meningkatkan Kemampuan

Bepikir Kritis Mahasiswa. Biormatika: Jurnal Ilmiah Fakultas Keguruan Dan Ilmu Pendidikan, 7(2), 122–129. http://ejournal.unsub.ac.id/index.php/FKIP

García-López, I. M., Acosta-Gonzaga, E., & Ruiz-Ledesma, E. F. (2023). Investigating the Impact of Gamification on Student Motivation, Engagement, and Performance. Neveléstudomány, 13(8). https://doi.org/10.3390/EDUCSCI13080813

Hafizh, M., M, A. H., Dafrizal, D., & Edni, A. P. (2024). The Importance of Technology-Based Learning Design to Increase Student Involvement. Journal of Islamic Education, 3(1), 1–9. https://doi.org/10.58485/JIE.V3I1.212

Irfawandi, S., & Nur, M. A. (2023). Kemampuan Literasi Numerasi Matematika melalui Penerapan Model Pembelajaran Problem Based Learning (PBL). Proximal, 7(1), 100–107. https://doi.org/10.30605/PROXIMAL.V7I1.3159

Jeyarajaguru, K. S. (2023). Effective Creation and Usage of Simplified Virtual Curation Lab Using Google Sites: Implementation for Principles of Biochemistry Laboratory Course. Journal of Educators Online, 20(1). https://doi.org/10.9743/JEO.2023.20.1.6

Kassam, S. M., & Subramanian, S. (2024). Enhancing clinical nursing education for Gen Z students through brain-based learning. Journal of Nursing Education and Practice, 14(7), 42. https://doi.org/10.5430/JNEP.V14N7P42

Kassymova, G., Abutalip, D., Okenova, B., Yesbossyn, M., & Dossayeva, S. (2023). Importance of dialogue in psychological counselling to avoid stress anxiety of Generation Z. Қазақ Мемлекеттік Сәулет-Құрылыс Академиясының Хабаршысы, 88(2), 270–283. https://doi.org/10.51488/1680-080X/2023.2-27

Kumar, M., & Mamgain, P. (2023). Generation-Z Student Video-Based Learning Pedagogy Preference and Teaching Challenges. Redefining Virtual Teaching Learning Pedagogy, 155–167. https://doi.org/10.1002/9781119867647.CH9

Maralova, B. (2024). Development and Cultivation of Mathematical Literacy: A Pedagogical Perspective. Eurasian Science Review An International Peer-Reviewed Multidisciplinary Journal, 2(2), 94–99. https://doi.org/10.63034/ESR-55

Mustika, G. S., Astuti, D., Aprilia, A., & Yuliandari, Y. (2024a). Implementation of the Problem Based Learning Model Assisted with Google Sites to Improve Concept Understanding and Reduce Students' Mathematical Anxiety. SAR Journal, 99–112. https://doi.org/10.18421/SAR72-06

Mustika, G. S., Astuti, D., Aprilia, A., & Yuliandari, Y. (2024b). Implementation of the Problem Based Learning Model Assisted with Google Sites to Improve Concept Understanding and Reduce Students' Mathematical Anxiety. SAR Journal, 99–112. https://doi.org/10.18421/SAR72-06

Musyrifah, E., Dwirahayu, G., & Satriawati, G. (2022). PENGEMBANGAN BAHAN AJAR MATEMATIKA BAGI GURU MI DALAM UPAYA MENDUKUNG KETERAMPILAN MENGAJAR SERTA PENINGKATAN LITERASI NUMERASI. FIBONACCI: Jurnal Pendidikan Matematika Dan Matematika, 8(1), 61. https://doi.org/10.24853/fbc.8.1.61-72

Nur Ramadhanty, U. U., & Muslihin, H. Y. (2024). Problem Based Learning Sebagai Strategi Penting untuk Mengajar Ilmu Pengetahuan Alam di Kelas V (Materi IPA Kelas V Sekolah Dasar). Journal on Education, 6(4), 21677–21686. https://doi.org/10.31004/JOE.V6I4.6104

Podik, I. I. (2017). The implementation of google services for teaching generation z students. Information Technologies and Learning Tools, 60(4), 264–274. https://doi.org/10.33407/ITLT.V60I4.1770

Praditha, P. A. K., Nitiasih, P. K., Budasi, I. G., & Trika Adi Ana, I. K. (2024). Decoding Appropriate English for Flight Attendant Learning Materials for Gen Z Students: Insights and Preferences. Jurnal Pendidikan Bahasa Inggris Undiksha, 12(1), 87–95. https://doi.org/10.23887/JPBI.V12I1.79277

Pratiwi, S. A., Nofikusumawati Peni, N. R., & Prabowo, A. (2024). Study on literacy numeracy towards students' logic mathematics: a literature review. Journal Numeracy, 11(1), 58–69. https://doi.org/10.46244/NUMERACY.V11I1.2601

Pudjastuti, K. T., Agustika, G. N. S., & Wiyasa, I. K. N. (2024). Improving the Numeracy Skills Elementary School Students by Problem Based Learning Model. Mimbar PGSD Undiksha, 12(1), 57–63. https://doi.org/10.23887/JJPGSD.V12I1.69233

Safitri, M., Suryani, N., Asrowi, & Sukarmin. (2024). Validity of Metacognitive Awareness Inventory as A Measuring Tool for Metacognitive Ability in Mathematics Problem Solving. Journal of Law and Sustainable Development, 12(1), e2246. https://doi.org/10.55908/SDGS.V12I1.2246

Shafi, A. N., Hilalludin, H., & Haironi, A. (2024). Pendidikan dan Pranata Sosial: Membentuk Masyarakat Masa Depan. Jurnal Nakula, 2(5), 157–164. https://doi.org/10.61132/NAKULA.V2I5.1038

Shamdas, G. B. N., Laenggeng, Abd. H., Ashari, A., & Fardha, R. (2024). The Influence of the Problem-Based

Learning Model on Metacognitive Knowledge and Science Learning Outcomes. JPPIPA (Jurnal Penelitian Pendidikan IPA), 10(3), 1383–1395. https://doi.org/10.29303/JPPIPA.V10I3.5444

Shinta, S., Azhar, Muh., Partino, P., & Suud, F. M. (2024). The Role of Technological Media in the Character Building Education Process for Generation Z: A Literature Review. Jurnal Penelitian Pendidikan IPA (JPPIPA), 10(6), 284–291. https://doi.org/10.29303/JPPIPA.V10I6.7449

Sobkow, A., Jurewicz, K., Zaleskiewicz, T., Pronczuk, A., Mondal, S., Badecka, J., Bartkiewicz, U., Bobowiec, W., Bochniak, M., Chwalibog, K., Czech, L., Daniluk-Malcherek, J., Domanska, M., Dziwusz, N., Falborska, P., Gazda, Z., Gruszczynski, L., Grzejdziak, S., Kalus, A., … Traczyk, J. (2024). The role of numeracy in judgment and decision making: the replication of eleven effects using several numeracy scales. https://doi.org/10.31234/OSF.IO/8S237

Susanti, R., Saha, S., & Mallya, D. (2024). Exploring Pedagogical Approaches for Teaching English to Generation Z: A Bibliometric Analysis. Asian Journal of Education and Social Studies, 50(5), 442–451. https://doi.org/10.9734/AJESS/2024/V50I51374

Rihui Wu (2023). The Application of PBL Mode in General Education Courses in Universities. International Journal of New Developments in Education, 5(11). https://doi.org/10.25236/IJNDE.2023.051109

Vinh, T. Q. (2020). Understanding generation z students to meet target's learning preference in the international integration age. https://doi.org/10.15625/VAP.2020.00113

Widad, F., Ibrahim, M., Thamrin, M., & Kasiyun, S. (2021). Implementasi Penggunaan Media Pembelajaran Berbasis Video Melalui Daring Di Sekolah Dasar. EDUKATIF : JURNAL ILMU PENDIDIKAN, 3(5), 3263–3268. https://doi.org/10.31004/edukatif.v3i5.1217

Wirdatul Izzah, D., Yeti Nuryantini, A., & Pitriana, P. (2024). Development of Web-based Online Learning Media Using Google Sites to Increase Student Motivation and Learning Outcomes on Elasticity Material. KnE Social Sciences. https://doi.org/10.18502/KSS.V9I8.15628