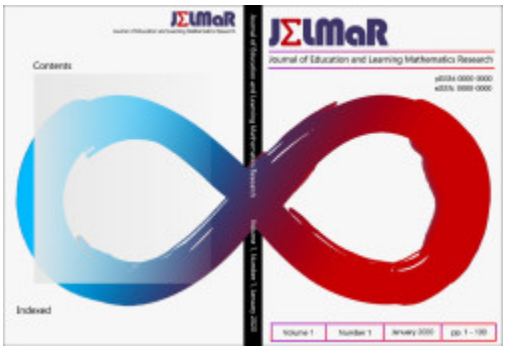

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# Artificial Intelligence (AI)-Assisted Hybrid Learning For Improved Learning Outcomes On Digital Literacy Problems

**[1]Hersiyati Palayukan, [2]Septi Triyani, [3]Inelsi Palengka**
[1, 3]Toraja Indonesian Christian University, [2]Sebelas Maret University
*Email: hersiyati@ukitoraja.ac.id*

***Abstract**: Hybrid learning, also known as blended learning, is a learning approach that combines traditional face-to-face learning with online learning. This research uses a qualitative research type with a descriptive approach. the research subjects were taken students of the education study program at the Indonesian Christian University of Toraja in the fourth semester. The preliminary research used a random interview method to obtain preliminary data on the application of artificial intelligence. The conclusions that can be drawn from the data and discussions above are that hybrid learning with artificial intelligence (AI) can improve student learning outcomes. However, there are obstacles and challenges that students face. The obstacles that arise are related to the need to be able to keep up with technological developments by using and utilizing AI appropriately and well. These obstacles and challenges are related to how to.*
*Keyword: artificial intelligence, hybrid, digital literacy*

## INTRODUCTION

Hybrid learning, often called blended learning, is a learning model that combines online and offline learning. In recent years, it has become increasingly popular, especially in response to the need for flexibility and adaptability in education. Hybrid learning, also known as blended learning, is a learning approach that combines traditional face-to-face learning with online learning to optimize students' learning experience (Aulia et al., 2021). Hybrid learning is considered an effective solution to the following problem: flexibility so that students can learn whenever and wherever they want, especially in online learning. This is very beneficial for students who have limited time or access to physical schools. In addition, students can use various learning materials, videos and other digital resources that may not be available in conventional classrooms through technology. Students can have more diverse interactions while learning face-to-face and online. Application of artificial intelligence (AI) in learning (Gontina & Asyhar, 2023). Learning by using digital literacy as a way of presenting problems (Panglipur & Yana, 2023).

Pipit Widiat in her research on digital literacy said that by using various learning approaches and digital-based media, the strategy of strengthening citizen literacy through digital literacy can be carried out successfully. Students will be interested in the lessons because they are a digital native generation that cannot be separated from digital technology (Widiatmaka & Kurniawan, 2023). Meanwhile, flexible and interactive learning involving artificial intelligence is in line with twenty-first century learning competencies (Aisah et al., 2023). However, using ChatGPT raises several issues. These include the risk of damaging the school's credibility, social interactions, and reliance on technology that may interfere with students' critical thinking skills. It is imperative to use a broad and integrated approach to effectively utilize ChatGPT in learning. Clear regulations on the limitations and opportunities of using ChatGPT in learning, changes to learning models, and improving students' digital literacy are some examples of steps that can be taken to address the challenges and opportunities of using ChatGPT. Education policymakers, teachers, and students can better prepare themselves to use ChatGPT by understanding the opportunities and challenges (Anastassia Amellia Kharis et al., 2024). Digital literacy skills are very important to improve knowledge, understanding and ability to use media,

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especially social media, which is often used by the general public, especially by students. Based on these findings, researchers suggest that educational institutions should help students acquire digital literacy skills (Zulkarnain et al., 2020).

The above study is related to the research trend on artificial intelligence (AI) in learning has become something that must be followed because it is one of the technological changes that must be faced (Rahayu et al., 2023). Of course, it is faced wisely and appropriately. Side by side with artificial intelligence (AI), learning with digital creation is the right thing and interrelated. It is necessary to conduct further research, especially in learning mathematics, which has been very much experiencing obstacles and is not of general interest. The hope is that math learning will become something fun and widely popular so that learning success is easy to achieve.

## METHOD

This research uses a type of qualitative research with a descriptive approach. the research subjects were taken students of the education study program at the Indonesian Christian University of Toraja in the fourth semester. Preliminary research uses a random interview method to obtain preliminary data on the application of the use of artificial intelligence in assisting learning activities in all courses. departing from preliminary research, the researcher continued the research carried out by adding digital literacy in learning. Artificial intelligence assistance in research using exploration at https://www.bing.com. The instruments used in data collection are documentation, tests and interviews. documentation related to test results for supporting data, tests are used to see learning outcomes, while interviews are conducted to obtain confirmation results related to supporting the implementation of learning activities take place.

## RESULTS AND DISCUSSION

The results of preliminary research conducted using the interview method on four randomly selected students obtained the following identification results in Table 1.

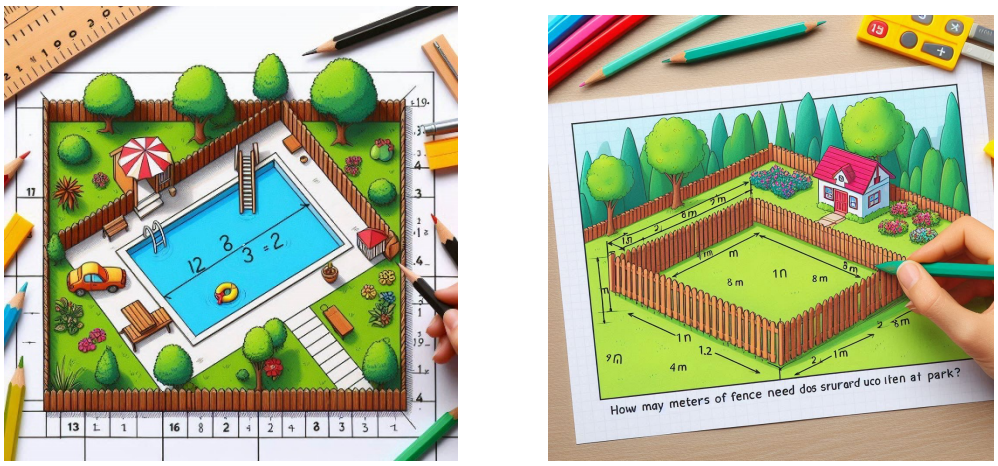
*Table 1. Identification From Preliminary Research*

| No. | Interview Material | Interview Subject Answers |
|---|---|---|
| 1 | Learning Activities that have been implemented | Learning is carried out centered on lecturers, there are several lecturers who have implemented PBL but still with a large amount of material from lecturers. In student-centered learning, lecturers do not provide material at all. |
| 2 | Future learning that will take place | The desired learning is digital-based, easy to follow, material information from global sources, and does not limit space and time in learning. |
| 3 | Referensi pendukung | The number of reference books in the library has not increased significantly and even lacks the latest material. Digital-based references that are easily accessible and accessible are needed. |
| 4 | Media availability | There are not many media that can be accessed, especially related to abstract material. |

Based on the results in table 1 the learning that has been received by the subjects is still not much variety and needs to be developed into better learning and interest by students. Students needs to get more contemporary learning, especially by utilizing technological developments that are of course very close to their daily lives, easily accessible, and affordable with additional material that is very broad or global. In addition, it appears that more support is needed related to references for broader course materials and media to help students understand the material better.

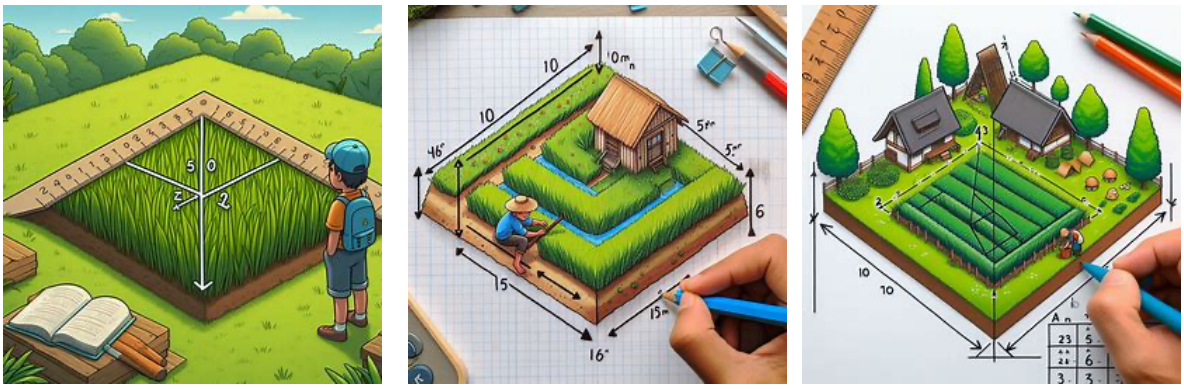
The results of this preliminary research are of course the basis for conducting further research related to alternative solutions that can be taken, namely hybrid learning assisted by Artificial intelligence (AI) to improve learning outcomes on digital literacy problems. Hybrid learning facilitates the implementation of learning that is very flexible and can be followed by all students. Artificial intelligence (AI) is involved as one of the media to expand the material and develop student analysis of a mathematical problem given in the form of digital literacy. The source of the problems used in this hybrid learning uses AI-assisted problems so that variations can be made very diverse and interesting to read and analyze.

Learning in geometry courses by applying hybrid learning assisted by Artificial intelligence (AI) with problems prepared using digital literacy. After being applied, at the end of learning, a digital literacy test is given. Here are some examples of digital literacy questions given to students.




*Problem 1. Digital Literacy Understanding Of Flat Buildings*

In Figure 1 is the result of Artificial intelligence (AI) Assisted on the problem Ani has a rectangular garden in her backyard. The length of the garden is 12 meters, and the width is 8 meters. Ani plans to install a fence around the garden. How many meters of fence does Ani need to surround the garden?



*Problem 2. Digital literacy in understanding flat shapes*

In Figure 2 is the Artificial Intelligence (AI) assisted result for the problem Eko has a trapezoid-shaped plot of land that he wants to plant with grass. The length of the shorter parallel side is 10 meters, the length of the longer parallel side is 16 meters, and the height of the trapezoid is 6 meters. How much land does Eko need to plant grass on?

Problem 1 and problem 2 are given to the subject and then the subject works on the problem by writing the answer directly on the picture.

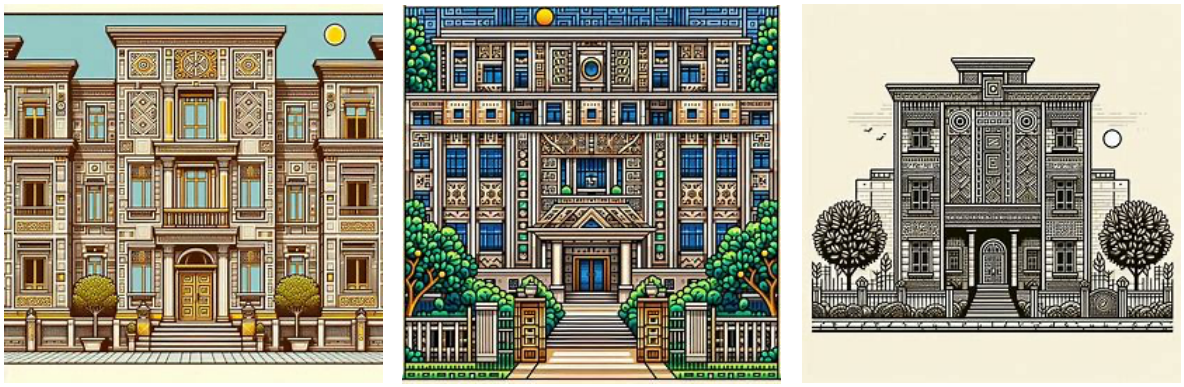


*Figure 3. Flat building application*

In Figure 3 shows the three best student works in manipulating flat building applications using AI assistance. This flat building application involves commands for the construction of a building with the determination of flat shapes of circles, squares, rectangles, triangles.

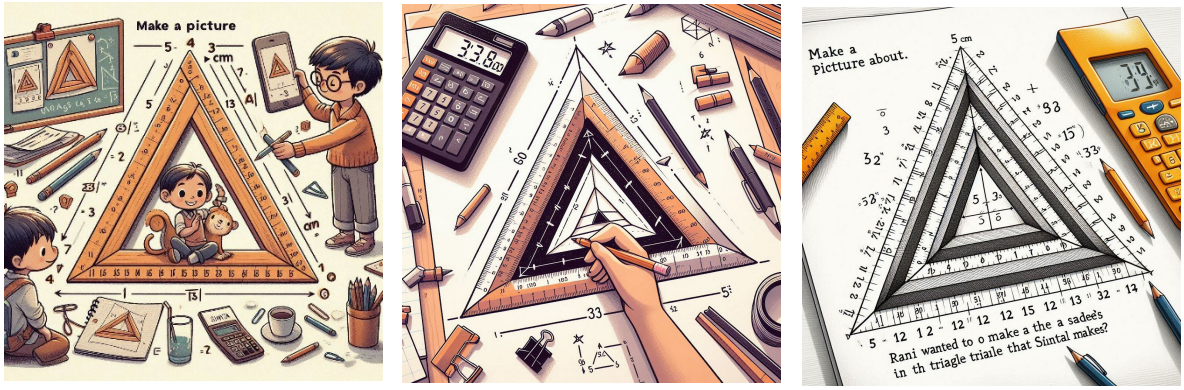



*Figure 4. Triangle similarity*

Meanwhile, Figure 4 is the result of the concept of similarity of triangles made with the help of AI using the main command "create an image about the application of similarity of triangles". The three pictures are the best results collected by students.

Students' learning outcomes by solving problem 1 and problem 2 before and after using AI are shown in the following table.

*Table 2. Student Learning Outcomes*

| Learning Outcome Score | Pre Tes | Post Tes |
|---|---|---|
| | jumlah siswa | |
| 80 - 100 | 2 | 8 |
| 60 - 79 | 10 | 16 |
| 40 - 59 | 16 | 4 |

Learning outcomes have improved The success rate of achieving the number of students who scored better and the number who scored less appears to be much reduced. The improvement can be seen more clearly in the graph in Figure 5 below.

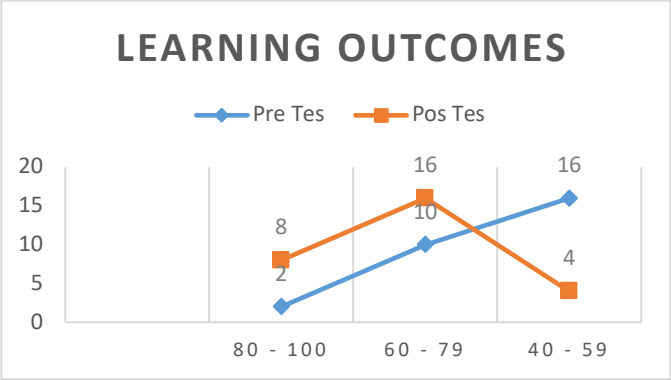



*Figure 5: Achievement of Learning Outcome Improvement*

Learning outcomes as seen and explained above, the use of AI in learning has a positive impact on student learning success. This is in line with the results of research by Putri Supriadi et al. (2022) said that the application of AI (Artificial Intelligence) to the world of education will bring new breakthroughs in the application of learning, based on Science and Technology (Science and Technology) in the 21st century. The ability of parents and teachers to understand the development of Science and Technology (Science and Technology), is enhanced by the presence of AI technology. Therefore, it is hoped that this research will trigger an understanding of AI in the field of education. In addition, Muarif et al. (2023) provide an explanation that the use of AI can make a positive contribution in increasing learning effectiveness, student engagement, and learning satisfaction. From the data above, it can be seen that AI learning positively helps the development of student learning, this is in line with the results of research that the development of student learning is very rapid both in terms of analytical skills and learning outcomes (Muarif et al., 2023).

The results of the interviews were taken from six research subjects from each category of student learning outcomes. The results show that there are barriers and challenges experienced for learning using AI. However, in terms of technological developments that must be followed, the student learning outcomes show that there are some obstacles faced. In addition, the considerable challenges faced are of course additional student competencies related to soft skills that will be needed in the world of work. This is in line with the statement of Suryokta et al. (2023) that the use of AI in the context of chemistry learning offers a variety of opportunities including personalization, enhanced feedback, roles as virtual assistants, support for research, efficiency, and increased engagement (Yuspita et al., 2023). Various AI applications, ranging from intelligent tutoring systems to sophisticated molecular simulations, promise the ability to present chemistry materials in a more interactive, personalized, and adaptive manner according to individual needs. Other competencies obtained include the explanation in the interview that students are trained to have high independence to learn. Independent in understanding the concept of material, independent in analyzing problems, and independent in development by exploring themselves, in line with what was expressed by Karyadi (2023).

## CONCLUSIONS

The conclusions that can be formulated from the results of the data and discussions above are that learning that is held with a hybrid through the use of artificial intelligence (AI) can improve student learning outcomes. In addition, there are obstacles and challenges faced by students. the obstacles that arise are related to the need to be able to keep up with technological developments by being able to use and utilize AI appropriately and well. Related to how to operate and apply it in learning. while the challenges faced are related to soft skills that are increasingly honed for the application of artificial intelligence (AI) in concept understanding and applied learning.

Recommendations given from the results of the study include the addition of the subjects given and the addition to the problems given, for example in the form of projects that are interesting to be developed by students. The hope is that the results of the project will be extraordinary findings that can add to the development of the material discussed.

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