



Artificial Intelligence in Social Sciences Education Presents New Challenges and Opportunities

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Abstract. The emergence of AI technology can be used in learning, especially in Social Sciences with the complex and dynamic object of studying society. With the speed and flexibility of AI, it can help analyze a lot of complex data and provide the necessary information efficiently. The aim of this research is to explore the use of AI in assisting student learning activities, as well as describing the opportunities and challenges in learning Social Sciences. Research subjects included 155 undergraduate students in Social Sciences Education, Universitas Negeri Surabaya, Indonesia. Data collection was carried out using questionnaires, interviews and literature studies. Data analysis uses the mix method. Data from the questionnaire was processed using percentage techniques to draw conclusions which were then strengthened by qualitative interview results and the support of relevant literature study documentation. The research results show that almost all students use various AI platforms to support social studies learning activities. However, the majority of students consider the use of AI platforms to only help learning to a certain extent, because AI also has many limitations, including the problem of information bias from AI algorithms, infrastructure limitations, ethical issues, security of personal data and readiness of AI users. The greatest opportunity for using AI in social studies learning is being able to create personalized, inclusive, flexible learning, provide feedback, and be in line with student preferences, thereby helping effectively and efficiently in solving complex and dynamic social problems.

Keywords: Artificial intelligence, Social Science, Challenges, Opportunities.

1. Introduction

The increasingly rapid development of technology, especially information and communication technology, has an impact on changes in various sectors of life. According to Chen & Chen [1], Artificial Intelligence (AI) is an information and communication technology that is now widely used in the education sector; The scope of AI which includes computer vision, natural language processing, and machine learning has been used in various schools and universities to optimize effectiveness and efficiency in learning [2]. In the world of education, AI offers opportunities for wide and fast access to information resources, and provides the ability to personalize

learning. AI can be the basis for designing an application that can be used as a learning medium and can be utilized by educators and students to facilitate learning.

AI is increasingly developing with the support of E-learning learning strategies [3]. By wisely utilizing e-learning and artificial intelligence, teachers can create a more inclusive, adaptive and efficient learning environment in the era of digitalization. In practical use of learning, AI can be used to access learning materials according to student preferences and abilities, provide real-time feedback, and analyze individual learning needs. For example, an AI learning platform in a management system (LMS) can monitor learning progress, identify several areas that need improvement, and provide follow-up training. In this way, AI is not only able to improve learning outcomes, but also helps teachers increase the effectiveness and efficiency of the learning process.

Today's artificial intelligence or what is commonly known as Artificial Intelligence (AI), has brought about huge changes in reality and influenced the way people work, learn, communicate in life. [4]. This artificial intelligence refers to the capacity of machines to demonstrate a level of intelligence and perform various tasks that require human-like thinking abilities. Examples of several levels of intelligence and carrying out various tasks in student life are ChatGpt, Gemini, Canva, Speedwriter, Slides Go, Virtual reality, Augmented reality, Capcut, Grammarly, Paraphrase, Google Meet, Zoom, and many other applications that support work. with the help of Artificial intelligence (AI).

When it is related to social science learning, the role of AI is very important. Social Science material which studies social phenomena, which includes integrated studies of geography, economics, sociology, history, politics, culture, and so on, has very complex studies. Integrated analysis is needed regarding issues that develop dynamically, so AI is needed as a tool for analysis, simulation and interactive learning scenarios to solve various social phenomena in society. For example, AI can help analyze demographic data quickly and predict social dynamics trends so that students know how patterns of change exist in society. Through the help of AI such as Augmented reality and virtual reality, it can help students understand the material with visual-based scenarios to make abstract material more concrete. Through AI technology, students not only have analytical skills in solving social problems but also trigger students to develop critical thinking skills.

Developing Social Sciences learning in accordance with developments in AI technology and ensuring that teachers and students have an adequate understanding of this technology is crucial. Apart from opportunities, in using AI there are also several challenges, such as the availability of information and communication technology infrastructure resources in schools, the security of students' personal data, and the ability of teachers to adopt AI technology into learning. Thus, it is necessary to identify opportunities and challenges for using AI comprehensively, especially for learning in Social Sciences subjects.

In facing opportunities and challenges, appropriate recommendations and strategies for using AI are needed [5]. These recommendations include guidance for teachers and policy makers to optimize the use of AI in Social Studies learning. Innovative AI-based learning strategies are needed to implement them efficiently and effectively in the

learning process. This research aims to answer these questions by analyzing various case studies, survey data, and interviews with students and educational technology experts. Thus, it is hoped that the results of this research can provide comprehensive insight into the best way to utilize AI in Social Sciences learning and develop appropriate strategies to overcome existing challenges.

2. Research Methods

In analyzing the use of Artificial Intelligence (AI) in the Social Sciences learning process, the author uses descriptive research with a mix method approach, namely combining quantitative data analysis which is reinforced with qualitative data which is also supported by relevant literature studies. This research involved 155 respondents from Social Sciences Education students, Surabaya State University.

Data was collected using a questionnaire distributed using Google Form to find out how respondents used AI for social studies learning. The data that has been collected from the questionnaire is then tabulated to make percentages so that conclusions can be drawn. Interviews were conducted directly with 20 respondents to sharpen the analysis of the role of AI in helping complete lecture assignments. Respondents who conducted interviews in the research were given the initials N1, N2, N3 to N20. Data documentation was also collected from various literature sources relevant to the research theme.

Data analysis was carried out descriptively with the aim of finding information that was relevant and related to the research theme. The research steps carried out include selecting a research topic, collecting data from respondents and library sources, data analysis, and disseminating research results. By applying this method, it will produce accurate information that can be used as a reference in the context of utilizing Artificial Intelligence (AI) technology in facing opportunities and challenges in Social Sciences learning.

3. Results and Discussion

3.1. Response to the Use of AI from Social Science Education Students

Student responses were obtained from a questionnaire distributed via Google Form which consisted of 15 questions. Four questions have two alternative answers "yes" and "no". The six questions have three alternative answers "positive response", "negative response" and "neutral response". There are five questions in the questionnaire that have open alternative answers. Based on data obtained from a questionnaire that was given to 155 social studies students, the following data was obtained in Table 1:

Table 1. Student responses to the use of AI

No	Question	Answer (%)	
		Yes	No
1	Have you ever used AI in lectures?	90,1	9,9

2	Have you ever used ChatGPT to complete lecture assignments?	87,9	12,1
3	Have you ever used Gemini to complete college assignments?	25,3	74,7
4	Have you ever used Canva to complete college assignments?	98,9	1,1

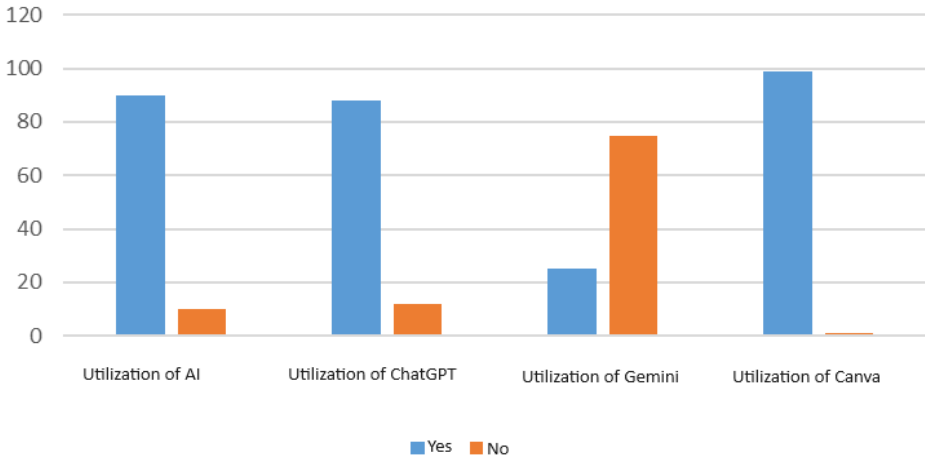


Fig 1. Student responses to the use of AI

Based on Table 1, the responses of IPS Education students stated that the majority, 90.1%, had used AI in lecture activities, while 9.9% said they had never used AI in lecture activities. Based on the results of interviews with students who have used AI, they stated that:

"For me personally, AI has many benefits if we can use it wisely in completing college assignments where we feel we cannot find sources that explain this matter, but we need to remember that we must continue to look for and validate credible sources such as journals, scientific articles, books, or other media" (N4).

"In my opinion, the most important benefit of using AI in completing course assignments is its ability to provide clear and fast explanations of complex concepts, making it easier to understand and complete assignments." (N7).

"In my opinion, the most important benefit of using AI to complete lecture assignments is its ability to provide broad and varied information quickly and efficiently" (N19).

Some students do not use AI for lectures for the following reasons:

"Actually, the AI application only helps provide general ideas, for example, it will create a title, but it becomes even more confusing if you use AI, later it will have to be developed a lot more, because the results are often inhumane and difficult to understand." (N15).

Based on Table 1, the most common use of AI in lecture activities is Canva (98%) have used; ChatGPT (87%) have used; Gemini (25.3%) have ever used.

Following are several reasons why students use the Canva application.

"Canva is very useful for creating infographics and digital products for completing assignments, especially with many choices of templates for assignment types that can be tailored to your needs" (N1).

"In my opinion, the most important benefit of using Canva to complete college assignments is its ability to produce attractive and professional visual designs quickly and easily, thus speeding up the process of creating presentations and other visual materials" (N18).

"Canva is very useful for creating infographics and digital products for completing assignments, especially with many choices of templates for assignment types that can be tailored to your needs" (N9).

Following are several reasons why students use the ChatGPT application.

"ChatGPT can help students understand complex concepts with explanations that are easy to understand, provide additional references, and offer different perspectives that they may not have thought of before. In addition, ChatGPT can support idea development, help organize writing, and improve structure and grammar in academic writing. This allows students to focus more on critical analysis and creativity in their assignments, as well as saving time on research and writing" (N16).

"ChatGPT is quite helpful for us as students to complete assignments which are submitted almost simultaneously and of course we are still looking at the results from ChatGPT first, which ones are good to take and vice versa, which should not be taken" (N20).

Following are several reasons why students use the Gemini application.

"Gemini and Perplexity, this AI is my mainstay in finding information quickly and can perform various tasks in simple form." (N6).

"I have never used it and just found out there is an AI called Gemini, previously I thought Gemini was a zodiac sign, so I was curious to know how to use the Gemini application." (N17).

"In my opinion, for Gemini, the answers given make more sense and there are references as a reference for Gemini AI answers when compared to ChatGPT." (N11).

"In my opinion, the benefits of Gemini are almost the same as ChatGPT, but Gemini has a bibliography or reference list. This makes it easier to crosscheck information." (N16).

The research questionnaire also analyzed how AI contributes to helping complete assignments in lectures at the Bachelor of Social Sciences Education Study Program, Surabaya State University, which can be seen in table 2.

Table 2. AI contribution in completing assignments in lecture activities

No	Statement	Positive response (%)	Helps to some extent (%)	Negative response (%)
1	AI helps complete lecture assignments	30,8	68,1	1,1
2	AI helps critical thinking skills	25,3	63,7	11
3	AI helps the ability to think rationally	28,6	61,5	9,9
4	AI helps performance become more effective	46,2	50,5	3,3
5	AI helps performance become more efficient	48,4	46,2	5,5

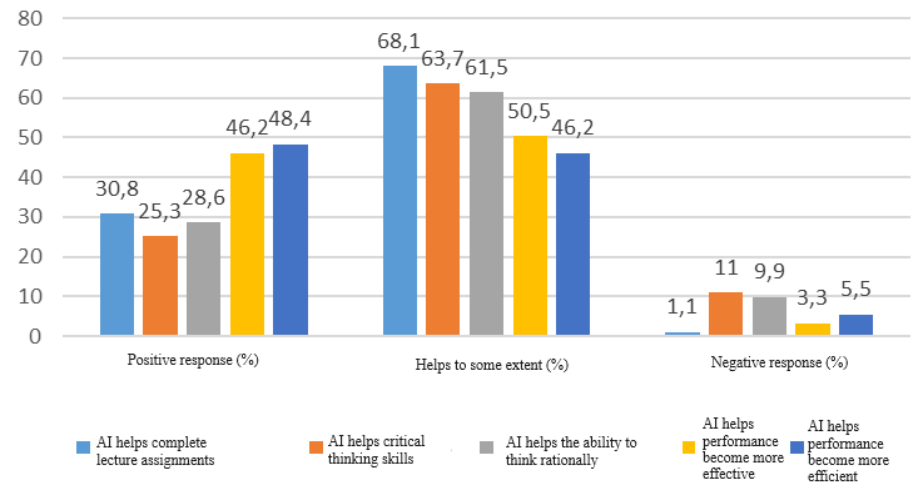


Fig 2. Contribution of AI in lecture activities

Based on Table 2 and Figure 2, the majority of students responded neutrally (helpful to a certain extent) to AI's contribution to lecture activities. The statement that AI helps complete tasks, thinks critically, thinks rationally, is effective and efficient, respectively, received a neutral response (helped to a certain extent), namely 68.1%; 63.7%; 61.6%; 50.5%; 46.2%. In positive responses respectively, namely 30.8%; 25.3%; 28.6%; 46.2%; 48.4%. Meanwhile, the negative responses were: 1.1%; 11%; 9.9%; 3.3%; 5.5%. It can be concluded that students think that the presence of AI in learning has limitations and does not fully help complete assignments, because students have to review a lot of information produced by AI.

This condition is also reinforced by the opinion that AI has various limitations, for example not being able to match the complex knowledge and experience possessed by humans [6]; AI can display algorithms, where the information is general which sometimes does not match the specific information desired [7]. AI is very suitable to be applied in education as an innovative medium, but AI cannot be fully guaranteed and can only help to a certain extent. [8]. AI can be an intelligent tutor to help teachers facilitate student learning, but AI cannot be used absolutely, teachers need to pay close attention and review the information produced by AI [9].

3.2. Opportunities for Using AI in Social Sciences Education

The use of AI in education continues to undergo changes, AI originally directed learning, become an AI that supports learning, and now AI is empowering learning for

students [10]. Through the use of AI in the world of education, it provides space, especially for social sciences, so that the learning process is more optimal. Individuals' abilities to manage and process information on complex societal phenomena can easily be assisted by AI technology. AI algorithms can help analyze in a short time with additional materials that are up to date according to the social topics to be studied. In this way, AI provides space for students to learn according to their individual preferences and learning speed.

The importance of AI in providing fast access according to student needs is revealed by the results of the following interview.

"I think it is important to use AI, because I use it to provoke ideas that will pop into my head" (N1).

"AI helps find other information about what has not been studied during the lecture period and find out other meanings about what is being asked and can help speed up work if assignment time is increasingly limited" (N11).

"What I need from AI is just looking for reference answers, then I will assume my own answer from the AI's explanation" (N7).

Through the use of AI, data can be analyzed to provide a deeper understanding of student learning patterns and progress. This can be beneficial for both teachers and students, as it allows them to make informed decisions and identify areas of learning that need attention. According to Starčič [11], AI-based technology can be used by students to personalize their learning, such as the ability to create presentations and articles using Canva, Bing for images, and Openai for creative ideas.

Apart from controlling learning which can be carried out by students themselves, through AI technology students can also increase their active involvement in learning. For example, the use of technology such as virtual reality (VR) and augmented reality (AR) can enable students to learn independently and actively to participate in digital space situations. Apart from developing educational elements, VR and AR also develop visual elements that can increase motivation and interaction in the learning process.

The following is an example of the use of AR in Hindu-Buddhist religious material in Indonesia. One of the greatest legacies of the 9th century is the Borobudur temple which was built during the Sailendra dynasty. Through the AR application, the shape of the Borobudur temple can be presented in three dimensions, making it interesting to use as a social science learning resource.

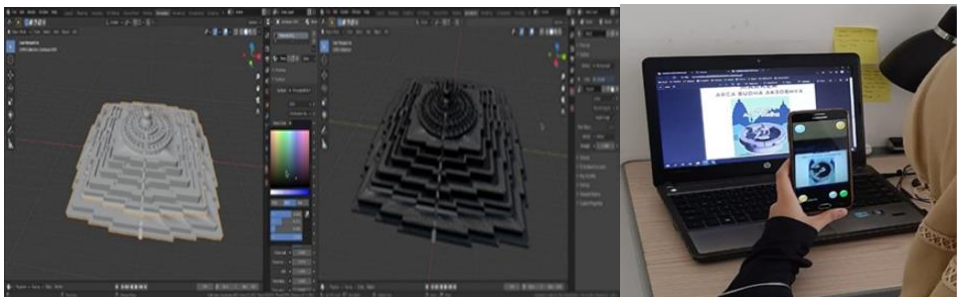


Fig 3. Use of Augmented Reality (AR) on Borobudur temple objects with three-dimensional visuals

Another example is the use of AR in material on the symptoms of volcanism in Indonesia. Through the AR application, the shape of a volcano can be presented in three dimensions, making it interesting to use as a social science learning resource.



Fig 4. Use of Augmented Reality (AR) on volcanoes with three-dimensional visuals

Apart from the learning process, the use of AI can also be used in evaluation activities. Through various applications, AI can automate assessments both in the form of multiple choice questions and essays. In this way, the teacher's burden in carrying out assignment assessments and exams can be reduced. The emergence of various assessment platforms such as Kahoot!, Quizizz, Wordwall, Quizlet and so on can be used to measure students' understanding of the material that has been provided. Each platform certainly has its own mainstay features and shortcomings; Teachers must consider and choose the right AI platform to adapt to specific learning objectives [12]. Chih-ming & Ying-you [13] are of the view that teachers need to pay attention to the use of the right platform with learning materials and objectives, so that teachers can identify students' learning progress and weaknesses from time to time.

3.3. Challenges of Using AI in Social Sciences Education

Nation [14], identified six main challenges for the use of AI in education that need attention, namely: comprehensive public policy, inclusion and equality, teacher competency, quality data systems with continuous development, significant AI research in education, and collection and use of data that is transparent and meets ethical values [15]. The biggest challenge of AI in education is ensuring that the use of AI must prioritize ethical and responsible issues, so it is important to combine technology with human values.

The main technical problem that is a challenge in implementing AI into learning activities is related to the technological infrastructure available in educational institutions [16]. To be able to apply AI to learning requires infrastructure such as high-speed computers or smartphones, internet access, availability of AI platform software which is generally paid. Generally, educational institutions do not provide all these

facilities, so individual students must complete all the requirements to be able to apply AI optimally.

The ability of human resources, in this case the ability of teachers and students in using AI, is also a challenge that must be considered [17]; [18]. Not all teachers and students can understand how to use the AI platform, in fact sometimes students are more capable of mastering AI technology. This can happen because students have more time to interact with smartphones so that students' access to use and development of AI is superior to that of teachers. Through interaction, students who use AI a lot make them feel highly dependent. All tasks will be completed quickly through AI without further scrutiny.

The following are the results of interviews with students who often use AI platforms to complete lecture assignments.

"There are several other applications that are often used to complete lecture assignments, such as Google Scholar, Evernote, and Trello. Google Scholar is a very useful tool for searching academic literature, journal articles, and scientific research, allowing students to access credible and up-to-date sources for assignment references. Evernote is a note-taking application that helps organize lecture notes, ideas, and research materials in one place that is easy to access and organize. Trello, on the other hand, is a project management tool that makes it easy to plan, track, and coordinate coursework, especially in group projects. By using Trello, students can create task boards, set deadlines, and monitor project progress efficiently. This combination of applications supports various aspects of the learning process, from research to task management and collaboration." (N5).

"AI applications make it easier to search for and create various products, but I also don't forget manual applications for creating works, such as Corel Draw for creating graphic media, Flimora and Capcut for creating videos, and don't forget the MS Family. Office for work needs, whose users will enable us to think more critically and not always rely on AI as the answer to these problems. "Because when the brain becomes dependent on this AI feature, we will be lazy to think, and from there we will gradually become weaker in critical thinking, less creative and innovative." (N10).

The use of various AI platforms must prioritize ethics and maintain data security, so that their benefits in education can be optimized [19]. Students' intensive use of AI access carries privacy and data security risks [20]. The risk of student data being stolen could be misused by irresponsible parties, thereby harming students as AI users. AI algorithms can strengthen biases in the data, this condition creates injustice and discrimination in learning activities. Another concern is the challenge regarding the transparency of the information provided by AI, given the difficulty of understanding and auditing recommendations for data information provided from AI systems.

When all learning is provided by AI, what are teachers for?. argue that the increasingly rapid development of AI technology brings another challenge, namely the reduced role of teachers in the learning process; AI can provide quickly and effectively all the material needed, assist students in completing various learning tasks, and make learning evaluations packaged efficiently [21]. In this way, AI can become a medium for reducing interaction between teachers and students in the learning process. Despite the technological advances that have occurred in the world of education, teachers still

have an important role in providing effective and efficient feedback. They still need to be involved in every aspect of the learning process.

4. Conclusion

The use of AI applications has been widely used by undergraduate students of Social Sciences Education, Surabaya State University to support learning activities. Some frequently used platforms are Canva, ChatGPT, and Gemini. However, students consider the contribution of AI in helping learning activities to be largely neutral (AI helps with certain limitations). AI is still considered inhumane in providing answers and information, so it needs a lot of scrutiny before being used for lecture assignments. The opportunities for AI are huge in optimizing social studies learning because it is able to support the analysis of complex and dynamic social phenomena, as well as supporting critical thinking skills in solving social problems. The biggest challenges for AI in learning are infrastructure availability, data security privacy, and the role of teachers which is increasingly being replaced by AI technology.

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