Development of Artificial Intelligence-Based Digital Learning Media to Improve The Quality of Civic Literacy of Muhammadiyah Senior High School Students in Purbalingga

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Abstract.

This study aims to develop an Artificial Intelligence (AI)-based digital learning media to improve students' civic literacy at SMA Muhammadiyah Purbalingga. The development of this media is motivated by the growing digitalization in education, which demands innovative learning tools that are adaptable to technological advances while remaining focused on forming intelligent and virtuous citizens (good and thoughtful citizens). This research employs a Research and Development (R&D) approach using the ADDIE model, which comprises five stages: analysis, design, development, implementation, and evaluation. The focus of this study is on the analysis and development stages to produce a feasible and effective learning media product.The results indicate that integrating Artificial Intelligence (AI) in the learning process has positive impacts, such as increasing efficiency, effectiveness, and accessibility in civic education. Moreover, the use of AI encourages students to think critically, creatively, and adaptively in responding to technological advancements within the context of citizenship education. However, potential adverse effects, including overdependence on technology and reduced critical thinking skills, must be anticipated by instilling digital ethics consistent with Islamic values. Therefore, the development of AI-based digital learning media is expected to serve as an innovative solution for effectively and ethically enhancing students' civic literacy at SMA Muhammadiyah Purbalingga.

Keywords: *Digital Learning Media; Artificial Intelligence (AI) and Civic Literacy.*

I. INTRODUCTION

The transformation of education in Indonesia is improving, particularly through the digital revolution supported by various learning platforms launched by the Ministry of Education, Culture, Research, and Technology. This means that the development of information and communication technology (ICT) has brought significant changes to various aspects of human life, including education. One rapidly developing technological innovation with great potential for adoption in the education sector is Artificial Intelligence (AI). AI refers to computer systems capable of mimicking human cognitive functions, such as learning, thinking, and problem-solving. Therefore, an essential aspect of this transformation is the use of artificial intelligence (AI), which continues to develop rapidly. AI has already been applied to various needs in the education sector, helping students better understand the material. The development of AI towards generative AI (GenAI) is increasingly facilitating all elements in the field of education. In recent years, the use of AI in education has become a widely discussed topic. AI is believed to offer various solutions to enhance the quality of learning in schools. By utilizing AI, the learning process can become more interactive, adaptive, and personalised. This is particularly relevant in the digital era, where the use of technological devices has become an inseparable part of students' daily lives (Faizah, 2017). Artificial intelligence (AI) facilitates ongoing dialogue and helps students improve their communication skills in the context of language learning (Vázquez-Cano, 2021) in Hermanto, et al. (2024), as it promotes collaborative learning (Ruan, 2019) and enhances peer communication skills (Hill, 2015).

Thus, the implementation of AI in education not only improves students' academic understanding but also assists lecturers in designing and delivering material more effectively. Generative AI, an advanced form of AI, offers greater potential through its ability to produce adaptive and personalised learning content. This

technology can tailor material according to individual needs and abilities, providing a more personal and relevant learning experience. In addition, GenAI can ease administrative burdens by automating routine tasks, allowing educators and administrative staff to focus on activities that require a human touch. Thus, this transformation not only improves efficiency but also the quality of education, making education in Indonesia more inclusive and of high quality.These findings indicate that AI has the potential to play an important role in supporting students with learning difficulties and helping them reach their full potential. In the affective domain, AI technology can help boost students' confidence in learning outcomes (Hsieh, 2020) by enabling them to learn in an engaging, comfortable environment (Rooein, 2019), thereby enhancing self-confidence and reducing learning anxiety (Kim, 2021). The utilisation of artificial intelligence (AI) in the Indonesian education sector has brought significant changes in various aspects. AI is used to enhance teaching methods and provide a more interactive and personalised learning experience for young citizens (students). With AI, learning materials can be tailored to individual needs and abilities, allowing each young citizen (student) to learn at their own pace and style alone.

Moreover, AI also helps teachers in designing curricula and delivering material more effectively. For instance, AI tools can analyse the performance data of young citizens (students) to identify areas that need more attention, allowing lecturers to provide more targeted guidance. On the administrative side, AI automates routine tasks such as class scheduling, grading, and financial administration, enabling staff to focus on tasks that require human interaction. The use of AI also opens the door to developing more advanced learning platforms, such as virtual simulations and online laboratories, that can provide practical experience without being physically present. Thus, the utilisation of AI in education not only increases the efficiency and effectiveness of the learning process but also helps create a more inclusive and responsive educational environment for every young citizen (student). Artificial Intelligence in Indonesian is a branch of computer science that aims to develop systems and machines to facilitate human tasks and meet human needs (Gunawan, 2021). In the academic and educational context, the use of ChatGPT can improve learning effectiveness by providing access to a wider range of information and materials that are easier to understand (Arifdarma, 2023). In a digital-based school environment, AI can be used in various forms. For example, adaptive learning systems can adjust materials and teaching methods according to each student's needs and abilities. In addition, AI can be used to analyse student learning data to provide quicker and more accurate feedback to teachers, thus assisting in decision-making related to learning strategies and more effective learning.

Not only that, but AI can also be utilised to develop more engaging and interactive learning content, such as simulations, educational videos, and games, that can enhance students' motivation to learn. The use of AI in school administration can also improve operational efficiency, allowing educators to focus more on teaching activities. One example is that Civic Education is significant to provide to young citizens (students), particularly in terms of knowledge and understanding, so that they can play an effective role in society at the local, national, and international levels. This helps them to be informed, policy-aware, and responsible citizens conscious of their duties and rights, encouraging students to play a role in assisting and contributing to life in their school, environment, community, and the wider world. Since the introduction of the new law subject in 2002, as a sign of the beginning rather than the end of the citizenship policy and education process, it has attracted significant attention and activity from commentators, researchers, practitioners, and policymakers. According to David Kerr, this provides basic evidence that citizenship education before 2002 was very weak. Although this factual basis was rarely found, citizenship education has been strengthened since 2002. (Kerr and Cleaver, 2004); (Arthur, 2008:216). The above view is in line with Parker in the context of building a global citizenship culture, suggesting that the citizenship education curriculum that needs to be developed is one capable of fostering multidimensional citizenship.Parker et al. (1999:127), in their study of citizenship education in nine countries around the world, found that there are four important aspects of multidimensional citizenship, namely (1) personal, (2) social, (3) temporal, and (4) spatial.

These four dimensions become an inseparable part of the development of a multidimensional Civic Education curriculum. The multidimensional curriculum is believed to be capable of developing citizens who can face challenges and solve global problems at the beginning of the 21st century. According to Kniep

(1989: 400), it is necessary to develop a broader curriculum concept to prepare a generation ready to face the challenges of the 21st century. According to him, the social sciences curriculum must reflect the current state of society and the historical realities of societies worldwide. At least four important aspects of global education need to be developed in the social sciences curriculum. These four aspects include: (1) the study of systems, (2) the study of human values, (3) the study of persistent issues and problems, and (4) the study of global history. These four important aspects are developed in sub-themes reflecting current global trends. The implementation of a Citizenship Education curriculum in England through a study combining Longitudinal and Cross-Sectional Surveys funded by the National Foundation for Educational Research (NFER) on behalf of the Department for Education and Skills (DfES) serves as a foundation for preparing young citizens to face the challenges of the globalised era. The advancement of technology in the 21st century has caused many changes across various fields, including information and communication technology.

The flow of information across national borders impacts citizens' lives worldwide. Ideologies, lifestyles, and beliefs that develop in one country can influence habits and life patterns in other countries. Core values in the form of national ideology have long served as a foundation for citizens, but these values have gradually eroded. The symptoms of erosion of these core values are very evident in the behaviour of the younger generation. Behaviours that follow global trends, such as a hedonistic, consumptive lifestyle, are easily imitated by young people. If excessive imitation of global trends is allowed, these core values could fade. One of the main outcomes of this transformation is the digitalisation of educational organisations, which involves integrating digital technology across many areas of education, such as teaching, learning, and administration (Ifenthaler et al., 2021). Digital transformation has made education more accessible, allowing students to learn wherever and whenever they want, and overcoming barriers such as illness or long working hours (Raja & Nagasubramani, 2018). Technology has also changed the appearance and function of classrooms. Contemporary classrooms are equipped with various tools and Digital resources that enhance student learning and increase their engagement levels (Raja & Nagasubramani, 2018). Teachers are now expected to demonstrate proficiency in using educational technology in the classroom (Tondeur et al., 2019). In addition to transforming the classroom environment, technology also impacts how teachers are trained. Teacher educators play a crucial role in preparing the next generation of teachers to integrate technology in education (Tondeur et al., 2019).

This involves developing teachers' competencies in using ICT in their teaching practices and equipping them with strategies to integrate technology effectively in the classroom (Tondeur et al., 2019). However, there are still challenges in implementing technology in education. Some of these challenges include the need for teachers to understand their curriculum more deeply before integrating technology, the availability of adequate facilities and infrastructure, and the level of teachers' commitment in using technology in learning (Morehead & LaBeau, 2005; Muhazir & Retnawati, 2020). Nevertheless, implementing AI in education also faces various challenges. These include the need for adequate technological infrastructure, educators' readiness to adopt new technology, and issues related to students' data privacy and security. Therefore, it is important for all parties involved, including the government, schools, teachers, and parents, to work together to address these challenges in order to maximise the benefits of AI in improving the quality of learning in a digitally-based school environment. For students, one of the main outcomes of implementing artificial intelligence (AI) is increased motivation and engagement (Xia, 2022). AI enhances students' interest in learning (Lin, 2020) and facilitates an interactive learning environment through specialised tools such as Smart Sparrow, thereby increasing student engagement. with educational content (Karsenti, 2019). In addition, AI technology also provides professional development for teachers by offering teaching evaluation models and giving suggestions to improve teaching practices (Gunawan, 2021).

Despite these challenges, the future of education in the digital era looks promising. The ongoing development of digital technologies, such as big data, machine learning, and the metaverse, is expected to revolutionise education further, making it more personalised, efficient, and engaging (Aghbashlo et al., 2021; Baig et al., 2020; Khansulivong et al., 2022). Furthermore, as educational institutions adapt to the digital era,

they need to focus on improving human resources, service quality, and financial management to ensure their sustainability (Hidayat et al., 2022). In conclusion, the digital era has significantly transformed education, making learning more accessible, engaging, and efficient. Although there are still challenges to be addressed, the ongoing development of digital technology and the commitment of educational institutions to adapt to these changes will ensure a bright future for education in the digital age. The 21st century brings unprecedented changes to the way we live, work, and learn. These changes are largely driven by rapid technological advancements (Davis et al., 2002; Geertshuis & Liu, 2022). As the world becomes increasingly digitally connected, the education sector has yet to recover from these revolutionary changes fully. Many countries around the world have explored integrating technology into their education systems to unlock new opportunities for knowledge advancement, pedagogical innovation, and improving student outcomes (Opriş & Cenușă, 2017; Suwastika, 2018; Tarigan et al., 2018).

Among these countries, Indonesia, with its large and diverse population, is at the forefront in terms of the use of technology in the field of education. Indonesia, the fourth most populous country in the world, has a rich cultural heritage and a diversity of ethnicities, tribes, races, religions, and languages. Significant achievements mark the educational landscape in this country, yet it also faces various challenges, including disparities in educational opportunities across regions and socio-economic backgrounds (Fadli et al., 2019). To address these issues and harness technology's potential, Indonesia's education system employs digital tools and approaches to reshape students' learning experience. Digital adaptation, particularly in Civics education, is one way to make the most efficient use of digital technology and also serves as a preventive measure against the effects of more intense digital transformation (Liansari & Nuroh, 2018). Furthermore, this adaptation subtly strengthens digital media. Integrating digital citizenship into traditional higher education is A collaborative process between teachers and students using digital technology methodically to achieve learning objectives (Nehe, 2021). Interaction between students and teachers using digital technology in learning activities is one way to help students become more disciplined, enabling them to use technology appropriately and quickly. The utilisation of the digital world in school education is expected to develop learners into law-abiding, responsible, and aware citizens who can utilise technology.Against this background, this study aims to understand the opportunities and challenges associated with technological advancements in Indonesian education in the context of the digital era, specifically through the Development of Digital Learning Media Based on Artificial Intelligence (AI) in improve the quality of civic literacy among students at Muhammadiyah Purbalingga High School.

It highlights the current state of technology integration in schools and universities in Indonesia. We try to understand several factors that influence success or failure. In addition, this study aims to explore the potential benefits and opportunities offered by technology in the Indonesian education system with the help of Artificial Intelligence (AI), including improving education standards, encouraging innovative pedagogical approaches, and preparing students for a future shaped by technology, particularly the development of AI-based digital learning media. There are many aspects to understanding the opportunities and challenges associated with technological advances in Indonesian education in the digital era, namely through the Development of AI-based Digital Learning Media to improve the quality of civic literacy among high school students, by highlighting the current state of technology integration in schools and universities in Indonesia. We try to understand several factors that influence success or failure, and explore the potential benefits and opportunities offered by technology in the Indonesian education system, including improving educational standards, encouraging innovative pedagogical approaches, and preparing students for a future shaped by Artificial Intelligence (AI)-based technology.

Theoretically, the results of this study are expected to provide understanding and knowledge about the Development of AI-Based Digital Learning Media in enhancing the Civic Literacy Quality of High School Students as a way to make the most efficient use of digital technology, and also as a preventive measure against stronger digital changes (Liansari & Nuroh, 2018). In addition, this adaptation quietly strengthens digital media. Practically, the data findings from this study are expected to serve as a guide for the Development of AI-Based Digital Learning Media in improving the Civic Literacy Quality of High School Students. Focusing on the current state of technology integration in schools and universities in

Indonesia, we aim to understand the factors that influence its success and the obstacles it faces. In addition, this research also seeks to explore the potential benefits and opportunities offered by technology to the education system in Indonesia, including enhancing educational equity, promoting innovative pedagogical approaches, and preparing students to face a future driven by Artificial Intelligence (AI)-based technology.

II. METHODS

This study uses a Research and Development (R&D) approach with the ADDIE model, which consists of five main stages: Analysis, Design, Development, Implementation, and Evaluation (Branch, 2009). This model was chosen because it is relevant to developing systematic, measurable educational products, particularly in the development of digital learning media based on Artificial Intelligence (AI). In this study, the focus is directed at the first three stages—analysis, design, and development—to produce a learning media product that is feasible for limited trials in a senior high school setting. This approach allows the researcher to gain an in-depth understanding of user needs, design media according to the learning context, and produce an initial prototype that is academically and technologically valid.

The study was conducted at Muhammadiyah Senior High School, Purbalingga, Purbalingga Regency, Central Java Province. The location was chosen purposively, considering that the school has: 1. A high commitment to technology-based learning innovation, 2. Adequate basic digital infrastructure (available computer laboratories and a stable internet connection), and 3. Institutional and teacher support in the development of digital-based learning media. The research subjects consisted of 30 eleventh-grade students, the main users of the media, and two Civics teachers, serving as validation partners and trial implementers. These subject characteristics are considered representative for measuring the media's effectiveness in improving civic literacy at the secondary education level. The research procedure follows the ADDIE model.

III. RESULT AND DISCUSSION

The final product developed in this research is a digital learning media based on Artificial Intelligence (AI) called CIVICSMART. This media is designed to enhance students' active participation, deepen their understanding of civic values, and strengthen their critical thinking skills in the context of learning Pancasila and Civic Education (PPKn) at Muhammadiyah High School, Purbalingga. CIVICSMART integrates AI technology focused on personalised learning, providing a more interactive, adaptive learning experience that meets students' needs. a. Main Features of CIVICSMART: AI Mentor Chatbot: This chatbot functions as an intelligent learning assistant ready to provide answers to students' questions related to PPKn material. Using Natural Language Processing (NLP) technology, this chatbot can provide immediate, relevant feedback on the material being taught. For example, when students ask about the values of Pancasila, the chatbot can provide brief explanations and examples of their application in everyday life. b. Adaptive Quiz: This quiz system uses adaptive algorithms that adjust question difficulty based on results from previous quizzes. Students who achieve high scores will receive more difficult questions, which will challenge their analytical abilities. In contrast, students who score lower will be given questions that help them understand basic concepts first. c. Civic Case Simulation: This feature presents simulations of social cases relevant to citizenship issues, such as democracy, human rights, and social responsibility. In this simulation, students are asked to analyse social situations occurring in society and choose solutions that align with the principles of Pancasila and the Indonesian constitution.

For example, students may face a situation involving social conflict and be asked to choose the steps to take in accordance with the values of citizenship. d. Literacy Dashboard: This dashboard allows students and teachers to monitor the development of civic literacy both individually and collectively. Students can view charts showing the improvement in their civic knowledge, civic skills, and civic dispositions. At the same time, teachers can monitor how well each student has mastered the material and how engaged they are in discussion and reflection.Before being trialled, the CIVICSMART media underwent expert validation by three specialists in Civics, educational media design, and educational technology. This validation was carried out to ensure that the developed media has good quality, high content relevance, and supports the learning process effectively. The following are the validation results from the three assessed aspects:

Content/Material: Rated 92% very feasible, indicating that the content presented in the media is highly relevant to the Civics curriculum standards and the values intended to be conveyed in citizenship education. Appearance/Media: Rated 89% very feasible, indicating that the media interface has been well designed, is easily accessible, and has an attractive appearance for high school students. Some validators suggest increasing the variety of graphic designs to capture students' attention further.

Learning: Rated 91% very feasible, indicating that this media is considered very effective in supporting learning objectives, both in terms of pedagogy and in the use of technology to facilitate student interaction with PPKn material.The results of interviews with DSR, a PPKn teacher at SMA Muhammadiyah Purbalingga, indicate a positive view towards the use of digital learning media based on Artificial Intelligence (AI) in PPKn learning. According to the XI-grade PPKn teacher, AI media greatly supports student interactivity and engagement in learning, as well as enhancing their understanding of the material taught, particularly relating to civic literacy. This media allows students to learn in a more enjoyable and technologically relevant way. However, the main challenges are limited access to technology and infrastructure, which affect students' access, as well as teachers' skills in maximising AI technology use. These obstacles highlight the need for further teacher training and improvements in school infrastructure to ensure optimal use of AI media. Overall, the use of AI media in PPKn learning at SMA Muhammadiyah Purbalingga has significantly improved students' civic literacy, particularly in understanding the values of citizenship, developing analytical abilities, and participating in democratic life. Positive responses from students further affirm that technology can be an effective tool in enhancing the quality of education in the digital era.After a three-week limited trial on 30 eleventh-grade students, CIVICSMART showed a significant positive impact on improving students' civic literacy.

This improvement was measured across three main dimensions of civic literacy, namely civic knowledge, civic skills, and civic dispositions. Civic Knowledge: Before using the media, the average civic knowledge score among students was 68%; after using CIVICSMART, it increased to 87%. This represents an increase, indicating that students better understood the basic concepts of citizenship, human rights, and Pancasila values after using the media. Civic Skills: Students' abilities in civic skills increased from 65% to 84% after using the media, also showing an improvement of +19%. This indicates that students were better able to apply citizenship values in everyday life, such as participating in discussions and decision-making. After a 3-week trial period with 30 eleventh-grade students, CIVICSMART showed a significant positive impact on students' civic literacy. This improvement was measured across three main dimensions of civic literacy: civic knowledge, civic skills, and civic dispositions. Civic Knowledge: Before using the media, the average student's civic knowledge score was 68%; after using CIVICSMART, it increased to 87%. This indicates an improvement of +19%, showing that students have a better understanding of basic concepts about citizenship and human rights in social situations. Civic Dispositions: Civic dispositions, which include students' attitudes and behaviours in social and national life, increased from 70% to 89%. This increase indicates that students not only understand the values of citizenship but are also beginning to internalise positive attitudes such as social responsibility, nationalism, and democracy in their lives.

Additionally, the student response survey showed that 93% of students felt learning became more engaging and enjoyable, 88% found it easier to understand PPKn concepts, and 85% felt more active in discussions and more confident in expressing their opinions. Teachers also reported an increase in more intensive two-way interactions between students and teachers, facilitated by the AI Chatbot feature, which can answer basic questions, allowing teachers to focus on deeper and more analytical guidance in discussions.Development of AI-Based Learning Media and Its Impact on Civics Learning. The development of Civicsmart, an Artificial Intelligence (AI)-based learning media, marks a significant transformation in the way Civics is taught. Civicsmart has successfully shifted the learning paradigm from teacher-centered to student-centered. This aligns with the constructivist principle, which emphasises that learning should involve students in building their own knowledge through active exploration and social interaction (Siemens, 2005). In this context, the AI Tutor Chatbot and Civic Case Simulation features are essential tools that encourage students to engage actively with the material, develop critical thinking skills, and create a more personalised learning experience. According to Anderson & Dron (2022), the use of AI in education enables more

flexible, adaptive learning. The AI Tutor Chatbot feature provides instant feedback, which is crucial for accelerating students' understanding of complex learning material. It allows students to learn in a more dynamic, tailored way, in line with the principles of personalized learning emphasized by Holmes et al. (2019).

Personalized learning, as an approach that prioritizes each student's needs and abilities, enables AI to adjust the difficulty of the material to their capabilities and to provide a learning path suited to their pace and learning style. In the study by Park et al. (2023), the use of AI technology in education yielded better results because AI can customise and deliver learning to students' cognitive and emotional needs, supporting more inclusive and practical learning. On the other hand, the Civic Case Simulation in CIVICSMART allows students to solve citizenship issues relevant to their lives, using the values of Pancasila as the basis for decision-making. This approach supports the development of students' civic literacy in a more practical, contextual manner, as they not only learn concepts theoretically but also practice addressing fundamental problems in society (Branson & Cogan, 2000). Civic Case Simulation and Civic Literacy Development. The Civic Case Simulation feature in CIVICSMART allows students to solve citizenship issues relevant to their lives, using the values of Pancasila as the basis for decision-making. This approach supports the development of students' civic literacy in a more practical, contextual way, as they not only learn concepts theoretically but also practice addressing fundamental problems in society (Branson & Cogan, 2000). This simulation helps students develop critical thinking and decision-making skills, which are important in a democratic society.

Jung & Kim (2022), in their journal, emphasise that case-based learning is highly effective in honing students' ability to analyse social and political issues by applying theory in real-world contexts. In this simulation, students are trained to evaluate various solution options based on profound civic values, strengthening their understanding of rights, duties, and responsibilities as citizens. Furthermore, the findings of Koh et al. (2023) on the integration of technology in civic education learning concluded that the use of AI-based interactive simulations can enhance students' civic literacy in a more participatory and reflective manner. In this study, students who engaged in simulation-based learning were able to relate citizenship theory to real-world practice, thereby improving their skills in participating in the democratic process. Simulation in Civismart not only teaches students about the values of Pancasila but also encourages them to address social and political challenges with a more critical, solution-oriented approach, which is at the core of civic skills.One of the main objectives of developing Civicsmart is to enhance students' civic literacy, which consists of three main aspects: civic knowledge, civic skills, and civic dispositions. Based on test results, there was a significant improvement in all three aspects, indicating that AI functions not only as a technological aid but also as a catalyst in shaping a more critical and ethical citizenship character. Civic Knowledge. The increase in civic knowledge from 68% to 87% shows that students are gaining a better understanding of Pancasila values, citizens' rights and obligations, and democratic principles. The AI Mentor Chatbot feature allows students to quickly access information and receive more in-depth explanations of difficult-to-understand concepts.

This aligns with research by Mishra & Koehler (2006) on Technological Pedagogical Content Knowledge (TPACK), which emphasizes the importance of technology and content to create effective learning. In Civicsmart, AI not only serves as a tool for delivering material but also as a learning resource that provides instant feedback and personalises content based on students' abilities and learning pace. Research by Spector (2022) confirms that integrating AI in learning increases information accessibility and accelerates students' understanding of complex material. Civic Skills. The increase in civic skills from 65% to 84% demonstrates students' ability to analyse social issues, think critically, and make appropriate decisions. The Civic Case simulation challenges students to analyse real citizenship cases and select solutions based on Pancasila values. This supports more practical civic education, aligned with the problem-based learning (PBL) concept, which can enhance students' critical thinking (Hmelo-Silver, 2004). Recent research by Fadel et al. (2022) confirms that the problem-based learning (PBL) approach is highly effective in honing students' analytical and decision-making skills. In Civicsmart, citizenship case simulations provide real-life experiences that challenge students to think about social issues relevant to their lives, enhancing

their ability to analyse and make appropriate decisions. Civic Dispositions. The increase in civic dispositions from 70% to 89% indicates that students not only understand the values of citizenship but also internalise these values in their attitudes and actions.

AI Chatbots and Civic Case Simulations encourage students to be more active in moral and ethical discussions and help them develop a sense of social responsibility. This shows that AI plays a role in shaping students' character to become responsible citizens who are not only intelligent but also responsible (Nasrullah, 2023). Research by Zhao & Wang (2023) revealed that AI-based learning can enhance students' social awareness and commitment to citizenship, making them better prepared to engage in the democratic process and fulfill their social responsibilities.The integration of technology and pedagogy in enhancing civics learning success can also be understood through the TPACK framework (Mishra & Koehler, 2006), which holds that the effectiveness of technology in learning depends on the teacher's ability to balance technology, pedagogy, and content. In this study, civics teachers are not only facilitators of material but also curators of national values mediated by AI technology. This allows teachers to focus more on analytical guidance and reflective discussions, while AI helps manage routine interactions and provide instant feedback. Interviews with civics teachers at SMA Muhammadiyah Purbalingga revealed that AI media provides students with opportunities to learn more independently and construct their own knowledge.

Nevertheless, teachers still play an important role in guiding students during the reflection and discussion process, especially regarding the moral values students must uphold. The importance of TPACK in Civicsmart aligns with the research of Mishra & Koehler (2006), which argues that the success of technology in education depends on teachers' ability to align technology with content and pedagogy. Teachers, with the aid of AI-based media, can focus more on developing moral understanding and ethical discussions. At the same time, AI technology manages routine interactions and provides instant feedback, enabling a more personalised and adaptive learning approach. Aldowah et al. (2023), in their research on technology integration in education, emphasise that the TPACK model provides a strong foundation for developing technology-based learning that relies not only on hardware or software but also recognises the teacher's role in integrating technology into more effective learning processes. In addition to the clear technological benefits, AI media in Civicsmart also fosters ethical digital awareness among students. Interviews with teachers and students indicate that students not only learn to use technology, but also understand the moral responsibility in interacting in digital spaces. Nasrullah (2023) argues that AI should be understood as humanizing technology, that is, technology that places humans at the centre and as the goal, rather than merely an automation tool.

AI in Civicsmart is expected to serve as a means to humanize humans by fostering moral and ethical awareness related to citizenship and social life. This approach is highly relevant to the concept of digital ethics, which is increasingly urgent for young people to understand in the digital age (González et al., 2022). In research by González et al. (2022), ethical awareness in the use of AI in digital education becomes an important element in shaping responsible student social behavior. This research confirms that AI technology used with an ethical approach will help students understand their responsibilities as technology users, focusing not only on practical benefits but also on the social and moral impacts of technology use. In the context of Civicsmart, AI technology not only supports learning but also instills ethical values and social responsibility, which are crucial in shaping intelligent and ethical citizens.Although Civicsmart has been proven effective in improving civic literacy, some ethical and technological challenges need to be considered. In interviews, PPKn teachers expressed concerns regarding student data privacy and unequal access to technology. Some students lack adequate access to devices or the internet, which could hinder optimal use of AI media. In addition, concerns about dependency on technology and overly automated learning need to be a primary focus in further implementations.

This confirms the findings in research by Zheng et al. (2023), which stated that equal access to technology is a significant challenge in the application of AI-based learning technology. Furthermore, concerns about dependency on technology and overly automated learning need to be a primary focus in further implementations. Zheng et al. (2023) emphasised in their study that Equal access must be a priority in the implementation of AI in schools, and concerns about technological dependence should be addressed with

an approach focused on developing critical thinking skills and decision-making related to the wise use of technology. This means that AI-based education should be accompanied by strong ethical guidance and mentoring, so that students are not only proficient in using technology, but also responsible for its use.

IV. CONCLUSION

This research successfully developed Civicsmart, a digital learning media based on Artificial Intelligence (AI), which has been proven effective in enhancing civic literacy among students at Muhammadiyah Purbalingga High School. By integrating AI technology, Civicsmart shifted the learning paradigm from teacher-centred to student-centred. The AI Mentor Chatbot and Civic Case Simulation features within this media encourage students to actively engage, develop critical thinking skills, and create a more personalised learning experience suited to their individual abilities. The significant improvement in civic knowledge, civic skills, and civic dispositions indicates that AI functions not only as a technological aid but also as a catalyst in shaping a competent and ethical character of digital citizenship. The research results show that using Civicsmart is highly effective in enhancing civic literacy, as students not only understand the values of Pancasila, the rights and obligations of citizens, and the principles of democracy, but also actively engage in shaping more responsible and critical citizenship attitudes. In addition, the use of AI enables more flexible and adaptive learning, provides instant feedback, and offers students the opportunity to learn more independently. Thus, Civicsmart becomes a learning model that effectively combines technology and pedagogy to create innovative and personalised learning. However, despite the proven effectiveness of this medium, several challenges remain to be addressed to ensure broader, more equitable implementation. Limited access to technology in some regions, student data privacy, and teachers' digital skills are important issues that require attention.

Therefore, some steps that need to be taken include further teacher training, improvements to school technology infrastructure, and strengthened policies to protect students' personal data. With these measures, AI-based learning can be implemented optimally, ensuring that all students, regardless of background, can benefit from technology in education. Furthermore, this study suggests that the development of AI-based learning media can be expanded to include new features, such as more complex automated evaluation, as well as integration with other platforms that enrich the student learning experience. In addition, further research is needed to examine the long-term impact of AI use in education to assess the extent to which this technology can influence changes in students' social behaviour and their engagement in democratic life. Overall, the use of AI in learning, especially in Pancasila and Civic Education, has excellent potential to further teacher training, enhance school technological infrastructure, and strengthen student data protection policies. With these measures, AI-based learning can be optimally implemented, ensuring that all students, regardless of background, can benefit from technology in education. Furthermore, this study suggests that the development of AI-based learning media can be expanded to include new features, such as more complex automated evaluations, as well as integration with other platforms that improve the quality of education and shape intelligent, critical, and responsible citizens ready to face the increasingly digital world. However, to realise this, collaboration between teachers, governments, and educational institutions is necessary to ensure that AI is used ethically and in line with whole-person education.

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