Strengthening the Character of Global Diversity through Project Citizen-Based Augmented Reality in Senior High Schools

[1]Ahmad Sugianto
[2]Universitas Tangerang Raya
email: sugiantoahmad47@gmail.com

[2]Suryono
[2]Universitas Tangerang Raya
email: Suryono1680@gmail.com

Article Info :
Received:
12/11/2025
Revised:
28/12/2025
Accepted:
28/01/2026

ABSTRACT

This study aims to analyze the effectiveness of Augmented Reality (AR) media integrated with the Project Citizen learning model in strengthening the character of global diversity among senior high school students. The main problems identified are the increase in intolerance and the low level of cross-cultural empathy among the younger generation, as well as civic education learning that remains predominantly textual and oriented toward Lower Order Thinking Skills (LOTS). This study used a Research and Development (R&D) method with the ADDIE model. The population consisted of 120 tenth-grade students from a public senior high school in Bandung, with the sample selected using purposive sampling. Data were collected through questionnaires, observation sheets, and documentation. The results showed that the AR-based Project Citizen model was effective in strengthening the character of global diversity, as indicated by a significant increase in character scores in the experimental group compared with the control group (p = 0.000). AR technology facilitates immersive visualization of cultural diversity, while the Project Citizen approach encourages critical thinking and active participation. This study concludes that the combination of AR and Project Citizen is a pedagogical innovation that is adaptive to the digital era.

Keywords: Augmented Reality; Character Education; Global Diversity; Senior High School; Project Citizen

INTRODUCTION

In the twenty-first century, the rapid development of digital technology has fundamentally changed the educational landscape, including civic education at the senior high school level. One of the most critical competencies students must possess is the character of global diversity. This character includes the ability to respect, understand, and interact harmoniously with people from different cultural, religious, and ethnic backgrounds. In Indonesia, the Ministry of Primary and Secondary Education has explicitly strengthened the policy foundation through Regulation of the Minister of Primary and Secondary Education Number 12 of 2025 concerning Content Standards for Early Childhood Education, Primary Education, and Secondary Education, which integrates the strengthening of diversity character into the national curriculum.

However, this study emerged from concern over the reality in the field: increasing intolerance, social polarization, and low cross-cultural empathy among the younger generation. The results of the National Character Survey conducted by the Ministry of Education and

Culture in 2024 revealed that only 52% of senior high school students showed an adequate level of tolerance toward cultural differences, while around 30% admitted having prejudiced views toward certain ethnic or religious groups. Civic education practices in schools remain predominantly textual and oriented toward Lower Order Thinking Skills (LOTS), so they have not fully encouraged students' reflective and participatory abilities in responding to the complexity of global issues.

The core problem of this study is the weak integration between technology and civic pedagogy in strengthening the character of global diversity. Most teachers still rely on lecture methods and discussions using printed teaching materials such as textbooks and modules. These methods fail to provide authentic, contextual, and emotional learning experiences. According to Lickona (2013), character education does not only include moral knowing, but also moral feeling and moral action. Without touching the aspects of feeling and action, the character of global diversity will not be formed comprehensively.

One digital innovation considered highly promising in the development of educational research is Augmented Reality (AR). This technology works by adding virtual elements to the real environment so that users can see a combination of the physical world and digital information at the same time. Through devices such as smartphones or tablets, AR can display three-dimensional objects, interactive text, animations, and sounds that are relevant to learning material. The presence of this technology means that learning is no longer limited to printed books or verbal explanations alone. Students can observe a concept more concretely because the object being studied seems to be present in front of them. This condition is especially helpful for material that is abstract, complex, or difficult to visualize using conventional methods.

Augmented Reality is different from Virtual Reality (VR), which creates a fully digital environment and places users inside an artificial world. In VR use, a person usually needs special devices such as a headset to experience total immersion. By contrast, AR does not eliminate the real environment, but enriches it with integrated digital elements. This allows users to remain aware of their surroundings while receiving additional visual and audio information. In the context of education, this approach is more practical because students can still interact directly with teachers, peers, and the classroom during learning activities. In addition, AR enables collaborative learning because several students can see the same object and discuss it together. With these characteristics, AR is often regarded as more adaptive for implementation at various levels of education than fully immersive technology.

Another advantage of AR lies in cost efficiency and ease of implementation. Unlike VR devices or metaverse technology, which require large investments, AR can generally be run through smartphones that most students already own. This condition means educational institutions do not have to provide expensive devices to begin using interactive digital technology. Besides being more economical, smartphone use also makes application distribution easier because students can access materials anytime and anywhere. This flexibility opens opportunities for independent learning outside the classroom, so the learning process does not only occur during school hours. In terms of development, AR content can also be redesigned according to curriculum needs and the characteristics of particular subjects.

In the context of learning about global diversity, AR can bring cultural artifacts, traditional houses, traditional clothing, traditional dances, and religious symbols from various regions directly into the classroom. A study by Meiliana Rizkyani and Ika Wulandari (2022) developed Arfedo, an AR-based medium to improve global diversity character at the elementary school level, with a gain test result showing an average classical increase of 0.42. Research by Rina Windiarti (2019) also showed that AR is effective in stimulating children's good character through educational games assisted by micro dolls. Furthermore, research conducted by Iwan Hermawan, Inayah Inayah, Rina Windiarti, and Gita Hindrawati (2022)

developed an inspirational storybook equipped with AR technology, which was proven to build children's cognitive and affective aspects and to serve as edutainment media in the Merdeka Belajar curriculum. These studies confirm the potential of AR as an effective medium for character education.

However, there remains a significant research gap. Studies on AR for global diversity character have so far been limited to the elementary and early childhood education levels, and they have not integrated a structured civic action approach such as Project Citizen. Research by Zulfikar Adjie (2024) developed AR learning media to improve global diversity character at the junior high school level through Civic Education, but it did not combine AR with a specific project-based pedagogical model. Thus, no study has specifically targeted the senior high school level by integrating AR and Project Citizen.

The Project Citizen model developed by the Center for Civic Education is a project-based learning model that guides students through a structured process of identifying public problems, collecting and analyzing information, developing alternative solutions, preparing action plans, and presenting projects to a public audience. This model has been proven effective in improving critical thinking, collaboration, communication, and civic responsibility. Research by Restu Adi Nugraha (2026) in his dissertation at Universitas Pendidikan Indonesia was the first study to systematically integrate AR with Project Citizen for strengthening the character of global diversity at the senior high school level. The dissertation, entitled "Strengthening the Character of Global Diversity of Indonesian Students through the Use of Project Citizen-Based Augmented Reality," developed the AR GCED (Global Citizenship Education) application based on Project Citizen, integrating three main elements: Global Citizenship Education as a framework of global values, Project Citizen as a civic action approach, and AR technology as an immersive medium. As emphasized by Restu Adi Nugraha (2026), "Augmented Reality is only a tool. The essence is the transformation of value learning, namely how students learn to empathize, engage in rational dialogue, and act responsibly in the context of global diversity."

This study is grounded in several major theories. First, Vygotsky's sociocultural theory emphasizes that learning occurs through social interaction and the use of cultural tools. AR functions as a modern cultural tool that mediates students' understanding of other cultures. Second, Kolb's (1984) experiential learning theory argues that learning is most effective when it involves concrete experience, reflective observation, abstract conceptualization, and active experimentation. Third, Lickona's (2013) theory of character education highlights the importance of moral knowing, moral feeling, and moral action.

Based on this background, this study was formulated to answer the following question: Is the Project Citizen-based AR learning model effective in strengthening the character of global diversity among senior high school students? This study aims to test the effectiveness of the model and analyze its contribution to the development of civic pedagogy in the digital era.

RESEARCH METHOD

This study used a Research and Development (R&D) method with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). This model was chosen to develop and test Project Citizen-based AR learning media because it has systematic and structured stages.

The Analysis stage was conducted at three public senior high schools in Bandung City through interviews with five Civic Education teachers, questionnaires administered to 120 students, and classroom observations. The analysis results showed that: (1) teachers had difficulty teaching global diversity contextually, (2) 94% of students owned smartphones but

had not used them for character learning, and (3) immersive visual media were needed to provide authentic learning experiences.

The Design stage involved designing the AR-GCED (Augmented Reality for Global Citizenship Education) application, which integrates three elements: Global Citizenship Education as a value framework, Project Citizen as an action approach consisting of six steps, and AR as an immersive medium featuring 3D cultural objects from 34 provinces. Supporting features included a marker scanner, a 3D gallery with audio narration, animated videos, a guiding avatar, and a discussion chatbot.

The Development stage included: (a) developing the application using Assemblr Edu and Unity 3D, (b) validation by four experts (two educational technology experts and two civic education experts) with very feasible results (media 89.5%, material 91.2%), and (c) limited trials with three students in a one-to-one trial and 12 students in a small group trial, which showed that the application was easy to operate (93%), attractive (88%), and helpful for understanding (85%).

The Implementation stage was carried out at SMA Negeri 3 Bandung. The study population consisted of 120 tenth-grade students. The sample consisted of 72 students selected using purposive sampling, divided into an experimental class (n = 36) and a control class (n = 36). The experimental group used Project Citizen-based AR for eight meetings over four weeks, while the control group used conventional learning methods consisting of lectures, discussions, and textbooks. Pretests and posttests were administered at the beginning and end of the treatment.

The Evaluation stage used a 25-item global diversity character questionnaire with a 1-4 Likert scale, which had been tested for validity (23 valid items, r table = 0.361) and reliability (Cronbach's Alpha = 0.89). Data were analyzed using the independent sample t-test ($\alpha = 0.05$) after meeting the normality test (Shapiro-Wilk) and homogeneity test (Levene's Test), with the assistance of SPSS 26.0.

RESULTS AND DISCUSSION

RESULTS

Based on the results of field data collection, pretest and posttest score data on global diversity character were obtained from both groups, as presented in Table 1.

Table 1. Pretest, Posttest, and Gain Score

No	Group	N	Pretest	Posttest	Gain
1	Experimental (AR + Project Citizen)	36	63.42	86.53	23.11
2	Control (Conventional)	36	63.15	71.28	8.13

Source: Primary data processed, 2026

The independent sample t-test on the pretest data showed a value of t = 0.186 with p = 0.853 (p > 0.05). This means that there was no significant difference between the initial abilities of the two groups. In other words, the initial conditions of students in the experimental and control groups were relatively the same before treatment was given.

After four weeks of treatment, the independent sample t-test on the posttest data showed a value of t = 13.247 with df = 70 and p = 0.000 (p < 0.05). These results indicate a statistically significant difference between the experimental group and the control group. The group that used Project Citizen-based AR obtained a posttest score (86.53) far higher than the control group (71.28). The gain score increase in the experimental group (23.11) was almost three times greater than that of the control group (8.13).

`

Table 2. Comparison with Previous Studies

No.	Researcher (Year)	Focus	Result	Gap
1	Meiliana Rizkyani & Ika Wulandari (2022)	Arfedo media (AR) for elementary school	Gain 0.42 (moderate)	Not yet integrated with Project Citizen
2	Rina Windiarti (2019)	Micro doll games for early childhood education	Effective for character stimulation	Not specifically focused on global diversity
3	Iwan Hermawan et al. (2022)	AR storybook for early childhood education	Effective for character stimulation	Not specifically focused on global diversity
4	Zulfikar Adjie (2024)	AR storybook for early childhood education	Effective cognitively and affectively	Not specifically focused on global diversity
6	Restu Adi Nugraha (2026)	AR + Project Citizen for senior high school	Significant (p = 0.000)	First study integrating the three elements

Source: Google Scholar search results, 2026

DISCUSSION

The findings of this study show that the Project Citizen-based Augmented Reality (AR) learning model is significantly more effective than conventional learning in strengthening the character of global diversity among senior high school students. The effectiveness of this model can be explained through three main factors.

The first factor explaining the success of AR technology is its ability to provide visual and emotional experiences that are far more vivid than ordinary learning. In many schools in Indonesia, material on cultural diversity is still often delivered through textbooks, worksheets, or oral explanations from teachers in front of the class. This method does help convey basic information, but it often does not foster deep emotional engagement among students. Students only recognize the names of dances, traditional clothing, traditional houses, or musical instruments as memorized facts. The information they receive stops at the level of knowledge and has not yet reached admiration or a sense of belonging toward the nation's cultural heritage. When material is studied in a flat manner, learning interest also easily declines because students feel that cultural topics are only a collection of facts to be remembered. This situation is different when AR is used as a learning medium that displays cultural elements more realistically. Students become more interested because they feel they are interacting directly with the object being studied, not merely reading explanations on paper.

Through AR applications, students can view three-dimensional models of various cultural objects, rotate the display from the angle they want, enlarge certain parts, and listen to supporting narration at the same time. This kind of experience makes learning feel active and less monotonous. When students scan a marker about the Saman Dance from Aceh, for example, they do not only find a short explanatory text. They can watch the dance movements in dynamic three-dimensional animation, hear the rhythm of hand clapping and accompanying songs, and understand the social messages contained within it. Values of togetherness, discipline, cooperation, and tolerance become easier to understand because they are displayed through concrete examples. Students can also observe movement patterns, costumes, and dancer formations more clearly than in static images in books. When multiple senses are involved at once, information absorption tends to increase. This makes cultural learning more enjoyable and more meaningful for students.

From the perspective of educational psychology, this experience is related to the emergence of presence, namely a condition in which students feel close to and present with the object being studied. This feeling of presence is important because it encourages an emotional connection between students and the learning material. When students feel as though they are

directly in front of a cultural performance, curiosity, admiration, and the desire to know more arise. Such emotional reactions strongly influence the formation of attitudes that appreciate cultural differences. Students no longer view the cultures of other regions as distant or foreign, but as part of a shared identity as the Indonesian nation. When empathy grows, the potential for attitudes that demean other cultures can decrease. Restu Adi Nugraha (2026) emphasized that Augmented Reality is only a tool, while the main essence lies in changing the way values are learned so that students are able to empathize, engage in rational dialogue, and act responsibly amid global diversity. This view shows that the main strength of AR is not merely technological sophistication, but its ability to instill human values through learning experiences that touch students' minds and feelings.

The study by Meiliana Rizkyani and Ika Wulandari (2022), entitled "Arfedo Based on Augmented Reality to Improve Global Diversity Character in Supporting the Success of the Pancasila Student Profile at the Elementary School Level," also found that AR was effective in improving global diversity character at the elementary school level with an average gain value of 0.42, which falls into the moderate criterion. Similarly, Rina Windiarti's (2019) study entitled "Stimulating Children's Good Characters Through the Use of Micro Doll-Assisted Adventure Games" confirmed that interactive visual technology contributes positively to stimulating children's good character. Furthermore, Iwan Hermawan, Inayah Inayah, Rina Windiarti, and Gita Hindrawati (2022) proved that AR-based inspirational storybooks effectively build children's cognitive and affective aspects and serve as edutainment media in the Merdeka Belajar curriculum.

The second factor is active involvement through the Project Citizen model. The model developed by the Center for Civic Education differs from project-based learning models in general because it has a clear structure and is oriented toward real policy action. In this study, the Project Citizen model was adapted into six steps: (1) identifying public problems in the school environment related to diversity, (2) selecting priority problems through discussion and voting, (3) collecting information and data through AR exploration and interviews, (4) developing a policy portfolio containing alternative solutions, (5) preparing action plans that students can carry out, and (6) presenting the project to public audiences such as teachers, vice principals, and peers.

In its implementation at SMA Negeri 3 Bandung, students in the experimental group successfully identified real issues such as negative stereotypes between regions, for example students from Papua being teased because of their curly hair and students from East Java being considered harsh because of their accent; low understanding of cultures outside Java; and the absence of school activities specifically celebrating cultural diversity. With Project Citizen guidance, students did not merely complain, but prepared portfolios containing policy proposals such as a "Nusantara Cultural Week" held every month, the installation of interactive posters with AR markers in each classroom, and the formation of "Diversity Ambassadors" responsible for becoming communication bridges among students from various regions. These action plans were then presented before the vice principal for student affairs and received a positive response for actual implementation.

This learning process demonstrated the involvement of the three domains of character education proposed by Lickona (2013) in an integrated and interconnected way. The moral knowing domain appeared when students gained a broader understanding of the meaning of diversity as a social strength of the nation. They did not only memorize definitions, but also studied real examples of ethnic, religious, linguistic, and traditional diversity living in Indonesia. Through Augmented Reality media, information that was previously abstract became easier to understand because it was visualized in an attractive and interactive way. Students could see cultural representations from various regions, allowing their knowledge to develop more deeply. Pancasila values were also introduced as guidelines for living together

while respecting differences. At the same time, the concept of Global Citizenship Education helped students understand that respect for others is needed not only at the national level, but also in global society.

The moral feeling domain was visible when students began to build emotional sensitivity toward the experiences of others. When they watched stories or simulations about stereotypes and discrimination through AR content, feelings of pity, sympathy, and a desire to be fairer emerged. Learning experiences that presented realistic visualization made it easier for students to place themselves in the position of victims of unequal treatment. They learned that words and actions that demean others can cause psychological wounds. In addition, pride in national identity also grew when students saw the beauty of Indonesia's cultural heritage in the form of three-dimensional objects. Emotional interest in cultural diversity encouraged a sense of belonging to the nation. These positive feelings become important capital so that students are encouraged to maintain unity and appreciate the differences around them.

The moral action domain was visible through the concrete behavior carried out by students after gaining knowledge and emotional experience during the learning process. Students did not stop at the stage of understanding and feeling, but moved to create works carrying social messages. They designed diversity campaigns as invitations to peers to avoid prejudice and intolerance. Some students created AR-based posters that displayed messages of unity creatively so that they could be easily accepted by the school environment. This activity shows that character values can be realized through innovation and collaboration. Students' courage to submit policy proposals to the school also became evidence of developing social responsibility. They learned that change can begin with small, consistent actions delivered politely and argumentatively.

Research by Zulfikar Adjie (2024), entitled "Development of Augmented Reality (AR)-Based Civics Learning Media to Improve Global Diversity Character in Junior High School," found that the AR media he developed was feasible and effective in improving global diversity character at the junior high school level. However, Zulfikar Adjie's (2024) study did not integrate AR with a specific pedagogical model, so students tended to remain passive recipients of information even though the information was presented attractively in 3D form. This research gap is addressed by the present study by adding a structured civic action approach. In this study, students did not merely watch AR content passively, but actively used the information obtained from AR to solve real problems in their environment.

The third factor is the synergy between AR and Project Citizen. These two components do not stand alone, but reinforce each other. AR provides rich, factual, and visually engaging data that awakens moral feeling because students directly see the beauty and uniqueness of other cultures. Meanwhile, Project Citizen provides a systematic framework for processing that visual data into moral knowing and moral action. Without AR, Project Citizen would lack sufficient visual appeal and factual data, so students would only discuss based on texts and assumptions. Without Project Citizen, AR would only become an interesting spectacle like a 3D documentary that is watched and then forgotten, without meaningful behavioral transformation.

This study proves that the proper integration of technology and pedagogy can produce a greater effect than each component used separately. This can be seen from the gain score comparison: the study by Meiliana Rizkyani and Ika Wulandari (2022), which used AR without Project Citizen at the elementary school level, produced a gain of 0.42 (moderate criterion). This study, which combined AR with Project Citizen, produced a gain score of 23.11 points, which, if converted into a normalized gain standard, reached 0.63 (high criterion). The increase, which was almost 50% higher than the use of AR alone, indicates a significant synergy effect. This finding is in line with Restu Adi Nugraha's (2026) dissertation, which emphasized that

the integration of the three elements (AR, Project Citizen, and GCED) provides a more holistic impact in strengthening the character of global diversity.

The practical implications of this study are broad. First, for Civic Education teachers, this model can be adopted by using the smartphones that students already own. Teachers do not need to become programming experts because the AR application developed in this study is available as a ready-to-use product. Second, for school principals, this model can be used as a flagship program to strengthen the Pancasila Student Profile, especially the global diversity dimension. Third, for policymakers at the education office and ministry levels, this study provides empirical evidence that AR technology is not merely a gimmick or entertainment, but can become an effective medium for value transformation if designed with an appropriate pedagogical approach such as Project Citizen.

This study still has several limitations that need to be explained so that the results can be understood proportionally. The study was conducted only in one major city, Bandung, which is known to have relatively good educational facilities and technological support compared with many other regions. This condition provides an advantage because students can more easily access digital devices, internet networks, and a learning environment that supports the use of technology-based media. Such a situation may not necessarily be found in other areas with limited facilities and infrastructure. Schools in remote areas often face unstable internet connections, limited numbers of devices, and even uneven electricity availability. These differences in conditions may affect the successful implementation of the learning model tested in this study. Therefore, further research needs to be conducted in disadvantaged, frontier, and outermost regions to determine the extent to which the same model can run effectively under more challenging conditions.

The next limitation relates to the duration of the study, which lasted only four weeks. This period was sufficient to observe initial changes, but not adequate to assess whether changes in students' character can be sustained in the long term. Character formation is a process that develops gradually and is influenced by habits, social environment, and repeated learning experiences. The global diversity values that increased at the end of the treatment may not necessarily remain high several months after the activity ended. There is a possibility that students return to previous attitude patterns when they no longer receive reinforcement from the implemented program. This condition is often called a fading effect, namely a decline in results after an intervention stops. Future research should use a long-term design with repeated measurements after three months, six months, or one year so that the durability of character change can be assessed more accurately.

Another limitation lies in the use of research instruments that still relied on self-report questionnaires. This measurement model depends on students' answers to statements provided by the researcher. A common problem is the tendency of respondents to choose answers that are considered socially desirable rather than answers that truly describe their actual condition. Students may give positive responses because they want to be viewed favorably by teachers, the school, or the researcher. This condition has the potential to create bias and make the data not fully reflect real behavior. To improve the accuracy of results, future research should combine quantitative and qualitative approaches. In-depth interviews, participatory observation, focus group discussions, and field notes can help capture changes in students' attitudes and behavior more fully, realistically, and deeply.

CONCLUSION

This study concludes that the Project Citizen-based Augmented Reality (AR) learning model is effective in strengthening the character of global diversity among senior high school students. The independent sample t-test results showed a significant difference between the experimental group and the control group with a value of $p = 0.000$ ($p < 0.05$). The gain score

of the experimental group (23.11) was almost three times higher than that of the control group (8.13). The effectiveness of this model was caused by three factors: AR visual immersion that awakens empathy, active involvement through the Project Citizen stages, and the synergy between the two that simultaneously covers moral knowing, moral feeling, and moral action. This study is the first study to integrate AR, Project Citizen, and Global Citizenship Education (GCED) for strengthening the character of global diversity at the senior high school level. Future researchers are advised to replicate this study in disadvantaged regions, test the long-term durability of character change, and use mixed methods to obtain more holistic results.

REFERENCES

Abdurohim, N., Abdurrohman, M., Ali, H., & Nazar, R. F. (2023). Implementation of anti-corruption education of the PKn subjects in Project Citizen-based learning. Tafkir: Interdisciplinary Journal of Islamic Education, 4(1), 147-162. https://doi.org/10.31538/tijie.v4i1.373

Adjie, Z. (2024). Development of Augmented Reality (AR)-based Civics learning media to improve global diversity character in junior high school. Jurnal Universitas Negeri Gorontalo, 4(2), 45-58.

Akçayır, M., & Akçayır, G. (2017). Advantages and challenges associated with augmented reality for education: A systematic review of the literature. Educational Research Review, 20, 1-11. https://doi.org/10.1016/j.edurev.2016.11.002

Dahliyana, A., Budimansyah, D., Nurdin, E. S., Suryadi, A., & Cahyati, S. (2024). Project citizen digital: Civic education strengthen the national defense character? Kasetsart Journal of Social Sciences, 45(1), 159-166. https://doi.org/10.34044/j.kjss.2024.45.1.17

Fajrie, N., & Purbasari, I. (2021). Augmented reality media development in early childhood learning system during the Covid-19 pandemic era. Proceedings of the 5th International Conference on Learning Innovation and Quality Education, 1-7. https://doi.org/10.1145/3516875.3516999

Gardner-McTaggart, A., & Palmer, N. (2018). Global citizenship education, technology, and being. Globalisation, Societies and Education, 16(2), 268-281. https://doi.org/10.1080/14767724.2017.1405342

Handayani, M. I., & Wibowo, A. (2022). Project Citizen model in citizenship education and its impact on critical thinking skills for elementary school teacher education students. International Journal of Elementary Education, 6(2), 276-281. https://doi.org/10.23887/ijee.v6i2.46763

Hermawan, I., Inayah, I., Windiarti, R., & Hindrawati, G. (2022). Develop ECE's virtuous character by designing inspirative storybook with Android-based Augmented Reality application. Indonesian Journal of Early Childhood Education Studies, 11(2), 67-75. https://doi.org/10.15294/ijeces.v11i2.61095

Huang, T.-C., Chen, C.-C., & Chou, Y.-W. (2016). Animating eco-education: To see, feel, and discover in an augmented reality-based experiential learning environment. Computers & Education, 96, 72-82. https://doi.org/10.1016/j.compedu.2016.02.008

Ibáñez, M. B., Di Serio, Á., Villarán, D., & Delgado Kloos, C. (2014). Experimenting with electromagnetism using augmented reality: Impact on flow student experience and educational effectiveness. Computers & Education, 71, 1-13. https://doi.org/10.1016/j.compedu.2013.09.004

Japar, M., Kardiman, Y., Raharjo, Fadhillah, D. N., & Syarifa, S. (2021). Interactive mobile technologies on civic education learning in higher education. International Journal of Interactive Mobile Technologies, 15(3), 84-96. https://doi.org/10.3991/ijim.v15i03.17509

`

Jayadiputra, E., Mulyasana, D., Saloko, A., & Suparman, O. (2020). Project citizen learning model: Skills of critical thinking and 21st century learning in higher education. Proceedings of the 2nd International Conference on Education (ICE 2019), 663-670. https://doi.org/10.4108/eai.28-9-2019.2291068

Jesionkowska, J., Wild, F., & Deval, Y. (2020). Active learning augmented reality for STEAM education: A case study. Education Sciences, 10(8), 198. https://doi.org/10.3390/educsci10080198

Karakus, M., Ersozlu, A., & Clark, A. C. (2019). Augmented reality research in education: A bibliometric study. EURASIA Journal of Mathematics, Science and Technology Education, 15(10), em1759. https://doi.org/10.29333/ejmste/103904

Kolb, D. A. (1984). Experiential learning: Experience as the source of learning and development. Prentice-Hall.

Koutromanos, G., Sofos, A., & Avraamidou, L. (2015). The use of augmented reality games in education: A review of the literature. Educational Media International, 52(4), 253-271. https://doi.org/10.1080/09523987.2015.1125988

Lickona, T. (2013). Educating for character: How our schools can teach respect and responsibility. Bantam Books.

Nugraha, R. A. (2026). Penguatan karakter kebinekaan global pelajar Indonesia melalui penggunaan Augmented Reality berbasis Project Citizen [Dissertation, Universitas Pendidikan Indonesia].

Radu, I. (2014). Augmented reality in education: A meta-review and cross-media analysis. Personal and Ubiquitous Computing, 18, 1533-1543. https://doi.org/10.1007/s00779-013-0747-y

Rafzan, R., Belladonna, A. P., & Saputra, E. (2024). Improving critical thinking skills in civic education based on Project Citizen building awareness of environmental issues. Jurnal Civics: Media Kajian Kewarganegaraan, 21(2), 359-368. https://doi.org/10.21831/jc.v21i2.73198

Rizkyani, M., & Wulandari, I. (2022). Arfedo berbasis Augmented Reality untuk meningkatkan karakter kebhinekaan global dalam mensukseskan Profil Pelajar Pancasila jenjang SD. Social, Humanities, and Educational Studies (SHEs): Conference Series, 5(2), 146-155. https://doi.org/10.20961/shes.v5i2.58325

Windiarti, R., Inayah, I., Hermawan, I., & Aulia, I. R. (2019). Stimulating children's good characters through the use of micro doll-assisted adventure games: An innovation in educational technology. Indonesian Journal of Early Childhood Education Studies, 8(2), 86-91. https://doi.org/10.15294/ijeces.v8i2.34588