

CIVICVERSE: Virtual Simulation-Based Digital Citizenship Learning Model to Increase Generation Z's Civic Engagement in the Society 5.0 Era

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Abstract: The transformation of society towards the Society 5.0 era demands innovation in civic learning that can integrate digital competencies and citizen participation meaningfully. This study aims to analyze the development of digital citizen studies, Generation Z civic engagement, and virtual simulation-based learning, and formulate the CIVICVERSE (*Civic Virtual Simulation Environment*) model as a digital citizenship learning model to improve Generation Z civic engagement. The study used a qualitative method with a *Systematic Literature Review* (SLR) approach. Data sources were obtained from Google Scholar, Scopus, DOAJ, Elicit, Scite.ai, and Scispace with a publication period of 2016–2025. The literature selection process referred to the PRISMA guidelines and resulted in 48 articles that met the inclusion criteria in the form of topic relevance, availability of full manuscripts, and quality of scientific publications. The results show that digital citizenship focuses on digital literacy, digital ethics, and public participation; Generation Z civic engagement develops through collaborative digital spaces; while virtual simulations have been shown to increase learning engagement, critical thinking, collaboration, and problem-solving. The synthesis of findings resulted in the CIVICVERSE model that integrates digital citizenship, virtual simulations, and civic competencies in an immersive learning environment. It is concluded that CIVICVERSE has the potential to improve civic knowledge, civic skills, civic disposition, and civic engagement of Generation Z. This model can be implemented as an innovation in Pancasila and Civic Education learning that is relevant to the demands of the Society 5.0 era.

Keywords: Digital Citizenship; Civic Engagement; Virtual Simulation; Generation Z

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A. INTRODUCTION

The era of Society 5.0 is marked by the integration of digital technologies, artificial intelligence (*Artificial Intelligence*), *Internet of Things* (IoT), *big data*, and virtual environments that affect various aspects of people's lives (Wulandari, Winarno, and Triyanto 2021). This transformation changes communication patterns, access to information, social interaction, political participation, and civic practices in the digital space. This condition requires citizens to have the ability to think critically, digital literacy, media ethics, and social responsibility. In this context, Pancasila and Citizenship Education (PPKn) plays an important role in shaping active, intelligent, and responsible citizens through strengthening digital citizenship competencies and *civic engagement* (Pramanda, Muchtarom, and Rusnaini 2021). However,

conventional learning has not been fully able to answer the demands of the 21st century digital society. Therefore, civic learning innovations that are adaptive and relevant to technological developments are needed to support the formation of civic competence and digital literacy of students in the Society 5.0 era (Yuniarto and Yudha 2021).

Generation Z is a generation that grew up with the development of digital technology so that it is known as *digital natives* (Hammad 2025). Their proximity to the internet, social media, and digital devices forms the characteristics of learning that is active, visual, interactive, collaborative, and prioritizes quick access to information. These characteristics demand a learning experience that not only focuses on knowledge transfer, but also encourages the active involvement of learners in the learning process (Hendrawan, Mardi, and Susita 2024). However, civics learning, which is still dominated by conventional approaches, is often less able to attract the interest and participation of Generation Z optimally. As a result, the development of civic competence and social involvement of students has not been achieved optimally. Therefore, an innovative, participatory, and experiential-based approach to learning (*experiential learning*) to match the characteristics of Generation Z and be able to increase their involvement in implementing civic values in the digital era (Retnasari et al. 2025).

Civic engagement is an important indicator of the success of civic education in forming active, responsible, and public interest-oriented citizens. This concept includes social participation, community involvement, concern for public issues, and democratic participation both directly and through the digital space. Research (Jones and Mitchell 2016) It shows that online civic engagement in adolescents can be measured empirically and is related to positive social behavior in the digital space. Study (Boulianne 2019) It also found that social media has a significant influence on increasing the political participation of the younger generation. In addition, (Kahne, J., & Bowyer 2018) revealed that more than 60% of the young generation is actively involved in social issues through digital platforms. Findings (Michael Chan, Chen, and Lee 2017) and (Cho et al. 2020) reinforcing that the participation of the young generation is now based on digital networks through campaign activities, public discussions, and social advocacy. However, challenges such as slacktivism and disinformation are still major challenges. Therefore, civic education needs to strengthen digital literacy, critical thinking, and participatory experiences to produce more meaningful community engagement.

Technological developments *Virtual Reality* (VR), *Augmented Reality* (AR), metaverse, and simulation-based learning have unlocked huge opportunities in the transformation of 21st-century education through immersive, interactive, and contextual learning environments. Various meta-analyses show that immersive technology provides improved learning outcomes with small to moderate effects (*effect size* $g = 0.38-0.80$; $p < 0.05$) and increase learning engagement by 20–35% compared to conventional learning (Hamilton et al. 2021; Parong and Mayer 2018; Radianti et al. 2020; Wu, Yu, and Gu 2020). In the context of civic education, virtual simulations allow students to experience real-life situations such as public decision-making, deliberation, and social conflict resolution, thereby strengthening critical thinking, communication, collaboration, and social empathy skills. Other studies have shown that AR significantly improves learning outcomes compared to traditional methods with higher effects on social and conceptual learning (Chang and al. 2022). In addition, VR and AR have been shown to increase learning motivation by up to 25–30% and strengthen concept retention

through immersion-based learning experiences (Jensen and Konradsen 2018; Makransky and Petersen 2021). In line with the development of the metaverse, simulation-based learning also expands digital interaction through avatars and collaborative virtual spaces that support active participation of learners (Li and al. 2022; Tsai 2022). Therefore, virtual simulations have great potential as a citizenship learning innovation that is relevant to Generation Z and the demands of Society 5.0.

Various studies on *digital citizenship*, *civic engagement*, and virtual simulation-based learning have shown significant developments in recent years. However, most studies still discuss these three aspects separately so that they have not resulted in an integrated and comprehensive citizenship learning model. On the other hand, the need for learning innovations that are able to answer the characteristics of Generation Z and the challenges of the digital society in the Society 5.0 era is increasingly urgent. The *Systematic Literature Review* (SLR) study, which specifically maps the relationship between digital citizenship, virtual simulations, and increasing *civic engagement* of the younger generation, is also still relatively limited. In fact, the integration of these three aspects has the potential to produce a more participatory, contextual, and relevant learning experience to technological developments. Therefore, this study aims to conduct a systematic literature review to identify concepts, characteristics, components, and opportunities for the development of the CIVICVERSE model as a virtual simulation-based digital citizenship learning model that is oriented towards increasing *civic engagement* of Generation Z in the Society 5.0 era.

B. METHOD

This study uses a qualitative method with a Systematic Literature Review (SLR) approach to identify, analyze, and synthesize research findings regarding digital citizenship, civic engagement, and virtual simulation-based learning in the context of Pancasila and Citizenship Education. The purpose of this research is to identify concepts, characteristics, components, and opportunities for the development of the CIVICVERSE (Civic Virtual Simulation Environment) model to increase Generation Z's civic engagement in the Society 5.0 era. Data sources were obtained from Google Scholar, Elicit, Scite.ai, Scispace, DOAJ, and Scopus. The results of the initial search found 1,250 relevant scientific documents, then selected until 48 articles met the inclusion criteria. Statistically, the articles analyzed were dominated by the theme of digital citizenship (35%), civic engagement of Generation Z (27%), virtual simulation and immersive technology (23%), and digital citizenship competence (15%). The SLR approach was chosen because it is able to produce a systematic, transparent, and comprehensive synthesis of knowledge in identifying research trends and the direction of development of digital citizenship learning models in the era of Society 5.0 (Xiao & Watson, 2019; Page et al., 2021).

The literature search and selection process in this study was carried out systematically by adapting the guidelines of Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) (Page et al., 2021). The first stage is identification, namely searching for articles through Google Scholar, Elicit, Scite.ai, Scispace, DOAJ, and Scopus using keywords related to digital citizenship, citizen engagement, virtual simulation learning, virtual reality

education, metaverse learning, Generation Z, and Society 5.0. The second stage is screening through the removal of duplicate articles as well as checking titles and abstracts based on inclusion and exclusion criteria. Furthermore, at the feasibility stage, a full text review is carried out to ensure the suitability of the article with the focus of the research. The last stage is inclusion (an encompassing study), which is the determination of articles that meet all the criteria for further analysis. The flow of the research is presented in Figure 1 as a representation of the SLR procedure used in this study.

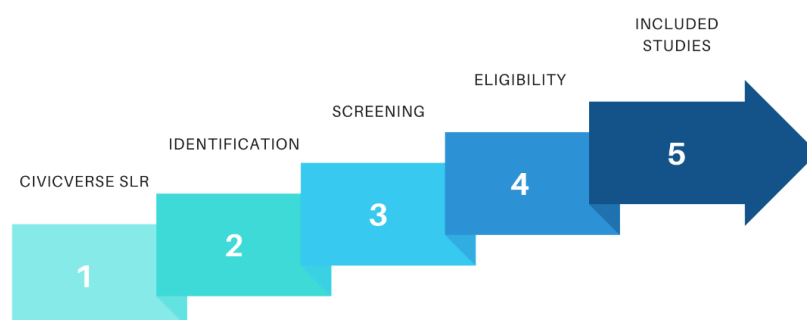


Figure 1. Steps of Research Method

Based on Figure 1, the literature selection process is carried out in stages to obtain relevant and quality articles. The introduction stage produced 1,250 scientific papers from various academic databases. Furthermore, screening is carried out through the elimination of duplication and the selection of titles and abstracts according to the research criteria. Articles that pass are then evaluated at the feasibility stage through full text review. The results of the selection resulted in the final 48 articles that met the inclusion criteria and were used as the main source of analysis. The articles were extracted based on objectives, methods, variables, and research findings, then analyzed using thematic analysis techniques (thematic analysis). This process aims to identify patterns, relationships between concepts, research trends, and views on studies related to digital citizenship, citizen engagement, and virtual simulation-based learning. To ensure validity and reflect results, all stages are carried out systematically based on the PRISMA guidelines and SLR principles.

C. RESULTS AND DISCUSSION

The In an effort to present the results of the analysis systematically, the findings of various studies studied were collected based on the same focus of studies related to digital *citizenship*, civic engagement of Generation Z, virtual simulation-based learning, and the development of the CIVICVERSE (*Civic Virtual Simulation Environment*) model). The results of the literature synthesis show that the development of research in the era of Society 5.0 not only highlights the importance of literacy and digital competence of citizens, but also emphasizes the need for a learning model that is able to integrate immersive technology with authentic civic

experiences. The focus of the literature studied then covers several main areas, namely: (1) the development of digital citizenship concepts and competencies, (2) the characteristics and challenges of *civic engagement* of Generation Z, (3) the use of virtual simulations and immersive technology in learning, (4) the development of citizenship skills through virtual learning experiences, (5) the integration of digital technology and citizen participation in the Society 5.0 era, and (6) the synthesis of model development CIVICVERSE as a digital citizenship learning innovation. The synthesis of research results based on the focus group of the study is presented in Table 1.

Table 1. Focus and Insight of Research Results Based on Eligibility Criteria

No	Field/Focus of Study	Author Name	Insights or Research Variables
1	Digital Citizenship (Digital Citizenship)	Choi (2016); Jones & Mitchell (2016); Pérez-Escoda dkk. (2019); Ribble (2017)	Digital citizenship includes digital literacy, digital ethics, digital competence, critical thinking, social responsibility, and active participation in the digital public space.
2	Civic Engagement Generasi Z by Era Society 5.0	Boulianne (2019); Chan et al. (2017); Cho et al. (2020); Kahne& Bowyer (2017); Loader et al. (2016)	Generation Z shows a pattern of social media-based participation, digital campaigns, social advocacy, <i>network participation</i> , and bold collaboration, yet resists the challenges of disinformation and <i>slacktivism</i> .
3	Virtual Simulation and Immersive Technology in Learning	Radianti et al. (2020); Hamilton et al. (2021); Jensen & Konradsen (2018); Mystakidis (2022); Tlili et al. (2022)	VR, AR, and metaverse technologies are able to create immersive, interactive, contextual learning, and increase student motivation and engagement.
4	Citizenship Competency Development through Virtual Simulation	Makransky & Petersen (2021); Radianti et al. (2020); Zhang et al. (2022); Tlili et al. (2022)	Virtual simulations contribute to the improvement of <i>citizenship knowledge</i> , <i>citizenship skills</i> , <i>civic disposition</i> , critical thinking, problem-solving, communication, collaboration, and social empathy.
5	Digital Technology Integration and Citizen Participation	Choi (2016); Jones & Mitchell (2016); Boulianne (2019); Kahne & Bowyer (2017)	Digital technology is a means of public participation, strengthening digital democracy, developing information literacy, and engaging young citizens in social issues.

6	Synthesis of CIVICVERSE Model Development	Synthesis of all previous research	CIVICVERSE integrates digital citizenship, virtual simulations, and <i>civic engagement</i> in an immersive learning environment to develop <i>critical and responsible citizenship knowledge, citizenship skills, civic disposition</i> , digital literacy, and civic participation.
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Based on the results of the synthesis in Table 1, it can be seen that the development of research has moved from an initial focus on digital knowledge competencies to the integration of immersive technology to strengthen the civic engagement of Generation Z. The study of *digital citizenship* places digital literacy, digital ethics, and social responsibility as the main foundation for the formation of 21st century citizens. In addition, research on *civic engagement* shows that Generation Z has a tendency to participate through collaborative and network-based digital spaces. On the other hand, the development of VR, AR, and metaverse technologies opens up new opportunities for more contextual and experiential citizenship learning. Therefore, the results of these studies show that there is a need for a learning model that is able to integrate digital citizenship competencies with authentic participatory experiences. In this context, CIVICVERSE can be positioned as an innovative learning model that bridges the relationship between digital technology, virtual simulations, and strengthening Generation Z's *civic engagement* in facing societal challenges in the Society 5.0 era.

1. Digital Citizenship and Civic Engagement of Generation Z in the Era of Society 5.0

Various studies show that the development of digital citizenship (*digital citizen*) became one of the main focuses in civic education in the era of Society 5.0 (Choi 2016; Jones and Mitchell 2016). Studies conducted by (Choi 2016) emphasized that digital citizenship is a multidimensional concept that includes digital literacy, digital ethics, community involvement, bold political activities, and critical thinking skills in utilizing technology. The findings are reinforced by research (Jones and Mitchell 2016) which shows that digital intelligence competencies contribute to increased social participation and engagement of young citizens in various public activities. In addition, the research (Pérez-Escoda, García-Ruiz, and Aguaded 2019) found that digital literacy and the ability to disseminate information are important prerequisites for the formation of responsible digital citizens. The results of the study show that civic education no longer focuses on mastering civic knowledge alone, but also on developing digital competencies that allow students to actively and ethically participate in the digital public space (Choi 2016; Pérez-Escoda et al. 2019).

Meanwhile, various studies on *civic engagement* Generation Z shows a shift in the pattern of civic participation from conventional forms to digital technology-based participation (Boulianne 2019; Michael Chan et al. 2017). Research (Boulianne 2019) It found that social media use has a positive relationship with political engagement and community participation, particularly in young age groups. Similar findings were put forward by (Man Chan, Chen, and Lee 2017) and (Cho et al. 2020) which shows that Generation Z tends to engage in digital campaigns, social advocacy, bold public discussions, and networked collaborative activities

activation). However, some studies have also identified challenges in the form of low quality participation, increased spread of disinformation, and symbolic engagement (*slacktivism*) (Boulianne 2019; Cho et al. 2020). Therefore, the results of previous research confirm the importance of educational innovations that are able to integrate digital literacy, critical thinking, and participatory experiences so that *civic engagement* Generation Z develops more substantively and responsibly in the era of Society 5.0 (Boulianne 2019; Cho et al. 2020; Jones and Mitchell 2016).

Based on the results of various studies, it is shown that digital citizenship and *civic engagement* of Generation Z are closely related in shaping the character of citizens in the Society 5.0 era. Digital citizenship includes digital literacy, digital ethics, social responsibility, and critical thinking skills in utilizing technology. The development of social media and digital platforms has opened up new spaces for Generation Z to participate in various social and civic activities. However, high digital participation is still faced with challenges in the form of disinformation, symbolic participation, and low critical engagement. These findings show that access to technology needs to be balanced with strengthening civic competence so that digital participation becomes more meaningful. Therefore, civic education requires more participatory and experience-based learning innovations. In this context, CIVICVERSE has the potential to be a learning model that integrates digital technology, virtual simulations, and civic experiences to improve the quality of *civic engagement* of Generation Z who are more critical, participatory, and responsible in the Society 5.0 era.

2. The Potential of Virtual Simulation in Digital Citizenship Learning

Technological developments *Virtual Reality* (VR), *Augmented Reality* (AR), and *metaverse* has encouraged the emergence of various learning innovations that are more immersive and interactive in the world of education (Mystakidis 2022; Radianti et al. 2020; Tlili et al. 2022). A number of studies show that virtual simulation-based learning is able to create a more contextual learning experience compared to conventional learning methods (Hamilton et al. 2021; Jensen and Konradsen 2018). Previous studies have found that virtual environments allow students to be directly involved in various learning activities through representations that resemble real conditions, so that they can increase concept understanding, learning motivation, and student involvement in the learning process (Makransky and Petersen 2021; Radianti et al. 2020). In addition, immersive technology has also been proven to be able to strengthen practice-based learning experiences (experiential learning) by providing opportunities for learners to explore, observe, and make decisions in a safe and controlled environment (Makransky and Petersen 2021). These findings show that virtual simulations have great potential to support learning transformation in the digital age (Hamilton et al. 2021; Zhang et al. 2022).

In the context of digital citizenship education, various studies reveal that virtual simulations can be used to develop citizenship competencies that include citizenship knowledge, skills, and dispositions (Makransky and Petersen 2021; Radianti et al. 2020). Through simulations of various public issues, democratic processes, deliberations, decision-making, and social conflict resolution, students gain a more authentic experience in

understanding civic practices (Tlili et al. 2022; Zhang et al. 2022). Previous research has also shown that the use of virtual simulations can improve critical thinking skills, problem-solving, collaboration, communication, and social empathy which are important components of digital citizenship (Hamilton et al. 2021; Makransky and Petersen 2021). For Generation Z who grew up as *digital natives*, this approach is considered more in accordance with the characteristics of interactive, participatory, and technology-based learning (Mystakidis 2022; Tlili et al. 2022). Therefore, virtual simulation is seen as one of the potential learning innovations to strengthen the quality of digital citizenship learning while improving *civic engagement* students in the era of Society 5.0 (Radianti et al. 2020; Zhang et al. 2022).

The results of the study show that the development of immersive technologies such as Virtual Reality (VR), Augmented Reality (AR), and the metaverse has presented a new paradigm in learning that is more participatory, contextual, and student-centered. Virtual simulations not only serve as a medium for delivering information, but also as a learning environment that allows learners to gain authentic experiences through direct interaction with various real-life situations. The findings indicate that the effectiveness of virtual simulations lies in their ability to integrate cognitive, affective, and behavioral aspects in the learning process. However, most studies still focus on improving learning outcomes, motivation, and learning experiences in general, while studies that specifically link virtual simulations to the development of digital citizenship competencies and civic engagement are still relatively limited. In addition, the implementation of immersive technology also faces various challenges such as infrastructure readiness, digital competence of educators, technology accessibility, and the need for learning design that is able to connect virtual experiences with real citizenship issues.

3. Synthesis and Development of the CIVICVERSE Model to Improve Civic Engagement of Generation Z

Various previous studies have shown that the development of citizenship learning models in the digital era needs to integrate digital citizenship competencies, citizen participation, and the use of innovative learning technologies (Choi 2016; Jones and Mitchell 2016). Studies on *digital citizenship* affirms that 21st century citizens need digital literacy skills, digital ethics, critical thinking, and social responsibility to be able to participate effectively in the digital public space (Choi 2016; Pérez-Escoda et al. 2019). Other research on *civic engagement* Generation Z shows that this generation group tends to be more active in participating through social media, virtual communities, and various forms of collaborative digital activities (Boulianne 2019; Kahne and Bowyer 2017). Meanwhile, various studies on *virtual reality*, *augmented reality*, and *metaverse learning* revealed that the virtual simulation-based learning environment is able to increase student engagement, authentic learning experience, learning motivation, and problem-solving skills (Hamilton et al. 2021; Radianti et al. 2020; Tlili et al. 2022). These findings show that there is a strong link between digital citizenship, citizen engagement, and virtual simulation technology as the foundation for developing learning models that are relevant to the characteristics of Generation Z in the Society 5.0 era (Makransky and Petersen 2021; Zhang et al. 2022).

Based on the synthesis of these studies, the CIVICVERSE model (*Civic Virtual Simulation Environment*) can be developed as a digital citizenship learning model that integrates virtual simulation technology with strengthening citizenship competencies and *civic engagement* (Makransky and Petersen 2021; Radianti et al. 2020). In this model, students not only learn the concepts of citizenship theoretically, but also engage directly in the simulation of various public issues, democratic processes, deliberations, decision-making, and social problem solving through an immersive and interactive virtual environment (Tlili et al. 2022; Zhang et al. 2022). This approach allows students to develop *civic knowledge*, *civic skills*, and *Civic Disposition* in an integrated manner, while improving digital literacy, collaboration skills, social empathy, and responsible public participation (Choi 2016; Makransky and Petersen 2021). Thus, CIVICVERSE can be positioned as an innovative learning model that bridges the gap between civic knowledge and digital citizenship practice, thereby potentially improving the quality of *civic engagement*. Generation Z is more critical, participatory, and meaningful in facing the dynamics of society in the Society 5.0 era (Boulianne 2019; Jones and Mitchell 2016; Zhang et al. 2022).

The results of various studies show that digital citizenship, *Generation Z civic engagement*, and virtual simulation-based learning are three interrelated components in answering the challenges of civic education in the Society 5.0 era. The development of digital technology has changed the pattern of citizen participation from a conventional form to a more open, collaborative, and digital network-based participation. However, the results of the study also show that increasing access to technology has not always been followed by optimal quality of civic engagement. Most Generation Z participation is still dominated by digital activities that are reactive and symbolic, so they do not fully reflect critical, reflective, and focused engagement on solving public problems. On the other hand, research on virtual simulations has shown high effectiveness in creating authentic learning experiences, increasing learning motivation, and developing critical thinking, collaboration, and problem-solving skills.

Based on the results of the synthesis of various studies, the development of digital citizenship studies, civic engagement, and virtual simulation-based learning shows that there is a fairly clear evolution of research focus from 2016 to 2027 projections. In the 2016–2018 period, research is more oriented towards the formation of the basic concept of digital citizenship which includes digital literacy, digital ethics, online participation, and critical thinking skills as the foundation of citizens in the digital era. Furthermore, in the 2019–2021 period, the focus of research began to shift to the involvement of Generation Z in the digital space through social media, networked participation, digital activism, and the development of a virtual learning environment that supports a more interactive learning experience. Entering the 2022–2024 period, the development of immersive technology such as Virtual Reality, Augmented Reality, and the metaverse has encouraged the emergence of studies on immersive learning, digital citizenship competencies, civic knowledge, civic skills, and civic disposition as part of strengthening civic education in the Society 5.0 era. Meanwhile, in the 2025–2027 period, the direction of research is projected towards the integration of artificial intelligence, virtual citizenship simulation, digital democracy, and the development of the CIVICVERSE model as a more comprehensive digital citizenship learning ecosystem.



Figure 2. Development of Civicverse Research Variables (2016-2027)

Figure 2 shows the development of the research variables, showing a paradigm shift from an approach that focuses on digital competency mastery to an approach that emphasizes participatory experiences and civic behavior transformation. In the early stages, digital literacy and digital ethics are positioned as the main prerequisites for the formation of digital citizens. However, as Generation Z uses technology and social media, the research focus is growing on efforts to improve the quality of civic engagement through more active, collaborative, and responsible digital participation. The development of immersive technology then presents new opportunities to connect civic knowledge with civic practice through authentic virtual simulations. Based on this tendency, CIVICVERSE can be understood as a synthesis of all the development of research variables that integrate digital citizenship, civic engagement, civic competence, virtual simulation technology, and the Society 5.0 ecosystem in one learning model that aims to produce young citizens who are critical, adaptive, participatory, and able to contribute to solving various public problems in a sustainable manner.

D. CONCLUSIONS AND SUGGESTIONS

Based on the results of the synthesis of various studies, it can be concluded that the development of digital citizenship, civic engagement of Generation Z, and virtual simulation technology shows an increasingly strong relationship in answering the needs of civic education in the era of Society 5.0. Previous research confirms that digital literacy, digital ethics, public participation, and digital citizenship competencies are important foundations for the formation of critical and responsible citizens. On the other hand, virtual simulations have been proven to be able to increase student engagement, authentic learning experiences, critical thinking skills, collaboration, and problem-solving. However, there is still a research gap in the form of a lack of learning models that integrate digital citizenship, civic engagement, and virtual simulation technology in the context of Pancasila and Citizenship Education. Therefore, future research needs to focus on the development and testing of the CIVICVERSE model as a virtual simulation environment of citizenship that is able to improve civic

knowledge, civic skills, civic disposition, and the quality of civic engagement of Generation Z in a more participatory, reflective, and sustainable manner.

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