

Gamification-Based Civic Education: Its Impact on High School Students' Civic Knowledge and Skills

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Abstract

Effective civic education is essential to improve students' civic knowledge and skills, but the challenge of increasing student engagement in PPKn learning is still a significant problem. This study aims to investigate the effect of gamification in PPKn learning on improving high school students' civic knowledge and skills. This study used an experimental design with the ANCOVA approach, involving three classes in Sumenep, consisting of an experimental class (gamification) and two control groups (positive control with lectures and negative control). The results showed that the implementation of gamification resulted in a significant increase in critical thinking skills, with a value of $F(2,26) = 65.14$, $p = 0.021$, and $\eta^2 = 0.95$. The experimental group had a higher average score compared to both control groups. These findings suggest that gamification can be an effective strategy in improving engagement and quality of PPKn learning. The implications of this study provide insights for the practice of civic education and open up opportunities for further research with larger samples and longer durations.

1. Introduction

Amidst the rapid development of technology and the complexity of the socio-political dynamics of the 21st century, civic education plays an important role in forming responsible citizens, critical thinkers, and active participants in public life (Chansa, 2023). Civic knowledge and skills are two main components in building civic competence that is essential for the sustainability of a democratic society. However, in learning practices in various educational units, especially in Indonesia, Pancasila and Civic Education (PPKn) is still dominated by conventional approaches that are centered on teachers, with an emphasis on memorizing material and minimal active involvement of students (Yuniarto & Panji, 2021). This condition results in low student interest in learning and weak internalization of contextual and applicable civic values. To answer these challenges, pedagogical innovation is a necessity, and one approach that is starting to receive attention in various fields of education is gamification. Gamification integrates game elements such as points, challenges, reward systems, and narrative flows into the learning process to increase motivation, engagement, and learning effectiveness (Malazonia et al., 2021). Although it has been widely applied in the fields of science and technology, the application of gamification in civic education is still relatively limited, especially in developing the cognitive and participatory dimensions of students as citizens. This study is here to answer this need by examining the impact of the application of gamification in PPKn learning on the knowledge and skills of high school students' citizenship.

Although the urgency of strengthening civic competence has become an important agenda in national education policy, the reality in the field shows that PPKn learning still faces various fundamental problems. One of the main problems is the low effectiveness of conventional learning approaches in fostering conceptual understanding (civic knowledge) and practical abilities (civic skills) needed by students to actively participate in democratic life (Slam, 2024). Many students have difficulty connecting PPKn material to their real-life contexts, which causes learning to feel abstract, boring, and less meaningful (Tambunan et al., 2024). This condition has an impact on students' weak ability to express opinions critically, make joint decisions, and participate in social activities in the school environment and the community. On the other hand, although the gamification approach has been proven effective in increasing student learning engagement and motivation in various subjects, there has not been much research that specifically examines its application in the context of PPKn, especially in relation to improving high school students' civic knowledge and skills. This raises an important question: to what extent is the gamification approach able to overcome the limitations of conventional PPKn learning and encourage the creation of a more active, reflective, and transformative learning experience for students?

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Based on the problems that have been described, this study aims to explore and analyze the effect of implementing gamification in learning Pancasila and Citizenship Education (PPKn) on improving students' citizenship knowledge and skills at the Senior High School (SMA) level (Martina, 2023). More specifically, this study is directed to determine the extent to which gamification elements, which are applied systematically in the learning process, can strengthen students' understanding of citizenship concepts and develop their abilities in critical thinking, communicating, collaborating, and making decisions in the context of community life (Rivers & Bertoli, 2024). Thus, this study not only measures the instructional effects of gamification strategies, but also aims to provide empirical contributions to the development of citizenship learning models that are more interactive, adaptive, and in accordance with the characteristics of the digital generation.

Although gamification has been widely studied in the context of education, especially in the fields of science, technology, mathematics, and language, studies that specifically place gamification within the framework of citizenship education are still very limited, especially in the high school environment in Indonesia (Hosen et al., 2024). Most previous studies have focused more on the motivational aspects and student engagement in general, without deeply evaluating its impact on mastery of substantive civic content or development of participatory skills. In addition, there are still few studies that simultaneously measure the influence of gamification on two main dimensions of civic competence, namely civic knowledge and civic skills (Supriadi et al., 2024). This gap indicates a lack of integration between innovative pedagogical approaches and substantive objectives of civic education. Furthermore, there are not many studies that provide an implementation framework that is contextual to the characteristics of the national curriculum, the learning culture of Indonesian students, and local values in PPKn learning. Therefore, an empirical study is needed that not only fills the gap in the literature but also offers an applicable and relevant approach to strengthen PPKn learning practices in schools.

This study offers novelty in two main aspects. First, the gamification approach applied in the context of Pancasila and Citizenship Education (PPKn) is specifically designed to not only increase learning motivation, but also to develop students' conceptual understanding of citizenship issues and their skills in applying democratic values, participation, and social responsibility in real life. Second, this study adopts an evaluative framework that simultaneously measures the impact of gamification on civic knowledge and civic skills, which have rarely been discussed in an integrated manner in previous studies. This approach allows for a more comprehensive analysis of the effectiveness of innovative pedagogy in civic education. Another justification for this study lies in its relevance to the challenges of 21st-century education, where students as digital natives need a more interactive, contextual, and meaningful learning model. Therefore, the results of this study are expected to be a theoretical contribution to the development of civic pedagogy studies, as well as a practical reference for teachers and policy makers in designing adaptive and transformative PPKn learning strategies.

2. Method

This study used a quasi-experimental design with a non-equivalent control group design approach. This study aims to test the effect of implementing gamification in Pancasila and Citizenship Education (PPKn) learning on improving civic knowledge and civic skills of high school students. This study was conducted by comparing two groups of students, namely the experimental group that followed gamification-based learning and the control group that followed conventional learning. The population of this study was all high school students in Sumenep Regency, Kangean Islands. The research sample was taken from three classes registered in one of the high schools in the area. The sample selection was carried out using a purposive sampling technique based on the criteria that the classes had similarities in academic ability levels and student composition. Of the three selected classes, one class was selected for the experimental group, while the other two classes were used as control groups.

This research was carried out through several structured stages. The first stage is preparation, which includes class selection, preparation of gamification-based learning materials, and development of research instruments. In the second stage, a pre-test was conducted to measure the level of students' initial civic knowledge and civic skills. Next, the experimental group was given gamification-based learning treatment, which was implemented for eight weeks, while the control group followed conventional learning according to the applicable curriculum.

The gamification learning syntax applied to the experimental group includes:

- (1) Determining clear and measurable learning objectives.
- (2) Compiling narratives and challenges based on game scenarios that involve students in active roles.

- (3) Giving points and awards for achieving certain tasks relevant to citizenship material.
- (4) Feedback and reflection through group discussion sessions and collaborative-based activities.
- (5) Evaluation of learning outcomes using a level system that marks the achievement of citizenship skills in stages.

Data were collected using a rubric-assisted test developed by Zubaidah et al. (2017) to measure students' civic knowledge and civic skills. The test consists of two main parts: a knowledge test to measure students' conceptual understanding of civic values, and a skills test to measure students' ability to apply these values in real-life contexts. Each test is equipped with a clear assessment rubric, allowing for a more objective and structured assessment of students' responses. The data collection process was carried out at two points in time: before (pre-test) and after (post-test) the treatment was carried out. Data obtained from the pre-test and post-test will be analyzed using analysis of covariance (ANCOVA) to test the effect of gamification implementation on changes in students' civic knowledge and civic skills scores. ANCOVA is used to control for confounding variables that may affect the results, such as students' initial academic abilities. By using ANCOVA, this study aims to assess whether there is a significant difference between the experimental group and the control group after treatment, by considering the difference in initial scores as a covariate. The results of this analysis are expected to provide a clear picture of the effectiveness of gamification-based learning in improving the civic competence of high school students.

3. Result and Discussion

The results of the ANCOVA analysis showed that the application of gamification in PPKn learning had a significant effect on improving students' civic knowledge and civic skills. The results of the statistical test with a value of $F(2,26) = 65.14$, $p = 0.021$, and $\eta^2 = 0.95$ indicated that the effect of gamification in learning was not only significant, but also had a large effect on improving students' critical thinking skills. The results of the post hoc LSD further showed that the average critical thinking test score in the experimental group (gamification) was significantly higher ($M = 75.6$, $SD = 5.2$) compared to the positive control group using lecture-based learning ($M = 68.9$, $SD = 4.8$) and the negative control group ($M = 67.2$, $SD = 6.1$), with a p value < 0.001 . This finding strengthens the argument that gamification as an interactive learning approach has the potential to improve students' understanding of civics material and enrich their critical thinking skills.

In the context of educational theory, these results support the view that game-based learning can encourage active student engagement and improve learning quality through engaging challenges and feedback. The results of this study provide important contributions to the development of educational theory, particularly in the context of active learning theory and gamification theory. The findings showing significant differences in the increase in civic knowledge and civic skills of students who participated in gamification-based learning compared to the control group, both those using lecture-based learning and those using gamification-based learning, support the argument that gamification is effective in increasing engagement and learning quality (Monica et al., 2024). In the context of active learning theory, gamification has been shown to be able to create a more engaging and meaningful learning experience for students, which in turn improves their understanding of civic values and critical thinking skills that are essential in PPKn learning. In terms of practice, these findings provide significant implications for civic education in secondary schools, where the application of gamification can be a more effective alternative in optimizing the learning process (Hosen et al., 2024). For educators, the results of this study can be a reference for designing and implementing more dynamic and technology-based learning strategies, which will ultimately enrich students' learning experiences and improve their academic achievement.

Although the results of this study provide a significant contribution to the understanding of the influence of gamification in PPKn learning, there are several limitations that need to be considered. First, the sample used in this study only involved three classes from one school in Sumenep Regency, which limits the generalization of the findings of this study to a wider population. Therefore, the findings of this study may not fully reflect the influence of gamification in different geographical or cultural contexts. Second, the duration of the study which only lasted for eight weeks also became a limitation in assessing the long-term impact of the implementation of gamification on the development of students' civic knowledge and civic skills. This study cannot provide an overview of how these learning outcomes persist or develop after a longer period. Third, although the rubric used in this study was developed by Zubaidah et al. (2017) to assess critical thinking skills, there is potential bias in the measurement, especially related to the influence of the assessor's perception of students' critical thinking skills. Therefore, to obtain a more comprehensive and accurate picture, further research with a more comprehensive approach and

more varied instruments is needed. Based on the results of this study, there are several suggestions that can be considered for further research. First, it is recommended that future research involve larger and more diverse samples, including students from different regions with different social, cultural, and economic backgrounds.

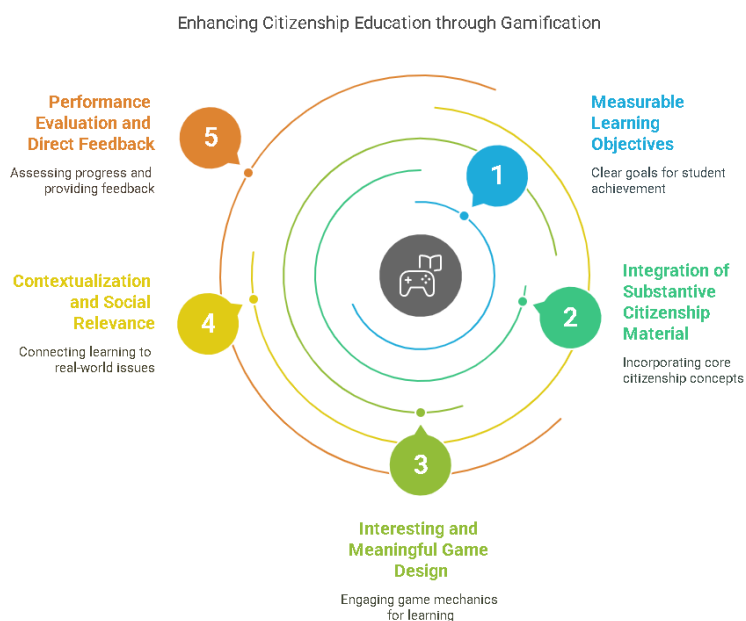
This will allow to test the generalizability of the research findings to a wider context and increase the external validity of the results obtained. In addition, a longer research duration, for example a full academic year, will provide deeper insight into the long-term impact of the implementation of gamification in PPKn learning on the development of students' civic knowledge and civic skills (Kristiawan & Hariati, 2024). Further research can also explore more varied and innovative types of gamification to find out the specific elements that are most effective in improving students' critical thinking skills. Finally, future research can consider using more diverse and more standardized measurement instruments, such as direct observation and in-depth interviews, to obtain more comprehensive data on the influence of gamification on civic learning.

The findings of this study have significant social implications, especially in the context of civic education in Indonesia. The application of gamification in civic education learning has the potential to increase student participation in social and political activities in the future, because more interactive and engaging learning can build critical thinking skills that are essential for an active citizen. In addition, gamification applied in education can introduce students to the values of democracy, citizenship, and social justice in a more enjoyable and accessible way. However, on the ethical side, there are potential risks that need to be considered (Motuz & Lysokolenko, 2022). The use of technology in gamification-based learning must be done carefully to avoid excessive reliance on game elements, which can reduce the substantial quality of the learning itself. Therefore, it is important for educators to maintain a balance between game elements and deeper learning objectives.

In addition, there is a need to ensure equitable access to technology for all students, given the inequality of access to devices and internet connections in various regions that can create gaps in students' learning experiences. These ethical implications are important to consider in efforts to implement gamification fairly and effectively across the education system. The results of the analysis using ANCOVA showed a significant difference between the experimental group using gamification and the two control groups, namely the positive control group using lecture-based learning methods and the negative control group. This finding is expressed by the value of $F(2,26) = 65.14$, $p = 0.021$, and $\eta^2 = 0.95$, which indicates a large effect of the application of gamification in PPKn learning on improving students' civic knowledge and civic skills. The results of the post hoc LSD showed that the experimental group using gamification had a higher average score ($M = 75.6$, $SD = 5.2$) compared to the positive control group ($M = 68.9$, $SD = 4.8$) and the negative control group ($M = 67.2$, $SD = 6.1$), with a p value <0.001 . This finding supports the hypothesis that gamification as a more interactive and technology-based learning approach has a significant impact on improving students' critical thinking skills, which are the main components of civic education. In the context of learning theory, these results are in line with the literature showing that game-based learning can increase student engagement and encourage the development of higher-order thinking skills, as described in active and constructivist learning theories. Therefore, gamification not only provides a more engaging learning experience, but can also accelerate students' understanding of important concepts in civic education.

In addition, the application of gamification in civic education learning also strengthens students' affective dimensions, especially in terms of active participation, sense of responsibility as citizens, and motivation to be involved in civic issues (Gómez & Suárez, 2023). Observations during the learning process showed that students in the experimental group were more enthusiastic in participating in discussions, more active in expressing opinions, and showing high collaboration in completing game-based challenges designed according to the context of the material. This supports the view that gamification can build a fun learning atmosphere while stimulating students' emotional involvement, which is very important in the formation of character and civic attitudes (Medina et al., 2020). Thus, this finding indicates that the use of gamification in civic education not only has an impact on cognitive and skill aspects, but also significantly strengthens the internalization of democratic values and national spirit in students (Jaskulska & Starba, 2020). The implications of this finding emphasize the importance of innovation in the design of civic education in schools, especially through the use of technology-based approaches such as gamification that are in line with the characteristics of the digital generation. This approach is able to bridge the gap between normative teaching materials and students' needs for contextual, interactive, and meaningful learning. Therefore, PPKn teachers need to be encouraged to not only master substantial civics material, but also be competent in designing structured, directed, and measurable gamification-based learning activities. The integration of civics substance and game-based

learning elements has the potential to be an effective pedagogical strategy in developing the profile of Pancasila students who are intellectually intelligent, socially skilled, and strong in character.



In gamification-based learning, measurable learning objectives are a fundamental aspect that cannot be ignored. Game elements must be designed with reference to the learning outcomes of the subjects that have been set, including aspects of knowledge, skills, and attitudes. Therefore, every challenge, quiz, mission, or simulation in the game must be clearly linked to competency achievement indicators. Students' success in completing gamification tasks is not solely assessed from participation, but also from the extent to which they achieve the learning objectives that have been formulated specifically and measurably (Vaughan & Amosun, 2016). Furthermore, the integration of substantial civics material becomes the foundation of the content in the game. Gamification should not obscure the substance of PPKn which teaches the values of Pancasila, the principles of democracy, human rights, and the constitution. Instead, gamification should be an alternative medium to convey this content in a more interesting and interactive way (Murdiono et al., 2020).

Challenges in the game ideally represent the context of civic dilemmas or socio-political cases that require analysis and decision-making by students. Thus, students are not only entertained but also cognitively involved in understanding and applying civic concepts. In that context, interesting and meaningful game design also plays an important role. A learning game should be built with fun elements—such as a points system, level levels, awards, or badges—but still keep the focus on learning. A good game is able to stimulate students' intrinsic motivation, encourage collaboration, spark curiosity, and foster responsibility for learning. Challenges in the game should be designed progressively, from simple to complex, so that students experience a learning process that is not only fun but also transformative (Razzaq & Ali, 2023).

Then, the contextualization and social relevance of gamification content are determinants of the success of meaningful learning. A good game should reflect the real lives of students and their social environment. For example, gamification scenarios can take the form of school election simulations, decision-making in inter-community conflicts, or case studies of human rights violations in society (Makri, 2019). This approach helps students understand that civic values are not something abstract or far from their lives, but rather something that is alive and has a direct impact on their existence as citizens. Finally, no less important is performance evaluation and direct feedback during the gamification process. Teachers need to provide an assessment mechanism that is fair, transparent, and reflects learning outcomes. In addition, feedback given directly during or after the game process helps students reflect on their actions, realize mistakes, and improve their understanding. This reflection and evaluation is an integral part of the in-depth learning process, not just a complement to gamification activities (Makri, 2019).

4. Conclusion

This study shows that the application of gamification in PPKn learning has a significant effect on improving civic knowledge and civic skills of high school students. The results of the ANCOVA analysis indicate a significant difference between the experimental group using gamification and the control group, both using lecture-based learning and gamification-based learning, with a large impact ($\eta^2 = 0.95$). These findings support the hypothesis that gamification increases student engagement in learning and stimulates the development of critical thinking skills needed in civic education. Therefore, gamification can be considered an effective learning strategy in improving students' understanding of PPKn materials and enriching their critical thinking skills.

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