

Student perceptions of game-based learning in civic education: A Technology Acceptance Model (TAM) approach

Iim Siti Masyitoh* 

* Universitas Pendidikan Indonesia, Indonesia
iim.sitimasyitoh@upi.edu

Giri Harto Wiratomo 

Universitas Negeri Semarang, Indonesia
girihw@mail.unnes.ac.id

Margi Wahono 

Universitas Negeri Semarang, Indonesia
margi85@mail.unnes.ac.id

Sukron Mazid 

Universitas Tidar, Indonesia
sukronmazid@untidar.ac.id

Eem Munawaroh 

Coventry University, United Kingdom
munawarohe@uni.coventry.ac.uk

*Corresponding Author

Article Info

Article History

Submitted:

26 March 2026

Revised:

29 April 2026

Accepted:

03 May 2026

Keywords

Civic Education; Games; Game-Based Learning; Technology Acceptance Model (TAM)

Abstract

The rapid development of digital technology has significantly changed learning practices in higher education, particularly using games that resonate with students' everyday lives. Although the Technology Acceptance Model (TAM) has increasingly been applied to explain acceptance of educational games in general higher-education contexts, its application to civic education, where intended outcomes extend to civic disposition and civic engagement, remains largely unexplored, particularly through empirical, university-level evidence from Indonesia. This study aims to analyse students' perceptions of game-based learning in civic education using digital game-based learning media. A quantitative survey approach was employed, involving 120 students from Universitas Negeri Semarang (UNNES) across various study programmes and semesters in the 2025–2026 academic year. Data were collected using a Likert-scale questionnaire and analysed using quantitative descriptive methods within the TAM, covering indicators of perceived usefulness and perceived ease of use. The results show that students exhibited a relatively moderate level of game-playing and held positive perceptions of digital games as a learning medium. Students considered that digital games can increase interest in learning, aid understanding of the material, and foster character traits such as (1) tolerance, (2) appreciation, (3) honesty, and (4) responsibility. However, students also acknowledged potential negative impacts, namely the risk of game addiction and reduced learning focus. These findings suggest that game use in learning should be pedagogically guided and grounded in values. Theoretically, this study reinforces TAM's relevance in civic education and provides an empirical basis for developing game-based learning media to support student character formation.

Article Link: <https://journal.uny.ac.id/index.php/civics/article/view/96527>

Introduction

The development of digital technology has significantly changed how students acquire knowledge and experience in higher education. Interactive technologies such as digital games



are increasingly used as learning media, valued for their capacity to enhance motivation, engagement, and student experience. Research shows that game-based learning can create immersive learning experiences through mechanisms such as challenge-based learning, reward-based feedback loops, and simulation-based scenarios that encourage students' active participation in the learning process (Clark et al., 2016; Kaushal, 2025; Vázquez-Calatayud et al., 2024). The use of digital games in higher education aims not only to improve academic achievement but also to strengthen critical thinking, decision-making, and experiential learning, which are essential competencies for today's digital generation.

Game-based learning can enhance motivation and engagement, as students learn through challenge mechanisms, reward-based feedback, and immersive experiences. Quantitative studies indicate that using digital games in learning is significantly associated with improvements in students' motivation and experience, particularly when combined with technology acceptance and self-regulation (Zhang, 2024). These findings confirm that the effectiveness of digital game-based learning depends not only on content but also on users' perceptions of its benefits and ease of use. Civic education aims not only to build knowledge but also to develop citizens' character (Istianah et al., 2021). Education in the digital era has become increasingly complex, marked by rising misinformation, digital impulsivity, polarisation, and a decline in the quality of public dialogue. Research shows that intervention-based digital games can strengthen individuals' resilience to misinformation through learning-based experiences (Roozenbeek & Van Der Linden, 2019).

Studies show that educational games can serve as simulations that help participants understand moral dilemmas, value conflicts, and the social consequences of decisions in a safe environment (Kohn, 2024; Roozenbeek & Van Der Linden, 2019). Empirical studies further indicate that digital game-based learning can significantly enhance motivation to learn, student engagement, and digital ethics literacy compared with conventional learning methods (Zheng et al., 2024). Nevertheless, most large-scale studies on game-based learning remain concentrated in science, technology, and language, while research on the use of digital games in civic education remains relatively limited.

One relevant civic education study on the connection between digital citizenship and quality civic learning highlights the role of attitudes—not merely responsibility, tolerance, and participation in social activities (Alrakhman et al., 2024). Lecturers' learning media need to be adapted to the characteristics of the digital generation to enable effective internalisation. Thus, the effectiveness of digital games as a learning medium depends on the quality of their design and their alignment with learning objectives. Clark et al. (2016) emphasise that games can positively impact learning, but this does not happen automatically; it depends on instructional design, game mechanisms, and their direct link to learning achievement. Before digital games can be widely implemented in civic education, empirical research on students as users is needed to build a clear understanding.

Gamification studies also show that not all elements of game implementation produce the same impact. The literature indicates that gamification success depends heavily on context, user characteristics, and the alignment between game mechanisms and learning objectives (Luo, 2022). Measuring student perceptions is important to ensure that digital games genuinely support learning rather than merely offering a partial innovation. Perceived usefulness relates not only to understanding the material but also to strengthening students' character. Research shows that digital games can significantly enhance literacy, digital ethics, motivation, and student engagement compared with conventional methods (Zheng et al., 2024).

Civic education involves not only mastering knowledge of political and legal systems but also deliberately forming character in democratic, responsible citizens. Branson (1998) explains that civic education encompasses three main dimensions—civic knowledge, civic skills, and civic disposition—which together form a good citizen. The civic disposition component is particularly important because it relates to the attitudes, values, and character

that underlie responsibility, tolerance, work ethic, and participation in democratic life (Mazid et al., 2024; Mazid et al., 2025). The challenges facing civic education are becoming increasingly complex due to the rise of misinformation, opinion polarisation, and declining communication ethics in the digital sphere.

In addition to the limitations identified in civic education studies, previous research shows that user acceptance of technology strongly influences the success of its implementation in learning. The Technology Acceptance Model (TAM) proposed by Davis (1989) explains that two main factors—perceived usefulness and perceived ease of use—shape technology adoption. These constructs determine individuals' attitudes and intentions toward using technology for specific purposes. Several studies have applied TAM to analyse technology acceptance in digital learning, including game-based learning in higher education (Zhang, 2024).

Most previous studies have examined the impact of games on learning motivation or learning outcomes in science and technology, whereas research specifically analysing students' perceptions of digital game-based learning media in civic education remains limited. Furthermore, studies integrating the TAM approach with the learning of civic values and character are also scarce. This study therefore aims to analyse student perceptions of the use of educational game-based learning media in civic education using the TAM approach. It is expected to contribute empirically to the development of digital technology-based innovations in civic education while enriching civic education studies within the context of digital-era learning transformation.

Despite the considerable potential of digital games, student perceptions of their use in civics courses vary. Some students see games as engaging and contextually relevant, while others view them as potentially distracting. This divergence underscores the importance of quantitative, survey-based research to provide an objective picture of students' attitudes toward using games as a learning medium (Belda-Medina & Kokošková, 2023; Clark et al., 2016). This study's findings are expected to provide an empirical basis for developing and implementing game-based learning media that are not only engaging but also effective in strengthening students' civic character (Davis, 1989; Zhang, 2024).

Taken together, the literature indicates a specific gap: although the TAM has been increasingly applied to explain user acceptance of game-based and simulation-based learning technologies (Cardona Valencia & Betancur Duque, 2023; Zhang, 2024), its application has so far been concentrated in general higher-education and vocational settings rather than in civic education, where the intended learning outcomes extend beyond cognitive gains to encompass civic disposition, civic virtue, and civic engagement. Existing civic-education studies on digital games, meanwhile, have largely been conducted at the primary or secondary level or framed conceptually rather than empirically (Istianah et al., 2021; Novitasari et al., 2025), leaving university-level, TAM-grounded evidence from the Indonesian context largely absent from the literature.

This study addresses that gap by providing empirical, survey-based evidence grounded in the TAM constructs of perceived usefulness and perceived ease of use on how Indonesian university students perceive digital games as a medium for civic learning and character formation. Its novelty lies in extending TAM beyond general technology acceptance outcomes to the specific domains of civic disposition, civic virtue, and civic engagement, and in offering higher-education, Indonesian-context data on game-based civic education, where prior work has been confined mainly to lower education levels or conceptual discussion.

Method

Research Design

This study employs a quantitative, descriptive survey design to examine students' perceptions of game-based learning as a medium for civic education, with a particular focus on

character building. TAM serves as the guiding theoretical framework, focusing on two core constructs-perceived usefulness and perceived ease of use-both of which are hypothesised to influence interest in using digital games for learning (Davis, 1989).

Population and Sample

This study population comprised active students at Universitas Negeri Semarang (UNNES) during the 2025-2026 academic year. The study involved students from selected faculties and study programmes relevant to the research objectives. A total of 120 students from various study programmes and semesters participated. Participants were selected using purposive sampling based on predetermined inclusion criteria: active undergraduate students with experience using digital games who could provide perceptions of games as a medium for learning and character development. The sample size was determined based on the research objectives and the feasibility of data collection.

Research Instrument

Data were collected using a closed-ended questionnaire employing a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), comprising 18 items distributed across three indicators of students' perceptions: (1) intensity of game use, (2) views on the positive and negative impacts of games, and (3) perceptions of games' potential as a medium for learning and character building. The instrument was developed by adapting indicators from established TAM-based instruments (Davis, 1989; Zhang, 2024) to the civic education context. Content validity was established through expert judgement by 3 validators in civic education and educational measurement. The instrument's reliability was tested using Cronbach's alpha, yielding a coefficient of 0,842, indicating good reliability.

Data Collection Procedure

The questionnaire was administered online via Google Forms or in printed form to respondents during the 2025-2026 academic year. Before data collection, respondents were informed of the study's purpose and provided consent to participate; all responses were anonymised, and the data were used solely for this research.

Data Analysis Technique

The collected data were analysed using quantitative descriptive statistics, with responses summarised as frequencies and percentages for each indicator. Student game-use intensity was categorised as low, moderate, or high based on total scores from the relevant questionnaire items. The categorisation divided the theoretical score range into three equal intervals, representing low, moderate, and high levels of game-use intensity.

Results and Discussion

Table 1 shows that respondents were predominantly female (72.5%), while male students accounted for 27.5%. This composition reflects the broader characteristics of the student population in several education-related and social study programmes, which generally have a higher proportion of female students. The predominance of female respondents is also contextually significant in interpreting perceptions of digital games, since preferences for digital media use are often shaped by social and cultural background.

Table 1.

Respondent Characteristics by Gender

Gender	Number	Percentage (%)
Male	33	27.5
Female	87	72.5
Total	120	100

The findings in Table 1 align with several studies showing that gender can influence students' interaction patterns with digital technology, including the use of digital games as a

learning medium. Gender differences can shape users' engagement and motivation in activity-based gamification (Oliveira et al., 2022; Feng et al., 2025). Other studies show that digital experiences and attitudes towards learning technology may differ between male and female students, thereby influencing their perceptions of digital media use in the learning process (Jones & Procter, 2023). Female students tend to hold a more positive attitude towards learning technology when it is perceived as useful and easy to use (Liesa-Orús et al., 2023).

Furthermore, most respondents were drawn from the earlier and middle semesters, namely semester 2 (51.67%) and semester 4 (47.50%). This finding suggests that most respondents are still adjusting to and forming patterns in academic life. This is relevant, as students at this stage tend to be more receptive to technology-based, innovative learning, including digital games as a learning medium.

Table 2.

Respondent Characteristics by Semester

Semester	Number	Percentage (%)
Semester 2	62	51.67
Semester 4	57	47.50
Semester 8	1	0.83
Total	120	100

Further analysis shows that most students engage in light-to-moderate gameplay. As many as 45.8% of respondents play for one to two hours per day, while 30% play for less than one hour. Only a small proportion of students (6.7%) play for more than three hours per day. These findings indicate that students' gaming activity generally remains within reasonable limits, allowing games to be used as a learning medium without being automatically associated with addictive behaviour. Table 3 presents the intensity of students' digital game play per day.

Table 3.

Students' Daily Game-Playing Intensity

Duration of Play (hours)	Number	Percentage (%)
< 1	36	30.0
1–2	55	45.8
2–3	21	17.5
> 3	8	6.7
Total	120	100

The pattern shown in Table 3 is consistent with several studies indicating that, over time, digital games can become part of everyday entertainment and may offer cognitive and motivational benefits to users. Digital games can positively affect the learning process in both directed and undirected contexts (Barz et al., 2024; Clark et al., 2016; McLaren et al., 2022; Zheng et al., 2024). However, the risk of negative impacts such as addiction tends to increase with intensive and prolonged use (Haberlin & Atkin, 2022). The moderate duration of use observed in this study's data suggests a pedagogical opportunity to use digital games as a learning medium that aligns with students' existing technology habits. Other studies similarly show that student interaction with digital games can enhance learning engagement and motivation when combined with structured learning activities (Zheng et al., 2024).

Serious digital games relevant to civic education include democracy simulations, policy games, and educational platforms. Games that raise political awareness through simulated moral dilemmas and conflicts—such as PeaceMaker, which depicts the Israeli–Palestinian conflict—enable players to engage critically with real-world political tensions. Democracy simulation games, such as Democracy, allow students to understand political processes, including elections and public policy, through simulated state governance. Public policy games such as SimCity provide experience in managing urban development and its social impact. In addition, platforms such as iCivics offer a range of educational games designed to enhance

students' understanding of government systems, citizen participation, and civic engagement. Figure 1 illustrates one such game developed for civic education.

Figure 1.

Games in Civic Education



Taken from: <https://www.filamentgames.com/>

The effectiveness of game-based learning depends not only on content but also on game mechanics that align with learning objectives. Mechanisms such as challenges, simulated social situations, and active student involvement help foster conceptual understanding and an immersive learning experience. Furthermore, the decision-making processes, strategies, and consequences embedded within games contribute to the development of critical thinking and decision-making skills as part of civic competence. This research also shows that games can serve as a medium for internalising the values of responsibility, cooperation, and honesty through direct gameplay experience.

The most frequently played digital game genre among students is strategy games (31.7%), followed by casual games and simulations. The predominance of strategy games suggests that students are drawn to challenging games requiring planning, decision-making, and tactical thinking—characteristics closely aligned with civic education's emphasis on critical thinking, responsibility, and the consequences of decisions. Table 4 presents the most frequently played game categories among students.

Table 4.

Most Frequently Played Digital Game Categories among Students

Game Type	Number	Percentage (%)
Strategy games	38	31.7
Casual games	29	24.2
Simulation games	21	17.5
RPG Games	18	15.0
Other	14	11.6
Total	120	100

The findings in Table 4 indicate that strategy and simulation games can serve as effective learning tools, as they allow players to experience decision-making and its consequences directly (Stampfl et al., 2024; Vázquez-Calatayud et al., 2024). Digital games can enhance engagement and experiential learning when their mechanisms align with learning objectives (Clark et al., 2016; McLaren et al., 2022). Games that require strategy and simulation can develop analytical ability, social negotiation, and decision-making—competencies central to citizenship (Kohn, 2024; Sun & Theussen, 2023). Furthermore, when pedagogically designed, digital games can serve as a simulation medium for understanding the social and practical dilemmas citizens face (Hamari et al., 2014; Liu & Shadiev, 2025).

Table 5 shows that most students view digital games positively as a learning medium. As many as 82.5% of respondents indicated that games make learning more interesting, and 78.3% agreed that games are worth using as a learning medium in civic education. However, a small proportion of students remained neutral or disagreed, indicating that civics learning games should be designed with more substantive and relevant material.

Table 5.

Perception of Digital Games as Learning Media

Statement	Agree (%)	Neutral (%)	Disagree (%)
Games can be used as a learning medium	78.3	14.2	7.5
Games make learning more interesting	82.5	11.7	5.8
Games make it easier to understand the material	69.2	20.8	10.0

Consistent with Table 5, game-based learning can enhance engagement, motivation, and conceptual understanding through experiential, interactive, and contextual learning (Clark et al., 2016; Gee, 2003; Hamari et al., 2014; Zhang, 2024). Games have also been shown to encourage active participation, critical thinking, and the development of civic literacy through simulation and participatory learning experiences (Angelelli et al., 2023; Liu & Shadiev, 2025; Pranata & Syamsijulianto, 2025). Furthermore, from a TAM perspective, the high level of respondent agreement indicates that students perceive games as both useful and easy to use in supporting learning, increasing the likelihood of technology acceptance within the educational process (Cardona Valencia & Betancur Duque, 2023; Davis, 1989).

Students see games as a practical way to explore positive character traits, particularly strategic thinking and fairness. These findings suggest that games are not viewed solely as entertainment but also as a medium that can foster character development when guided pedagogically.

Table 6.

Positive Impact of Games on Student Character

Character Aspect	Percentage (%)
Teamwork	71.7
Strategic thinking	76.7
Increase perseverance	63.3
Responsibility	58.3

Table 6 shows that developing social care is part of civic disposition and encompasses cooperation, responsibility, and the ability to make reflective decisions (Branson, 1998; Mulyono, 2017; Novitasari et al., 2025). Research on game-based civic education further shows that digital games can function as a social simulation space, enabling participants to learn, practise negotiation, work in teams, and make decisions within a safe and interactive context (Cardona Valencia & Betancur Duque, 2023; Dishon & Kafai, 2022; Hwang et al., 2025). In addition, a systematic review of gameful civic education affirms that mechanisms such as game-like challenges, collaboration, and problem-solving can strengthen engagement while simultaneously developing students' social and character-related skills (Hamari et al., 2014). Game-based learning can enhance engagement and experiential learning when designed to align with learning objectives and include opportunities for reflection (Clark et al., 2016; Zhang, 2024; Zheng et al., 2024).

Most students recognise the potential negative consequences of game use, particularly the risk of addiction and a decline in learning focus. This awareness reflects respondents' attitudes towards gameplay, indicating that using digital games as a learning medium must be accompanied by clear controls over duration and objectives. Table 7 shows that although digital games have potential as a learning medium, uncontrolled use can lead to unintended consequences that conflict with educational objectives—particularly regarding academic engagement and self-directed study. Excessive play can trigger addiction and contribute to declines in concentration and academic performance (Angelelli et al., 2023; Gonzalez-Mohino

et al., 2023; Pranata & Syamsijulianto, 2025). Learning should be oriented not only toward knowledge acquisition but also toward character formation and responsible social awareness in both social and digital life (Branson, 1998; Kolb, 2015; Luo, 2022). Games used in learning therefore need to be pedagogically designed and directed to balance the potential benefits and risks of digital technology (Clark et al., 2016). Furthermore, research on gameful civic education shows that games' effectiveness in civic learning depends heavily on instructional design that encourages reflection on values, self-control, and digital responsibility (Alrakhman et al., 2024; Sun & Theussen, 2023).

Table 7.

Negative Impact of Digital Games on Student Character

Negative Impact	Percentage (%)
Addiction	74.2
Decline in study focus	68.3
Health disturbance	52.5
Procrastination of academic tasks	61.7

Table 8 shows that 92.5% of students considered their smartphones ready or very ready to support game applications, indicating that, in terms of technological readiness, students are well prepared to adopt game-based learning innovations without significant technical barriers. This finding also confirms that, although digital games hold pedagogical potential, their uncontrolled use may produce consequences that conflict with the goals of civic education, particularly in developing responsibility, discipline, and empathy. Excessive game use can trigger addiction and disrupt students' academic and psychological well-being (Anjum et al., 2024). The positive impact of games depends heavily on their design, learning objectives, and the degree of control exercised over their use (Clark et al., 2016). Civic education must therefore strengthen social character traits such as responsibility and self-control, given that risks such as procrastination and declining learning focus remain serious concerns (Branson, 1998). The quality of civic learning in the digital era is closely tied to developing social responsibility and participation (Alrakhman et al., 2024), and gameful civic education is effective only when designed in a pedagogically and ethically sound manner (Dishon & Kafai, 2022). Table 8 presents students' smartphone readiness to support game-based learning.

Table 8.

Readiness of Student Smartphone Devices

Category	Percentage (%)
Very ready	48.3
Ready	44.2
Not ready	7.5
Total	100

The intensity data in Table 3 show that most respondents play games for a relatively moderate duration—1–2 hours per day (45.8%), followed by less than one hour (30%)—suggesting that students' gaming falls within a reasonable range. This pattern has implications for students' perceptions of games as a learning medium: those accustomed to moderate gameplay tend to view games more positively in learning, owing to their familiarity with game mechanisms such as challenges, reward-based feedback, and strategy. In addition, Table 5 shows that a substantial proportion of respondents consider games capable of making learning more interesting (82.5%) and worth using as a learning medium in civic education (78.3%).

Beyond gameplay intensity, respondents' gender characteristics offer additional insight into students' perceptions of games in learning. As shown in Table 1, respondents were predominantly female (72.5%), while male students accounted for 27.5%, indicating that the acceptance of learning media such as digital games is not confined to students traditionally associated with gaming. This suggests that digital games, as a learning medium, can be accepted by a wide range of students. Although this study did not specifically test differences in

perception between male and female students, the composition of respondents indicates that female students also hold a positive view of digital games as a learning medium, particularly with respect to learning interest and the potential formation of character traits such as tolerance, honesty, cooperation, appreciation, and responsibility.

These findings can also be interpreted within the TAM framework adopted in this study. Students' perceptions of the benefits of digital learning materials reflect perceived usefulness—the belief that technology offers tangible benefits in the learning process. Meanwhile, students' high smartphone readiness to install game applications (92.5%) reflects perceived ease of use. These two constructs represent the principal factors influencing users' acceptance of technology.

The findings show that students are relatively familiar with digital games in their daily lives, although their use remains moderate. Respondents typically play for less than two hours per day and prefer strategy and simulation games. This suggests that students do not view gameplay solely as entertainment; it is also linked to thinking, decision-making, and problem-solving—conditions that offer pedagogical opportunities to use games as a contextual, relevant learning medium aligned with students' characteristics.

Furthermore, the findings reveal that a substantial proportion of students view digital games positively as a learning medium in civic education, particularly for character development. Students consider that games can increase interest in learning, enhance understanding of the material, and foster character traits such as tolerance, fairness, honesty, and responsibility. However, students also demonstrate awareness of the potential negative impact of digital games, particularly the risk of addiction and reduced learning focus. This two-sided awareness underscores the need for well-structured, controlled, and pedagogically grounded game-based learning. Digital games should not be positioned solely as entertainment products but rather as a learning medium with genuine potential when designed pedagogically (Jackson et al., 2022). Digital games can enhance learning outcomes when combined with clear, objective-driven instructions and reflective mechanisms (Clark et al., 2016). They can also serve as simulated spaces that let students learn civic components through experience rather than through normative lectures or texts alone.

The findings show that many students view digital games positively as a learning medium in civic education, particularly in terms of increased interest in learning, tolerance, cooperation, and responsibility. Using digital games in civic education can not only increase students' interest in learning but also strengthen citizens' character. These findings relate to the concept of civic disposition—namely, the supportive attitudes and values that underpin good citizenship in life and democracy. Civic disposition encompasses character traits such as responsibility, cooperation, and commitment to democratic values (Branson, 1998). Game-like mechanisms involving teamwork, decision-making, and problem-solving can therefore serve as a learning tool that enables students to internalise these values in more contextualised ways.

Beyond civic disposition, these findings also connect to the concepts of civic virtue and civic engagement within civic education. Civic virtue refers to individuals' moral values and commitment to the public interest within a democratic context (Peterson & Civil, 2023), while civic engagement refers to citizens' active participation in social and political life (Alscher et al., 2022). By emphasising strategy and responsibility, games can serve as a social simulation medium, enabling students to practise civic virtue. Involving students in games during learning can also be associated with deliberative and democratic learning approaches, which are becoming increasingly important in civic education.

Deliberative learning emphasises the learning process through dialogue, consideration of diverse perspectives, and reflective decision-making, whereas democratic learning emphasises active participation, cooperation, and the practice of democratic values within the learning process (Rahman & Irayanti, 2025). Digital games can simulate environments that allow

students to weigh options, understand the consequences of their decisions, and collaborate with other players to solve problems. Research shows that game-based learning can foster environments that encourage discussion, negotiation, and collective decision-making, thereby supporting democratic practice in the classroom (Gee, 2003; Squire et al., 2011). Furthermore, empirical evidence shows that digital games designed to simulate social processes can enhance students' understanding of deliberation and democratic participation, as participants are directly engaged in scenario-based decision-making (Dishon & Kafai, 2022; Gonzalez-Mohino et al., 2023).

Based on the TAM, students' high agreement with the use of digital games reflects strong perceived usefulness and perceived ease of use. Davis (1989) explains that these two constructs are the principal influences on individuals' attitudes and intentions towards adopting learning technology. The findings show that students who use digital games perceive them as easy to access, relevant to their digital habits, and beneficial in increasing learning interest. This strengthens the argument that technology acceptance in learning is more effective when aligned with students' everyday practices.

Figure 2.
Mechanism Connecting Game Design with Civic Learning Outcomes

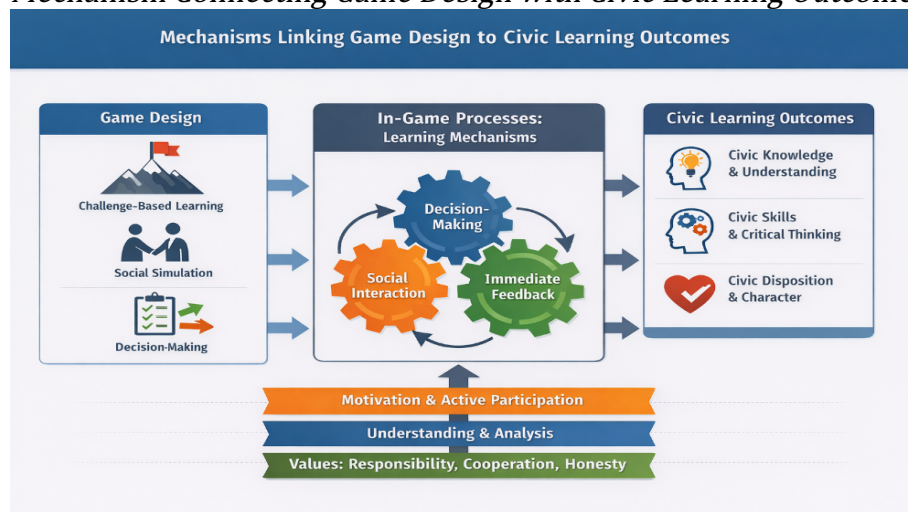


Figure 2 illustrates a conceptual mechanism showing how game design contributes to civic learning outcomes through specific in-game processes. It begins with key elements of game design—such as challenge-based learning, social simulation, and decision-making tasks—that create an interactive and immersive learning environment. These design features activate core learning mechanisms within the game, including decision-making, social interaction, and immediate feedback, forming a dynamic cycle that engages students both cognitively and socially. Through this process, students participate actively and sustain motivation, which enhances their understanding and analytical abilities. As a result, the learning experience leads to three principal civic outcomes: (1) improved civic knowledge and understanding, (2) strengthened civic skills such as critical thinking, and (3) the development of civic disposition. The model further highlights that values such as responsibility, cooperation, and honesty are internalised through experiential learning rather than passive instruction.

Furthermore, the findings on the potential of digital games for character development highlight the role of game-based learning in fostering engagement, responsibility, and self-regulation. Zheng et al. (2024) find that learning through digital games significantly increases literacy, digital ethics, motivation to learn, and student engagement. The literature indicates that games contribute not only to cognitive development but also to affective and character dimensions, which lie at the core of civic education.

Students' awareness of the negative impact of digital games represents an important finding that cannot be overlooked. The risks of addiction, diminished learning focus, and health-

related concerns identified among respondents indicate that uncontrolled game use can affect students' academic and psychological well-being (Stampfl et al., 2024). Nevertheless, digital games retain strategic value as a medium for internalising values. Roozenbeek and Van Der Linden (2019) show that educational games can build cognitive resilience to misinformation through learning-based experiences—findings relevant to the goal of civic education: fostering critical, ethical, and responsible citizens in the digital space. Digital games can create a safe learning environment in which students engage with moral dilemmas, value conflicts, and the social consequences of decisions.

The findings indicate that students perceive digital games as capable of fostering responsibility and strategic thinking, closely aligned with the concept of civic disposition. Using digital games in civic education can therefore increase students' interest in learning while also supporting character formation through more contextual and participatory experiences. Branson (1998) explains that civic disposition is an essential dimension in shaping good citizens, as it relates to the values, attitudes, and character underpinning a democratic way of life, including responsibility, respect for others, and the ability to work collaboratively to solve public problems. Digital games can simulate such spaces, enabling students to make decisions, collaborate with others, and understand the consequences of their actions.

Furthermore, this study's findings carry pedagogical implications for developing civic education in higher education. Civic education should extend beyond knowledge transfer about political and legal systems to include developing critical thinking, participation, and responsibility as citizens. Effective democratic education should foster active, reflective, and problem-based learning experiences to help students understand the values of citizenship more deeply (Cahyati & Rizqia, 2025). Using digital games as a learning medium can be an innovative strategy for creating interactive, meaningful learning experiences, enabling students to engage with moral dilemmas, social conflicts, and decision-making in realistic, contextual ways.

The pedagogical implications of this study suggest that integrating games into learning should be guided by value-based design, as the success of gamification largely depends on the alignment between game mechanics and learning objectives (Hamari et al., 2014). Overall, this discussion demonstrates that students' positive perceptions of digital games reflect not merely a response to technological innovation but a broader need for more contextual, participatory, and meaningful learning. These findings reinforce the literature suggesting that digital game-based learning can be an effective approach in higher education when developed in a planned, controlled, and integrated manner oriented towards character building (Zhang, 2024).

The practical implications of this research confirm that the successful implementation of game-based learning in civic education largely depends on two key factors within the TAM framework: perceived usefulness and perceived ease of use, both of which directly influence students' attitudes and intentions toward using learning technology. Teachers should select or develop game media that are engaging and interactive, easy to understand, technically undemanding, and aligned with students' learning objectives and real-life contexts, making civics material more meaningful. Educational app developers, in turn, must ensure a user-friendly interface, features that support active engagement, and content that stimulates critical thinking and decision-making. Institutions also need to provide adequate technological infrastructure, such as devices and stable internet access, and to train teachers to integrate game-based learning effectively. By addressing these aspects, game-based learning can not only increase student motivation and participation but also strengthen conceptual understanding, democratic attitudes, and social skills in civic education.

Conclusion

Overall, students generally view game-based learning as a model for civic education in higher education, with digital games serving as the learning medium. Most respondents play

games for less than two hours per day, indicating that gaming activity remains at a reasonable level. The most frequently played game genre is strategy, which requires tactical thinking, decision-making, and problem-solving skills. The findings further indicate that most students believe games can make learning more interesting, facilitate understanding of the material, and foster character traits such as tolerance, cooperation, honesty, appreciation, responsibility, and strategic thinking. The high level of student approval for digital games reflects a strong perception of the technology's usefulness and ease of use. Nevertheless, the findings also indicate that students are aware of the potential negative impacts of digital games, such as addiction and reduced learning focus. The use of games in learning should therefore be pedagogically designed, purposeful, and aligned with sound values. These findings suggest that digital games are not merely entertainment media but potential learning tools that can support the formation of civic disposition, civic virtue, and civic engagement among students, positioning them as a relevant pedagogical innovation for strengthening character in the digital era.

Acknowledgements

The authors express sincere gratitude to the faculty and research staff at Universitas Negeri Semarang (UNNES) for their support during the study's preparation and data collection. We also thank the validators for their valuable insights and expert judgment in developing and refining the research instrument. Finally, the authors thank all the undergraduate students who voluntarily participated in this survey and shared their perspectives on game-based learning in civic education.

Disclosure Statement

The authors have no potential conflicts of interest to disclose.

Funding Statement

This work did not receive funding.

Ethics Approval

No ethics approval is needed because this study involved non-invasive quantitative survey research collecting anonymous student perception data without intervention, clinical procedures, or sensitive personally identifiable information.

References

- Alrakhman, R., Budimansyah, D., Sapriya, S., & Rahmat, R. (2024). The effect of digital citizenship on the quality learning civic education. *Jurnal Civics: Media Kajian Kewarganegaraan*, 21 (1), 29–40. <https://doi.org/10.21831/jc.v21i1.67086>
- Alscher, P., Ludewig, U., & McElvany, N. (2022). Civic education, teaching quality and students' willingness to participate in political and civic life: Political interest and knowledge as mediators. *Journal of Youth and Adolescence*, 51(10), 1886–1900. <https://doi.org/10.1007/s10964-022-01639-9>
- Angelelli, C. V., Ribeiro, G. M. D. C., Severino, M. R., Johnstone, E., Borzenkova, G., & Da Silva, D. C. O. (2023). Developing critical thinking skills through gamification. *Thinking Skills and Creativity*, 49, 101354. <https://doi.org/10.1016/j.tsc.2023.101354>
- Anjum, R., Nodi, N. H., Das, P. R., Roknuzzaman, A. S. M., Sarker, R., & Islam, M. R. (2024). Exploring the association between online gaming addiction and academic performance among the school-going adolescents in Bangladesh: A cross-sectional study. *Health Science Reports*, 7(9), e70043. <https://doi.org/10.1002/hsr.2.70043>
- Barz, N., Benick, M., Dörrenbächer-Ulrich, L., & Perels, F. (2024). The effect of digital game-based learning interventions on cognitive, metacognitive, and affective-motivational learning outcomes in school: A meta-analysis. *Review of Educational Research*, 94 (2), 193–227. <https://doi.org/10.3102/00346543231167795>

- Belda-Medina, J., & Kokošková, V. (2023). Integrating chatbots in education: Insights from the Chatbot-Human Interaction Satisfaction Model (CHISM). *International Journal of Educational Technology in Higher Education*, 20(1), 62. <https://doi.org/10.1186/s41239-023-00432-3>
- Branson, M., S. (1998). The role of civic education: A forthcoming education policy task force position paper from the Communitarian Network. In *Center for Civic Education*. Center for Civic Education. https://www.civiced.org/papers/articles_role.html
- Cahyati, N. M., & Rizqia, M. (2025). The effectiveness of project-based learning model on citizenship attitudes of elementary school students in civic education learning. *Journal of Contemporary Islamic Primary Education*, 3(3), 283–291. <https://doi.org/10.61253/jcipe.v3i3.333>
- Cardona-Valencia, D., & Betancur-Duque, F. A. (2023). Technology acceptance model (TAM): A study of teachers' perception of the use of serious games in the higher education. *IEEE Revista Iberoamericana de Tecnologías Del Aprendizaje*, 18(1), 123–129. <https://doi.org/10.1109/RITA.2023.3250586>
- Clark, D. B., Tanner-Smith, E. E., & Killingsworth, S. S. (2016). Digital games, design, and learning: A systematic review and meta-analysis. *Review of Educational Research*, 86(1), 79–122. <https://doi.org/10.3102/0034654315582065>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Dishon, G., & Kafai, Y. B. (2022). Connected civic gaming: Rethinking the role of video games in civic education. *Interactive Learning Environments*, 30(6), 999–1010. <https://doi.org/10.1080/10494820.2019.1704791>
- Feng, L., Shen, X., Xie, Z., & Yan, X. (2025). How gamification-based courses drive online learners' engagement: Focusing on intrinsic motivation and effect mechanisms. *Education and Information Technologies*, 30(8), 10943–10977. <https://doi.org/10.1007/s10639-024-13242-5>
- Gee, J. P. (2003). What video games have to teach us about learning and literacy. *Computers in Entertainment*, 1(1), 20–20. <https://doi.org/10.1145/950566.950595>
- Gonzalez-Mohino, M., Rodriguez-Domenech, M. Á., Callejas-Albiñana, A. I., & Castillo-Canalejo, A. (2023). Empowering critical thinking: The role of digital tools in citizen participation. *Journal of New Approaches in Educational Research*, 12(2), 258–275. <https://doi.org/10.7821/naer.2023.7.1385>
- Haberlin, K. A., & Atkin, D. J. (2022). Mobile gaming and Internet addiction: When is playing no longer just fun and games? *Computers in Human Behavior*, 126, 106989. <https://doi.org/10.1016/j.chb.2021.106989>
- Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does gamification work? A literature review of empirical studies on gamification. *2014 47th Hawaii International Conference on System Sciences*, 3025–3034. <https://doi.org/10.1109/HICSS.2014.377>
- Hwang, G.-J., Huang, H., & Chen, H.-Y. (2025). Promoting students' civic literacy and positive learning behaviors: A supportive feedback-based decision-making gaming approach. *Education and Information Technologies*, 30(1), 189–227. <https://doi.org/10.1007/s10639-024-12839-0>
- Istianah, A., Mazid, S., & Susanti, R. P. (2021). Learning strategies for Pancasila education and civic education as character-building courses for students. *Heritage*, 2(1), 17–31. <https://doi.org/10.35719/hrtg.v2i1.37>

- Jackson, L. C., O'Mara, J., Moss, J., & Jackson, A. C. (2022). Analyzing digital educational games with the Games as Action, Games as Text framework. *Computers & Education*, 183, 104500. <https://doi.org/10.1016/j.compedu.2022.104500>
- Jones, S.-L., & Procter, R. (2023). Young people's perceptions of digital, media and information literacies across Europe: Gender differences, and the gaps between attitudes and abilities. *Technology, Pedagogy and Education*, 32(4), 435–456. <https://doi.org/10.1080/1475939X.2023.2210152>
- Kaushal, N. (2025). An analysis and profiling of promising Indian women's innate leadership and entrepreneurial approaches. In J. Marques (Ed.), *The Palgrave Handbook of Change and Resilience at Work* (pp. 455–479). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-91493-5_22
- Kohn, P. (2024). *Elevating leadership: Innovative teaching methods for developing future leaders*. Emerald Publishing Limited. <https://doi.org/10.1108/9781835495643>
- Kolb, D. A. (2015). *Experiential learning: Experience as the source of learning and development* (Second edition). Pearson Education, Inc. <https://www.pearson.com/en-us/subject-catalog/p/Kolb-Experiential-Learning-Experience-as-the-Source-of-Learning-and-Development-2nd-Edition/P200000000384/9780133892406>
- Liesa-Orús, M., Latorre-Coscolluela, C., Sierra-Sánchez, V., & Vázquez-Toledo, S. (2023). Links between ease of use, perceived usefulness and attitudes towards technology in older people at university: A structural equation modeling approach. *Education and Information Technologies*, 28(3), 2419–2436. <https://doi.org/10.1007/s10639-022-11292-1>
- Liu, J., & Shadiev, R. (2025). A review of empirical research on game-based digital citizenship education. *Education and Information Technologies*, 30(14), 19365–19417. <https://doi.org/10.1007/s10639-025-13549-x>
- Luo, Z. (2022). Gamification for educational purposes: What are the factors contributing to varied effectiveness? *Education and Information Technologies*, 27(1), 891–915. <https://doi.org/10.1007/s10639-021-10642-9>
- Mazid, S., Komalasari, K., Abdulkarim, A., Rahmat, R., Hasanah, I., Istianah, A., Wulansari, A., & Prasetyo, D. (2024). Digital-based comic learning to develop civic disposition. *Journal of Engineering Science and Technology*, 19(6), 145–152. https://jestec.taylors.edu.my/Special%20Issue%20ISCoE%202024_1/ISCoE2024_1_19.pdf
- Mazid, S., Wulansari, A., Komalasari, K., Abdulkarim, A., & Rahmat, R. (2025). The meaningfulness of Sa Tidar philosophy in strengthening community civic disposition. *Jurnal Moral Kemasyarakatan*, 10(2). <https://doi.org/10.21067/jmk.v10i1.10479>
- McLaren, B. M., Richey, J. E., Nguyen, H., & Hou, X. (2022). How instructional context can impact learning with educational technology: Lessons from a study with a digital learning game. *Computers & Education*, 178, 104366. <https://doi.org/10.1016/j.compedu.2021.104366>
- Mulyono, B. (2017). Reorientasi civic disposition dalam kurikulum Pendidikan Kewarganegaraan sebagai upaya membentuk warga negara yang ideal [Reorienting civic disposition in the citizenship education curriculum as an effort to shape ideal citizens]. *Jurnal Civics: Media Kajian Kewarganegaraan*, 14(2), 218–225. <https://doi.org/10.21831/civics.v14i2.17007>
- Novitasari, N., Syahroni, M., Sukron Mazid, Firda Aulia Izzati, & Arum Nisma Wulanjani. (2025). Civics education learning based on local cultural values to strengthen students' civic

- disposition. *Jurnal Iqra': Kajian Ilmu Pendidikan*, 10(3), 171–179. <https://doi.org/10.25217/ji.v10i3.6672>
- Oliveira, W., Hamari, J., Joaquim, S., Toda, A. M., Palomino, P. T., Vassileva, J., & Isotani, S. (2022). The effects of personalized gamification on students' flow experience, motivation, and enjoyment. *Smart Learning Environments*, 9(1), 16. <https://doi.org/10.1186/s40561-022-00194-x>
- Peterson, A., & Civil, D. (2023). Virtues, values and the fracturing of civic and moral virtue in citizenship education policy in England. *Educational Review*, 75(7), 1313–1328. <https://doi.org/10.1080/00131911.2021.2023105>
- Pranata, A., & Syamsijulianto, T. (2025). Enhancing civic literacy in primary education through and team games tournament: A bibliometric review (2015–2025). *Journal of Elementary Education*, 2(1), 42–52. <https://doi.org/10.38040/jeleduc.v2i1.1248>
- Rahman, A., & Irayanti, I. (2025). The Pancasila deliberation model: A framework for fostering democratic citizenship in civic education. *Entita: Journal of Social Science and Social Sciences Education*, 7(1), 41–58. <https://doi.org/10.19105/ejpis.v7i1.18530>
- Roozenbeek, J., & Van Der Linden, S. (2019). Fake news game confers psychological resistance against online misinformation. *Palgrave Communications*, 5(1), 65. <https://doi.org/10.1057/s41599-019-0279-9>
- Squire, K., Gee, J. P., & Jenkins, H. (2011). *Video games and learning: Teaching and participatory culture in the digital age*. Teachers' College Press. <https://eric.ed.gov/?id=ED523599>
- Stampfl, R., Geyer, B., Deissl-O'Meara, M., & Ivkić, I. (2024). Revolutionising role-playing games with ChatGPT. <https://doi.org/10.48550/ARXIV.2407.02048>
- Sun, Z., & Theussen, A. (2023). Assessing negotiation skill and its development in an online collaborative simulation game: A social network analysis study. *British Journal of Educational Technology*, 54(1), 222–246. <https://doi.org/10.1111/bjet.13263>
- Vázquez-Calatayud, M., García-García, R., Regaira-Martínez, E., & Gómez-Urquiza, J. (2024). Real-world and game-based learning to enhance decision-making. *Nurse Education Today*, 140, 106276. <https://doi.org/10.1016/j.nedt.2024.106276>
- Zhang, F. (2024). Effects of game-based learning on academic outcomes: A study of technology acceptance and self-regulation in college students. *Heliyon*, 10(16), e36249. <https://doi.org/10.1016/j.heliyon.2024.e36249>
- Zheng, Y., Zhang, J., Li, Y., Wu, X., Ding, R., Luo, X., Liu, P., & Huang, J. (2024). Effects of digital game-based learning on students' digital etiquette literacy, learning motivations, and engagement. *Heliyon*, 10(1), e23490. <https://doi.org/10.1016/j.heliyon.2023.e23490>