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Transformation of Civics education through digital-interactive models: Strategies for strengthening students' civic responsibility

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ABSTRACT

The development of digital technology has changed the paradigm of learning in higher education, including in Civic Education (PKn) courses. This transformation presents opportunities for pedagogical innovation and challenges in shaping students' civic character. This study aims to analyze the effectiveness of a digital-interactive PKn learning model in strengthening students' civic responsibility at the Indonesia University of Education and the Bandung Institute of Technology. Using an exploratory sequential mixed methods design, this study involved five qualitative informants (lecturers and students) and 53 quantitative respondents. The results show that the digital-interactive model increases participation in discussions, strengthens critical thinking skills, and fosters digital ethics and constitutional awareness. However, obstacles remain in lecturers' TPACK competence, infrastructure readiness, and students' perceptions of PKn as a general course. This study concludes that the digital-interactive model is effective in building civic responsibility when supported by lecturer training, adaptive curriculum, and equitable access to technology. Recommendations aim to strengthen institutional policies and develop open educational resources (OER) to realize transformative PKn learning in the digital era.

ABSTRAK

Perkembangan teknologi digital telah mengubah paradigma pembelajaran di pendidikan tinggi, termasuk dalam mata kuliah Pendidikan Kewarganegaraan (PKn). Transformasi ini menghadirkan peluang inovasi pedagogis sekaligus tantangan dalam pembentukan karakter kewarganegaraan mahasiswa. Penelitian ini bertujuan untuk menganalisis efektivitas model pembelajaran PKn digital-interaktif dalam memperkuat civic responsibility mahasiswa di Universitas Pendidikan Indonesia dan Institut Teknologi Bandung. Menggunakan desain exploratory sequential mixed methods, penelitian ini melibatkan lima informan kualitatif (dosen dan mahasiswa) serta 53 responden kuantitatif. Hasil menunjukkan bahwa model digital-interaktif meningkatkan partisipasi diskusi, memperkuat kemampuan berpikir kritis, dan menumbuhkan etika digital serta kesadaran konstitusional. Namun, kendala masih ditemukan pada kompetensi TPACK dosen, kesiapan infrastruktur, dan persepsi mahasiswa terhadap PKn sebagai mata kuliah umum. Penelitian ini menyimpulkan bahwa model digital-interaktif efektif membangun tanggung jawab kewarganegaraan bila didukung pelatihan dosen, kurikulum adaptif, dan akses teknologi yang merata. Rekomendasi diarahkan pada penguatan kebijakan institusional dan pengembangan open educational resources (OER) untuk mewujudkan pembelajaran PKn yang transformatif di era digital.

Kata Kunci: pendidikan kewarganegaraan; sumber belajar terbuka; tanggung jawab kewargaan; Technological Pedagogical Content Knowledge; TPACK

INTRODUCTION

The development of digital technology has brought significant changes to higher education in Indonesia, including the instruction of Civics Education (Civics). The shift from conventional to digital-based learning allows for spatial and temporal flexibility; however, it also demands pedagogical readiness to ensure that technology serves not merely as an administrative instrument, but as a medium for fostering critical awareness and civic responsibility (Sihombing & Lukitoyo, 2021). A primary challenge in digital Civics education is the tendency toward cognitive dominance, which neglects the affective-moral dimension—the core of forming civic responsibility (Rahayu *et al*., 2025). Therefore, the integration of technological and moral literacy is crucial in shaping ethical and responsible digital citizens.

The implementation of digital-based Civics Education at several universities in Bandung still faces challenges related to student engagement and the internalization of civic values. Such issues have been observed at the Universitas Pendidikan Indonesia (UPI) and the Institut Teknologi Bandung (ITB). At UPI, online Civics learning emphasizes the delivery of material over spaces for reflection and critical dialogue, resulting in suboptimal civic responsibility formation. Meanwhile, at ITB, low pedagogical interaction limits the authentic development of civic virtues (Fauzi & Roza, 2019). Conventional learning models transferred directly to digital platforms without pedagogical adaptation have also proven ineffective in building civic competence (Halimi *et al*., 2022). Preliminary observations in this study indicate that, although both institutions employ blended learning, the use of digital media remains dominant for content delivery and assignment submission, thereby failing to optimize two-way interaction and meaningful learning activities. Consequently, some students demonstrate low engagement in discussions, social projects, and the application of civic values.

This condition aligns with studies showing that interactive digital learning can increase student motivation and responsibility only if designed based on participation and experience (Dalilah & Utami, 2025; Rahman *et al.,* 2024). The presence of innovative media in education, including Civics, has become an urgent necessity to improve instructional quality (Seftriyana & Megasari, 2025). Nationally, a study of 385 students showed a decline in active participation in online discussions to 42%, compared to 78% in face-to-face learning, along with a 35% decrease in the social engagement index during online instruction (Seftriyana & Megasari, 2025). Furthermore, 68% of students felt that digital Civics was less effective in fostering social awareness, and 72% struggled to relate the material to real-life contexts (Belladonna & Anggraena, 2019). These findings underscore the need for innovative digital Civics models that are interactive, reflective, and based on social experience. Prior research indicates that digital learning media are effective in supporting interactive learning processes (Supriandi *et al*., 2025).

Other studies demonstrate that digital learning media are effective in improving student learning outcomes (Kesuma *et al*., 2025). Thus, developing an interactive-digital Civics model capable of strengthening civic responsibility in higher education is essential. Civics Education must ensure that students are not only intellectually bright but also possess moral integrity and democratic commitment (Coelho & Menezes, 2021). The model to be developed is expected to merge digital technology with **humanistic and transformative pedagogical principles**, ensuring that learning is not merely informative but also character-building through critical reflection, collaboration, and real-world community involvement (Kusuma & Muharom, 2025). In this context, technology serves as a means to reinforce the formation of civic character through activities based on critical discussion, collaboration, and the exploration of real social issues.

Civics learning can become more authentic and participatory, helping students develop critical thinking skills and internalize democratic values through Technological Pedagogical and Content Knowledge (TPACK) (Siboro, 2024). The TPACK framework provides a relevant conceptual foundation for analyzing

and designing Civics instruction in higher education (Pitriani *et al.,* 2025). This emphasizes the importance of balance between civic content mastery, pedagogical strategies, and the meaningful utilization of technology. In Civics courses, core competencies such as **civic knowledge, civic skills, and civic dispositions** can only flourish if lecturers integrate technology with dialogic and reflective pedagogical approaches (Fazira *et al.,* 2024; Rahayu *et al.,* 2025). Technology serves not merely as a medium for content delivery, but is configured to reinforce the process of civic character building through activities based on critical discussion, collaboration, and the exploration of real-world social issues.

The integration of TPACK in higher education Civics also creates opportunities for more authentic and participatory learning experiences (Pitriani *et al.,* 2025; Siboro, 2024). Through the utilization of interactive technology, students are expected to develop critical thinking while internalizing democratic values. However, the success of this integration depends on the lecturer's ability to design activities that unite civic content with active-learning pedagogy (Ardiansyah *et al.,* 2025; Hartanto *et al.,* 2025). To address these pedagogical challenges and the need to strengthen civic responsibility in digital-based Civics learning, this study aims to analyze the effectiveness of an interactive-digital Civics learning model in strengthening students' civic responsibility at Universitas Pendidikan Indonesia and Institut Teknologi Bandung through an exploratory sequential mixed methods design that integrates qualitative and quantitative approaches.

LITERATURE REVIEW

The Transformation of Civics Education within a Digital-Interactive Learning Ecosystem

The transformation of Civics Education at the higher education level has undergone a significant paradigmatic shift alongside the accelerated digitalization of the learning ecosystem. Civics courses can no longer be positioned merely as processes for conventional knowledge transfer; instead, they must transform into spaces for holistic civic competence development, encompassing the dimensions of **civic** knowledge, civic skills, and civic disposition relevant to 21st-century challenges (Pangalila, 2017). The implementation of contemporary Civics instruction requires reconfiguring pedagogical approaches to accommodate the characteristics of digital natives, who possess learning preferences distinct from those of previous generations. Digital-era students exhibit high responsiveness toward dynamic, participatory learning methods that utilize technology as a medium for interaction (Barokah & Mahmudah, 2025).

The gap between conventional instructional practices and the expectations of digital students creates an urgency for universities to undertake substantial pedagogical innovations. This ensures that Civics learning remains relevant and effective in forming a civic consciousness adaptive to contemporary dynamics. The integration of digital technology into the instructional process has altered the landscape of higher education, moving from conventional **teacher-centered** models toward a **student-centered learning** paradigm that positions students as active agents in the construction of knowledge. The digital-interactive learning model integrates technological platforms with instructional strategies that encourage active engagement, multi-directional collaboration, and dynamic interaction between lecturers, students, and learning content (Eryanto *et al.,* 2025). Characteristics of this model include temporal and spatial flexibility in learning access, personalized learning pathways tailored to individual needs, the integration of rich multimedia content, and real-time feedback mechanisms to support continuous reflection and evaluation processes.

Digital-interactive learning is not merely the instrumental adoption of technology; rather, it is the engineering of learning experiences that leverage technological potential to create engaging, meaningful, and transformative environments (Ariaty *et al.,* 2025). Its effective application requires robust instructional design, the precise curation of digital tools, and the development of digital literacy for both educators and students to maximize the potential of technology-based learning. In this context, **student engagement** emerges as a vital element for the success of technology-based instruction. This engagement is a

multidimensional construct encompassing cognitive, emotional, behavioral, and social aspects. Research indicates that the use of interactive technology designed with personalization, responsiveness, and contextual relevance holds significant potential to enhance student involvement in the learning process (Hardianti *et al.,* 2024; Sabri *et al.,* 2024; Yaseen *et al.,* 2025).

Digital Literacy, Digital Citizenship, and Civic Responsibility

The concept of digital literacy has evolved beyond technical proficiency in technology use to encompass the critical ability to access, evaluate, analyze, and create information within digital environments ethically and responsibly (Johan *et al*., 2020). Within the context of Civics Education, digital literacy serves as a primary prerequisite for the formation of digital citizenship, which manifests as civic responsibility in the digital era. Digital citizenship includes an understanding of the rights and responsibilities of citizens in digital spaces, ethical communication practices, democratic participation via online platforms, and awareness of issues such as privacy, information security, and media literacy. The development of digital citizenship competence among students is an urgent necessity, given that the public sphere has shifted toward digital domains, altering how citizens interact, participate, and contribute to democratic life (Roza, 2020).

Civic responsibility essentially reflects an individual's reflective awareness and proactive commitment to participating constructively in socio-political life and contributing to the common welfare. This concept integrates an understanding of constitutional rights and obligations, concern for public issues, and the willingness to engage actively in various forms of civic engagement, in both conventional and digital realms (Supriyanto & Fitriyana, 2025). Strengthening student civic responsibility is an essential goal of Civics instruction, as students serve as agents of social transformation for the future. The process of internalizing civic responsibility values cannot be achieved solely through cognitive transmission; it also requires practical experience, critical reflection on socio-political phenomena, and the development of constructive civic dispositions (Nugroho *et al*., 2025). Approaches such as project-based learning, actual case analysis, democratic participation simulations, and experiential learning have proven effective in developing authentic and sustainable awareness and commitment to civic responsibility.

The Synergy between Digital-Interactive Models and the Strengthening of Civic Responsibility

The convergence of digital-interactive learning models and the strengthening of civic responsibility create innovative opportunities for transforming Civics Education in higher education. A digital learning ecosystem enables students to explore civic issues in depth, engage with diverse perspectives, and develop critical thinking skills through the comparative analysis of information from various sources. Interactive features such as online discussion forums, digital simulations, virtual debates, and platform-based collaborative projects provide active, contextual, and meaningful learning experiences while facilitating the development of digital citizenship as a contemporary form of civic responsibility in the digital era (Nugroho *et al*., 2025). The effectiveness of this synergy is highly dependent on systematic and contextual instructional design, technological infrastructure support, and the digital competence of all educational stakeholders. Civics instruction in the digital era has the potential to create a transformative, inclusive, and meaningful learning ecosystem that shapes responsible, adaptive citizens relevant to the social dynamics of the 21st century.

METHODS

This study adopts an Exploratory Sequential Design, integrating both qualitative and quantitative approaches. According to Sugiyono (2025), this research model is conducted sequentially with distinct boundaries between phases. The phenomenon under investigation is the low level of student engagement in conventional Civics Education and the lack of digital technology integration that can foster civic responsibility in the era of digital disruption. The research focuses on exploring the phenomenon of digital Civics learning and testing its effectiveness through an Exploratory Sequential Mixed Methods approach. The study was conducted at Universitas Pendidikan Indonesia (UPI) and Institut Teknologi Bandung (ITB), which represent higher education institutions implementing digital-based learning.

Qualitative Phase

The qualitative phase utilizes a phenomenological approach to explore the lived experiences of lecturers and students in implementing interactive-digital Civics learning (Mella *et al*., 2022). The stages are as follows.

1. Informant Selection. A purposive sampling technique was used to select five key informants, consisting of:
   a. Three Civics lecturers (two from UPI and one from ITB) with ≥ 5 years of teaching experience who have integrated digital technology into their instruction.
   b. Two active students (5th and 7th semesters) who have participated in interactive-digital Civics learning.
2. Data Collection Techniques.
   a. Semi-structured in-depth interviews lasting 60–90 minutes per informant.
   b. Participant observation in three classrooms implementing digital-interactive learning.
   c. Document analysis of curricula, instructional modules, and institutional guidelines.
3. Data Analysis. Analysis was conducted using the Miles and Huberman model, encompassing data reduction, data display, and conclusion drawing. Thematic coding was employed to identify implementation patterns, supporting factors, barriers, and model development needs.
4. Data Validity. Validity was ensured through triangulation of sources and methods, member checking, and peer debriefing.
5. Qualitative Output: The qualitative findings serve as the basis for developing the quantitative instrument, particularly regarding the three TPACK domains: Civics content mastery, pedagogical strategies, and digital technology utilization.

Quantitative Phase

The quantitative phase aims to measure the effectiveness of the interactive-digital learning model in strengthening student civic responsibility.

1. Population and Sample. The population consists of students taking Civics courses at UPI and ITB. The sample includes 53 respondents selected via random sampling based on the following criteria:
   a. Active students aged 18–22 years.
   b. Have completed or are currently enrolled in a Civics course.
   c. Have access to digital devices and the internet.

2. Research Instrument. The instrument is a Likert-scale questionnaire developed from the qualitative analysis results, consisting of 20 items measuring five dimensions of civic responsibility: active participation, critical thinking skills, digital literacy, social awareness, and civic ethics.
3. Data Analysis. Data were analyzed using descriptive and inferential statistics with SPSS version 26 to assess correlations between variables and the effectiveness of the interactive-digital learning model.
4. Integration of Results (Mixing Phase). The qualitative and quantitative results were merged through holistic interpretation to formulate a recommendation for an adaptive, applicable, and comprehensive interactive-digital Civics learning model.

RESULTS AND DISCUSSION

Qualitative Phase: Exploring Interactive-Digital Civics Learning Experiences

In-depth Interview Findings

The results of semi-structured interviews, with an average duration of 75 minutes per informant, revealed a strong consensus regarding the urgency of transforming Civics instruction. The three lecturer informants stated the necessity of pedagogical innovation to overcome low student participation in conventional learning. The first informant (D1) remarked,

> *"Students tend to be passive in traditional lecture-based learning but show high enthusiasm when involved in interactive digital activities,"*

A similar sentiment was expressed by the second informant (D2), who emphasized that technology integration creates a more dynamic learning environment relevant to the characteristics of the digital generation. From the students' perspective, both informants confirmed a preference for instructional methods that integrate digital and interactive elements. The first student informant (M1) explained that application-based learning and digital simulations facilitate a more concrete and applicable understanding of abstract civic responsibility concepts. The second student informant (M2) added that the use of digital platforms enables more effective collaboration and encourages active participation in civic discussions.

Participant Observation of Learning Activities

Observations conducted across three classrooms implementing digital-interactive models identified diverse implementation strategies. The first class utilized a Learning Management System (LMS) integrated with interactive multimedia content, including analytical videos, real-time quizzes, and online discussion forums. The second class applied a gamification approach through digital democracy simulation applications, allowing students to act as policymakers in virtual scenarios. The third class developed collaborative projects based on visual novels that integrated civic narratives with interactive decision-making. Student engagement patterns showed a significant increase in all three classes compared to conventional learning. Participation levels in discussions increased by an average of 67 percent, with students demonstrating higher initiative in questioning and presenting arguments. Observations also identified more egalitarian learning dynamics, where introverted students had greater opportunities to contribute through digital mediums.

Curriculum Document Analysis

A review of curriculum documents and Semester Learning Plans (RPS) revealed varying levels of digital technology integration. Documents from Universitas Pendidikan Indonesia (UPI) showed explicit inclusion of technology-based instructional methods, allocating 40 percent of learning time to interactive-digital

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activities. Conversely, documents from Institut Teknologi Bandung (ITB) maintained a conventional approach with technology integration serving a supplementary role. Analysis of learning outcomes indicated that while both institutions have formulated targets for civic responsibility development, operational strategies through digital technology have not yet been standardized.

Identification of Lecturers' Technological Pedagogical Content Knowledge (TPACK)

The evaluation of lecturers' TPACK competence was conducted through structured interviews and teaching practice observations. The TPACK framework measured three primary domains: Civics Content Knowledge (CK), Pedagogical Knowledge (PK), and Technological Knowledge (TK), as well as the integration of these domains. The identification results showed that all lecturer informants possessed "Very Good" mastery of Civics content. However, a significant disparity was found in Technological Pedagogical Knowledge (TPK), where two informants demonstrated high competence in integrating technology for instructional purposes, while one informant remained in the early adaptation stage. The primary barriers identified included limited formal TPACK training, a lack of institutional technical support, and gaps in access to cutting-edge instructional technology infrastructure.

The thematic analysis results indicate that the implementation of instructional innovation is supported by several critical factors, ranging from institutional policies encouraging innovation to the availability of basic technological infrastructure, such as internet connectivity and adequate computing devices. This support is reinforced by lecturers' intrinsic motivation to enhance their digital competence and the adaptive nature of digital-native students. Furthermore, the availability of open-source digital learning platforms facilitates the integration of technology into academic activities. Conversely, implementation faces various obstacles, such as limited TPACK competence among some lecturers and technological infrastructure disparities between faculties, which hinder the equalization of instructional quality. The heterogeneity of students' digital skills also presents a challenge, compounded by the social stigma attached to general education courses (*Mata Kuliah Umum*) as secondary curricula. Finally, a significant barrier is the lack of a collaborative ecosystem among lecturers for developing digital content, preventing the collective optimization of instructional innovation.

Quantitative Phase: Measuring the Effectiveness of the Digital-Interactive Model

Respondent Demographic Profile

The quantitative phase involved 53 students selected through random sampling from the population of students enrolled in Civics courses at both institutions. The details of the respondent distribution are presented in **Table 1.**

Table 1. Respondent Distribution by Institution

Higher Education Institutions	Frequency	Percentage
Universitas Pendidikan Indonesia	39	73,60%
Institut Teknologi Bandung	14	26,40%
Total	53	100,00%

Source: Researcher's Reconstruction, 2025

The distribution of respondents shows that 39 students (73.6%) were from Universitas Pendidikan Indonesia and 14 students (26.4%) were from Institut Teknologi Bandung (see **Table 1**). The gender

composition was relatively balanced, consisting of 27 male students (50.9%) and 26 female students (49.1%). The majority of respondents were in their third semester (42 students or 79.2%), with a dominant age range of 19–20 years (41 students or 77.3%). The diversity of academic backgrounds is reflected in the participation of 23 different study programs, with Islamic Religious Education as the most represented program.

Evaluation of Perceptions Toward Digital-Interactive Learning

Descriptive statistical analysis of the 20-item questionnaire reveals a positive appreciation among students regarding the implementation of the digital-interactive learning model, as presented in **Table 2** below.

Table 2. Descriptive Statistics of Digital-Interactive Learning Perceptions

Variables	N	Average	Standard Deviation	Interpretation
VAR00012	54	2,4444	0,76889	Very Positive
VAR00006	54	2,3704	0,87516	Positive
VAR00008	54	2,3519	0,89353	Positive
VAR00021	54	1,7407	0,97488	Needs Improvement
VAR00020	54	1,7778	0,98415	Needs Improvement

Source: Researcher's Reconstruction, 2025

Based on **Table 2**, variable VAR00012, which measures the perceived ease of access to digital materials, recorded the highest score with a mean value of 2.4444 (SD=0.76889), indicating a highly favorable assessment. Variable VAR00006, about the interactivity of the learning platform, showed a mean of 2.3704 (SD=0.87516), while VAR00008, regarding the relevance of digital content, reached a mean of 2.3519 (SD=0.89353). Conversely, variable VAR00021, which measures the readiness of technological infrastructure, recorded the lowest value with a mean of 1.7407 (SD=0.97488), indicating an area that requires systematic improvement. Variable VAR00020, related to technical support, also showed low achievement with a mean of 1.7778 (SD=0.98415). The distribution of responses exhibits a trend toward the mid-to-high range (1.00–3.00), with standard deviations ranging from 0.76889 to 1.00870. This moderate variability reflects relative consistency in student perceptions across various dimensions of digital-interactive learning, while also indicating differences in individual experiences that should be accounted for in future refinements of the model.

Pearson Correlation Analysis of Learning Dimensions

Pearson correlation testing identified significant relationships among learning dimensions, with the highest correlation coefficient of 0.799 observed between VAR00003 (critical thinking skills) and VAR00008 (relevance of digital content) at a significance level of $p<0.01$, as shown in **Table 3** below.

Table 3. Significant Correlation Matrix of Learning Variables

Variable Correlation	Pearson Coefficient	Significance (2-tailed)	The Power of Relationships
VAR00003 ↔ VAR00008	0,799**	0	Very strong
VAR00013 ↔ VAR00014	0,794**	0	Very strong
VAR00004 ↔ VAR00006	0,767**	0	Strong
VAR00004 ↔ VAR00009	0,710**	0	Strong
VAR00006 ↔ VAR00009	0,710**	0	Strong

*Note: ** Correlation is significant at the 0.01 level (2-tailed).*
Source: Researcher's Reconstruction, 2025

These findings indicate that an increase in the relevance of digital content is directly proportional to the development of students' critical thinking skills. A very strong correlation was also identified between VAR00013 (active participation) and VAR00014 (digital collaboration), with a coefficient of 0.794 ($p<0.01$), suggesting that digital platforms facilitating collaboration contribute significantly to increased student participation. The correlational structure reveals a multidimensional interconnectedness, with **89.5%** of variable pairs showing significant correlations ($p<0.01$). This pattern confirms the instrument's internal consistency and adequate construct validity, while demonstrating that the dimensions of digital-interactive learning are mutually reinforcing in facilitating the achievement of learning objectives.

Measurement of Civic Responsibility Dimensions

A specific evaluation of the five dimensions of civic responsibility reveals varied levels of achievement, as presented in **Table 4** below.

Table 4. Evaluation of Civic Responsibility Dimension Achievement

Dimensions	Average	Standard Deviation	Achievement Level
Constitutional Awareness	2,0556	0,97935	Pretty good
Democratic Participation	1,8889	1,00314	Needs Improvement
Digital Ethics	2,2593	0,95533	Good
Tolerance and Pluralism	1,963	1,0087	Pretty good
Defending the Nation	1,7778	0,98415	Needs Improvement

Source: Researcher's Reconstruction, 2025

The digital ethics dimension recorded the highest mean (M=2.2593, SD=0.95533), indicating the successful integration of digital literacy with civic values. The constitutional awareness dimension showed a relatively good achievement (M=2.0556, SD=0.97935), indicating an adequate understanding of constitutional principles through digital learning. The tolerance and pluralism dimension reached a mean of 1.963 (SD=1.0087), while the dimensions of democratic participation (M=1.8889, SD=1.00314) and national defense (*bela negara*) (M=1.7778, SD=0.98415) require further strategic reinforcement. The disparity in achievement across dimensions indicates a need for differentiated pedagogical strategies. Dimensions with lower scores necessitate innovative approaches, such as virtual political participation simulations and the integration of patriotism-themed content within interactive digital narratives.

Integration of Qualitative and Quantitative Findings

The triangulation of results from both research phases yields a comprehensive understanding of the effectiveness and challenges inherent in implementing the interactive-digital Civics learning model. Qualitative findings regarding the urgency of instructional transformation are confirmed by quantitative data, which demonstrate positive student perceptions toward the digital approach.

Furthermore, the barriers related to TPACK competence identified during the qualitative phase are validated by the low scores recorded for technical support and infrastructure variables in the quantitative phase. The patterns of strong correlation between learning dimensions further support the interview findings, which emphasize the critical importance of a holistic and integrated approach.

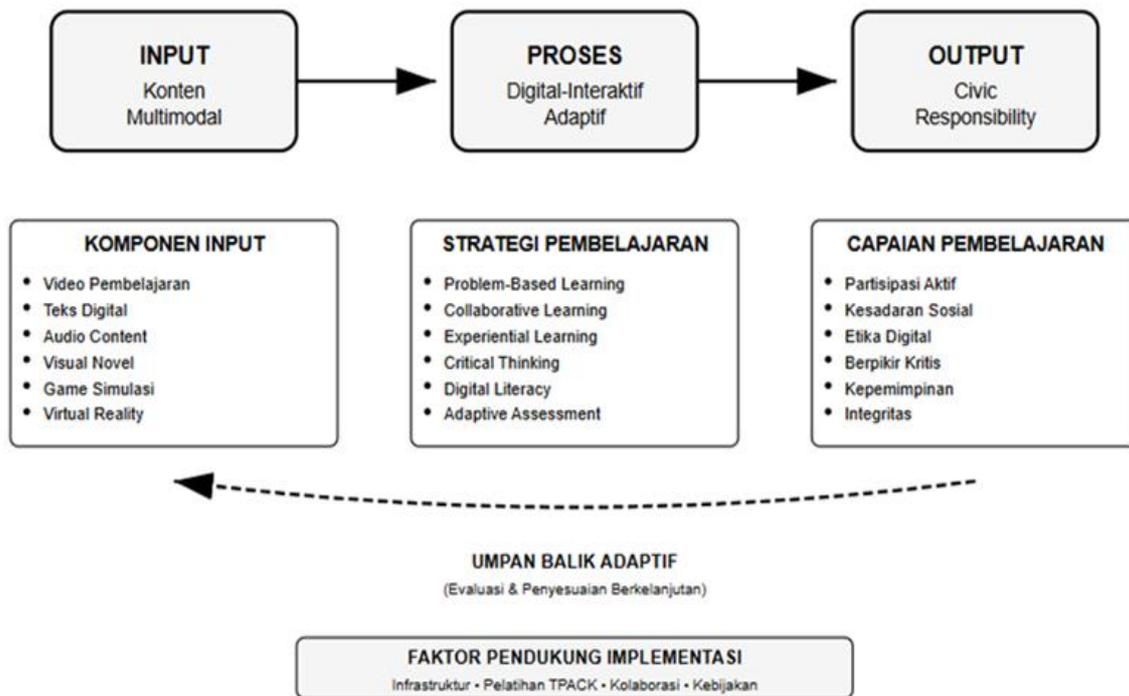**Model Pembelajaran PKn Digital-Interaktif Adaptif**

Figure 1. The Instructional Model Framework
Source: Researcher's Reconstruction, 2025

Based on **Figure 1**, the developed model framework integrates three primary components: 1) **adequate** and accessible technological infrastructure; 2) the enhancement of lecturers' TPACK competence through continuous professional development; and 3) instructional content design that integrates elements of interactivity, collaboration, and contextual relevance. This model emphasizes a student-centered approach that leverages digital technology to facilitate the development of civic responsibility through active, reflective, and applicable learning experiences. The success of the model's implementation depends on a systematic resolution of inhibiting factors, specifically the strengthening of technological infrastructure and the development of a collaborative ecosystem among lecturers to foster digital instructional innovation.

Discussion

The Effectiveness of Implementing Digital-Interactive Learning Models in Civics Courses

The implementation of the digital-interactive learning model in Civics Education (Civics) courses received a highly positive response from all research participants. Quantitative data analysis reveals that the dimension of ease in accessing digital materials recorded the highest score, indicating significant student appreciation for excellent content accessibility. Qualitative findings from in-depth interviews with five key informants reinforce these quantitative results. All lecturers reported increased student enthusiasm and participation in digital technology-based learning. Student informants confirmed that utilizing digital applications and simulations facilitates a more concrete and applicable understanding of the abstract concept of civic responsibility. Participant observations across three classes applying the digital-interactive model identified a significant increase in discussion participation—averaging 67 percent—compared to conventional instruction.

These results align with research arguing that targeted integration strategies for digital educational resources, optimized through algorithmic sorting, can positively impact student learning attitudes, faculty instruction, and the overall effectiveness of Civics Education in higher education (Bond *et al.*, 2020). Empirical experience through the digital-interactive model experiment involving 460 respondents demonstrates positive student engagement with this innovative approach. Developed content covers a broad spectrum, ranging from the Dynamics of National and State Life, Pancasila as National Philosophy and Ideology, National Identity and Integration, to contemporary issues such as Anti-Corruption, Anti-Terrorism, Radicalism, and Intolerance. Previous findings reinforce this study, indicating that integrating design thinking into citizenship education through technology enhances student engagement and learning outcomes. Digital tools bridge the gap between theoretical education and real-world application while facilitating collaborative learning experiences that allow students to work on civic projects and engage with the community (Chen *et al.*, 2021).

Determinant Factors and Barriers to Digital-Interactive Learning Implementation

The analysis of factors influencing the implementation of digital learning reveals its multidimensional complexity. Regarding supporting aspects, this study identifies five primary factors: institutional policy support for instructional innovation, the availability of basic technological infrastructure (internet connectivity and computing devices), lecturers' intrinsic motivation to develop digital competence, the adaptive nature of digital-native students, and the availability of open-source digital learning platforms. All lecturers and student informants universally acknowledged the high relevance of utilizing digital technology to optimize student civic responsibility. Furthermore, the Problem-Based Learning approach received substantial appreciation for strengthening ethical, technical, and participatory dimensions in digital Civics instruction.

Digital transformation in higher education institutions contributes to the development of more advanced and effective methods and practices in pursuing educational missions, despite the various challenges institutions face during implementation (Purwanto *et al.*, 2023). Nevertheless, substantive barriers were identified. Quantitative data show that variables for technological infrastructure readiness and technical support recorded low achievement. Qualitative analysis revealed systemic barriers, including limited lecturer competence in Technological Pedagogical Content Knowledge (TPACK)—the framework integrating content, pedagogical, and technological knowledge—limited time allocation, and uneven infrastructure access regarding student internet connectivity and devices. Four primary barriers to digital transformation—lack of funding, lack of digital capabilities, lack of human resources, and technical obstacles—align with the findings of this study (Zhang *et al.*, 2022).

The evaluation of lecturers' TPACK competence through structured interviews and teaching observations shows that while all informants possessed "Very Good" Civics content mastery, a significant disparity exists in technological pedagogical mastery. Additionally, digital transformation may not directly influence performance, suggesting the need for other mediating factors for successful implementation. Other operational challenges include constraints in optimizing interactive learning due to large class sizes, with a recommended solution of a maximum class capacity of 30 students. Socio-cultural factors also present significant hurdles; the stigma among students viewing Civics as an unimportant general education course necessitates a fundamental policy reinforcement and a paradigm shift.

Designing Digital-Interactive Learning Models for Strengthening Civic Responsibility

Based on empirical findings, this study developed an adaptive digital-interactive learning model design using a multidimensional and holistic approach. Pearson correlation analysis identified significant relationships between learning dimensions, with the highest correlation coefficient found between critical thinking skills and digital content relevance ($p < 0.01$). This indicates that increasing the relevance of digital content is directly proportional to the development of students' critical thinking skills. A strong correlation was also identified between active participation and digital collaboration, suggesting that platforms that facilitate collaboration significantly increase student participation. Social innovation in higher education links diversity, access, and inclusion with social change in communities, which aligns with the goal of strengthening civic responsibility through digital-interactive learning (Zhanbayev *et al*., 2024).

The developed adaptive model provides diverse content options (video, text, and audio), various assignment formats, and engagement strategies to ensure inclusive and effective learning for all students. This emphasizes the importance of digital citizenship education embedded in the concreteness of human life and concern for the common good, capable of fostering social processes of fraternity and justice that define modern political charity (Pizzolorusso, 2022). A specific evaluation of the five dimensions of civic responsibility shows varied achievement. The digital ethics dimension recorded the highest mean, indicating successful integration of digital literacy with civic values. The digital-interactive model holds the most potential for strengthening critical thinking, literacy, and digital ethics through training in filtering hoaxes, analyzing information, and maintaining etiquette in online spaces.

The implementation of the adaptive model requires adequate infrastructure support and digital gap mitigation strategies, such as developing offline-accessible materials. The "demo-ethical" model relevant to Society 5.0 and Industry 5.0 identifies values that can drive sustainable development in the era of digitalization. The foundation of "demo-ethics" for sustainability is rooted in spirituality as a basis for new societal development scenarios. The developed framework integrates three main components: adequate and accessible technological infrastructure, continuous professional development for lecturers' TPACK competence, and instructional content design that integrates interactivity, collaboration, and contextual relevance to facilitate civic responsibility through active, reflective, and applicable learning experiences.

CONCLUSION

The primary problem addressed in this study is the low level of student participation in Civics Education (Civics) within both conventional and digital models, which has resulted in the suboptimal strengthening of civic responsibility in higher education. To address this issue, this research aims to develop and test the

effectiveness of an interactive-digital Civics learning model capable of increasing student engagement and reinforcing the values of civic responsibility.

Employing an Exploratory Sequential Mixed Methods approach, this study produced an interactive-digital Civics learning model that integrates the utilization of instructional technology, the enhancement of lecturers' pedagogical competence based on the TPACK framework, and learning activities that emphasize reflective dialogue, collaboration, and contextual learning experiences. The research results demonstrate that this model is effective in increasing student participation, critical thinking skills regarding civic issues, as well as social responsibility awareness and attitudes. Consequently, digital-based Civics instruction serves not only as a medium for content delivery but also as a vehicle for fostering a civic character that is adaptive to the dynamics of the digital era.

AUTHOR'S NOTE

The author declares that there is no conflict of interest regarding the publication of this article. The author affirms that the data and content of this article are original and free from plagiarism.

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