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ORIGINAL RESEARCH ARTICLE

Reigniting Historical Engagement: What Can Interactive Posters Teach Us About Competency Development in Civic Education?

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ABSTRACT

Background: Traditional teaching methods in Civic Education often lead to monotonous rote learning, preventing young students from grasping the essence of national heroes due to the lack of visually stimulating and interactive media. Objective: This study aims to develop an innovative QR code-based interactive poster media and evaluate its effectiveness in enhancing elementary students' competencies compared to conventional methods. Methods: Guided by the Research and Development (R&D) approach, this study designed a visual product integrated with independent digital content—including short animated videos, audio narratives, and interactive quizzes—accessible via smartphone scanning to measure cognitive, affective, and psychomotor learning domains. Results: The product achieved high theoretical validity scores of 86% from material experts and 84% from media experts. Empirical testing showed a significant leap in classroom performance, with the average score rising from 54.20 in the pre-test to 85.60 in the post-test, supported by a normalized gain (N-Gain) score of 0.68. Conclusion: The interactive poster serves as a highly valid, applicable, and practical tool that successfully transitions the learning paradigm into a student-centered environment, reduces understanding disparities, and fosters long-term competency development.

ABSTRAK

Latar Belakang: Metode pengajaran tradisional dalam Pendidikan Kewarganegaraan sering kali berujung pada pembelajaran hafalan yang monoton, sehingga menghambat siswa untuk memahami esensi sosok pahlawan nasional akibat kurangnya media yang interaktif dan menarik secara visual. Tujuan: Penelitian ini bertujuan untuk mengembangkan media poster interaktif berbasis kode QR yang inovatif serta mengevaluasi efektivitasnya dalam meningkatkan kompetensi siswa sekolah dasar dibandingkan dengan metode konvensional. Metode: Dengan menggunakan pendekatan Penelitian dan Pengembangan (R&D), penelitian ini merancang produk visual yang terintegrasi dengan konten digital mandiri—meliputi video animasi pendek, narasi audio, dan kuis interaktif—yang dapat diakses melalui pemindaian ponsel pintar untuk mengukur ranah pembelajaran kognitif, afektif, dan psikomotorik. Hasil: Produk ini mencapai skor validitas teoretis yang tinggi, yaitu 86% dari ahli materi dan 84% dari ahli media. Uji empiris menunjukkan peningkatan signifikan dalam kinerja kelas, dengan nilai rata-rata naik dari 54,20 pada *pre-test* menjadi 85,60 pada *post-test*, yang didukung oleh skor *normalized gain* (N-Gain) sebesar 0,68. Kesimpulan: Poster interaktif ini merupakan sarana yang sangat valid, dapat diterapkan, dan praktis; media ini berhasil mengalihkan paradigma pembelajaran menuju lingkungan yang berpusat pada siswa, mengurangi kesenjangan pemahaman, serta mendorong pengembangan kompetensi jangka panjang.

Keyword: Civic Education Learning Media Interactive Poster Pancasila Figures QR Code

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INTRODUCTION

Civic Education (PKn) is a foundational pillar for cultivating comprehensive national values and patriotism among elementary students worldwide. In the modern era, integrating history and national identity is essential to prepare students to become informed citizens who understand their nation's historical trajectory systematically and chronologically (Efrilia Nadifa et al., 2025; Munasib et al., 2023). However, achieving this goal in the digital age requires more than rote memorization; it demands interactive learning ecosystems that bridge historical abstraction and students' lived experiences (Muneer et al., 2024; Rifka Alkhilyatul Ma'rifat & I Made Suraharta, 2024). This research underscores the need to present Pancasila figures not merely as historical names but as inspirational figures who embody national integrity and form the core of a student's citizenship profile (Mahfud et al., 2023; Setiyono et al., 2025). As the world shifts toward digital-first educational paradigms, transforming traditional Civics instruction into dynamic, engagement-driven experiences has become a global imperative for educational quality (Purba, 2024; Widiasanti et al., 2023).

Despite the pedagogical imperative for innovation, elementary classrooms often face significant challenges, including monotonous lecture-based methods and reliance on static two-dimensional media. Students, particularly at the third-grade level (ages 8–9), are in the concrete operational stage of cognitive development, making them highly dependent on sensory and visual stimuli to understand abstract concepts of nationalism (Utaminingsih & Purwati, 2024). Reliance on dense textbooks or passive worksheets creates a major disconnect between the curriculum's cognitive demands and students' actual capacity to absorb information (Hidayat et al., 2024; Mariati et al., 2022). This structural challenge is exacerbated by a "crisis of creativity" in delivering national values, leading to passive classroom dynamics and a notable decline in student curiosity toward historical subjects (Ginanjar et al., 2023; Wulandari et al., 2024). Consequently, failing to modernize instruction in the digital era risks alienating a generation naturally accustomed to visual, interactive technological environments.

Previous studies have extensively explored media-based learning in various contexts, yet their methodologies and specific focuses reveal critical limitations. Several scholars have conducted research on interactive multimedia for Civic Education (Septiani et al., 2020; Aprillia et al., 2022; Anzelina et al., 2023; Elisa et al., 2023; Kartika Sari & Nabilla Qonita, 2024; Rahayu et al., 2025). For instance, Septiani et al. (2020) focused on interactive multimedia based on the values of the Youth Pledge, while Aprillia et al. (2022) examined digital comic media. Other scholars, such as Anzelina et al. (2023), explored the "Picture and Picture" model, whereas Kartika Sari & Nabilla Qonita (2024) studied QR-code-based digital media for literacy skills. While these studies demonstrate the potential of digital integration, many remain limited to general perceptions or lack rigorous integration with a systematic "digital ecosystem" that bridges physical classroom presence with independent multimedia exploration (Mynaryathy & Wijayanti, 2023; Nathasya, 2024). These prior works often fail to address the specific pedagogical needs of teaching Pancasila figures at the third-grade level.

The novelty of the present research lies in creating an immersive, QR-integrated learning ecosystem designed specifically for elementary-aged learners. Unlike previous studies that often treat digital media as a standalone additive, this research introduces a "hybridized instructional media" that forces a paradigm shift from passive information reception to active, autonomous exploration (Bahtiar & Surjono, 2020; Marpelina et al., 2024). The innovation here is the direct, systemic integration of physical visual elements—such as interactive posters—with multi-layered digital content (biographies, audio narrations, and instant-feedback quizzes). This approach transforms the poster from a static object into a gateway to a comprehensive digital environment, addressing the

gap in existing research on specific instructional designs for Pancasila-related history (Mynaryathy & Wijayanti, 2023; Muneer et al., 2024). This study provides a specialized, evidence-based pathway that standard descriptive reports often lack.

The research gap in this domain is the absence of localized, QR-based interactive media tailored to the third-grade level at Sukomulyo Elementary School. Many existing studies focus on high-level abstract frameworks or general primary school settings without addressing the nuanced cognitive development of 8-to-9-year-olds in relation to national history (Utaminingsih & Purwati, 2024; Mynaryathy & Wijayanti, 2023). Previous research by Adiesti Peppy Ramadhani & Susilo Tri Widodo (2024) on "Lift-the-Flap" books and Widarini et al. (2022) on pop-up books shows that physical-interactive media are effective, yet they often lack the depth of digital interactivity that current generations demand. This study fills this gap by merging the physical, tactile engagement of posters with high-tech digital interactivity (QR-linked animation and assessment), creating a superior instructional model that prior researchers have not fully synthesized (Chandra et al., 2023; Kartika Sari & Nabilla Qonita, 2024).

This study's theoretical framework is Constructivist Learning Theory, which posits that students construct knowledge through active engagement with their environment rather than passive absorption (Firdausya & Fatayan, 2024; Astprachon et al., 2025). This theory is supported by the Dual Coding Theory, which suggests that combining visual and auditory stimuli leads to deeper cognitive retention than verbal lectures alone (Ivanova, 2021; Silalahi & Faizal, 2022). By integrating these theories, the research utilizes an instructional design approach that respects the cognitive limitations of third-grade students (concrete operational stage) while pushing them toward independent learning. This theoretical foundation ensures that the digital components—such as video biographies and audio narrations—are not just "technological toys" but are purposefully aligned with cognitive load management and student-centered learning (Bahtiar & Surjono, 2020; Muneer et al., 2024).

This study draws on three core concepts: "Instructional Technology Integration," "Pedagogical Transformation," and "Competency-Based Assessment." Instructional technology is defined here not as a tool, but as a digital ecosystem that delivers diverse multimedia content directly into the classroom (Widarini et al., 2022; Widiasanti et al., 2023). "Pedagogical Transformation" refers to the shift in the teacher-student relationship, where the instructor becomes a facilitator, and the learner manages their own pace through digital navigation (Bahtiar & Surjono, 2020; Kartika Sari & Nabilla Qonita, 2024). "Competency-Based Assessment" is applied through interactive quizzes that provide immediate feedback as a positive stimulus for learning (Suryanto & Dewi, 2023). These concepts are operationalized to measure three domains: cognitive (knowledge retention), affective (internalized national values), and psychomotor (technical proficiency in operating digital tools) (Anzelina et al., 2023; Kartika Sari & Nabilla Qonita, 2024).

The attractiveness of this study stems from its immediate, practical applicability to the "krisis of creativity" in Civic Education. It is uniquely significant because it offers a scalable, low-cost, high-impact solution that any elementary school can implement, even with limited infrastructure, by using existing gawai (smartphones) as portals to rich content (Mariana et al., 2021; Astaño, 2025). The research bridges the divide between high-level historical disciplinary knowledge and the practical, modern requirements of instructional design—a focus explicitly championed by the Assyfa Learning Journal (ALJ) (Marpelina et al., 2024; Mynaryathy & Wijayanti, 2023). By focusing on the direct experience of third-grade students at Sukomulyo Elementary, this study moves beyond theoretical speculation to prove that the simple, strategic integration of physical and digital assets can fundamentally re-engage a generation of students who are otherwise becoming disconnected from their historical identity.

Ultimately, this research aims to develop, validate, and test the instructional effectiveness of an innovative, QR-integrated interactive poster media in enhancing students' understanding of Pancasila figures at Sukomulyo Elementary School. Using the Research and Development (R&D) methodology, the study aims to develop a valid,

practical, and replicable instructional instrument (Afriani et al., 2025; Badriyah et al., 2025). The study intends to objectively compare the performance of this new media against conventional learning methods, measuring its capacity to enhance cognitive, affective, and psychomotor outcomes. Through this rigorous, data-driven approach, the research aspires to contribute a modernized tool that not only solves the immediate problem of classroom boredom but also serves as a long-term foundation for character education, ensuring that national values are not just understood, but profoundly lived and integrated by students at the formative elementary stage (Septiani et al., 2020; Mahfud et al., 2023).

RESEARCH METHODS

This study adopts a systematic scientific approach to examine how disciplinary content in elementary Civic Education can be transformed into an effective technology-enhanced instructional design. In line with the scope of the Assyfa Learning Journal (ALJ), the study positions QR-integrated interactive posters not merely as instructional media, but as an evidence-based learning innovation that integrates subject-matter content, instructional design, digital technology, and measurable learning outcomes. The methodological framework is structured to investigate the development, implementation, usability, and instructional effectiveness of the media in primary school settings (Afriani et al., 2025; Badriyah et al., 2025).

2.1 Research Design

This research employs the Research and Development (R&D) methodology using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation), which provides a systematic framework for developing and evaluating instructional innovations (Afriani et al., 2025; Nurkhodri & Dafit, 2022). In this study, the ADDIE stages are used to translate Civic Education content into a technology-enhanced learning experience through QR-integrated interactive posters. The design is depicted in the following visual process:

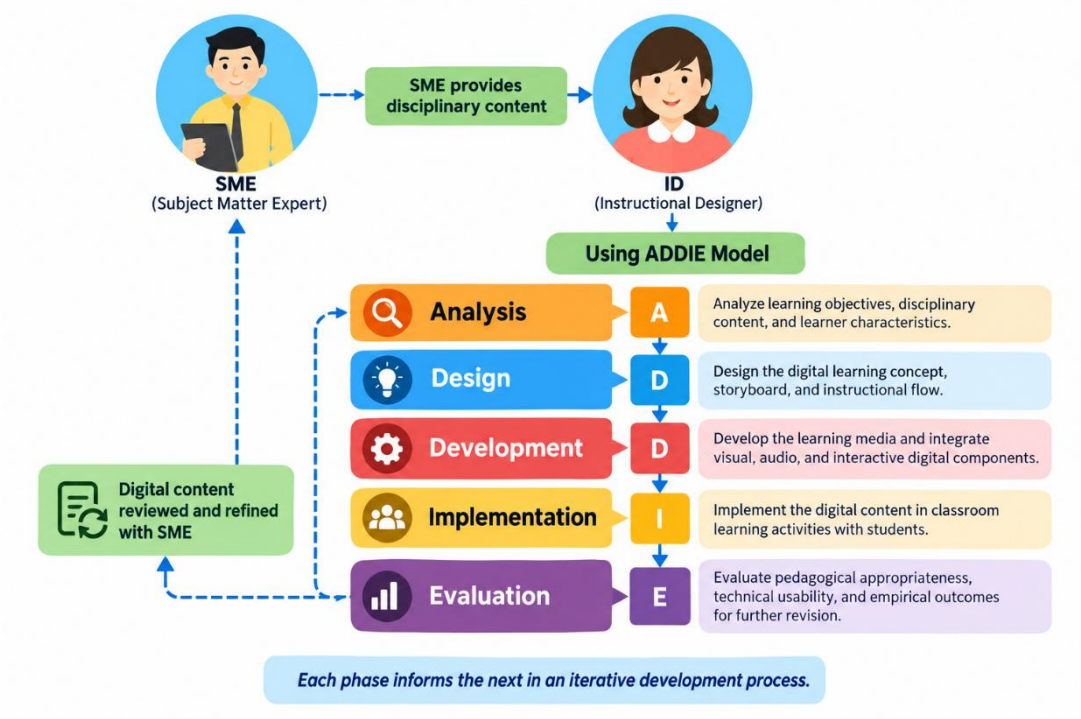


Figure 1: R&D Instructional Design Flowchart

Figure 1 illustrates the iterative nature of the development process, in which each phase informs the next to ensure that the resulting media is pedagogically appropriate, technically usable, and empirically evaluated (Badriyah et al., 2025). Rather than functioning as a descriptive media-development report, the R&D process provides a systematic basis for examining how disciplinary content can be transformed through instructional design and technology-enhanced learning (Mynaryathy & Wijayanti, 2023; Muneer et al., 2024).

2.2 Data Collection

Following the research design, data collection is structured to capture evidence of instructional effectiveness, usability, engagement, and implementation. The data collection strategy is governed by the following research questions and analytical types, allowing quantitative and qualitative evidence to be triangulated:

Table 1: Research Questions and Analytical Framework

Research Question	Type of Analysis	Data Source
How effective is the interactive poster in improving conceptual understanding?	Quantitative (N-Gain)	Pre-test & Post-test scores
How do students perceive the QR poster's usability and engagement?	Qualitative/Descriptive	Survey Questionnaires
Does the media facilitate active learning and teacher management?	Qualitative/Observational	Field Notes & Observation Sheets

The collection process employs a multi-instrument strategy. First, researchers conduct a needs analysis through interviews and classroom observation to identify instructional constraints and learning needs (Rojas et al., 2017). Second, researchers obtain expert judgment using structured evaluation sheets to refine content accuracy and instructional-media design quality (Ainah et al., 2022). Finally, researchers collect student engagement and learning-performance data during implementation through digital quizzes and direct observation protocols (Suryanto & Dewi, 2023; Kartika Sari & Nabilla Qonita, 2024).

2.3 Data Analysis

The analysis combines quantitative evidence of learning outcomes with descriptive and qualitative evidence of usability and engagement. Quantitative data are analyzed using the N-Gain Score to determine the normalized improvement in students' conceptual understanding. This procedure evaluates measurable learning outcomes associated with implementing the instructional innovation (Anzelina et al., 2023; I Ketut Ngurah et al., 2025). The study analyzes qualitative data from questionnaires and field observations through thematic content analysis to identify patterns in student motivation, classroom engagement, and teacher perception (Badriyah et al., 2025).

2.4 Research Instrument

The research instruments are designed to capture cognitive, affective, and psychomotor dimensions of student learning. These instruments enable the study to evaluate not only whether the media is usable, but also how the technology-enhanced instructional design relates to measurable student outcomes.

Table 2: Instrument Specifications and Subject Distribution

Instrument	Butir Soal/Items	Subjek	Location
Pre-test/Post-test (Cognitive)	20 Valid Items	Grade 3 Students	Classroom
Usability Survey (Practicality)	15 Likert Items	Students/Teachers	Classroom
Expert Judgment Sheet	10 Qualitative Items	Material/Media Experts	Academic Office

Observation Sheet (Engagement)	10 Criteria	Grade 3 Students	Classroom

The instruments were subjected to validation procedures. The cognitive test items were tested on a separate group to determine validity through Pearson Product Moment correlations and reliability through the KR-20 formula (Utamiani & Parmiti, 2022). These procedures support the use of the instruments for recording student performance consistently.

2.5 Validity and Reliability

Validity and reliability assessments strengthen the credibility of the instructional-outcome measurements. Validity is confirmed through expert judgment, in which specialists in history and instructional technology review the accuracy of the content and its pedagogical alignment (Ainah et al., 2022; Sinaga et al., 2022). Reliability is established through empirical consistency testing, with a KR-20 coefficient of 0.78 (Utamiani & Parmiti, 2022).

2.6 Research Subjects and Location

The study is conducted at Sukomulyo Elementary School and specifically targets Grade 3 students. The location was selected through purposive sampling because of the identified technological gap and the need for an instructional innovation that could connect curricular content with accessible digital learning experiences (Chandra et al., 2023).

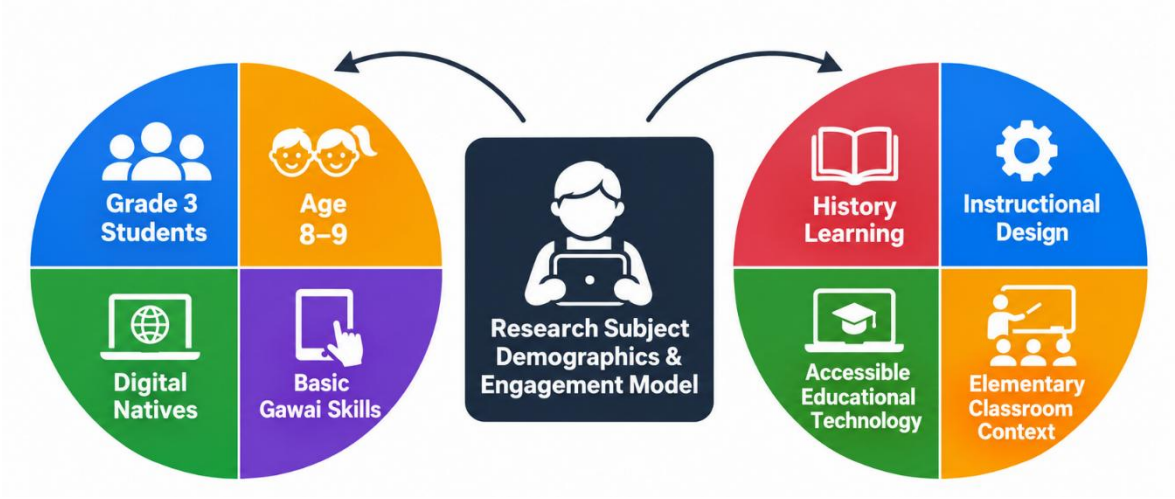


Figure 2: Research Subject Demographics and Engagement Model

Figure 2 highlights the student profile as digital natives who possess basic gawai-operation skills but have not yet been systematically supported in using those skills for history learning (Mariana et al., 2021; Bahtiar & Surjono, 2020). Positioning the intervention within this socio-technological context provides evidence of how instructional design can connect existing learner characteristics, disciplinary content, and accessible educational technology in elementary classrooms (Mynaryathy & Wijayanti, 2023).

RESULTS RESEARCH

This section presents the empirical findings from developing and implementing the QR-integrated interactive poster for Grade 3 Civic Education at Sukomulyo Elementary School. The findings are organized according to the development sequence so that the relationship among the identified instructional need, product design, expert validation, instrument quality, classroom implementation, and learning outcomes can be examined as a coherent instructional-design process. All numerical values reported below are retained from the original study data; no additional numerical results were introduced.

3.1 Needs Analysis and Instructional Gap

The preliminary investigation combined classroom observation and an in-depth interview with the Grade 3 classroom teacher. The existing learning process relied primarily on linear textbook material and teacher explanation. Visual learning aids were limited, while the topic of the Pancasila-formulating figures required students to understand historical information and character values that were relatively abstract for children aged 8–9 years. At the same time, students were already familiar with mobile devices outside school, but this familiarity had not been systematically directed toward instructional activities in Civic Education.

The needs analysis therefore identified a dual instructional gap. First, the existing printed resources did not provide sufficient visual and multimodal support for concrete-operational learners. Second, students' basic ability to operate a device was not yet connected with structured learning tasks. These findings became the basis for designing a physical-digital learning resource in which printed historical content could be extended through QR-linked multimedia.

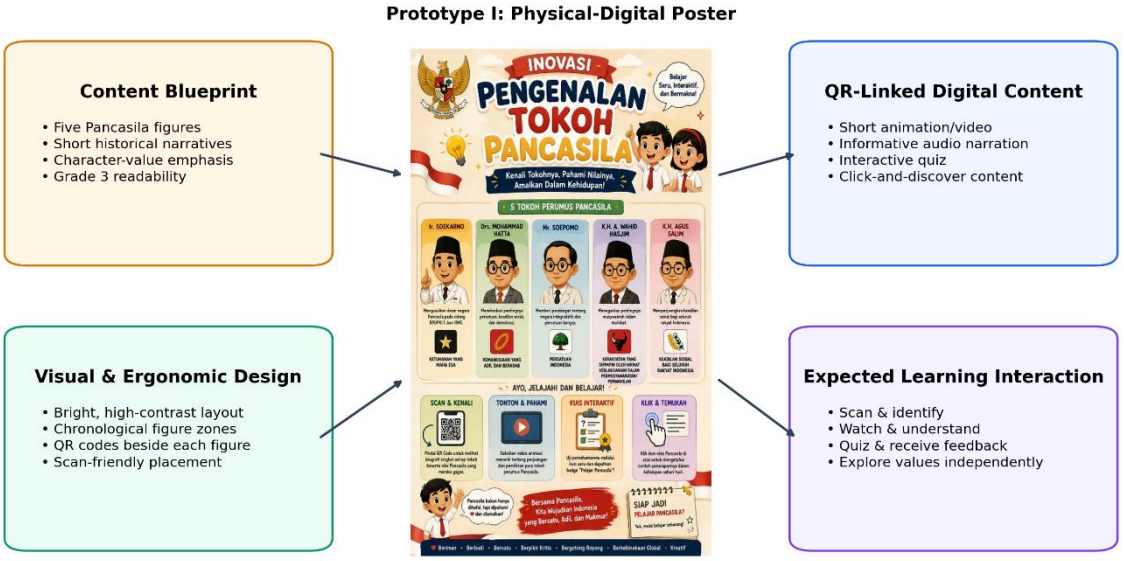
Table 3. Needs-analysis findings and corresponding design responses

Observed condition	Instructional implication	Design response
Learning depended mainly on textbook and verbal explanation	Historical content remained highly verbal and less concrete	Use a visually structured poster as the primary physical learning surface
Limited visual learning aids in the classroom	Students required stronger visual anchors for historical figures and values	Use illustrated figure zones, concise text, and clear visual hierarchy
Students were familiar with mobile devices	Existing device skills could be redirected toward learning	Integrate QR codes that can be scanned with students' devices
Need for more active participation	Students needed opportunities to explore rather than only listen	Link the poster to video/animation, audio narration, interactive quizzes, and discovery activities

3.2 Design-Stage Results: From Content Blueprint to Prototype I

The design stage translated the needs-analysis findings into a concrete instructional architecture. The content blueprint organized the material around five figures associated with the formulation of Pancasila. Each figure was presented in a distinct visual zone that combined an illustration, concise historical information, and a nearby QR access point. The physical poster was therefore not treated as an isolated display object; it served as the entry point to a broader digital learning sequence.

The QR-linked component expanded the printed material through four forms of student interaction: scanning and identifying the figure, watching and understanding short multimedia content, completing an interactive quiz, and accessing additional value-based information. This design decision was intended to connect disciplinary content with visual attention, device manipulation, multimodal information processing, and immediate learning feedback.



Design logic: disciplinary content → physical poster → QR access → multimodal learning activities

Figure 3. Design-stage output and instructional architecture of the QR-integrated interactive poster.

Figure 3 shows that the product design was built around a physical-digital sequence rather than a stand-alone poster. The central printed artifact organized disciplinary information visually, while the QR-linked components extended the learning experience beyond the printed surface. The design also placed QR codes close to the relevant figure zones to reduce unnecessary search and support direct scanning by Grade 3 students.

Figure 4. Prototype I of the QR-integrated interactive poster developed for the Pancasila-figures topic.

The first prototype used a bright, high-contrast visual composition and displayed the five Pancasila-formulating figures in separate information panels. The lower part of the poster contained the main interaction routes—Scan & Identify, Watch & Understand, Interactive Quiz, and Click & Discover—thereby making the intended learning actions visible to students. Because the product was designed for Indonesian elementary-school learners, the instructional text embedded in the original poster remained in Indonesian.

3.3 Expert Validation and Product Revision

Material and media experts reviewed Prototype I before classroom implementation. The material/content validation score reached 86%, which placed the content in the very suitable category. Expert feedback focused on simplifying historical diction so that the wording better matched the reading ability of eight-year-old learners. The media-design and usability score reached 84%, also within the very suitable category. The main technical recommendation was to enlarge the QR-code dimensions so that scanning remained reliable on lower-specification mobile-device cameras.

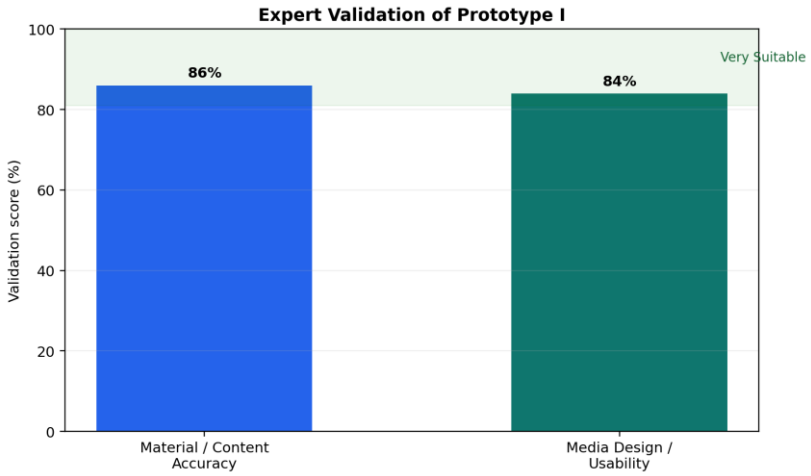


Figure 5. Expert validation scores for the initial product.

Table 4. Expert validation results and revisions made to Prototype I

Validation component	Score	Qualification	Main feedback	Revision outcome
Material / content accuracy	86%	Very Suitable	Historical diction should be simplified for Grade 3 readers	Narrative wording was simplified while retaining the core historical meaning
Media design / usability	84%	Very Suitable	QR codes should be easier to scan using lower-specification devices	QR-code dimensions were enlarged and scanning accessibility was improved

The revised product produced after expert review was designated Prototype II. This stage is important because the transition from Prototype I to Prototype II was based on explicit pedagogical and technical evidence rather than visual preference alone: content readability and QR accessibility were treated as functional parts of the instructional design.

3.4 Validity and Reliability of the Cognitive Test Instrument

Before Prototype II was implemented in the target classroom, the cognitive assessment instrument was tested with a comparable group outside the main research sample. Twenty-five multiple-choice items were examined using Pearson Product Moment correlation. Twenty items met the validity criterion and were retained for the pre-test and post-test. The retained items were then analyzed using the Kuder–Richardson 20 (KR-20) formula, producing a reliability coefficient of 0.78. Because this coefficient exceeded the minimum criterion of 0.70 used in the study, the final instrument was considered sufficiently reliable for measuring conceptual understanding.

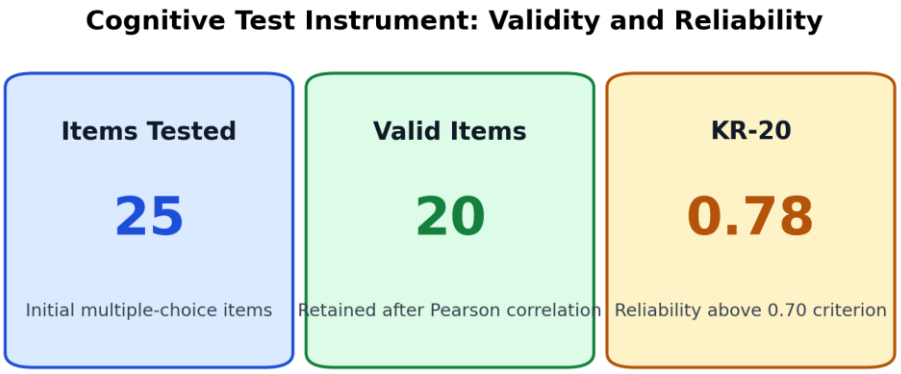


Figure 6. Summary of cognitive test validity and reliability results.

Table 5. Summary of cognitive assessment quality

Indicator	Result	Interpretation
Initial multiple-choice items	25 items	Items entered into empirical validity testing
Valid items retained	20 items	Used in the final pre-test and post-test
Reliability coefficient	KR-20 = 0.78	Above the 0.70 criterion; high/acceptable reliability for the study

3.5 Classroom Implementation of Prototype II

Prototype II was implemented during actual Grade 3 Civic Education learning at Sukomulyo Elementary School. Before interacting with the poster, students completed the pre-test. During the learning activity, students received a brief orientation to the scanning procedure and then used mobile devices to access the QR-linked content. Classroom observation showed that students could use the scanning function, follow the multimedia resources, and move between the physical poster and digital content with high visible enthusiasm. The learning sequence focused on active exploration rather than continuous teacher explanation. Students first observed the five figure zones on the poster, selected a QR point, scanned the code, and then accessed the corresponding digital resource. The linked resources included short historical animations, audio narration, and interactive quiz activities. In this configuration, the teacher served primarily as a facilitator, helping students navigate the content and relate the historical material to Pancasila values.

Figure 7. Classroom implementation of the QR-integrated interactive poster with Grade 3 students at Sukomulyo Elementary School.

The classroom documentation in Figure 7 provides contextual evidence that the product was implemented in an authentic instructional setting rather than evaluated only through expert review. The observed activity also supported the psychomotor dimension of the study because students had to coordinate device handling, camera positioning, scanning, and subsequent navigation of digital content.

3.6 Quantitative Learning Outcomes

Students' conceptual understanding was measured before and after the implementation. The class mean increased from 54.20 on the pre-test to 85.60 on the post-test, representing a mean-score increase of 31.40 points. The normalized gain (N-Gain) was 0.68. Under the interpretation used in the original study, this value indicated a moderate-to-high improvement in conceptual understanding after the instructional intervention.

Figure 8. Comparison of class mean pre-test and post-test scores following implementation.

Table 6. Pre-test, post-test, and normalized learning gain

Measurement	Result	Interpretation
Pre-test mean	54.20	Baseline conceptual understanding before implementation
Post-test mean	85.60	Conceptual understanding after the QR-integrated learning experience
Mean-score difference	31.40 points	Increase from pre-test to post-test
N-Gain	0.68	Moderate-to-high normalized learning gain in the original study classification

The score pattern indicates that the most direct measurable outcome of the implementation was improved conceptual understanding of the Pancasila-figures content. Because the source study reported descriptive means and N-Gain rather than an inferential significance test, the result is described here as an observed improvement rather than as a statistically significant difference.

3.7 Practicality, Student Response, and Engagement Evidence

The field trial also generated evidence about the usability of the product. The teacher practicality response reached 88%, while student satisfaction reached 92%. Both values fall within the very high range used in the study. The teacher response indicates that the media could be incorporated into classroom management without creating excessive operational burden, while the student response indicates strong acceptance of the physical-digital learning format.

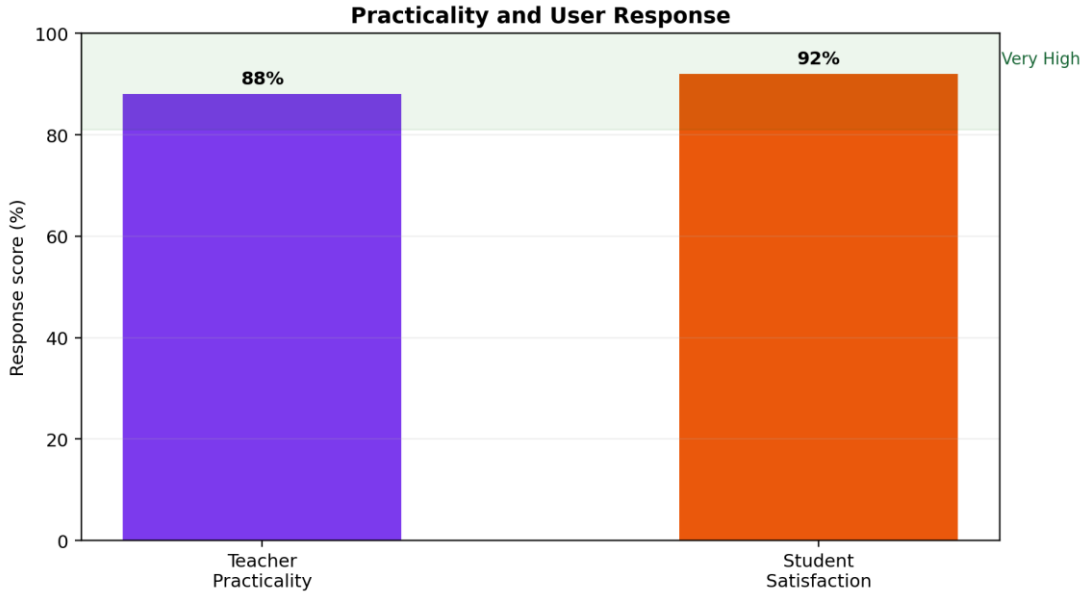


Figure 9. Teacher practicality and student satisfaction responses after implementation.

Table 7. Practicality and user-response findings

Indicator	Score	Meaning within the study
Teacher practicality	88%	Very high practicality/usability in classroom implementation
Student satisfaction	92%	Very high student acceptance of the learning media

Qualitative classroom evidence complemented these percentages. Students showed active interest when scanning the QR codes and accessing short audiovisual content. The learning activity therefore involved more than exposure to a digital resource: students physically manipulated the device, selected content, watched or listened to information, and completed interactive tasks. This pattern was consistent with the study's intended cognitive, affective, and psychomotor dimensions.

3.8 Product Evaluation, Final Revision, and Multidimensional Outcome Synthesis

After field implementation, the product entered the evaluation and final-revision stage. The evaluation considered the expert feedback, field usability, student response, and observed technical constraints. Issues such as QR-scanning accessibility and language complexity served as revision criteria. The resulting final version was designated Prototype III and represented the product condition after theoretical validation and empirical classroom testing.

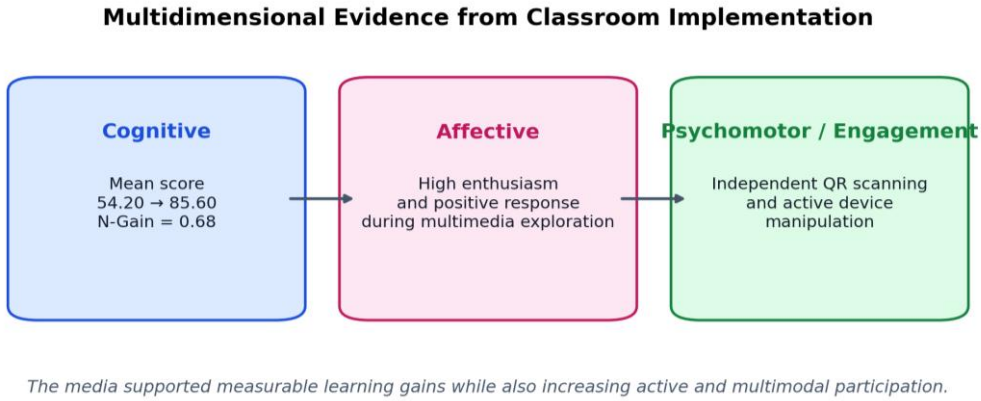


Figure 10. Synthesis of cognitive, affective, and psychomotor/engagement evidence obtained during implementation.

Table 8. Integrated evidence across learning dimensions

Learning dimension	Empirical evidence available in the study	Result interpretation
Cognitive	Pre-test mean 54.20; post-test mean 85.60; N-Gain 0.68	Improved conceptual understanding after implementation
Affective / response	Student satisfaction 92%; high observed enthusiasm during multimedia exploration	Strong acceptance and positive engagement with the learning experience
Psychomotor/engagement	Students independently manipulated devices and scanned QR codes during learning.	Active participation in the physical-digital learning sequence
Instructional practicality	Teacher practicality 88%	The product was considered highly usable within classroom instruction

Taken together, the findings show a coherent development pathway: the needs analysis identified the gap between static instruction and students' digital familiarity; the design stage converted that gap into a physical-digital instructional architecture; expert validation improved content readability and QR accessibility; empirical instrument testing established a usable cognitive measure; and classroom implementation produced higher learning scores together with high practicality, satisfaction, and active participation. The final product therefore represents not only a visually revised poster, but an instructional resource refined through iterative design, validation, implementation, and evaluation.

DISCUSSION

4.1 QR-Integrated Instructional Design and Product Feasibility

The first major finding of this study concerns the feasibility of the QR-integrated interactive poster as an instructional design product. Expert assessment resulted in scores of 86% for material/content accuracy and 84% for media design and usability, indicating that the developed product was pedagogically appropriate and technically feasible for classroom implementation. More importantly, these scores were not treated as the endpoint of the development process. Expert feedback led to revisions to the product's technical and visual components, particularly the size and readability of the QR codes, before classroom implementation. Therefore, the validation process functioned as a formative component of the instructional-design cycle rather than merely as a certification procedure. This finding is consistent with Widarini, Margunayasa, and Rati (2022), who developed QR-code-assisted pop-up book media for elementary-school students using the ADDIE model. Their media received very high ratings from material and media experts and was considered practical by both teachers and students. The similarity between their study and the present research lies in integrating a conventional physical learning resource with a QR-enabled digital layer. However, Widarini et al. focused on a QR-assisted pop-up book. In contrast, the present study transforms a classroom poster into an instructional gateway connecting printed information, historical narratives, audiovisual resources, and interactive assessment.

A similar pattern was reported by Auliaty, Iasha, and Siregar, who developed QR-code-based multimedia for elementary-school students using the ADDIE model. Their findings showed that QR-based multimedia facilitated students' understanding of learning materials. The present study confirms this general function of QR technology but extends it to elementary Civic Education, specifically the introduction of Pancasila figures. The findings are also consistent with previous development research on elementary-school multimedia. Sari et al. (2021) reported high expert feasibility ratings for interactive multimedia developed for elementary learners, demonstrating the importance of combining content, media, and practitioner validation before implementation. Likewise, research on game-based interactive multimedia found very high validation ratings from both media and material experts. It emphasized that expert comments should result in concrete revisions to content density, readability, navigation,

and evaluation features.

A further parallel can be found in elementary-school animation-media development research using the ADDIE model, where material and media validation, teacher evaluation, and student responses were jointly used to determine product feasibility. Thus, the present findings align with earlier R&D studies showing that instructional technology becomes more defensible when development is based on iterative analysis, expert review, revision, and classroom testing. What distinguishes the present research is that it examined product feasibility not only in relation to media attractiveness or technical usability, but also to the instructional transformation of disciplinary Civic Education content. The product was designed to convert abstract historical information into interconnected printed, visual, auditory, and interactive learning experiences. Therefore, the contribution is not simply creating another QR-based medium, but using QR technology as part of an integrated instructional-design architecture.

4.2 QR-Enabled Multimedia and the Transformation of History Learning

The second major finding concerns the QR code's function. Classroom implementation showed that the QR code did not function merely as a technological accessory attached to the poster. It served as an access point that moved students from printed historical information to animations, audio narration, and interactive quizzes. This transformed the poster from a static visual resource into a multimodal learning environment. This finding supports Widarini et al. (2022), whose QR-code-assisted learning media addressed limitations associated with conventional books and provided students with more accessible learning resources. It is also consistent with Auliaty et al., who demonstrated the instructional potential of QR-code-based multimedia for elementary learners. The result can also be interpreted through the broader framework of multimedia learning. Mayer (2024) explains that meaningful multimedia learning occurs through coordinated verbal and visual channels, while recognizing the limited capacity of working memory and the need for active cognitive processing. In the present study, the combination of text, illustrations, audio narration, animation, and interactive questions provided multiple representations of the same historical content. This may help explain why the intervention was associated with improved conceptual understanding.

La Torre and Désiron (2024) further support this interpretation by examining multimedia-design principles in instructional videos used in science and history classrooms. Their findings showed that multimedia principles can support cognitive processing, although effective outcomes depend on how consistently those principles are implemented rather than on the mere presence of video technology. This distinction is particularly relevant to the current findings: the instructional value of the QR poster appears to have resulted from the relationship among QR access, curated content, classroom activity, and evaluation rather than from QR technology alone. Previous scholarship on multimedia learning in history also emphasizes that historical understanding can be supported by presenting information through multiple documents and representational modes such as text, sound, images, video, animation, maps, and graphical representations. The current study provides an elementary-level example of such multimodal history learning within Civic Education. Therefore, an important point of convergence across previous studies is that technology is most useful when it expands the representation and accessibility of learning content. Previous studies reviewed here less often address the specific integration of Pancasila historical figures, a physical poster, QR-linked audiovisual narratives, and interactive assessment within one instructional sequence for Grade 3 students. This contextual integration constitutes one of the distinguishing features of the present study.

4.3 Improvement in Conceptual Understanding and Learning Outcomes

The third important finding is improved conceptual understanding after implementing the interactive poster. The mean score increased from 54.20 on the pre-test to 85.60 on the post-test, with an N-Gain score of 0.68. These findings show that students performed substantially better after the technology-enhanced instructional intervention. This result aligns with the broader evidence base on interactive multimedia in elementary education. Previous animation-media development research reported that multimedia was considered feasible and received highly positive responses from elementary students. Similarly, Sari et al. (2021) found that interactive multimedia

developed through systematic assessment, design, development, implementation, and evaluation procedures achieved strong feasibility and effectiveness indicators. The findings also align with Auliaty et al., whose QR-based multimedia was developed specifically to facilitate elementary students' understanding of instructional content. Although their content domain differed from the present study, both studies indicate that QR-enabled multimedia can provide additional representational resources that make learning material more accessible. Theoretically, the result is consistent with Mayer's cognitive theory of multimedia learning, particularly the proposition that learners can construct deeper understanding when verbal and visual information is selected, organized, and integrated appropriately. The learning gains found in this study can therefore be interpreted not simply as a consequence of increased exposure to technology, but as the outcome of restructuring historical content into a multimodal and interactive learning sequence.

The broader review by Boateng et al. (2024) also shows the growing importance of educational technology in primary and elementary education. It identifies game-based learning and collaborative learning as recurring themes in contemporary research. The present findings add subject-specific evidence to this growing literature by showing how a relatively accessible technology can be used in elementary Civic Education. Nevertheless, the present study differs from many feasibility-oriented R&D studies because it provides pre-test/post-test evidence in addition to expert validation and user responses. Thus, the contribution goes beyond demonstrating that students or experts liked the product. It demonstrates an observable change in conceptual performance associated with its classroom implementation. However, the interpretation should remain appropriately bounded. Because the evidence reported here primarily consists of pre-test/post-test change and N-Gain, the findings support improved learning outcomes. However, they should not be described as statistically significant unless an inferential test such as a paired-samples t-test or Wilcoxon signed-rank test was conducted.

4.4 Student Engagement, Learning Autonomy, and Technology-Supported Exploration

A fourth major finding is the behavioral transformation observed during implementation. Students moved from predominantly passive reception of teacher explanations toward active interaction with the poster, independent QR scanning, audiovisual exploration, and participation in interactive quizzes. The technology therefore altered not only how content was presented but also the pattern of student participation in the classroom. This finding corresponds with earlier literature already used in the original study. The previous paper positioned Bahtiar and Surjono (2020) as supporting evidence for the movement from passive information reception toward more independent digital exploration, and Mariana et al. (2021) as supporting the use of multimedia to strengthen students' confidence and independent engagement with learning material. The original manuscript explicitly connected these studies with learner control, curiosity, and independent learning. Widarini et al. (2022) similarly showed that QR-assisted elementary learning media could achieve strong practicality ratings from teachers and students, indicating that young learners can successfully interact with QR-mediated resources when designed appropriately. Evidence from the broader elementary educational-technology literature also supports this interpretation. Boateng et al. (2024) identified collaborative learning and game-based learning as recurring themes in elementary educational-technology research, suggesting that contemporary digital interventions increasingly emphasize active student participation rather than passive content consumption.

The findings can additionally be linked to studies of game-based interactive multimedia. Expert-reviewed interactive multimedia for elementary learners has been designed specifically to create more attractive and usable learning interactions, including improvements to navigation, evaluation questions, content density, and learner accessibility. The interactive quiz in the present research serves a similar instructional role by making assessment part of the learning interaction rather than treating it as an isolated endpoint. The distinctive contribution of the current research lies in showing that student engagement emerges from a sequence of actions: observing the physical poster, identifying a learning element, scanning a QR code, accessing multimedia content, interpreting historical information, and responding to interactive questions. Thus, student engagement is not reduced to enjoyment or positive perception. It is manifested through observable participation in the instructional process.

4.5 Cognitive, Affective, and Psychomotor Integration in Civic Education

The fifth finding is particularly important because the intervention generated evidence across multiple learning dimensions. Cognitively, students demonstrated improved understanding of Pancasila figures. Affectively, classroom observations and student responses indicated stronger interest and emotional engagement with the historical narratives. Psychomotorically, students demonstrated the ability to operate devices and scan QR codes as part of the learning process. The original study had already conceptualized elementary Civic Education outcomes as an interaction among cognitive, affective, and psychomotor dimensions, rather than treating achievement as test performance alone. The methodological design likewise explicitly established separate cognitive, affective, and psychomotor/student-engagement indicators. The current findings align with earlier work cited in the manuscript on character and Civic Education. Previous studies discussed in the original paper suggest that technology-supported narratives and visual materials can make historical material more understandable while simultaneously facilitating emotional involvement with civic values. The paper also positioned interactive quizzes and immediate feedback as potentially important for motivation and affective engagement.

Mayer's multimedia-learning framework further supports the multimodal interpretation by emphasizing active cognitive processing across verbal and visual representations. However, the current study extends beyond cognitive processing alone because the intervention was embedded in Civic Education, where emotional identification with national figures and values forms part of the intended learning experience. Research on elementary interactive multimedia also demonstrates that digital learning designs can combine cognitive targets with active learner interaction. Similarly, broader educational-technology research indicates that elementary-level technology increasingly intersects with game-based, collaborative, and participatory forms of learning rather than remaining a simple presentation tool. What is relatively distinctive in the present research is therefore the integration of three learning domains within one low-cost physical-digital medium. Previous QR-code development studies commonly emphasize validity, practicality, accessibility, or cognitive understanding. In contrast, this study documents how one instructional design simultaneously engages students in understanding historical content, responding emotionally to civic narratives, and physically interacting with the technological interface.

4.6 Convergence, Divergence, and the Novel Contribution of the Study

Taken together, the findings reveal substantial convergence with previous research but also several important extensions. The study confirms earlier findings that QR codes can extend conventional printed learning resources, that multimedia can improve access to instructional content, that interactive digital environments can support active student participation, and that systematic R&D procedures are important for establishing media feasibility.

However, the present research differs from previous studies in several respects. First, the product does not use QR codes merely to provide supplementary links. Instead, the QR code forms part of an instructional sequence connecting physical media, audiovisual historical narratives, interactive exploration, and assessment; Second, while several previous development studies primarily report expert feasibility or user-practicality ratings, this study combines expert validation, prototype revision, classroom implementation, pre-test/post-test measurement, N-Gain analysis, observational evidence, and affective/psychomotor indicators; Third, much earlier QR-based elementary learning research has focused on general themes, literacy, mathematics, or other content areas. In contrast, the current intervention specifically addresses introducing and interpreting Pancasila figures in Grade 3 Civic Education; Fourth, the study demonstrates that digital innovation does not necessarily require replacing existing physical classroom resources. Instead, a conventional poster can be redesigned as a hybrid physical-digital instructional environment. Finally, the study extends previous technology-integration research by demonstrating that learning outcomes can be conceptualized simultaneously across cognitive understanding, affective engagement, student autonomy, and psychomotor interaction with digital resources. Accordingly, this research's novelty does not lie in inventing QR technology itself. Its contribution lies in the instructional orchestration of QR technology, disciplinary Civic Education content, multimodal representations, learner interaction, and multidimensional assessment within a single elementary-school learning design.

CONCLUSION

5.1 Conclusion

This study developed and implemented a QR-integrated interactive poster as a technology-enhanced instructional design for introducing Pancasila figures to Grade 3 students at Sukomulyo Elementary School. The product was developed through a systematic Research and Development process involving needs analysis, instructional design, prototype development, expert validation, classroom implementation, evaluation, and product revision. The expert-validation results showed that the product achieved 86% for material/content accuracy and 84% for media design/usability, indicating that the instructional media was appropriate for classroom use. These results align with the original study's conclusion that the developed product was theoretically feasible and applicable to elementary-school learning.

The implementation findings indicate that the QR-integrated poster shifted the learning experience from predominantly teacher-centered, text-based instruction to a more active, student-centered environment. Students interacted directly with printed and digital content through QR scanning, audiovisual material, and interactive quizzes. This combination supported student autonomy, classroom engagement, and multimodal access to historical content. The original study also emphasized that the developed media was designed to address the learning characteristics of Grade 3 students aged 8–9 by combining printed visual material with accessible digital features.

The quantitative findings also showed improved conceptual understanding. The mean score increased from 54.20 on the pre-test to 85.60 on the post-test, with an N-Gain score of 0.68. These findings indicate that the instructional intervention was associated with meaningful improvement in learning outcomes. In addition to cognitive improvement, classroom observations showed evidence of affective involvement and psychomotor participation as students responded to historical narratives and independently operated digital devices to access the QR-based learning content. The original study explicitly positioned these three dimensions—cognitive, affective, and psychomotor—as interconnected learning outcomes.

The main contribution of this study therefore lies not merely in using QR technology, but in integrating disciplinary Civic Education content, physical poster media, audiovisual resources, interactive assessment, and learner engagement within a single instructional-design framework. The study demonstrates that a relatively simple and accessible technology can transform static printed material into a hybrid physical-digital learning environment suitable for elementary education.

5.2. Suggestions

Based on the findings, elementary-school teachers are encouraged to use QR-integrated learning media as part of carefully designed instructional activities rather than as standalone technological additions. The media's effectiveness depends on alignment among learning objectives, disciplinary content, student characteristics, digital resources, and assessment activities. Therefore, teachers should provide structured guidance when students use mobile devices so that QR scanning remains focused on the intended educational content.

Future studies should test the developed instructional design with a broader and more diverse sample across different schools and geographical contexts. The current study was implemented in a specific Grade 3 classroom context at Sukomulyo Elementary School, so broader implementation would help examine the model's transferability and scalability. Future research may also use experimental or quasi-experimental designs with comparison groups and inferential statistical testing to provide stronger evidence of the intervention's effect. Further development may incorporate more advanced digital features, such as augmented reality, adaptive quizzes, interactive historical timelines, or personalized feedback. However, future innovations should retain the

principle demonstrated in this study: technology should serve a clear pedagogical function and remain appropriate to the cognitive and technological characteristics of elementary-school students. Additional research may also examine long-term retention, character-value internalization, student self-regulated learning, digital literacy, and teacher usability over a longer implementation period. These variables would extend the present findings beyond immediate learning outcomes and provide a more comprehensive understanding of the instructional impact of QR-integrated learning environments.

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