



Development and Evaluation of CTL-Based Digital Learning Materials for Pancasila Education: Integrating Islamic Values in Elementary Schools

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ABSTRACT

Learning Pancasila Education in elementary schools remains insufficiently contextual and lacks the utilization of digital media; therefore, it is necessary to develop CTL-based teaching materials integrated with Islamic values to foster students' national and religious character. This study aims to develop and examine the feasibility of Digital Teaching Materials for Pancasila Education based on the Contextual Teaching and Learning (CTL) approach integrated with Islamic values for Grade IV students at Integrated Islamic Elementary Schools (SDIT). The research employed a Research and Development (R&D) method using the ADDIE model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. The research subjects included teachers and Grade IV students from four SDIT in Padang City: SDIT Arafah, SD Islam Nibros, SDIT Cendekia Andalas, and SDIT Permata. Research instruments consisted of validation sheets for material experts, media experts, and language experts, as well as practicality questionnaires for teachers and students, and learning outcome tests (pretest-posttest). The results showed that the developed product was categorized as highly valid with an average score of 93%, highly practical with a score of 93.5%, and effective in improving students' learning outcomes with an N-Gain score of 0.75 (high category). Learning using CTL-based digital teaching materials was proven to enhance student engagement, understanding, and character formation, particularly in instilling the values of unity, *ukhuwah* (brotherhood), *ta'awun* (mutual help), and *amanah* (responsibility). Thus, the CTL-Based Digital Teaching Materials for Pancasila Education Integrated with Islamic Values are declared valid, practical, and effective as an innovative instructional resource for Pancasila Education in integrated Islamic elementary schools. This product is expected to serve as a reference for developing contextual and character-based digital learning media in the era of the Kurikulum Merdeka.

INTRODUCTION

Advances in digital technology over the past decade have driven significant transformations in learning practices across all levels of education. In the context of primary education, technology is no longer perceived merely as a visual aid, but rather as a learning medium that enables deeper personalization, interactivity, and value integration (Harahap & Dalimunthe, 2024). In Pancasila Education, which encompasses abstract concepts such as democratic values, social justice, deliberation, tolerance, and civic life, the use of digital media has become increasingly relevant as it can provide students with concrete, multimodal, and contextual learning experiences (Ramli, 2023). Through the use of animated videos, interactive simulations, infographics, and digital quizzes, students are able

to actively construct meaning through visual and experiential learning processes.

The Merdeka Curriculum emphasizes the need for flexible, adaptive, and student-centered learning, while also requiring teachers to develop instructional materials that are relevant to students' socio-cultural contexts (Kemendikbud, 2022). In Pancasila Education, this approach is particularly crucial, as learning aims not only to transmit civic knowledge but also to cultivate character, social attitudes, and national identity from an early age. Research by Wahyuni et al. (2023) indicates that digital media enhances students' interest and engagement in understanding abstract concepts, as learners interact through visual, exploratory, and reflective learning experiences.

One pedagogical approach that aligns with the principles of the Merdeka Curriculum is Contextual Teaching and Learning (CTL), which emphasizes real-life experiences, problem-solving, collaboration, and reflection in the learning process (Bessie, 2023). CTL enables teachers to connect instructional content with students' everyday lives, allowing Pancasila values to be understood not merely as normative concepts, but as lived experiences through simulations, discussions, social projects, and other classroom activities. Several studies have also demonstrated that integrating digital media within a CTL framework can significantly enhance students' motivation and conceptual understanding (Jaya, 2024).

In Islamic-based schools, such as Sekolah Dasar Islam Terpadu (Integrated Islamic Primary Schools/SDIT), Pancasila Education carries an additional dimension, namely the integration of Islamic values. Values such as *amanah* (responsibility), *'adl* (justice), *shura* (deliberation), *tasamuh* (tolerance), and *ukhuwah* (brotherhood) closely correspond with Pancasila principles and can strengthen students' character development (Mahmud, 2022; Hidayat & Ramadhan, 2023). Integrating Islamic values into Pancasila Education facilitates a holistic learning experience that nurtures not only cognitive development but also students' spiritual, emotional, and social dimensions. Furthermore, Islamic values provide a moral and religious foundation that reinforces the internalization of national values, encouraging students not only to understand these concepts but also to practice them in daily life (Hasana, 2023).

Nevertheless, field findings indicate that Pancasila Education in many SDITs remains dominated by lecture-based methods, static PowerPoint presentations, and limited contextual activities that reflect CTL principles. Observations conducted in four SDITs in Padang City—SDIT Cendekia Andalas, SDIT Permata, SDIT Arafah, and SDIT Nibras—revealed that teachers have not yet developed systematically designed digital instructional materials that integrate Islamic values and the CTL approach. Learning activities have not sufficiently connected Pancasila concepts to students' real-life experiences, and reflective activities grounded in Islamic values have not been implemented in a structured manner (Observation, 2025). Teachers also reported difficulties in developing digital materials that are engaging, contextual, and enriched with Islamic values (Firmantika et al., 2023).

These conditions indicate the existence of a practical gap, namely the absence of digital instructional materials that meet the needs of CTL-based and Islamic value-integrated Pancasila Education in SDITs. In addition, there is a theoretical gap, reflected in the limited number of studies that simultaneously integrate three key aspects: (1) the CTL approach, (2) Islamic values integration, and (3) the context of Pancasila Education in primary schools. A methodological gap is also evident, as few research and development (R&D) studies have comprehensively examined the validity, practicality, and effectiveness of CTL-based digital instructional materials using the ADDIE model.

In response to these gaps, this study aims to develop CTL-based digital instructional materials integrated with Islamic values for Pancasila Education in SDITs. This research not only produces interactive digital learning materials but also evaluates their validity, practicality, and effectiveness in enhancing students' understanding and internalization of values. Consequently, this study contributes theoretically to the discourse on value-based learning and CTL, while offering practical contributions for SDIT teachers in providing contextual, value-rich, and digitally relevant learning media.

LITERATURE REVIEW

Contextual Teaching and Learning in Digital Learning

Contextual Teaching and Learning (CTL) is a student-centered instructional approach that emphasizes connecting academic content with learners' real-life experiences. Rather than focusing on memorization, CTL encourages students to construct knowledge actively through inquiry, collaboration, reflection, and authentic problem-solving. According to Johnson (2002), CTL enables learners to understand concepts more meaningfully because knowledge is acquired within relevant social and cultural contexts. Similarly, Reigeluth and Carr-Chellman (2016) argue that meaningful learning occurs when instructional activities are aligned with learners' needs, experiences, and expected competencies. The rapid development of educational technology has strengthened the implementation of CTL through interactive digital learning environments. Digital learning materials provide multimedia representations, simulations, videos, interactive quizzes, and collaborative activities that support contextual learning experiences. Mayer (2020) explains that multimedia learning environments facilitate deeper conceptual understanding by integrating visual and verbal information while minimizing unnecessary cognitive load. Likewise, Teo (2021) reported that well-designed digital learning media significantly improve student engagement, motivation, and learning effectiveness.

Several empirical studies have confirmed the effectiveness of integrating CTL with digital learning media. Jaya (2024) found that CTL-supported digital instruction significantly improved students' conceptual understanding and learning motivation compared with conventional classroom instruction. Similarly, Bessie (2023) demonstrated that CTL promotes meaningful civic education by encouraging students to relate learning content to real-life social situations.

Digital Learning Materials in Elementary Education

Digital learning materials have become one of the primary innovations in educational technology because they offer flexibility, accessibility, and interactivity. Unlike printed instructional materials, digital resources enable students to interact with multimedia content, receive immediate feedback, and engage in self-paced learning. According to Branch (2009), instructional media developed through systematic instructional design models produce higher instructional quality because each development stage is carefully evaluated. Within elementary education, digital instructional materials are particularly important because young learners generally respond better to visual, interactive, and contextual learning experiences. Harahap and Dalimunthe (2024) emphasized that digital transformation in elementary education enables teachers to design learning environments that are more personalized and engaging. Similarly, Wahyuni et al. (2023) found that digital learning media significantly increased students' participation and learning engagement in Pancasila Education.

Previous studies on digital instructional materials have mostly focused on technological aspects without integrating contextual pedagogy or value-based education. Rohayati (2021) developed interactive digital media for Civic Education, while Santoso (2022) emphasized digital instructional resources to improve conceptual understanding. However, both studies primarily addressed technological innovation and provided limited discussion regarding contextual learning approaches and character education integration.

Integration of Islamic Values in Pancasila Education

Pancasila Education aims not only to develop civic knowledge but also to strengthen students' character, national identity, and moral responsibility. In Islamic elementary schools, these educational goals become closely connected with Islamic teachings because moral values within Islam substantially correspond with the principles embodied in Pancasila. Abdul Majid (2020) explains that Islamic values should become an integral component of educational practice to develop students' cognitive, affective, and behavioral competencies simultaneously.

Islamic values such as amanah, ukhuwah, shura, tasamuh, and justice reinforce the implementation of Pancasila values in classroom learning. Azra (2021) argues that integrating Islamic values into general education strengthens students' moral identity while maintaining academic objectivity. Likewise, Hidayat and Ramadhan (2023) concluded that integrating Islamic values into Pancasila Education contributes positively to students' civic attitudes, ethical awareness, and character development. Hasana (2023) further demonstrated that value-integrated instruction facilitates students' internalization of moral concepts because religious teachings provide meaningful contexts for understanding civic values. Therefore, combining contextual learning, digital technology, and Islamic values offers opportunities to produce more holistic instructional experiences that address cognitive, emotional, social, and spiritual dimensions simultaneously.

Research Gap and Conceptual Framework

Although numerous studies have investigated CTL, digital instructional materials, and Islamic value integration independently, limited research has combined these three dimensions into one integrated instructional product. Existing studies generally emphasize either digital technology (Rohayati, 2021; Santoso, 2022), CTL implementation (Bessie, 2023; Jaya, 2024), or Islamic character education (Hasana, 2023; Hidayat & Ramadhan, 2023). Comprehensive research integrating contextual pedagogy, educational technology, and Islamic values within Pancasila Education remains scarce. Furthermore, previous development studies have rarely evaluated digital instructional materials comprehensively using the ADDIE model by examining product validity, practicality, and effectiveness simultaneously. Consequently, empirical evidence regarding the instructional quality of value-integrated digital learning materials remains limited.

Based on these theoretical considerations, this study proposes that CTL serves as the pedagogical foundation, digital learning materials function as the instructional innovation, and Islamic values strengthen character formation. The integration of these three components is expected to produce digital instructional materials that are valid, practical, and effective in improving students' understanding of Pancasila Education while simultaneously reinforcing national and religious character. The conceptual relationship of this study can be summarized as follows: Contextual Teaching and Learning (CTL) + Digital Learning Materials + Islamic Values Integration → Improved Student Engagement → Better Understanding of Pancasila Concepts → Strengthened Character Development → Valid, Practical, and Effective Learning Product

METHOD

This study employed a Research and Development (R&D) approach aimed at producing CTL-based digital instructional materials for Pancasila Education integrated with Islamic values for fourth-grade students of Integrated Islamic Primary Schools (SDIT). The development model adopted in this research was ADDIE, which is widely recognized as one of the most systematic, adaptive, and applicable instructional design models in educational media development (Branch, 2009; Molenda, 2015). The ADDIE model was selected because it provides a clear and structured framework encompassing needs analysis, instructional design, product development, implementation, and continuous evaluation and refinement. This approach aligns with the recommendations of Reigeluth and Honebein (2020), who emphasize the importance of instructional development that is grounded in real learning needs, competency-based outcomes, and multi-layered evaluation mechanisms.

Development Stages

The stages of the ADDIE model were implemented comprehensively and iteratively.

At the Analysis stage, learning needs were identified through classroom observations, teacher interviews, and curriculum document analysis. The findings revealed that Pancasila Education in SDITs was still predominantly delivered through textual methods and had not optimally utilized digital media. In addition, the need to integrate Islamic values was identified as a key characteristic of the

institutional context and learning objectives.

The Design stage involved developing a CTL-based instructional structure that connected Pancasila concepts with students' real-life contexts and relevant Islamic values. The interface layout, navigation flow, and visual elements were systematically planned using storyboards to ensure consistency, coherence, and alignment with learning objectives.

During the Development stage, the design was transformed into an interactive digital product featuring contextual illustrations, case studies, Qur'anic verses and hadiths, as well as CTL-based learning activities. The developed product was then validated by subject-matter experts, media experts, and language experts to ensure content accuracy, visual quality, and linguistic clarity. Validation was conducted using standardized assessment instruments based on both Guttman and Likert scales. The Implementation stage was carried out through a limited trial involving fourth-grade SDIT students as the research participants. This trial aimed to assess readability, ease of use, and students' and teachers' responses to the digital instructional materials. The implementation was conducted within regular classroom learning settings to ensure the authenticity of the collected data.

The final stage, Evaluation, comprised both formative and summative evaluations. Formative evaluation was conducted throughout the development process based on feedback from experts and teachers. Summative evaluation focused on analyzing the effectiveness of the instructional materials through a One-Group Pretest-Posttest design, which was used to measure students' learning gains after using the digital materials.

The overall framework of the development stages is illustrated in the following figure.

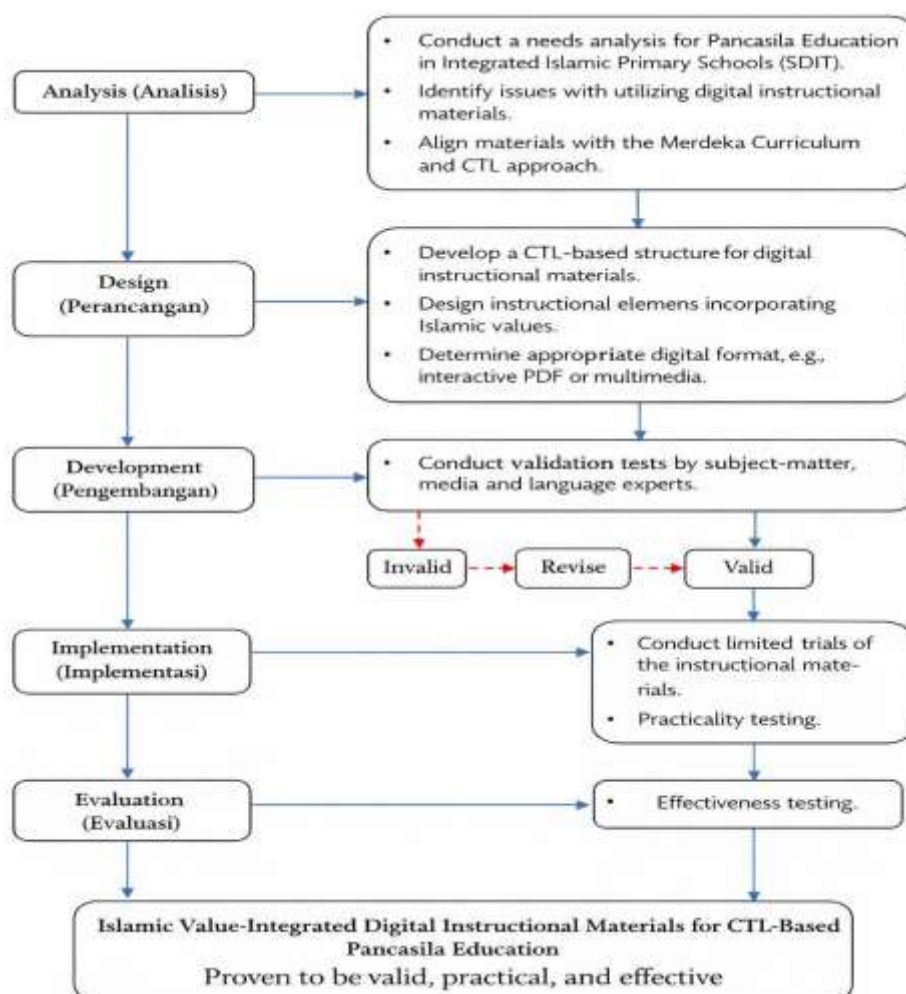


Figure 1. Development stage framework

Research Participants

The research participants consisted of fourth-grade students from four Integrated Islamic Primary Schools (SDIT): SDIT Cendekia Andalas, SDIT Arafah, SDIT Permata, and SDIT Nibras. These schools were selected because they implement Islamic-based education while facing limitations in the utilization of digital technology for Pancasila Education instruction. Additional participants included classroom teachers and experts involved in the validation process, comprising subject-matter experts, media experts, and language experts.

Validity, Practicality, and Effectiveness Testing

Validity testing was conducted by subject-matter experts, media experts, and language experts using evaluation instruments that covered content relevance, conceptual accuracy, integration of Islamic values, visual design quality, and linguistic appropriateness. The evaluation scores were calculated using percentage analysis to determine the feasibility level of the developed instructional materials.

Practicality testing involved teachers and students through questionnaire-based assessments to evaluate ease of use, attractiveness, relevance to CTL-based learning, and compatibility with the instructional context of SDITs. The collected data were analyzed quantitatively to determine the level of practicality of the developed product.

The effectiveness of the instructional materials was measured using pretest–posttest results, which were analyzed through N-Gain scores to assess improvements in students' conceptual understanding. In addition, a Paired Sample t-test was employed to examine the statistical significance of differences in learning outcomes before and after the use of the digital instructional materials.

Instruments and Data Collection Techniques

Research data were collected through classroom observations, interviews, validation questionnaires, practicality questionnaires, and achievement tests. Observations were conducted to monitor student engagement during the implementation of the instructional materials. Interviews were used to obtain in-depth information regarding teachers' and students' experiences in using the digital materials. Questionnaires were administered to experts, teachers, and students to gather quantitative evaluation data. Achievement tests were employed to measure students' mastery of concepts before and after the use of the developed product.

Data Analysis Techniques

Data on validity, practicality, and effectiveness were analyzed quantitatively. Validity and practicality were determined by calculating the percentage of obtained scores relative to the maximum possible scores, which were then classified into predefined categories (e.g., very valid, valid, sufficient, and so forth). Effectiveness was analyzed using mean scores, gain scores, and N-Gain values, along with statistical testing to determine the significance of improvements in learning outcomes. Qualitative data obtained from observations and interviews were analyzed thematically to support and strengthen the interpretation of quantitative findings.

The percentage scores for validity and practicality were calculated using the following formula:

$$P = \frac{x}{xi} \times 100 \%$$

Where:

P = Validity percentage

x = Score obtained

xi = Maximum score

The categories of validity and practicality were determined based on a modified scoring scheme adapted from Purwanto (2013), as presented in Table 1.

Table 1. Expert Validity and Practicality Scoring Criteria

Percentage Interval (%)	Category
86–100	Very valid / very practical
76–85	Valid / practical
60–75	Moderately valid
55–59	Less valid
0–54	Not valid

These criteria were used to classify the feasibility levels of the developed digital instructional materials based on expert judgments and user responses.

To determine the level of effectiveness more objectively, this study employed the Normalized Gain (N-Gain) formula proposed by Hake (1999), as shown below:

$$N - Gain = \frac{\text{Posttest Score} - \text{Pretest Score}}{\text{Maximum Score} - \text{Pretest Score}}$$

Where:

Posttest Score = students' score after the learning intervention.

Pretest Score = students' score before the learning intervention.

Maximum Score = the ideal maximum score (100)

The interpretation of N-Gain values follows the criteria established by Hake (1999), as presented in Table 2.

Table 2. N-Gain Interpretation Criteria

N-Gain Range	Improvement Category
$g \geq 0.70$	High
$0.30 \leq g < 0.70$	Medium
$g < 0.30$	Low

The N-Gain value indicates the level of effectiveness of the digital instructional materials. An N-Gain value of $g \geq 0.70$ signifies that the developed product is effective in improving students' learning outcomes.

RESULTS AND DISCUSSION

Results

This study produced CTL-based digital instructional materials for Pancasila Education integrated with Islamic values, along with empirical findings regarding the validity, practicality, and effectiveness of the developed product based on evaluations conducted by experts, teachers, and students. The complete results of the study are presented as follows.

Digital Instructional Materials

The developed product consists of interactive digital instructional materials comprising several key components, as illustrated in the following figure:



DAFTAR ISI	
DAFTAR ISI	i
INFORMASI UMUM	1
A. Identitas Modul	1
B. Kompetensi Awal	1
C. Profil Pelajar Pancasila yang Dikembangkan	1
D. Media & Alat	2
E. Target Peserta Didik	2
F. Model dan Moda Pembelajaran	2
KOMPONEN INTI	3
A. Capaian Pembelajaran	3
B. Tujuan Pembelajaran	3
C. Pemahaman Bermakna	4
D. Pertanyaan Pemantik	4
E. Persiapan Pembelajaran	5
F. Kegiatan Pembelajaran (Pendahuluan, Inti, Penutup)	6
G. Pengayaan & Remedial	8
H. Glosarium	8
DAFTAR PUSTAKA	9
LAMPIRAN	
Alur Tujuan Pembelajaran (ATP)	
Bahan Ajar	
Lembar Kerja Peserta Didik (LKPD)	
Kisi-kisi Soal Evaluasi	
Soal Evaluasi	
Kunci Jawaban Soal Evaluasi	
Penilaian	

Figure 2. Components/ Table of Contents of the Developed Digital Instructional Materials

To provide a more comprehensive overview of the developed product and to ensure open access for researchers and educational practitioners who wish to review or utilize it, the digital instructional materials produced in this study are made available through the following link: https://drive.google.com/file/d/1ZEzJ_2Z0ecFHulRKrJd6kauZvCleuDUM/view?usp=s_haring

Validity Test Results

Table 3. Product Validity Results

Validator	Evaluated Aspect	Obtained Score	Maximum Score	Percentage (%)	Category
Subject-Matter Expert	Content and Substance	36	40	90%	Very Valid
Media Expert	Interface and Design	36	40	90%	Very Valid
Language Expert	Linguistic Quality	49	52	94%	Very Valid
Islamic Education Expert	Integration of Islamic Values	39	40	98%	Very Valid
Average				93%	Very Valid

The validity test results indicate that the developed digital instructional materials achieved a very valid category across all assessed aspects.

Practicality Test Results

Table 4. Teachers' Practicality Test Results

Aspect	Score (%)	Category
Ease of use	93%	Very Practical
CTL relevance	88%	Very Practical
Visual design	90%	Very Practical
Navigation	91%	Very Practical
Average	90.5%	Very Practical

Table 5. Students' Practicality Test Results

Aspect	Score (%)	Category
Attractiveness	95%	Very Practical
Ease of use	89%	Very Practical
Interactivity	92%	Very Practical
Average	92%	Very Practical

The practicality test results demonstrate that both teachers and students perceived the digital instructional materials as very practical, particularly in terms of usability, interactivity, and alignment with CTL-based learning.

Effectiveness Test Results

Table 6. Pretest and Posttest Scores

School	Pretest (Mean)	Posttest (Mean)	Gain	N-Gain
SDIT Cendekia Andalas	52	87	+35	0.75
SDIT Arafah	39	86	+47	0.72
SDIT Permata	51	89	+38	0.78
SDIT Nibras	47	85	+38	0.75
Average	47.25	86.75	+39.5	0.75 (High)

The results of the validity, practicality, and effectiveness evaluations indicate that the developed digital instructional materials meet high standards of instructional quality and are well aligned with the learning needs of Integrated Islamic Primary Schools (SDIT). The high validation scores suggest that the instructional content is consistent with the Merdeka Curriculum, academically sound in terms of Pancasila Education, and appropriately integrates Islamic values. Moreover, the strong evaluations from media and language experts confirm that the visual design, interactivity, and linguistic clarity of the product are suitable for use by primary school students.

The very high practicality ratings reported by both teachers and students demonstrate that the product is not only easy to use but also effective in enhancing students' learning motivation, engagement, and comfort. Teachers indicated that the digital instructional materials facilitate the implementation of Contextual Teaching and Learning (CTL), as the learning activities are systematically structured and clearly aligned with contextual and experiential learning principles.

In terms of effectiveness, the improvement in pretest and posttest scores, with an average N-Gain value of 0.75 (high category), provides strong evidence that the digital instructional materials

significantly enhance students' conceptual understanding of Pancasila Education. The consistently high N-Gain scores across the four participating schools indicate that the product performs reliably across different school contexts. Furthermore, the contextual integration of Islamic values strengthens students' understanding of national values through a spiritual perspective, resulting in learning outcomes that improve not only cognitively but also affectively. Accordingly, these digital instructional materials can serve as a model for the development of other value-integrated digital learning resources in SDITs.

Discussion

The findings of this study indicate that the development of CTL-based digital instructional materials for Pancasila Education integrated with Islamic values for fourth-grade SDIT students achieved high levels of validity, practicality, and effectiveness. These results carry significant theoretical and practical implications for value-based learning models in Integrated Islamic Schools. The following discussion interprets the findings from theoretical and comparative perspectives while highlighting the scientific contributions of this study.

Validity of the Instructional Materials from Pedagogical, Technological, and Value Integration Perspectives

The average validity score of 93% indicates that the developed digital instructional materials meet high standards of instructional quality. The strong content validity confirms that the materials are aligned with the learning outcomes of the Merdeka Curriculum, particularly in fostering critical reasoning and moral character. In the context of Pancasila Education, high validity reflects coherence among instructional content, learning objectives, CTL-based activities, and performance indicators. From a pedagogical perspective, these findings support the view of Reigeluth and Carr-Chellman (2016) that effective instruction must ensure alignment among content, methods, and learning objectives. The developed materials adhere to this principle by embedding contextual learning activities that connect Pancasila concepts to students' everyday experiences, thereby facilitating meaningful learning.

From the perspective of educational technology, the high media validity demonstrates that the visual design, navigation structure, and functional features meet digital feasibility standards. This is crucial, as Teo (2021) emphasizes that the effectiveness of digital media is largely determined by ease of navigation, interactivity, and visual clarity that does not overload learners' cognitive capacity. The strong validation results from media experts further support cognitive load theory (Sweller, 2019), which suggests that well-organized and minimalist visual design enhances instructional effectiveness. Meanwhile, the high validity of Islamic value integration supports the argument that spiritual value formation can coexist harmoniously with civic education. This approach aligns with the perspectives of Abdul Majid (2020) and Azyumardi Azra (2021), who argue that integrating Islamic values into general education can strengthen students' moral identity without compromising academic objectivity. Accordingly, this study demonstrates that Pancasila Education in Islamic schools can be developed through an integrative approach that is coherent, balanced, and non-contradictory.

Practicality of the Product from Teachers' and Students' Perspectives

The practicality scores reported by teachers (90.5%) and students (92%) indicate that the digital instructional materials are easy to use, engaging, and pedagogically relevant. These high practicality levels reflect strong product acceptance from two complementary perspectives: pedagogical implementation (teachers) and learning experience (students). Teachers reported that the digital materials effectively support the implementation of CTL by providing a structured sequence of learning activities that link abstract Pancasila concepts to concrete real-life situations. This finding suggests that the CTL approach embedded in the product successfully positions teachers as

facilitators who guide learning processes rather than relying on one-way instruction. This result is consistent with Ningrum (2022), who found that CTL-based learning enhances relevance and reduces teacher-centered instruction in Pancasila Education.

From the students' perspective, visual attractiveness, interactive features, and ease of use significantly promoted active engagement. Such interactivity is essential, as Mayer (2020) argues that digital media that encourages interaction, reflection, and problem-solving can enhance intrinsic motivation and learning outcomes. Compared with previous studies, the present product demonstrates a clear advantage due to its integrated combination of CTL, Islamic values, and digital technology. Prior research by Rohayati (2021) and Santoso (2022) focused primarily on digital media development without value integration, while studies such as Fitriani (2023) emphasized Islamic value-based materials without fully incorporating digital technology. The integration of these three dimensions constitutes a key strength of this study and represents its primary novel contribution to the field.

Product Effectiveness: Learning Gains and Value Reinforcement

The increase in students' pretest-posttest scores from 47.25 to 86.75, with an N-Gain value of 0.75 (high category), indicates that the developed product is highly effective in enhancing students' understanding of Pancasila concepts. This level of effectiveness can be attributed to the use of a contextual learning approach, which connects instructional content with real-life situations familiar to students. According to Hake (1999), context-based learning approaches tend to yield high N-Gain values because learners actively construct knowledge through meaningful engagement rather than passive reception. In addition, the product incorporates Islamic value-based reflective activities that encourage students to understand the relationship between Pancasila principles and Islamic ethical values. Consequently, learning outcomes extend beyond cognitive achievement to include moral awareness and value internalization. This finding is consistent with Zubaedi (2020), who argues that integrating religious values into character education strengthens value internalization through experiential and reflective learning processes.

The consistent effectiveness observed across four different schools demonstrates the stability of the product and its potential for broader implementation. Unlike many instructional media studies that are typically tested in a single research setting (Firdaus, 2022), this study provides stronger empirical evidence that the developed materials function effectively across diverse SDIT contexts. This multi-site implementation enhances the external validity of the research findings. Furthermore, the use of interactive features such as digital quizzes, contextual images, videos, and CTL-based learning activities aligns with Vygotsky's (1980) social constructivist theory, which emphasizes the importance of social interaction, contextual learning, and concrete activities in facilitating meaningful learning. These features support students in actively engaging with content, collaborating, and reflecting on their learning experiences.

Research Contributions to Digital Instructional Material Development in SDITs

This study makes a significant contribution to the development of digital instructional materials in Integrated Islamic Primary Schools (SDITs), particularly in the context of Pancasila Education, which is often perceived as abstract and insufficiently connected to students' daily experiences. The integration of Contextual Teaching and Learning (CTL), digital technology, and Islamic values within a single instructional product represents an innovative approach that has been rarely addressed in previous studies. This integrative approach demonstrates that Pancasila Education can be designed to be more meaningful and relevant to the developmental needs of SDIT students by addressing not only cognitive competencies but also moral and spiritual development. In alignment with the Merdeka Curriculum, which emphasizes differentiated, experience-based, and student-centered learning, the developed product provides a practical model that can be

replicated for other subjects requiring similar integrative approaches.

Moreover, the availability of systematically structured, interactive, and Islamic value-oriented digital instructional materials offers an important alternative for SDIT teachers, who often face limitations in utilizing digital media for value-based instruction. Accordingly, this study contributes both theoretically and practically to the development of holistic digital instructional materials that harmoniously integrate values, context, and technology.

CONCLUSION

This study systematically reviewed the current literature on the implementation of Learning Analytics Dashboards (LADs) for predicting student learning outcomes in hybrid higher education environments. The review demonstrates that the rapid digital transformation of higher education has significantly expanded the role of learning analytics from descriptive reporting toward predictive and data-driven decision support. Learning Analytics Dashboards have evolved into intelligent educational tools that integrate learning data from multiple digital sources, visualize student learning progress, and provide predictive insights that assist instructors and institutions in identifying students who may require timely academic intervention.

The synthesis of the reviewed studies indicates that the effectiveness of predictive Learning Analytics Dashboards is largely determined by three interrelated components: the quality and diversity of learning data, the capability of machine learning algorithms, and the usability of dashboard visualizations. Rather than relying solely on examination results, contemporary predictive models increasingly incorporate multidimensional indicators such as learning engagement, LMS interaction, attendance, assignment completion, and online participation to produce more comprehensive predictions of student learning outcomes. Furthermore, the integration of machine learning techniques enables educational institutions to implement early warning systems that support personalized learning, improve student retention, and facilitate evidence-based instructional decision-making.

Despite these promising developments, the review also identifies several challenges that require further attention. Data quality, interoperability among institutional systems, ethical governance of educational data, algorithm transparency, and educators' data literacy remain important factors influencing the successful implementation of Learning Analytics Dashboards. Therefore, technological innovation should be accompanied by institutional policies, professional development programs, and responsible artificial intelligence practices to ensure that predictive analytics contributes positively to teaching and learning rather than functioning merely as a technological solution.

This review contributes to the existing body of knowledge by integrating research on learning analytics, machine learning, dashboard visualization, and hybrid higher education into a unified conceptual perspective. The findings provide theoretical insights into the evolving role of predictive learning analytics while offering practical guidance for universities seeking to implement data-driven academic support systems. The proposed synthesis also highlights the importance of aligning technological capabilities with pedagogical objectives and institutional readiness to maximize educational benefits.

Future research should extend beyond improving predictive accuracy by investigating adaptive and explainable Learning Analytics Dashboards capable of delivering personalized recommendations in real time. Additional studies are also encouraged to explore the integration of multimodal learning analytics, generative artificial intelligence, learning behavior modeling, and cross-institutional datasets to improve the generalizability and practical applicability of predictive learning systems. Such developments are expected to strengthen the role of Learning Analytics Dashboards as strategic components of intelligent, equitable, and learner-centered higher education ecosystems.

DECLARATIONS

Author Contributions

R.A.P and A.A contributed to the conceptualization and design of the study, development of the CTL-based digital instructional materials, data collection, analysis and interpretation of the results, and preparation, review, and editing of the manuscript. Both authors approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

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Conflict of Interest

The authors declare no conflict of interest.

Ethical Approval

This study involved fourth-grade students and teachers from four Integrated Islamic Primary Schools (SDIT) as research participants. The study was conducted in the context of regular classroom learning and involved the implementation and evaluation of digital instructional materials through questionnaires and pretest-posttest assessments. Ethical procedures and institutional permissions applicable to the research were followed in accordance with the requirements of the participating institutions and relevant research ethics guidelines.

Data Availability

The data supporting the findings of this study were obtained from the implementation and evaluation of the developed digital instructional materials involving teachers and fourth-grade students. The availability of the underlying research data is subject to applicable institutional policies and the protection of participants' privacy and confidentiality.

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The authors have no acknowledgments to declare.

AI-Assisted Tools Disclosure

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