

Kodular BHINEKA: Development and Preliminary Effectiveness of Android-Based Civic Learning Media for Enhancing Elementary Students' Critical Thinking and Learning Outcomes

Neng Widiya Puspitasari¹, Ratna Sari Dewi², Luluk Asmawati³

¹ Universitas Sultan Ageng Tirtayasa, Serang, Indonesia; widiyapuspitasari849@gmail.com

² Universitas Sultan Ageng Tirtayasa, Serang, Indonesia; ratna@untirta.ac.id

³ Universitas Sultan Ageng Tirtayasa, Serang, Indonesia; lulukasmawati@untirta.ac.id

ARTICLE INFO

Keywords:

android base learning media;
civic education;
critical thinking skills;
elementary school;
learning outcomes

Article history:

Received 2026-04-02

Revised 2026-05-18

Accepted 2026-09-15

ABSTRACT

Low learning outcomes and limited critical thinking skills remain challenges in elementary Civic Education, partly due to teacher-centered instruction and limited use of interactive digital media. This study aimed to develop Kodular BHINEKA, an Android-based learning medium, and examine its feasibility and preliminary effectiveness in supporting fifth-grade students' learning outcomes and critical thinking skills. This Research and Development study employed the ADDIE model and involved 30 fifth-grade students. Product feasibility was assessed through expert validation using Aiken's V. Changes in learning outcomes and critical thinking skills were examined using a one-group pretest-posttest design, with data analyzed through the Shapiro-Wilk test, paired-sample t-test, and N-Gain analysis. The application achieved an average feasibility score of 87.87% and an Aiken's V coefficient of 0.87, indicating high feasibility. Significant differences were found between pretest and posttest scores for both learning outcomes and critical thinking skills ($p < 0.001$). The N-Gain was 0.70 for learning outcomes, categorized as high, and 0.59 for critical thinking skills, categorized as moderate. These findings indicate that Kodular BHINEKA is feasible for classroom implementation and provide preliminary evidence of improved learning outcomes and critical thinking following its use. However, the absence of a control group limits causal interpretation, warranting further controlled studies.

This is an open access article under the [CC BY-NC-SA](https://creativecommons.org/licenses/by-nc-sa/4.0/) license.



Corresponding Author:

Neng Widiya Puspitasari

Universitas Sultan Ageng Tirtayasa, Serang, Indonesia; widiyapuspitasari849@gmail.com

1. INTRODUCTION

Basic education plays an important role in developing students' civic awareness, character, and understanding of national values. In civic education, the concept of Bhinneka Tunggal Ika is a fundamental foundation for fostering tolerance, respect for diversity, and national identity among elementary school students (Tilaar, 2021). However, previous studies have shown that civic and multicultural education practices in schools often remain limited to the transmission of moral concepts

and factual knowledge rather than encouraging reflective and critical engagement with social realities (Banks, 2021). Consequently, students tend to memorize civic concepts without deeply understanding their relevance to everyday life.

This condition is still frequently found in Indonesian elementary schools, where civic education learning is predominantly teacher-centered and focused on rote learning. Students are rarely encouraged to analyze social issues, evaluate arguments, or reflect critically on the implementation of Pancasila values in real contexts (Sari & Hidayat, 2021; Sukardi & Utami, 2023). Such instructional practices are inconsistent with current educational demands that emphasize critical thinking as an essential competency for 21st century citizenship (OECD, 2022). Critical thinking enables students to assess information critically, solve problems, and make reasoned decisions in diverse social situations. Therefore strengthening critical thinking in civic education has become increasingly important in elementary education contexts (Dewi, 2022).

Empirical evidence also indicates that students' learning outcomes in civic education remain relatively low, particularly in tasks involving higher-order thinking skills such as analysis and evaluation (Asmawati, 2023). One contributing factor is the limited integration of interactive and technology-supported learning experiences in classroom instruction. Although digital technology has become increasingly accessible in schools, learning activities often still rely heavily on textbooks and conventional explanations, limiting students' opportunities for active participation and reflective learning.

International studies have highlighted the potential of mobile learning and interactive digital applications in supporting student engagement, collaborative learning, and critical thinking development (Crompton & Burke, 2018; Sung et al., 2016). In civic education contexts, digital learning environments can provide more contextual and participatory learning experiences by connecting civic concepts with students' real-life situations (Choi et al., 2021). Several studies in Indonesia have also reported that digital comics, multimedia presentations, and interactive learning resources can improve students' motivation and conceptual understanding (Dewi & Pratama, 2022; Nurhayati et al., 2019). However, most previous studies mainly focused on general learning motivation or conceptual achievement, while empirical evidence regarding Android-based interactive media specifically designed to improve both learning outcomes and critical thinking skills in elementary civic education remains limited. In addition, many existing digital media studies emphasize content delivery rather than reflective civic learning and contextual value internalization.

To address this gap, this study developed an Android-based learning application called Kodular BHINEKA (*Belajar Harmoni Nilai Keragaman Budaya*) using the Kodular platform. Unlike previous studies that primarily examined multimedia presentation tools, Kodular BHINEKA integrates contextual civic problems, interactive quizzes, videos, educational games, and reflective learning activities within a single mobile learning application. The application was specifically designed to support elementary civic education learning related to cultural diversity and Pancasila values while simultaneously fostering students' critical thinking skills.

The development of Kodular BHINEKA is grounded in constructivist learning theory (Piaget, 1972; Vygotsky, 1978), meaningful learning theory (Ausubel, 1968; Novak, 1998), and multimedia learning theory (Mayer, 2009). These theoretical perspectives emphasize that meaningful knowledge construction occurs through active interaction, contextual learning experiences, and the integration of verbal and visual representations. Therefore, this study aims to develop and evaluate the feasibility

and effectiveness of Kodular BHINEKA in improving fifth-grade students' learning outcomes and critical thinking skills in civic education learning.

2. METHODS

2.1 Research Design

This study employed a Research and Development (R&D) approach to develop Kodular BHINEKA, an Android-based learning medium for fifth-grade Civic Education. The development process followed the ADDIE model, consisting of five stages: Analysis, Design, Development, Implementation, and Evaluation (Branch, 2009). The ADDIE model was selected because it provides a systematic framework for identifying learning needs, designing instructional content, developing educational media, implementing the product in an authentic learning environment, and evaluating its quality and use (Adeoye & Wirawan, 2024; Spatioti et al., 2022).

Following product development and expert validation, a one-group pretest-posttest design was used to examine students' learning outcomes and critical thinking skills before and after the implementation of Kodular BHINEKA. This design was intended to provide preliminary evidence of within-group changes following the intervention rather than to establish a definitive causal effect. A control group was not included because of the limited number of available classes at the research site. Consequently, the findings were interpreted as preliminary evidence of improvement associated with the implementation of the developed learning medium.

2.2 Research Setting and Participants

The study was conducted at SDN Panyirapan, an elementary school implementing the Merdeka Curriculum and using basic digital facilities to support classroom learning. The participants were 30 fifth-grade students selected purposively in consultation with the classroom teacher. Fifth-grade students were selected because they had previously encountered learning topics related to cultural diversity and Pancasila values, which constituted the main content of Kodular BHINEKA.

The classroom implementation involved the same group of students in the pretest, learning intervention, and posttest phases. The study therefore focused on changes within the participating group rather than comparisons between different instructional groups.

2.3 Development Procedures

The development of Kodular BHINEKA followed the five stages of the ADDIE model.

During the Analysis stage, classroom observations and an interview with the classroom teacher were conducted to identify learning problems, students' needs, characteristics of Civic Education instruction, and the availability of digital learning facilities. The findings from this stage informed the selection of learning content and the design of activities related to cultural diversity and Pancasila values.

During the Design stage, the learning content, application structure, storyboard, user-interface layout, learning activities, and assessment components were prepared. The application was designed to integrate textual and visual materials with interactive activities intended to promote active and reflective learning.

During the Development stage, Kodular BHINEKA was created using the Kodular platform. The application incorporated learning materials, animated illustrations, contextual videos, interactive quizzes, educational games, reflective questions, and evaluation activities. After the initial version had been developed, the application underwent expert validation. Feedback from the validators was used to revise the content, interface, language, usability, and instructional components before classroom implementation.

During the Implementation stage, the revised application was implemented in two classroom meetings, each lasting approximately 70 minutes. Students used Kodular BHINEKA individually and participated in guided group discussions facilitated by the teacher. The learning activities focused on cultural diversity and Pancasila values and incorporated contextual questions, multimedia materials, interactive exercises, and reflective activities.

During the Evaluation stage, information from expert validation, student responses, classroom observations, and pretest–posttest results was examined to evaluate the quality of the developed application and identify areas requiring further refinement.

2.4 Expert Validation

Before classroom implementation, Kodular BHINEKA was evaluated by three validators: an educational technology expert, a Civic Education content expert, and an elementary education practitioner. The validation covered content accuracy and relevance, language appropriateness, visual and media design, usability, interactivity, and instructional relevance.

Expert judgments were analyzed using Aiken's V to examine the content validity of the developed learning medium. In addition, percentage scores were calculated to describe the feasibility of the application. Qualitative comments and recommendations provided by the validators were analyzed descriptively and used as the basis for revising the application before classroom implementation.

2.5 Research Instruments

Data were collected using expert-validation sheets, classroom observation guidelines, student-response questionnaires, and pretest–posttest instruments.

Students' learning outcomes were assessed using 15 multiple-choice items. Critical thinking skills were assessed using 10 essay items developed with reference to Facione's (2015) critical-thinking framework. The essay items addressed four indicators: interpretation, analysis, evaluation, and inference. These indicators were adapted to learning situations involving cultural diversity, Pancasila values, and elementary Civic Education.

Each essay response was evaluated using a four-point scoring rubric. Higher scores represented stronger performance in interpreting information, analyzing problems, evaluating information or arguments, presenting logical reasoning, and drawing appropriate conclusions.

Before their use in the main study, the achievement and critical-thinking instruments were empirically tested. Item validity was examined using the Pearson Product Moment correlation, while internal consistency was assessed using Cronbach's Alpha. Item difficulty and discrimination indices were also examined to evaluate the quality of the test items. The empirical instrument trial involved 31 sixth-grade students who were separate from the main study participants.

2.6 Data Collection Procedure

The data collection procedure consisted of three principal phases. First, students completed a pretest to establish their initial learning-outcome and critical-thinking scores. Second, Kodular BHINEKA was implemented during two classroom meetings. Students interacted with the application and participated in teacher-guided discussions and reflective learning activities. Third, students completed a posttest after the intervention to measure changes in the two outcome variables.

During implementation, observational data and student responses were also collected to provide descriptive information regarding students' experiences with the application and to support product evaluation.

2.7 Data Analysis

Quantitative data were analyzed using descriptive and inferential statistics. Descriptive statistics were used to summarize students' pretest and posttest performance. Prior to inferential analysis, the Shapiro–Wilk test was conducted to examine the normality assumption. A significance value greater than 0.05 was interpreted as indicating no statistically significant departure from normality.

Because the measurements were obtained from the same participants before and after the intervention, a paired-sample t-test was used to determine whether there was a statistically significant difference between pretest and posttest scores for learning outcomes and critical thinking skills. Statistical significance was evaluated at $\alpha = 0.05$. The paired-sample analysis was interpreted as evidence of within-group change and not as definitive evidence of causality because no control group was included.

N-Gain analysis was additionally conducted to describe the relative improvement in students' scores between the pretest and posttest. The resulting N-Gain values were interpreted according to the criteria adopted in the study. Effect-size analysis was used as supplementary information to describe the magnitude of the observed pretest–posttest differences.

Qualitative information obtained from validator comments, classroom observations, and student feedback was analyzed descriptively. The qualitative findings were used primarily to support the revision and refinement of Kodular BHINEKA rather than as an independent qualitative strand of the study.

2.8 Ethical Considerations

Permission to conduct the study was obtained from the school principal and classroom teacher before data collection. Students participated voluntarily, and informed consent was obtained from their parents or guardians before classroom implementation. Participants' identities and research data were treated confidentially throughout the study.

3. FINDINGS AND DISCUSSION

3.1 Findings

3.1.1 Development of the Kodular BHINEKA Android-Based Learning Media

Kodular BHINEKA was developed through the five stages of the ADDIE model: Analysis, Design, Development, Implementation, and Evaluation. During the analysis stage, classroom observations and

teacher interviews indicated that fifth-grade Civic Education instruction relied predominantly on textbooks and teacher explanations. The needs analysis also indicated that students required more interactive and contextual learning activities to support their understanding of cultural diversity and Pancasila values.

Based on these findings, the application was designed to integrate textual materials, cultural illustrations, contextual videos, interactive quizzes, educational games, reflective questions, and evaluation activities. The initial product was subsequently developed using the Kodular platform and subjected to expert validation before classroom implementation. Feedback obtained during the validation stage was used to revise the content, visual design, language, usability, and interactive components of the application.

Following the revision, Kodular BHINEKA was implemented in two classroom meetings. During implementation, students used the application individually and participated in teacher-guided discussions and reflective activities related to cultural diversity and Pancasila values.

Before classroom implementation, the product underwent expert validation involving content, media, and language experts. The validation process assessed aspects related to content relevance, visual design, usability, interactivity, and language appropriateness. The results are presented in Table 1.

Table 1 Expert Validation Results of Kodular BHINEKA

Validation Aspect	Score (%)	Aiken's V	Category
Content	86.00	0.89	Highly Feasible
Media Design	87.00	0.86	Highly Feasible
Linguistics	90.60	0.88	Highly Feasible
Average	87.87	0.87	Highly Feasible

As shown in Table 1, the feasibility scores ranged from 86.00% to 90.60%. The language aspect received the highest feasibility score (90.60%), followed by media design (87.00%) and content (86.00%). The corresponding Aiken's V coefficients ranged from 0.86 to 0.89. Overall, Kodular BHINEKA obtained an average feasibility score of 87.87% and an average Aiken's V coefficient of 0.87. Based on the criteria applied in this study, these results placed the developed application in the highly feasible category for classroom implementation.

3.1.2 Instrument Validity and Reliability

The achievement and critical-thinking instruments were empirically tested with 31 sixth-grade students who were not included in the main study. Pearson Product Moment analysis was used to examine item validity, while Cronbach's Alpha was used to assess internal consistency.

Table 2. Empirical Validity and Reliability of the Research Instruments

Instrument Type	Number of Items	Validity Result (r-count range)	r-table ($\alpha = 0.05$)	Validity Category	Cronbach's Alpha	Reliability Category
Multiple Choice Test	15 items	0.441 – 0.813	0.355	Valid	0.888	High Reliability
Essay Test	10 items	0.642 – 0.957	0.355	Valid	0.953	Very High Reliability

All multiple-choice items obtained correlation coefficients ranging from 0.441 to 0.813, while the essay items produced coefficients ranging from 0.642 to 0.957. All coefficients exceeded the critical value of 0.355, indicating that all items met the validity criterion.

The Cronbach's Alpha coefficients were 0.888 for the multiple-choice test and 0.953 for the essay test. These findings indicated high to very high internal consistency for the instruments used to assess learning outcomes and critical thinking skills.

3.1.3 Normality of the Pretest and Posttest Data

Prior to the paired-sample analysis, the distributions of the pretest, posttest, and gain scores were examined using the Shapiro–Wilk test. The results are presented in Table 3.

Table 3. Shapiro–Wilk Normality Test Results

Variable	Data Group	Statistic	df	Sig. (<i>p</i>)	Conclusion
Learning Outcomes	Pretest	0.952	30	0.187	Normal
	Posttest	0.951	30	0.177	Normal
	Gain Score	0.940	30	0.089	Normal
Critical Thinking	Pretest	0.935	30	0.065	Normal
	Posttest	0.982	30	0.865	Normal
	Gain Score	0.968	30	0.477	Normal

Note: Note. Normality was evaluated at $\alpha = 0.05$.

All significance values exceeded 0.05. The pretest, posttest, and gain-score distributions for both learning outcomes and critical thinking therefore showed no statistically significant departure from normality. On this basis, paired-sample t-tests were used to examine differences between students' pretest and posttest scores.

3.1.4 Effectiveness of Kodular BHINEKA of learning Outcomes and Students' Critical Thinking Skills

After the data were confirmed to be normally distributed, the effectiveness of Kodular BHINEKA in improving students' learning outcomes and critical thinking skills was analyzed using the paired sample t-test and Cohen's *d* effect size analysis. The results of the analysis are presented in Table 4.

Table 4. Paired Sample t-Test and Cohen's *d* Effect Size Results

Variable	Mean Difference	Std. Deviation	<i>T</i>	<i>df</i>	Sig. (2-tailed)	Cohen's <i>d</i>	Effect Size Category
Learning Outcomes	-29.53	6.847	-	29	< 0.001	4.31	Very Large
Critical Thinking	-35.73	3.146	-	29	< 0.001	11.36	Very Large

Note: Cohen's *d* values were interpreted based on Cohen's criteria, where 0.20 = small, 0.50 = medium, and 0.80 = large effect size.

The paired sample t-test showed significant differences between pretest and posttest scores for both variables ($p < 0.001$). The results are presented in Table 4. Cohen's d indicated very large effect sizes for learning outcomes ($d = 4.31$) and critical thinking skills ($d = 11.36$).

3.1.5 N-Gain Analysis

Although the paired sample t-test confirmed statistically significant improvements, it does not indicate the magnitude of the improvement. Therefore, N-Gain analysis was conducted to determine the effectiveness level of Kodular BHINEKA in improving students' learning outcomes and critical thinking skills based on Hake's criteria.

Table 5. N-Gain Analysis Results

Variable	N-Gain	Category
Learning Outcomes	0.70	High
Critical Thinking Skills	0.59	Moderate

The N-Gain analysis showed that learning outcomes reached a high improvement category ($g = 0.70$), while critical thinking skills were categorized as moderate ($g = 0.59$).

3.2 Discussion

The findings of this study indicate that Kodular BHINEKA is both feasible and effective as an Android-based learning medium for elementary Civic Education. The expert validation results demonstrate that the application fulfilled pedagogical, technical, and linguistic standards required for classroom implementation. The high feasibility level suggests that the integration of interactive features, visual elements, and contextual learning materials was appropriate for the learning characteristics of fifth-grade students. These findings support multimedia learning theory, which explains that meaningful learning can be strengthened through the systematic integration of verbal and visual representations (Mayer, 2009). Similar findings have been reported in previous studies showing that systematically developed Android-based learning media generally achieve high feasibility before implementation in classroom settings (Khozain, 2023; Rahman & Aeni, 2021).

The implementation of Kodular BHINEKA also contributed positively to students' learning experiences in Civic Education. The interactive multimedia features encouraged students to participate more actively during classroom activities through contextual videos, quizzes, games, and reflective exercises related to cultural diversity and Pancasila values. Compared with conventional teacher-centered instruction, the use of interactive mobile learning media allowed students to engage more directly with learning materials and classroom discussions. This finding is consistent with previous studies reporting that mobile learning environments can improve student engagement, conceptual understanding, and learning participation through flexible and interactive learning experiences (Crompton & Burke, 2018; Mardatila & Trisnaningsih, 2021).

The improvement in students' learning outcomes indicates that interactive digital media can support conceptual understanding more effectively when learning activities are designed contextually and meaningfully. Through multimedia presentations and interactive learning tasks, students were encouraged not only to receive information but also to connect civic concepts with situations encountered in everyday life. This finding aligns with constructivist learning theory, which emphasizes

that knowledge is actively constructed through interaction and meaningful learning experiences (Piaget, 1972; L. Vygotsky, 1978). In the context of Civic Education, contextual learning activities appear to help students understand cultural diversity concepts more concretely and reflectively.

The findings also suggest that Kodular BHINEKA contributed to the development of students' critical thinking skills. Reflective tasks, contextual exercises, and discussion activities within the application encouraged students to analyze situations, evaluate information, and formulate conclusions related to diversity issues and Pancasila values. These activities reflect the characteristics of higher-order thinking skills, which involve reasoning, reflection, and evidence-based judgment. Consistent with these findings, (Asmawati, 2023) argued that technology-supported learning environments can enhance students' analytical and evaluative thinking abilities when learning activities are intentionally designed to promote active reflection and participation.

The N-Gain analysis further indicates that the improvement in conceptual understanding was greater than the improvement in critical thinking skills. This condition suggests that conceptual mastery may develop more rapidly through multimedia-supported learning activities, whereas higher-order thinking skills require more intensive cognitive engagement and longer learning experiences. The moderate improvement in critical thinking skills may also be associated with students' limited prior experience with reflective and technology-based learning activities. Similar patterns have been identified in previous mobile learning studies, where improvements in learning achievement tended to occur more quickly than the development of critical thinking skills because students needed time to adapt to reflective and inquiry-oriented learning environments (Sung et al., 2016; Sutiawati, 2022).

These findings strengthen previous arguments that critical thinking development in elementary education cannot be achieved instantly through short-term instructional interventions alone. Instead, students require continuous opportunities to engage in contextual problem-solving activities, guided reflection, collaborative discussion, and analytical learning experiences. Therefore, the integration of interactive learning media should be accompanied by instructional strategies that consistently encourage inquiry, reflection, and active participation in classroom learning processes (Facione, 2015; OECD, 2022).

Despite the positive findings, several limitations should be acknowledged. The study involved only 30 students from a single elementary school, limiting the generalizability of the findings to broader educational contexts. In addition, the use of a one-group pretest–posttest design without a control group restricted direct comparison with other instructional approaches and reduced the strength of causal interpretation (Creswell & Poth, 2018). The relatively short implementation duration of only two classroom meetings may also have influenced the level of improvement observed in students' critical thinking skills.

Overall, this study contributes to the growing body of research on mobile learning and digital innovation in elementary education. Practically, Kodular BHINEKA offers teachers an alternative instructional medium that supports interactive, contextual, and student-centered Civic Education learning while encouraging students' active participation, conceptual understanding, and critical thinking development. Future studies are recommended to involve larger participant groups, apply experimental research designs incorporating control groups, and conduct longer implementation periods to examine the long-term effectiveness of Android-based Civic Education learning media more comprehensively.

4. CONCLUSION

This study developed Kodular BHINEKA, an Android-based learning medium designed to support fifth-grade Civic Education learning through interactive, contextual, and reflective activities. Expert validation indicated that the application was highly feasible for classroom implementation. Following its use, students demonstrated statistically significant improvements in both learning outcomes and critical thinking skills. The N-Gain results showed a high level of improvement in learning outcomes and a moderate level of improvement in critical thinking skills.

These findings provide preliminary evidence that Kodular BHINEKA has the potential to support more interactive and meaningful Civic Education learning while facilitating students' conceptual understanding and critical thinking processes. The main contribution of this study lies in integrating multimedia content, contextual civic problems, interactive activities, and reflective tasks within a single Android-based learning environment for elementary students.

Nevertheless, the findings should be interpreted with caution. The study involved a relatively small sample from a single school, employed a one-group pretest–posttest design without a control group, and was conducted over only two classroom meetings. Therefore, the observed improvements cannot be attributed exclusively to Kodular BHINEKA. Future research should involve larger and more diverse samples, include comparison or control groups, and use longer intervention periods to provide stronger evidence regarding the effectiveness and sustainability of Android-based Civic Education learning.

REFERENCES

- Adeoye, M. A., & Wirawan, K. (2024). Revolutionizing education: Unleashing the power of the ADDIE model for effective teaching and learning. *Jurnal Pendidikan Indonesia*. <https://doi.org/10.23887/jpiundiksha.v13i1.68624>
- Ardiansyah, A., Nur, A., & Fitriah, S. (2021). *Metodologi Penelitian Pendidikan: Konsep, Prosedur, dan Aplikasi*. Yogyakarta: Deepublish.
- Arikunto, S. (2019). *Dasar-dasar Evaluasi Pendidikan*. Jakarta: Bumi Aksara.
- Asmawati, L. (2023). Media Digital sebagai Sarana Pengembangan HOTS dalam Pembelajaran PPKn. *Jurnal Pendidikan Kewarganegaraan*, 8(1), 55–70.
- Astuti, E., & Wulandari, R. (2022). Pemanfaatan media interaktif berbasis Android untuk meningkatkan hasil belajar siswa SD. *Jurnal Inovasi Pendidikan Dasar*, 8(3), 201–213.
- Ausubel, D. P., Novak, J. D., & Hanesian, H. (1968). *Educational Psychology: A Cognitive View*. New York: Holt, Rinehart and Winston.
- Banks, J. A. (2021). Cultural Diversity and Education: Foundations, Curriculum, and Teaching. In 7th ed. Routledge.
- Branch, R. M. (2009). *Instructional Design: The ADDIE Approach*. New York: Springer.
- Choi, M., Cristol, D., & Gimbert, B. (2021). Teachers as designers of technology-integrated civic learning environments. *Journal of Social Studies Education Research*, 12(1), 146–179.
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. Thousand Oaks, CA: SAGE Publications.
- Crompton, H., & Burke, D. (2018). The use of mobile learning in higher education: A systematic review. *Computers & Education*, 123, 53–64. <https://doi.org/10.1016/j.compedu.2018.04.007>

- Dewi, R., & Pratama, H. (2022). Penerapan Metode Inkuiri dalam Pembelajaran Bahasa Indonesia untuk Meningkatkan Kemampuan Berpikir Kritis Siswa. *Jurnal Pendidikan Bahasa Dan Sastra Indonesia*, 11(2), 134–148.
- Dewi, R. S. (2022). Pengembangan Media Pembelajaran Berbasis Digital untuk Meningkatkan Berpikir Kritis Siswa Sekolah Dasar. *Jurnal Pendidikan Dasar*, 13(2), 120–134.
- Dewi, R., & Wulandari, E. (2021). Validasi Instrumen Pengembangan Media Digital Berbasis Android di Sekolah Dasar. *Jurnal Penelitian Pendidikan*, 9(3), 44–57.
- Facione, P. A. (2015). *Critical Thinking: What It Is and Why It Counts* (U. Edition, Ed.). Millbrae, CA: Insight Assessment.
- Jannah, N., Putri, A. D., & Fitriani, R. (2023). Inovasi pembelajaran berbasis teknologi di sekolah dasar era digital. *Jurnal Pendidikan Dasar Indonesia*, 11(1), 45–56.
- Khozain, N. (2023). Development of Android-Based Indonesian Cultural Exploration Educational Game for Madrasah Ibtidaiyah Students. *Mudarrisa Journal of Islamic Education*. <https://doi.org/10.18326/mudarrisa.v15i2.550>
- Mardatila, D., & Trisnarningsih, R. (2021). Pengembangan Media Peta Digital Berbasis Android pada Materi Keragaman Budaya Indonesia di Sekolah Dasar. *Jurnal Pendidikan Dan Teknologi*, 11(2), 88–97.
- Mayer, R E. (2009). *Multimedia Learning (2nd ed.)*. New York: Cambridge University Press.
- Mayer, Richard E. (2009). *Multimedia Learning*. Cambridge University Press.
- Novak, J. D. (1998). *Learning, Creating, and Using Knowledge: Concept Maps as Facilitative Tools in Schools and Corporations*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Nurhayati, Hidayat, R., & Asmawati. (2019). Pengembangan Media Komik Digital untuk Meningkatkan Minat dan Pemahaman Siswa dalam Pembelajaran PPKn. *Jurnal Pendidikan Kewarganegaraan*, 9(2), 120–130.
- OECD. (2022). *PISA 2022 Assessment and Analytical Framework: Mathematics, Reading, Science and Creative Thinking*. OECD Publishing. <https://doi.org/10.1787/14d98240-en>
- Piaget, J. (1972). *The Psychology of the Child*. New York: Basic Books.
- Rahman, A., & Aeni, N. (2021). Media Digital Berbasis Budaya Lokal untuk Memperkuat Karakter Nasionalisme Siswa SD. *Jurnal Pendidikan Karakter*, 11(3), 337–349.
- Riduwan. (2015). *Metode dan Teknik Menyusun Tesis*. Bandung: Alfabeta.
- Sari, D. P., & Hidayat, M. (2021). Analisis Pembelajaran Pendidikan Pancasila di Sekolah Dasar pada Perspektif Reflektif dan Kritis. *Jurnal Cakrawala Pendidikan*, 40(1), 102–115.
- Spatioti, A. G., Kazanidis, I., & Pange, J. (2022). A comparative study of the ADDIE instructional design model in distance education. *Information*, 13(9), 402. <https://doi.org/10.3390/info13090402>
- Sugiyono. (2018). *Metode Penelitian: Kuantitatif, Kualitatif, dan R&D*. Bandung: Alfabeta.
- Sukardi, I., & Utami, S. (2023). Kendala Implementasi Pembelajaran Pancasila di Sekolah Dasar dalam Perspektif Kontekstual. *Jurnal Pendidikan Moral Dan Kewarganegaraan*, 6(1), 27–36.
- Sukardi, S. (2019). *Metodologi Penelitian Pendidikan: Kompetensi dan Praktiknya*. Jakarta: Bumi Aksara.
- Sung, Y.-T., Chang, K.-E., & Liu, T.-C. (2016). The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis. *Computers & Education*, 94, 252–275. <https://doi.org/10.1016/j.compedu.2015.11.008>
- Sutiawati, S. (2022). *Pengembangan Media Mobile Learning Berbasis Android Mata Pelajaran IPS pada Materi Pemanfaatan Sumber Daya Alam di Kelas IV IPT Sidamukti*.
- Tilaar, H. A. R. (2021). *Kebinekaan dan Pendidikan Multikultural di Indonesia*. Pustaka Pelajar.

Vygotsky, L. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Cambridge: Harvard University Press.

Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, MA: Harvard University Press.