Jurnal Pendidikan Agama Kristen

(JUPAK)

Vol. 6 No. 2 (June 2026) p. 47 - 64

Jurnal Pendidikan Agama Kristen (JUPAK) **e-ISSN 2775-4006**

https://ejurnal.sttkadesiyogyakarta.ac.id/index.php/jupak **p-ISSN 2774-9355**

https://doi.org/10.52489/jupak.v6i2.315

Developing PAIKEM-Oriented Blended Learning Media for Improving Students' Academic Achievement

Hendra Helwaun[1)], Vigo Yano Sahertian[2)], Meilany Angkota Mony[3)], Christiani Monica Moniharapon[4)], Novita Loma Sahertian[5)]

Institut Agama Kristen Negeri Ambon, helwaunhendra@gmail.com

Recommended Citation

Turabian 8th edition (full note)

Helwaun, Hendra, Vigo Yano Sahertian, Meilany Angkota Mony, Christiani Monica Moniharapon and Novita Loma Sahertian. "Developing PAIKEM-Oriented Blended Learning Media for Improving Students' Academic Achievement". Jurnal Pendidikan Agama Kristen (JUPAK) 6, no. 2 (June 26, 2026): 47-64, accessed June 26, 2026, https://doi.org/10.52489/jupak.v6i2.315

American Psychological Association 7th edition

(Hendra et al, 2026, p. 47)

Received: 21 January 2026	Accepted: 15 June 2026	Published: 24 June 2026

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For more information, please contact *helwaunhendra@gmail.com*

Abstract

This study aims to examine the development and implementation of PAIKEM-oriented blended learning media as an instructional innovation to improve students' academic achievement. Rapid technological advancement in the digital era has significantly transformed educational paradigms, making the integration of information and communication technology an essential requirement in 21st-century learning. In response to this shift, the development of effective and engaging learning media has become increasingly important, particularly in religious education contexts.Christian Religious Education not only provides students with opportunities to construct knowledge and deepen conceptual understanding, but also encourages the internalization and application of values reflected in students' attitudes and communication. The adoption of a PAIKEM (Active, Innovative, Creative, Effective, and Joyful Learning) approach within a blended learning environment is considered a strategic alternative to promote student engagement and enhance learning outcomes, especially during the pandemic period.The findings indicate that the implementation of PAIKEM-oriented blended learning media at SD Inpres Namano enabled students to participate in diverse learning activities that fostered understanding, skills development, and active learning. Teachers were required to utilize various learning resources and instructional tools, including the surrounding environment, to create an active, innovative, engaging, and enjoyable learning atmosphere. Overall, the use of interactive multimedia-based blended learning media grounded in the PAIKEM approach proved to be an effective alternative for supporting Christian Religious Education instruction and improving students' academic achievement.

Keywords: PAIKEM learning model, blended learning, instructional media, Christian Religious Education, academic achievement

INTRODUCTION

Contemporary students belong to a generation that is highly familiar with information and communication technology. This condition requires teachers not only to master curriculum content and subject matter but also to effectively integrate instructional media into classroom practices. The ability to utilize appropriate learning media is essential to create active, engaging, and enjoyable learning environments that actively involve students in constructing meaning and understanding learning experiences.

In the context of 21st-century education, blended learning has emerged as a relevant instructional model that combines face-to-face learning with digital and online learning environments. When aligned with the PAIKEM approach—Active, Innovative, Creative, Effective, and Joyful Learning—blended learning has the potential to optimize student engagement, encourage active participation, and enhance academic achievement. Through this approach, learning activities are designed to center on students' experiences, enabling them to actively build knowledge through interaction with learning content, peers, and instructional media.

The development of interactive multimedia-based instructional media that integrates audio-visual elements represents an effective alternative for supporting PAIKEM-oriented blended learning. Such media offer several advantages, including ease of integration into learning activities, increased attractiveness for students, and flexibility for continuous improvement and adaptation. Audio-visual learning media also facilitate more interactive learning processes and promote two-way communication between teachers and students (Haryoko, 2012). This perspective is supported by Arrosyida (2015), who defines interactive learning media as a combination of software and hardware designed to deliver instructional content while enabling user feedback and interaction, thereby enhancing the effectiveness of the learning process (Mustika et al., 2018).

PAIKEM refers to an instructional approach that emphasizes Active, Innovative, Creative, Effective, and Joyful Learning. In this model, teachers act as facilitators who design learning environments that enable students to actively construct knowledge through meaningful experiences rather than receiving information passively (Sagala, 2011; Mulyasa, 2014). Student-centered learning, as promoted by PAIKEM, aligns with constructivist learning theory, which views learning as an active process of meaning-making based on learners' interactions with their environment (Slavin, 2018).

Blended learning, on the other hand, is an instructional model that integrates face-to-face classroom instruction with online or virtual learning environments. Darmayanti et al. (2007) define blended learning as a combination of traditional learning and electronic learning environments that incorporate web-based instruction, video streaming, and synchronous as well as asynchronous communication. Similarly, Graham (2006) emphasizes that blended learning seeks to optimize learning effectiveness by combining the strengths of both conventional and online learning modalities. Through this integration, students are provided with greater flexibility, richer learning resources, and increased opportunities for interaction.

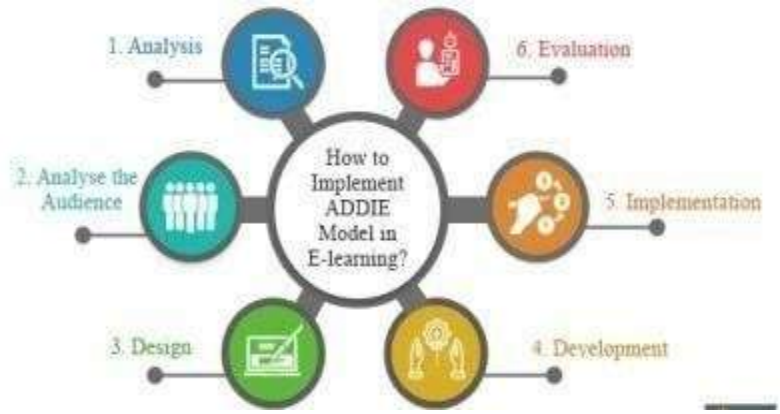
The application of blended learning within a PAIKEM-oriented framework is expected to enhance student engagement and academic achievement. Interactive multimedia-based instructional media play a crucial role in supporting this approach, as they integrate audio-visual elements that can increase learners' motivation, attention, and comprehension (Haryoko, 2012; Mayer, 2009). Interactive media also facilitate two-way communication in the learning process, allowing students to actively respond to learning content and receive immediate feedback (Arrosyida, 2015; Mustika et al., 2018).

Observations conducted at SD Inpres Namano, located in Amahai District, Central Maluku Regency, indicate that students' low academic achievement in Christian Religious Education is partly influenced by the limited use of innovative learning strategies, models, and instructional media. Teaching practices tend to rely on conventional, teacher-centered approaches, which reduce students' opportunities to actively participate and develop their academic potential. Such practices are inconsistent with the objectives of Christian Religious Education, which aim not only to foster cognitive understanding but also to encourage the internalization and application of Christian values in students' attitudes and communication (Groome, 2011).

The implementation of PAIKEM-oriented blended learning media requires teachers to be creative in designing learning activities that stimulate active participation, imagination, and creativity within an enjoyable learning atmosphere. By integrating web-based learning, video streaming, and synchronous and asynchronous communication with face-to-face instruction, this approach supports meaningful and contextual learning experiences. Consequently, the adoption of PAIKEM-based blended learning media is expected to result in significant improvements in students' academic achievement, particularly in Christian Religious Education and Character Education.What distinguishes this study from previous research is its focus on the pedagogical integration of blended learning and the PAIKEM (Active, Innovative, Creative, Effective, and Joyful Learning) approach as a unified instructional framework for contemporary learners who are deeply immersed in digital technology. While earlier studies have commonly examined blended learning and active learning approaches independently, this research investigates how the combination of these two models can create meaningful, student-centered learning experiences that promote active engagement, collaboration, creativity, and deeper knowledge construction. Furthermore, this study responds to the educational challenges of the digital era by emphasizing the role of teachers not only as content experts but also as designers of learning environments capable of effectively integrating instructional media and technology into classroom practice.

METHOD

This study employed a Research and Development (R&D) approach using the ADDIE instructional design model**,** which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation.



The ADDIE model provides a systematic and iterative framework for developing instructional products that are aligned with learning objectives, learner characteristics, and evaluation outcomes (Branch, 2009; Molenda, 2015).

The product developed in this study was an interactive PAIKEM-oriented blended learning media designed to support learning activities and improve students' academic achievement. The media was developed for Grade V elementary students in Christian Religious Education, focusing on the topic *"God Is Love."* This product integrates face-to-face learning with digital learning components to promote active, innovative, creative,

effective, and joyful learning, consistent with the principles of PAIKEM (Mulyasa, 2014; Sagala, 2011).

Development Procedures

The development of the PAIKEM-oriented blended learning media followed the ADDIE stages as outlined below:

1. Analysis Stage

At this stage, the researcher conducted a document analysis of the school's vision and mission, curriculum, lesson plans, and other relevant instructional documents. In addition, an analysis of the learning environment and student characteristics was conducted to identify learning needs, technological readiness, and instructional challenges at SD Inpres Namano. Needs analysis is a critical step in instructional design to ensure the relevance and effectiveness of learning media (Branch, 2009).

2. Design Stage

Based on the results of the analysis stage, the researcher determined the structure and scope of the learning materials. This stage involved formulating learning objectives, developing storyboards, and designing a prototype of the interactive learning media that aligns with PAIKEM principles and blended learning strategies. The design stage serves as a blueprint for systematic media development (Dick, Carey, & Carey, 2015).

3. Development Stage

During the development stage, the interactive learning media was produced in accordance with the approved prototype. The product was validated by subject matter experts and media experts to ensure content accuracy, pedagogical suitability, and technical quality. Expert validation is essential to ensure the credibility and usability of instructional media before implementation (Sugiyono, 2019).

4. Implementation and Evaluation Stages

The implementation stage involved direct interaction between the researcher and the users through small-group trials and large-group trials. The evaluation stage was conducted both formatively and summatively to assess the effectiveness, usability, and impact of the developed media on students' academic achievement. Evaluation in instructional design plays a vital role in determining the success of learning interventions and guiding product refinement (Molenda, 2015).

Application Design

The application design was developed using a use case diagram, which describes interactions between users and the system from a functional perspective. Use case diagrams help clarify system requirements and user interactions in educational software development (Sommerville, 2016). The application includes two main features: (1) learning materials and

(2) evaluation activities, consisting of five multiple-choice questions designed to assess students' understanding of the instructional content.

LITERATURE REVIEW

Blended Learning and Interactive Multimedia in Contemporary Education

The rapid development of information and communication technology has significantly transformed educational practices and the characteristics of contemporary learners. Elementary school students today belong to a generation that is highly familiar with smartphones, digital media, and internet-based communication, creating new expectations regarding how learning experiences should be designed and delivered. Consequently, teachers are required not only to master curriculum content but also to integrate instructional technologies and media that facilitate active and meaningful learning experiences. Learning media function as channels for delivering messages and instructional content in ways that stimulate students' attention, motivation, and understanding (Arsyad, 2017). Interactive multimedia, in particular, enables the integration of text, images, audio, animation, and video into a single learning environment that supports diverse learning styles and increases student engagement (Mayer, 2009; Heinich et al., 2002). Previous studies have demonstrated that multimedia-based learning media contribute positively to improving learning motivation and conceptual understanding among elementary school students (Haryoko, 2012; Mustika et al., 2018). The acceptance and effectiveness of educational technology are also strongly influenced by users' perceptions of usefulness and ease of use, as emphasized in the Technology Acceptance Model proposed by Davis (1989). Therefore, the development of interactive multimedia learning media represents a pedagogically relevant response to the characteristics of digital-native learners in contemporary educational environments.

Blended learning has emerged as one of the most prominent educational innovations in response to technological developments and changing learner characteristics. Graham (2006) defines blended learning as the strategic integration of face-to-face instruction with online learning experiences to maximize the strengths of both instructional environments. This model enables flexibility in learning time and place while maintaining direct interaction between teachers and students. Research has shown that blended learning can improve student participation, increase learning autonomy, and facilitate collaborative knowledge construction (Moore et al., 2011; Sun et al., 2008). In Indonesia, the implementation of blended learning became increasingly important following educational policies encouraging the use of technology-supported learning environments (Kemendikbud Republik Indonesia, 2019). Moreover, blended learning has been shown to improve academic performance and learning outcomes across various educational contexts (Rizkiyah, 2015). Nevertheless, the successful implementation of blended learning depends heavily on the availability of instructional media specifically designed to support interaction and engagement in both online and face-to-face settings. Consequently, the integration of interactive Android-based multimedia within a blended learning framework offers a practical and pedagogically sound approach for elementary education, particularly in contexts where mobile technology is more accessible than computer-based learning facilities.

PAIKEM and Christian Religious Education Learning

The PAIKEM approach, which emphasizes learning that is active, innovative, creative, effective, and joyful, has become one of the key pedagogical frameworks for improving the quality of classroom instruction in Indonesia. The approach positions students as active participants in the learning process rather than passive recipients of information, encouraging them to construct knowledge through interaction, exploration, and reflection (Mulyasa, 2014). Effective learning occurs when students are given opportunities to ask questions, solve problems, collaborate with peers, and engage directly with learning materials (Slavin, 2018). From this perspective, instructional media serve not merely as tools for presenting information but as learning environments that facilitate inquiry and active participation (Sagala, 2011). Interactive multimedia aligns closely with the principles of PAIKEM because it allows students to navigate content independently, receive immediate feedback, and engage with learning materials in a more enjoyable and meaningful manner (Arrosyida, 2015). Consequently, the combination of PAIKEM principles with digital learning technologies provides opportunities to create learning experiences that are both academically effective and emotionally engaging for elementary school learners.

Within the context of Christian Religious Education, the implementation of PAIKEM principles becomes particularly important because religious learning aims not only to transmit cognitive knowledge but also to facilitate personal reflection, character formation, and spiritual growth. Christian Religious Education seeks to help students internalize biblical values and apply them in everyday life rather than merely memorizing doctrinal concepts. Groome (2011) emphasizes that faith education should involve active participation and lived experience, enabling learners to connect religious teachings with their personal and social realities. Therefore, learning topics such as God's Forgiveness require instructional approaches that encourage reflection, interaction, and meaningful engagement with biblical narratives and moral values. Interactive multimedia can facilitate these processes by presenting stories, visual illustrations, videos, and activities that support students' understanding and internalization of theological concepts. The integration of blended learning and PAIKEM in Christian Religious Education therefore offers an opportunity to bridge technological innovation with holistic faith formation, creating learning experiences that address cognitive, affective, and spiritual dimensions simultaneously.

The Locus Problem at SD Inpres Namano and the Development of an Instructional Solution

Despite the growing recognition of blended learning and interactive multimedia in education, their implementation remains uneven across educational settings, particularly in schools located in rural or geographically isolated regions. The research locus, SD Inpres Namano, reflects these challenges in the context of Christian Religious Education instruction. Preliminary observations revealed that learning activities were still dominated by conventional teacher-centered approaches characterized by verbal explanation and textbook use, resulting in limited student participation and low learning motivation. The topic of God's Forgiveness, which ideally requires reflective and experiential learning activities, was often

delivered through traditional instructional methods that provided few opportunities for students to actively engage with learning content. As a result, students experienced difficulties in connecting theological concepts with their everyday experiences and moral decision-making processes. These findings indicate a gap between the characteristics of contemporary digital learners and the instructional practices implemented within the local educational context.

Addressing the educational needs identified at SD Inpres Namano requires an instructional solution that is both pedagogically meaningful and contextually appropriate. The development of Android-based interactive multimedia integrated within a blended learning framework was therefore selected as a strategic response to the challenges identified in the research locus. Android technology was chosen because of its accessibility and familiarity among students and teachers, enabling learning activities to continue both inside and outside the classroom. The development process followed the ADDIE instructional design model consisting of analysis, design, development, implementation, and evaluation stages to ensure systematic and learner-centered product development (Branch, 2009; Molenda, 2015; Sugiyono, 2019). Software development principles and multimedia design considerations were incorporated to ensure usability, functionality, and educational effectiveness (Sommerville, 2016). Through expert validation and field testing, the resulting instructional media was expected to provide an innovative and context-sensitive solution capable of improving learning engagement and outcomes in Christian Religious Education at SD Inpres Namano and in other elementary schools with similar characteristics.

RESULTS

The development process produced an interactive multimedia-based learning medium designed according to the principles of PAIKEM (Active, Innovative, Creative, Effective, and Enjoyable Learning) and integrated within a blended learning framework. The media was developed using the ADDIE instructional design model, which provides a systematic and iterative structure for instructional development (Branch, 2009; Molenda, 2015).

The final product was an Android-based interactive learning application incorporating text, images, audio narration, animations, and formative multiple-choice assessments related to Christian Religious Education, specifically the topic *God's Forgiveness* for Grade V elementary students. The integration of multimedia elements aligns with Mayer's Cognitive Theory of Multimedia Learning, which emphasizes that learners comprehend material more effectively when information is presented through coordinated verbal and visual channels (Mayer, 2009).

This finding contributes to instructional design literature by demonstrating that PAIKEM principles can be effectively translated into a blended learning environment supported by interactive multimedia. The study also extends blended learning research by providing a contextualized example of faith-based instructional media development at the elementary education level (Graham, 2006; Darmayanti et al., 2007).

Validation Results by Media and Content Experts

Expert validation indicated that the developed media met instructional feasibility standards. Media experts evaluated visual design, navigation consistency, layout clarity, and program responsiveness, while content experts assessed curriculum alignment, theological accuracy, and clarity of learning objectives. The overall validation results categorized the media as *valid and suitable* for instructional use after minor revisions.

These findings are consistent with instructional media evaluation frameworks emphasizing alignment between learning objectives, content accuracy, learner characteristics, and technical quality (Heinich et al., 2002; Arsyad, 2017). The validation process ensured that the instructional media was pedagogically sound and developmentally appropriate for elementary learners.

The expert validation process strengthens the reliability and academic rigor of the developed product. This contributes to best practices in educational media development by reinforcing the importance of multi-perspective expert review, particularly in religious education where doctrinal accuracy and pedagogical clarity are equally essential (Groome, 2011).

Implementation Results and Student Learning Engagement

The implementation of the PAIKEM-oriented blended learning media at SD Inpres Namano revealed increased student engagement, learning motivation, and active participation. Students interacted independently with learning materials, explored content repeatedly, and demonstrated greater focus during learning sessions compared to previous online learning practices relying mainly on text-based platforms.

These results support prior research indicating that interactive digital media enhances learner engagement and satisfaction in online and blended learning environments (Sun et al., 2008; Moore et al., 2011). The use of Android-based learning media also facilitated accessibility and flexibility, enabling students to learn anytime and anywhere.

This finding provides empirical support for the effectiveness of PAIKEM-based blended learning in promoting student-centered learning and learner autonomy. It contributes to the growing body of evidence that interactive multimedia learning environments foster higher engagement levels than conventional online instruction, especially at the elementary school level (Slavin, 2018).

Impact on Students' Learning Outcomes

The use of PAIKEM-oriented interactive blended learning media had a positive impact on students' learning outcomes in Christian Religious Education. Evaluation results indicated improved comprehension and retention of learning content, supported by interactive exercises and immediate feedback mechanisms embedded in the application.

This finding aligns with previous studies showing that blended learning and multimedia-based instruction can significantly improve academic achievement when compared to traditional learning methods (Rizkiyah, 2015; Mustika et al., 2018). The

inclusion of formative assessments also supports effective learning evaluation and reinforcement (Purwanto, 2011).

This study contributes to educational research by providing contextual evidence that PAIKEM-based interactive blended learning media can enhance learning outcomes in faith-based subjects. It highlights the pedagogical value of integrating instructional design models, multimedia learning theory, and blended learning strategies to improve student achievement in elementary Christian education.

Development of PAIKEM-Oriented Blended Learning Media

The development of the interactive blended learning media was conducted to support teachers in implementing PAIKEM-oriented instruction. The development process followed the ADDIE model, consisting of Analysis, Design, Development, Implementation, and Evaluation stages.

At the analysis stage, curriculum documents, lesson plans, and supporting instructional materials were reviewed. At the design stage, the structure and scope of the learning content were determined, followed by the development of storyboards and a prototype of the PAIKEM-oriented interactive media. During the development stage, the prototype was produced and validated by subject matter experts and media experts prior to implementation. Finally, the implementation and evaluation stages involved small-group and large-group trials with students to assess usability, feasibility, and instructional effectiveness.

The developed product was an Android-based interactive multimedia learning media designed for Grade V students in Christian Religious Education, aiming to foster active, innovative, creative, effective, and joyful learning experiences within a blended learning environment.

Product Evaluation and Expert Validation

Product evaluation was conducted through alpha testing and beta testing. Alpha testing was performed by the developer to identify technical errors and functional issues. After passing alpha testing, beta testing was conducted with end users to evaluate usability and learning functionality.

Material Expert Validation

Material expert validation assessed two aspects: learning design and content quality.

- In the first validation stage, the learning aspect (7 indicators) obtained a mean score of **3.7** (good), while the content aspect (9 indicators) also obtained a mean score of **3.7** (good).
- After revisions, the second validation stage showed improvement, with the learning aspect (9 indicators) scoring 4.2 (very good) and the content aspect (7 indicators) scoring 4.0 (good).
- The overall mean score from material experts was 4.0, indicating that the media was highly feasible for instructional use.

Media Expert Validation

Media expert validation focused on visual appearance and programming quality.

- In the first stage, the appearance aspect scored 3.1 (fair), and the programming aspect scored 3.6 (good).
- After revisions, the second-stage validation showed significant improvement, with appearance scoring 4.3 and programming scoring 4.5, both categorized as very good.
- The overall mean score from media experts was 4.4, indicating a very high level of feasibility**.**

Student Trials and Media Feasibility

Product trials were conducted in two phases:

- **Small-group trial** involving 4 students resulted in a mean score of 4.3 (very good).
- **Large-group trial** involving 12 students resulted in a mean score of 4.4 (very good).

The evaluation indicators included clarity of learning objectives, clarity of instructions, material presentation, opportunities for practice, feedback provision, language clarity, visual suitability, navigation freedom, color composition, font selection, and overall visual attractiveness. These results indicate that the media was perceived by students as highly usable and engaging**.**

Summary of Evaluation Results

Evaluator	Mean Score	Criteria
Material Expert	4.0	Very Good
Media Expert	4.4	Very Good
Students	4.4	Very Good

Contribution to Students' Academic Achievement

The findings demonstrate that the developed PAIKEM-oriented blended learning media effectively supports student-centered learning by encouraging independent learning, increasing learning motivation, and fostering active participation. The integration of multimedia elements, interactive navigation, and evaluation features enabled students to engage more deeply with learning content.

Overall, the results indicate that the developed media is feasible, effective, and beneficial for improving students' academic achievement in Christian Religious Education and Character Education, particularly in Grade V at SD Inpres Namano.

Strengths of the Developed Media

Based on expert validation and student trials, the interactive multimedia learning media offers several advantages:

1. Supports independent learning through Android-based accessibility.
2. Enhances students' motivation and engagement during the learning process.
3. Encourages active participation in blended and online learning environments through attractive and interactive design.

To address challenges encountered in the teaching and learning process, instructional support tools—commonly referred to as learning media—are essential components of effective instruction. Instructional media significantly influence learning success by facilitating the delivery of learning messages, clarifying abstract concepts, and supporting the achievement of learning objectives in an efficient and effective manner (Arsyad, 2017; Heinich et al., 2002).

Within a PAIKEM-oriented blended learning framework, the appropriate selection and utilization of interactive learning media play a crucial role in enhancing students' motivation, interest, and active participation. PAIKEM emphasizes student-centered learning in which teachers act as facilitators who design learning environments that encourage students to engage actively, creatively, and joyfully in the learning process (Mulyasa, 2014; Sagala, 2011). Through this approach, learning activities are focused on students' experiences, while teachers are encouraged to utilize diverse learning resources and instructional aids, including digital technology and the surrounding environment, to create active and innovative learning atmospheres.

The findings of this study indicate that online learning serves as a viable alternative to face-to-face instruction when supported by well-designed interactive learning media. In blended and online learning contexts, teachers are responsible for ensuring learning continuity despite physical distance. This requires teachers to design instructional media that are aligned with learning content and objectives, visually engaging, and capable of motivating students to participate actively in learning activities conducted from home (Graham, 2006; Moore, Dickson-Deane, & Galyen, 2011).

Interactive learning media, particularly Android-based applications, function as two-way communication tools that enable interaction between learners and learning content. Such media integrate software and hardware components to deliver instructional material while allowing students to respond, interact, and receive immediate feedback (Arrosyida, 2015; Mustika et al., 2018). Therefore, the implementation of PAIKEM-oriented interactive learning media within a blended learning environment represents an effective instructional innovation to support teaching practices and improve students' academic achievement.

Online learning has a significant impact on students' motivation, learning interest, and overall learning experiences. Changes in instructional delivery methods may influence students' engagement levels and, consequently, their learning outcomes (Slavin, 2018). To address these challenges, teachers are encouraged to redesign instructional strategies and learning systems that foster enjoyable and meaningful learning experiences, thereby promoting active student participation.

Based on the findings of this study, the use of Android-based interactive learning media in the topic *"God's Forgiveness"* created a learning environment that supported students' independence and active engagement. Compared to learning activities conducted solely through text-based communication platforms such as WhatsApp, the interactive media enabled students to better understand learning materials and actively engage in learning tasks. This finding is consistent with multimedia learning theory, which suggests that the

integration of text, audio, and visual elements can enhance comprehension and retention (Mayer, 2009).

Observational data revealed that the attractive visual design, clear navigation, and user-friendly language of the interactive learning media significantly increased students' motivation and interest in learning. Students demonstrated higher levels of focus and seriousness during learning activities and reported that interactive multimedia features helped them remember learning content more easily. Ease of use and clarity of language are key factors that influence students' acceptance and effective use of educational technology (Davis, 1989; Sun et al., 2008).

Overall, the integration of PAIKEM-oriented interactive learning media within a blended learning environment created a more enjoyable and distinctive learning atmosphere. The combination of student-centered pedagogy and interactive digital media contributed positively to students' learning experiences and supported improvements in academic achievement in Christian Religious Education and Character Education**.**

DISCUSSION

This study aimed to develop and examine the feasibility and effectiveness of PAIKEM-based interactive multimedia learning integrated within a blended learning environment for Grade V students at SD Inpres Namano. The discussion elaborates on how the findings respond to the research objectives and how they align with or extend existing theories and empirical studies.

Effectiveness of PAIKEM-Based Blended Learning Media

The findings indicate that the developed interactive multimedia learning media effectively embodies the principles of PAIKEM—active, innovative, creative, effective, and enjoyable learning. The implementation of student-centered activities, interactive navigation, and formative evaluations enabled learners to actively construct knowledge rather than passively receive information. This supports constructivist learning theory, which emphasizes learners' active engagement in meaning-making processes (Slavin, 2018).

The integration of blended learning further strengthened this approach by combining face-to-face interaction with digital learning experiences. As argued by Graham (2006), blended learning offers pedagogical flexibility and supports diverse learning styles. In this study, the blended model facilitated continuity of learning both in classroom and online contexts, making learning more accessible and meaningful for elementary students.

Instructional Design and Multimedia Learning Perspectives

The development process, guided by the ADDIE model, ensured a systematic and iterative instructional design. The positive validation results from media and content experts confirm that the ADDIE framework remains a robust model for developing effective instructional media, particularly when aligned with learner characteristics and curriculum demands (Branch, 2009; Molenda, 2015).

Furthermore, the effectiveness of multimedia elements embedded in the application corroborates Mayer's Cognitive Theory of Multimedia Learning. The combination of visual, textual, and auditory elements reduced cognitive load and enhanced information retention (Mayer, 2009). This finding aligns with Mustika et al. (2018), who reported that interactive multimedia learning media significantly improve conceptual understanding and learner engagement.

Student Engagement and Learning Motivation

One of the most significant outcomes of this study is the observed increase in students' motivation and engagement during learning activities. The interactive features of the media, such as navigation freedom, audio support, and immediate feedback, encouraged students to learn independently and repeatedly explore the learning content. These findings are consistent with Sun et al. (2008), who identified interactivity and system usability as key factors influencing learner satisfaction in e-learning environments.

The use of Android-based media also enhanced accessibility, enabling students to learn beyond the classroom context. This supports Moore et al. (2011), who emphasize that effective online learning environments must be flexible, learner-centered, and technologically accessible, particularly in primary education settings.

Implications for Christian Religious Education (CRE)

In the context of Christian Religious Education, the findings highlight the pedagogical potential of interactive blended learning media to support both cognitive and affective learning domains. Learning content related to *God's Forgiveness* was not only understood conceptually but also internalized through reflective and evaluative activities embedded in the media.

This aligns with Groome's (2011) perspective that religious education should move beyond content transmission toward transformative learning that shapes values, attitudes, and moral behavior. The PAIKEM-based approach provides meaningful learning experiences that foster spiritual reflection, ethical understanding, and character development.

Limitations and Future Research Directions

Despite the positive findings, this study has several limitations. The sample size was limited to one school and one grade level, which restricts the generalizability of the results. Additionally, the study focused primarily on feasibility, engagement, and perceived learning outcomes rather than long-term academic performance.

Future research may involve larger and more diverse samples, comparative experimental designs, and longitudinal studies to measure long-term learning retention and character development. Further development could also integrate adaptive learning features and learning analytics to personalize instruction and enhance learning effectiveness.

Contribution to Educational Practice and Research

This study contributes to educational research by providing empirical evidence that PAIKEM-based interactive multimedia learning integrated with blended learning can

enhance student engagement and learning outcomes in elementary Christian education. Practically, it offers teachers a viable instructional model that aligns with contemporary digital learning demands while maintaining pedagogical and theological integrity. Overall, the findings reinforce the importance of integrating instructional design models, multimedia learning theory, and active learning principles to create meaningful and effective learning experiences in the digital era.

CONCLUSION

Based on the findings and discussion, this study successfully developed a PAIKEM-based blended learning instructional medium in the form of an interactive Android-based multimedia application for the topic of God's Forgiveness in Christian Religious Education for Grade V students at SD Inpres Namano. The development process employed the ADDIE model through the stages of analysis, design, development, and implementation, ensuring that the product was aligned with students' learning needs and the instructional context of elementary education. The resulting interactive multimedia proved to be an effective instructional alternative that supports the principles of active, innovative, creative, effective, and joyful learning by promoting student-centered learning, fostering learner autonomy, and increasing students' interest and motivation in both face-to-face and online learning environments. Furthermore, the processes of instructional planning, expert validation, and field testing played a crucial role in ensuring that the media was pedagogically appropriate, relevant, and consistent with the characteristics of elementary school learners and the objectives of blended learning in Christian Religious Education. Evaluations conducted by media experts, subject-matter experts, and both small-group and large-group trials demonstrated that the developed media was feasible and suitable for implementation and contributed positively to improving students' learning outcomes. Overall, the implementation of a PAIKEM-based interactive multimedia model within a blended learning framework represents an innovative instructional approach for Christian Religious Education at the elementary level, contributing to the enhancement of learning quality, the creation of meaningful learning experiences, and the achievement of optimal student learning outcomes.

BIODATA



Hendra Helwaun is affiliated with the Institut Agama Kristen Negeri Ambon, Indonesia. His research interests include theological education, Christian leadership, and contextual ministry.

Hendra Helwaun
Surel: helwaunhendra@gmail.com



Vigo Yano Sahertian is a lecturer and researcher at the Institut Agama Kristen Negeri Ambon, Indonesia. His research interests include Christian Religious Education, educational technology, and curriculum development.

Vigo Yano Sahertian
Surel: igosahertian@gmail.com



Melany Angkota Mony is affiliated with the Institut Agama Kristen Negeri Ambon, Indonesia. Her research interests include Christian education, character formation, and educational psychology.

Melany Angkota Mony
Surel: melianyangkotamony@gmail.com



Novita Loma Sahertian is affiliated with the Institut Agama Kristen Negeri Ambon, Indonesia. Her research interests include discipleship, pastoral theology, and theological education.

Novita Loma Sahertian
Surel: vitasahertian@gmail.com

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