

ANALYSIS AND DESIGN OF AN ANDROID-BASED PERSONALIZED SCIENCE LEARNING MOBILE APPLICATION FOR UPPER ELEMENTARY SCHOOL STUDENTS

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Abstract

The advancement of digital technology has significantly impacted the field of education, including science learning (IPA) at the elementary school level. Science plays a vital role in shaping students' scientific understanding, critical thinking skills, and environmental awareness. However, traditional teaching methods still face various challenges, particularly for upper-grade elementary students, such as low learning interest, limited media, and diverse learning styles. This study aims to analyze the learning needs and design a personalized mobile learning application based on Android to support more effective and engaging science education. The research adopts a software engineering approach, involving stages of needs analysis, user interface design, and feature development tailored to students' cognitive levels and learning preferences. The proposed application offers interactive materials, adaptive quizzes, and automatic feedback to promote self-directed learning. The analysis indicates that a personalized mobile learning platform can significantly enhance students' motivation and comprehension in science subjects. Therefore, integrating IPA learning with mobile technology presents a promising solution to foster adaptive, flexible, and modern science education for elementary school students.

Keywords: *Personalized Learning, Mobile Learning, Science Education, Android Application, ADDIE Model, Elementary School Students.*

INTRODUCTION

The digital era is a period marked by rapid advancements toward digitalization. This era is characterized by fast and easy access to information. Rapidly evolving technology has brought many significant changes. According to (Ilyas & Hartono, 2023 in Sosial et al., 2024), the purpose of digitalization is to facilitate daily activities and tasks in sectors such as trade, education, and healthcare. In the digital era, there is a major impact on the field of education, including broader access, interactive learning, and more efficient collaboration. The current digital era has a significant influence on human life and cannot be underestimated, especially in the field of education in Indonesia (Widiara, 2018). This means that the digital era cannot be ignored, particularly by the education sector. Instead, it should be utilized as effectively as possible to make learning more effective, relevant, and adaptive to the times.

Education in the digital era demands innovation in teaching methods and learning media to address complex challenges and prepare the younger generation for the 21st century. Natural Science (IPA) is one of the essential subjects at the elementary school level, playing a role in shaping students' understanding of natural phenomena, developing critical thinking skills, and fostering scientific curiosity. However, science learning often faces obstacles such as abstract material, limited teaching aids, and conventional teaching methods, which tend to reduce students' interest and fail to accommodate diverse learning styles and individual learning speeds (Sujana, 2013; Trianto, 2011). Therefore, innovative and engaging science learning strategies are needed to actively involve students in the learning process. Such approaches not only make learning more dynamic but also enhance deeper conceptual understanding and foster positive attitudes toward science.

Science learning videos use images, animations, graphics, and visual demonstrations to help students visualize complex concepts. This allows students to directly observe how scientific concepts work and interact in the real world. Science learning videos can strengthen students' understanding by providing more in-depth explanations of topics that are difficult to comprehend (Nuryadin et al., 2021). With the support of such visual media, students can better visualize how scientific concepts operate in real-life contexts. In addition, learning videos can provide more engaging and comprehensive explanations, thereby enhancing students' understanding of complex topics.

Background

The development of digital technology has transformed various aspects of human life, including education. The utilization of Information and Communication Technology (ICT) in the teaching and learning process provides significant opportunities to create more interactive, flexible, and adaptive learning environments that meet students' needs. Amid these changes, the use of Android-based mobile applications has emerged as an innovative solution to overcome the limitations of conventional learning in elementary schools. Natural Science (IPA) is an important subject taught in elementary schools, especially in upper grades. It not only teaches scientific concepts but also fosters critical thinking, curiosity, and problem-solving skills. However, in practice, science learning often faces challenges such as abstract material, limited teaching aids, and teaching approaches that are less engaging for students. As a result, students often struggle to understand the material and lack motivation to actively participate in the learning process.

To address these challenges, a more modern and personalized learning approach is needed. One solution is the development of a personalized Android-based science learning application. This application is designed to tailor content and delivery methods according to the needs, interests, and abilities of each student. Through interactive features such as videos, animations, adaptive quizzes, and automated feedback, it is expected that students will find it easier to understand science materials and engage in independent learning in an enjoyable way. Based on this background, this study aims to analyze the needs and design a personalized mobile science learning application to enhance the effectiveness and attractiveness of science learning for upper elementary school students.

LITERATURE REVIEW

Science Learning for Upper Elementary School Students

Science (IPA) learning at the elementary school (SD) level, particularly in upper grades (IV, V, and VI), aims to instill an understanding of fundamental natural concepts and to develop scientific skills. At this age, students are in the transition from the concrete operational stage to the early formal operational stage, meaning they begin to think logically about real objects and events but still require concrete media and visualization to understand abstract concepts (Piaget, 1964). Effective science learning approaches for upper elementary students emphasize exploratory activities, observation, simple experiments, and discussions, which encourage active student engagement in the discovery process (Depdiknas, 2006). The main challenges in science learning at the elementary level are often related to limited laboratory facilities, a lack of interactive learning media, and teachers' difficulties in accommodating diverse student learning styles.

Educational Mobile Applications

The rapid development of mobile technology, particularly Android-based smartphones and tablets, has created new opportunities in education. Educational mobile applications offer flexible access, portability, and multimedia capabilities that can enrich the learning process (Putra & Nurdiansyah, 2018). These applications can present materials in various formats (text, images, audio, video, animation), provide interactive quizzes, simulations, and educational games that are engaging for students. The advantage of mobile applications lies in their ability to support ubiquitous learning (learning anytime and anywhere) and to enhance student motivation through gamification elements and attractive user interface design (Creswell, 2014). Research shows that the use of educational mobile applications can improve conceptual understanding, problem-solving skills, and students' positive attitudes toward subjects (Mustafa & Abdul Aziz, 2020).

Personalized Learning

Personalized learning is an educational approach designed to tailor the learning experience to the needs, interests, and learning styles of each individual student (Bray & McClaskey, 2015). This concept recognizes that each student has a unique learning path and different learning pace. In a digital context, personalized learning can be implemented through adaptive systems capable of analyzing student performance, identifying strengths and weaknesses, and recommending the most appropriate materials, activities, or learning paths (Hew & Lo, 2018). Features that support personalization include:

- Initial diagnosis: To determine students' prior knowledge levels.
- Adaptive content: Materials adjusted to students' understanding.
- Adaptive learning paths: Sequences of materials or activities that change based on student progress.
- Adaptive feedback: Responses tailored to students' answers or difficulties.
- Self-paced learning: Allowing students to learn according to their own pace.

The implementation of personalized learning in mobile applications can help address student heterogeneity in the classroom and ensure that each student receives optimal support to achieve learning objectives.

Android Platform in Educational Application Development

Android is the most widely used mobile operating system in the world, offering a broad and flexible ecosystem for application development (StatCounter Global Stats, 2024). The advantages of Android for educational application development include:

- **Wide accessibility:** Most elementary students and their families are likely to own Android devices, providing significant reach potential.
- **Development flexibility:** Its open-source nature and strong community support facilitate development and integration of complex features.
- **Multimedia features:** The ability to integrate high-quality audio, video, animation, and graphics supports engaging and interactive science content delivery.
- **Device sensor support:** The use of sensors such as GPS, accelerometer, or camera can create more immersive and contextual learning experiences, although this may be more relevant for advanced levels.

The combination of accessibility, advanced features, and personalization potential makes Android an ideal platform for developing effective mobile science learning applications for upper elementary school students.

Synthesis and Research Gap

From the literature review above, it is evident that mobile applications have significant potential to enhance the quality of science learning in elementary schools, especially when integrated with personalization principles. However, there remains a research gap in studies that specifically address comprehensive needs analysis and design for Android-based personalized mobile science learning applications that truly align with the cognitive, psychological, and learning style characteristics of upper elementary students in Indonesia. Many existing applications are still general in nature and do not fully accommodate deep personalization needs. Therefore, this study focuses on an in-depth analysis of student and teacher needs, as well as the design of an adaptive system to create a more effective and relevant learning solution.

METHOD

Research Time and Location

Research Location

This research was conducted at SD Negeri Plumbon 02, located in Mranggen, Plumbon, Suruh District, Semarang Regency, Central Java. The study was carried out during the odd semester of the 2025/2026 academic year.

Research Time

This research was conducted from the preparation stage to implementation, namely from July to August 2025.

Research Method

The research method used is the Research and Development (R&D) approach with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The ADDIE model is one of the most widely recognized instructional design frameworks used in developing training programs, curricula, and digital learning products. Although its origin cannot be attributed to a single inventor, this model has evolved from various systematic design approaches and became popular in the 1990s (Branch, 2009). The selection of the ADDIE model is based on the characteristics of this research, which aims to produce a product in the form of a learning application through systematic stages starting from needs analysis to evaluation. The stages carried out in this study are focused on the Analysis and Design phases, in accordance with the scope of the thesis title. The main objective of this development model is to design and develop a product that is both effective and efficient.

Research Procedure

This research procedure follows the stages of the ADDIE model, focusing on the Analysis and Design phases, as follows:

1. Analysis Phase

Analysis is the process of breaking down an object, idea, or phenomenon into smaller, separate components to understand its structure, function, and relationships in depth. The main purpose of analysis is to obtain a more detailed and comprehensive understanding of the complexity of an entity, which in turn enables the identification of patterns, problems, or opportunities (Miles & Huberman, 1994). At this stage, the identification of needs and problems in science learning for upper elementary school students is carried out. The activities include:

- **Student Needs Analysis:** Includes student characteristics (learning styles, level of understanding), common difficulties in learning science, and students' interest in using technology in learning. Data are obtained through initial observations, interviews with students, and distribution of needs questionnaires.
- **Elementary Science Curriculum Analysis:** Includes reviewing Core Competencies (SK) and Basic Competencies (KD) for upper elementary science, as well as essential materials relevant for integration into the application.
- **Technology and Resource Analysis:** Identifies the availability of Android devices owned by students/schools, students' technical abilities in using applications, and technological features that support personalized learning.
- **Personalization Potential Analysis:** Identifies aspects of science learning that can be personalized based on students' level of understanding, learning styles, or learning pace.

2. Design Phase

Design is a multidisciplinary process that integrates instructional design principles with software engineering to create applications that are not only functional but also effective in facilitating learning processes. The core of this design lies in a deep understanding of how users (learners) learn, the characteristics of the material to be delivered, and the potential of technology to support learning objectives (Reiser & Dempsey, 2017). It refers to a holistic process that goes beyond mere visual aesthetics, encompassing structure, functionality, and user experience. Based on the results of the previous analysis stage, the application concept and specifications are designed. The activities include:

- **Application Structure Design:** Creating flowcharts or sitemaps that illustrate navigation flow and application modules.
- **User Interface (UI) Design:** Creating wireframes and mockups for the visual appearance of the application (layout, colors, typography, icons) that are attractive and appropriate for elementary school students.
- **User Experience (UX) Design:** Designing user interactions so that the application is easy to use, intuitive, and enjoyable. This includes designing personalization features (e.g., adaptive content, question recommendations, adaptive feedback).
- **Science Learning Content Design:** Determining the science materials to be included, presentation formats (text, images, animations, videos), and types of questions or activities that support interactive and personalized learning.
- **Application Storyboard Development:** Illustrating each application screen and its interactions, explaining how personalization will work in each learning module.
- **Technical Specifications:** Determining the platform (Android), programming language (if identified), and development tools to be used in the next stage (if the research is continued).

Data Collection Techniques

The data collection techniques used in this research include:

- **Observation:** Conducted to directly observe the science learning process in the classroom, student interactions, and the use of available technology.
- **Interviews:** Conducted with science teachers and selected students to obtain in-depth information regarding needs, challenges, and expectations toward the learning application.
- **Questionnaires/Surveys:** Used to collect both quantitative and qualitative data related to student characteristics, learning preferences, and application feature requirements.
- **Documentation Study:** Conducted to collect data from science curriculum documents, syllabi, lesson plans, and references related to science learning applications.
- **Focus Group Discussion (FGD):** Conducted with small groups of students and/or teachers to obtain initial feedback on the design concept.

Research Instruments

The research instruments used include:

- Observation Guidelines: To record classroom observations.
- Interview Guidelines: A list of structured or semi-structured questions for interviews with teachers and students.
- User Needs Questionnaire: A set of closed and open-ended questions to gather student and teacher needs and preferences regarding the application.
- Design Validation Guidelines: Questionnaires or checklists used to obtain feedback and evaluations from experts regarding the application design concept.

Quantitative Descriptive Analysis

Quantitative descriptive analysis refers to a systematic process for interpreting and drawing conclusions from collected numerical data. This approach fundamentally differs from qualitative research due to its emphasis on objective measurement, the use of numerical data, and the application of statistical methods to test hypotheses and identify relationships between variables (Creswell, 2014; Sugiyono, 2018).

The data describe the results of product development in the form of a mobile science learning application. Data obtained through research instruments during the trial phase are analyzed using statistical methods. This approach is used to analyze data from user needs questionnaires. The data are processed using descriptive statistics (percentages, averages) to identify trends and priorities for application feature needs.

This method is expected to facilitate a deeper understanding of the data. The results of the data analysis are used as a basis for revising the developed product. The response questionnaires are completed by teachers and students. These questionnaires contain semi-open-ended questions. The structure includes a title, researcher statements, respondent identity, instructions for completion, and question items. The response questionnaire is quantitative in nature, and the data can be processed and presented in percentage form using a Likert scale as the measurement scale. This scale is structured in the form of statements followed by five response options. The measurement scale used in this development research is adapted from Riduwan. For quantitative analysis purposes, each response is assigned a score.

Table 1. Quantitative Analysis

No.	Quantitative Analysis	Score
1	Very Good	5
2	Good	4
3	Fair	3
4	Poor	2
5	Very Poor	1

The scores given range from one to five for very good, good, fair, poor, and very disagree, representing a range from very positive to very negative. The scale used in this study uses intervals. Interval data can be analyzed by calculating the average response based on the scores for each respondent.

$$percentage\ of\ respondents'\ answers = \frac{number\ of\ scores\ obtained}{highest\ score} \times 100\%$$

The results of these assessment scores were then averaged across a number of test sample subjects and converted into assessment statements to determine the quality and level of usefulness of the resulting product based on user opinions. The conversion of these scores into assessment requirements can be seen in the table below.

Table 2. Percentage score

Percentage Score (%)	Interpretation
80% – 100%	Very Feasible
60% – 80%	Feasible
40% – 60%	Moderately Feasible
20% – 40%	Less Feasible
0% – 20%	Very Poor / Not Feasible

Based on the table data above, the development product will end when the assessment score for this learning media has met the eligibility requirements with the level of material suitability, media suitability, and media suitability, and technical quality of the E-Book-based interactive media learning material for class VIII on the human digestive system material in the very suitable or suitable category.

RESULT AND DISCUSSION

Development Results and Discussion

This research and development produced an interactive multimedia learning product in the form of an Android application that can be accessed via smartphones and tablets. This multimedia is used by teachers to support the learning process both inside and outside the classroom. The multimedia takes the form of an application containing learning outcomes, learning objective flows (ATP), learning objectives, learning materials, and animated instructional videos. The materials are derived from student textbooks, which are then developed into learning videos and can be accessed through a Google Sites website, while additional materials are provided in the form of YouTube videos and presentations. The development in this study uses the ADDIE model, which consists of analysis, design, development, implementation, and evaluation.

Interactive Multimedia Development Process

The researcher used the ADDIE model to develop the interactive multimedia. This model consists of several stages. The first stage is analysis, which involves examining aspects such as needs, learner characteristics, and competencies. The design stage describes the initial concept of the application developed by the researcher. The development stage involves validation, where validators assess the product and provide suggestions, feedback, and conclusions. The implementation stage is the product testing phase.

Analysis Results (Analysis)

The analysis stage at SD Negeri Plumbon 02 produced data regarding feature requirements and the feasibility of application development through questionnaires distributed to students and teachers.

- **User Needs Analysis:** Based on questionnaire data, 85% of respondents (students and teachers) stated that the use of Android-based digital media is highly needed to support science learning.
- **Student Characteristics:** The analysis results show that 78% of students prefer materials presented in the form of animations and interactive videos compared to conventional lecture methods.
- **Level of Personalization Needs:** Data indicate that 82% of science teachers consider automatic feedback features very helpful in identifying individual student learning difficulties.
- **Data Interpretation:** Using a Likert scale of 1–5, the average score for application feature needs reached 4.3 (Category: Very Feasible).

Needs Data Analysis (Quantitative)

The following is a summary of the initial data from the user needs questionnaire at SD Negeri Plumbon 02:

Table 1. Initial Data from The User Needs Questionnaire at Plumbon 02 Public Elementary School:

No	Needs Indicator	Average Score	Percentage (%)	Interpretation
1	Need for visual media (Video/Animation)	4.6	92%	Very Feasible/Highly Needed
2	Need for independent learning at home	4.2	84%	Very Feasible/Highly Needed
3	Need for interactive quiz features	4.4	88%	Very Feasible/Highly Needed

Design Results

Based on the analysis results, an application design was carried out with the following technical specifications:

1. System Architecture

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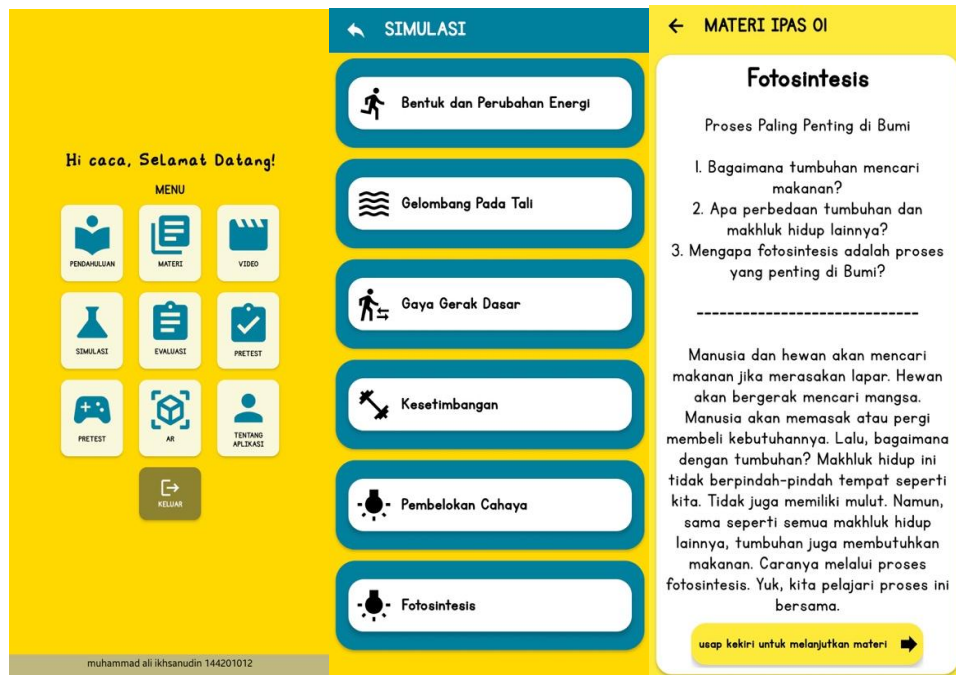


Figure 1. System Architecture

The application is designed using the Android platform with a navigation structure that allows students to engage in self-paced learning.

2. Interface Design (UI/UX):

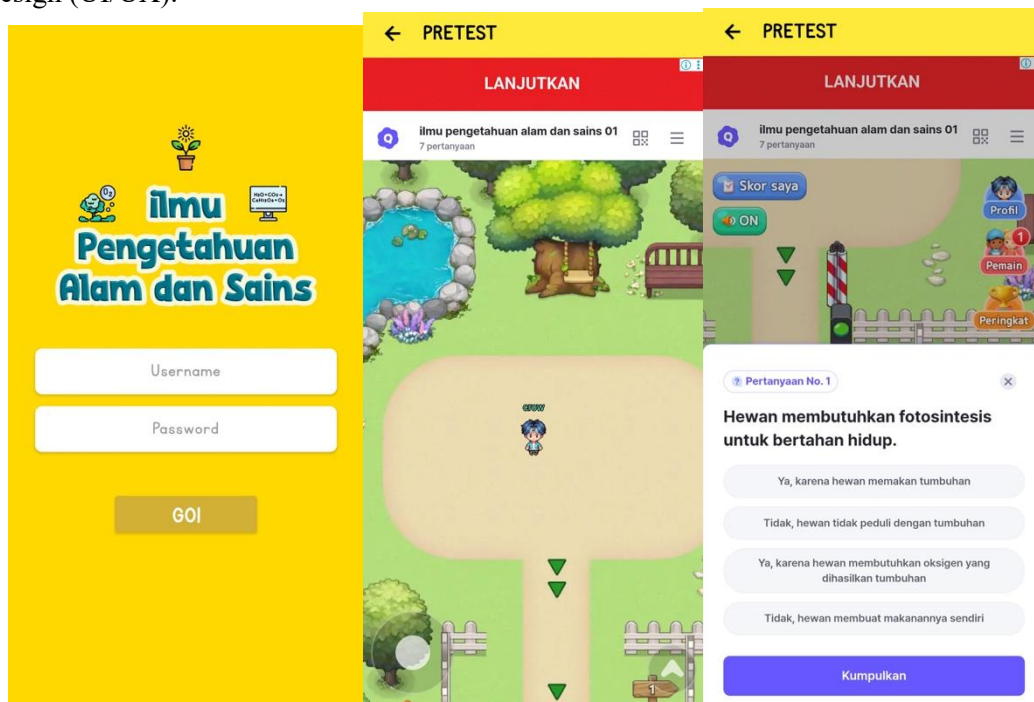


Figure 2. Interface Design (UI/UX)

Wireframes were created with the characteristics of upper-grade students in mind, who require concrete visualizations, using bright colors and intuitive icons.

3. Personalization Features: The system includes an initial diagnostic feature to map students' initial understanding levels.

- Materials are packaged adaptively;

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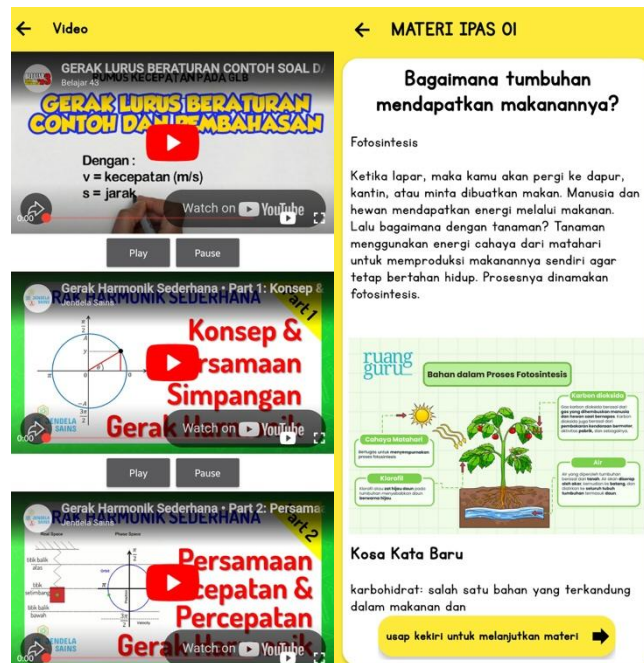


Figure 3. Materials are packaged adaptively

If students haven't mastered a concept, the app will provide a review of the material with a more in-depth explanation.

4. Content Specifications



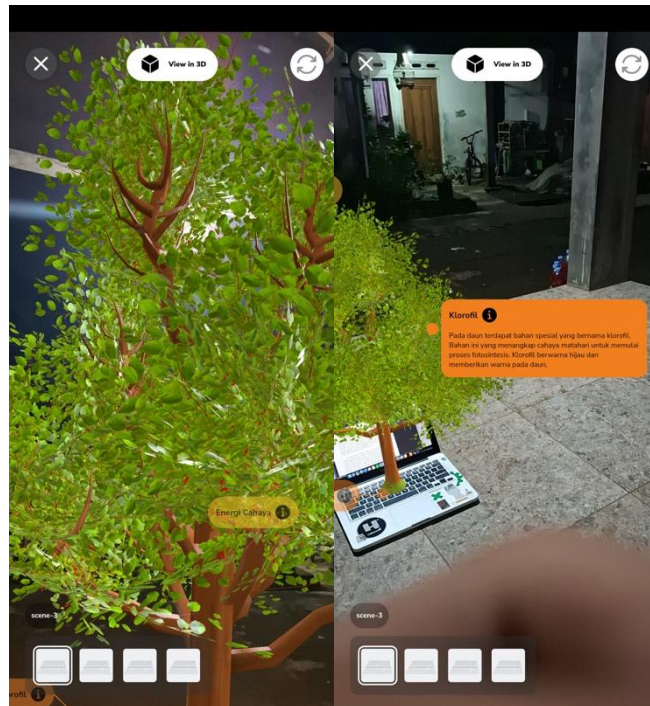


Figure 4. Content Specifications

Learning content includes multimedia elements such as videos, animations, graphics, and interactive quizzes designed to enhance students' scientific curiosity.

Discussion

The analysis at Plumbon 02 Public Elementary School shows that conventional learning often lacks student interest due to abstract material and one-way methods. The use of an Android-based mobile application is a potential solution because it offers flexible access (ubiquitous learning).

The application of the Personalized Learning concept in this application design is crucial because each student has a different learning pace. With an adaptive learning path and automatic feedback, this application helps overcome the barriers of differences in student backgrounds and abilities in the classroom. The integration of multimedia, such as instructional videos, has been proven to strengthen students' understanding of complex science topics in a more realistic way.

Overall, this application design meets the initial requirements for creating a fun and interactive learning environment to support student academic achievement.

CONCLUSION

Conclusion

Based on the results of the study "Analysis and Design of an Android-Based Personalized Science Learning Mobile Application for Upper Grade Elementary School Students" conducted at Plumbon 02 Public Elementary School, several legal and technical conclusions can be drawn as follows:

1. Holistic Needs Identification: The needs analysis process indicated that upper grade students at Plumbon 02 Public Elementary School are in the cognitive transition phase from concrete to formal operations, thus greatly needing digital visualization media to reduce the abstractness of science material. Teachers and students agreed that the limited teaching aids at school were a major obstacle that could be overcome through interactive multimedia features in the mobile application.
2. Personalized System Design: The resulting application design integrated four main pillars: essential science material, Android technology, interactive multimedia, and personalized learning. The system architecture was designed to accommodate differences in learning speed (self-paced learning) through adaptive quizzes and dynamic material paths tailored to each individual's abilities.
3. Effectiveness of the ADDIE Model: The use of the ADDIE development model has proven effective in systematically mapping problems before entering the design stage. The focus on the Analysis and Design phase

provides a strong foundation for developing an application that is not only visually appealing (UI) but also instructionally relevant (UX) for the characteristics of elementary school students.

4. Projected Product Success: Based on a quantitative descriptive analysis of the needs questionnaire data, this application design is projected to be categorized as "Feasible" because it addresses the challenges of digital-era learning that demand flexibility, interactivity, and personalization.

Research Implications

The results of this design have important implications for educational practices at Plumbon 02 Public Elementary School, namely:

- Pedagogical Transformation: Shifting the teacher's role from being the primary source of information to being a facilitator assisted by a personalized digital assistant.
- Learning Independence: Providing space for students to explore science concepts independently without being bound by classroom and time constraints (ubiquitous learning).

Recommendations

To enhance the sustainability of the results of this analysis and design, the researcher offers the following recommendations:

1. For the School (Plumbon 02 Public Elementary School): It is recommended that the school begin mapping its digital infrastructure readiness, such as the availability of a stable internet network and policies regarding the use of mobile devices for educational purposes, to support the future implementation of this application.
2. For Science Teachers: Teachers are expected to improve their competency in managing personalized data from the application, so they can provide appropriate interventions for students experiencing difficulties with specific material.
3. For Future Researchers: Given that this research is limited to the Analysis and Design stages, it is recommended that future researchers:
 - Proceed to the Development stage (physical product development) using a stable programming language or engine.
 - Conduct in-depth expert validation testing (materials and media) and field trials (Implementation) to significantly measure the application's effectiveness on student learning outcomes.
 - Develop device sensor features (such as cameras for Augmented Reality) to create a more immersive and contextual science learning experience.

Research Limitations

Although this research has been conducted to the maximum extent possible in accordance with scientific procedures, the researcher recognizes several limitations that require attention:

- Scope of the ADDIE Model: This research intentionally limits the development stages to the Analysis and Design stages, in accordance with the limitations of the title and objectives of the research, which focus on the initial design.
- Geographic and Sample Limitations: The research was conducted only at Plumbon 02 Public Elementary School, Suruh District. Therefore, the results of the analysis of student needs and characteristics may vary if applied to schools with different infrastructure or socio-economic backgrounds.
- Technical Aspects of Personalization: The design of the personalization mechanism in this design is still conceptual and requires further algorithm testing during the development stage to ensure the accuracy of the material's adaptation to students' learning styles in real time.
- Device Dependence: The effectiveness of this application design is highly dependent on the availability and specifications of Android devices owned by students or schools, as well as the stability of internet access for certain features.
- Prototype Validation: Because this research stopped at the design stage, the evaluation conducted was limited to concept validation and interface design, and did not touch on empirically measuring the effectiveness of student learning outcomes through direct use of the application.

REFERENCES

- Ambarwati, D., Wibowo, U., & Arsyiadanti, H. (2025). Analisis Problematika Penerapan Kurikulum Merdeka di Sekolah Dasar. *Jurnal Inovasi, Evaluasi, Dan Pengembangan Pembelajaran (JIEPP)*, 4(2), 294–302.
- Sherly, Dharma, E., & Sihombing, H. B. (2021). Merdeka Belajar: Kajian Literatur. *Konferensi Nasional Pendidikan I*, 183–190.
- Wijayanti, I. D., & Ekantini, A. (2023). Implementasi Kurikulum Merdeka pada Pembelajaran IPAS MI/SD. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 8(2), 2100–2112.
- Anwar, K., & Rosyid, A. H. (2024). Desain dan Implementasi Media Pembelajaran Interaktif IPA Menggunakan Model ADDIE untuk Siswa Sekolah Dasar. *Jurnal Pendidikan Sains Terapan*, 12(2), 112–125.
- Rinawan, R. B., Mustofa, Z., & Anggraini, Y. (2024). Tahap Development dalam Metode ADDIE Pengembangan Bahan Ajar berbasis Mobile. *Jurnal Publikasi Teknik Informatika (JUPTI)*, 3(2), 46–59.
- Satria, A., & Sutabri, T. (2025). Pengembangan Pembelajaran Virtual Reality Berbasis Metaverse Menggunakan Metode ADDIE. *Router: Jurnal Teknik Informatika Dan Terapan*, 3(2), 01–09.
- Fauzi, A. I. (2025). Strategi Penerapan Psikologi Pendidikan untuk Meningkatkan Kualitas Pembelajaran. *Jurnal Ilmiah Pendidikan (JIP)*, 5(2), 115–119.
- Mujahidah, A. I. (2025). Psikologi Pendidikan dalam Proses Belajar Mengajar. *Jurnal Ilmiah Pendidikan Dasar*, 3(3), 113–121.
- Putri, N. L., et al. (2025). Peran Psikologi Perkembangan dalam Mendukung Proses Pendidikan Anak SD Fase Operasional Konkret. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 10(4), 408–420.
- Asani, A. (2023). Efektivitas Media Pembelajaran IPA Berbasis Android terhadap Kemampuan Berpikir Kritis Siswa Sekolah Dasar: Systematic Literature Review. *Indonesian Journal of Innovation and Public Policy*, 4(1), 1–12.
- Choirunnisa, D., & Jupriyanto. (2025). Manfaat Aplikasi Berbasis Android Dalam Mata Pelajaran IPAS: Tinjauan Literatur Yang Komprehensif. *QOSIM: Jurnal Pendidikan Sosial & Humaniora*, 3(1), 481–490.
- Fitra, Z., & Airlangga, P. (2025). Perancangan UI (User Interface) dan UX (User Experience) Assets untuk Menarik Minat Siswa SD dalam Mempelajari Materi IPA. *JATI (Jurnal Mahasiswa Teknik Informatika)*, 9(1), 542–550.
- Ricky, A. S., et al. (2025). Systematic Literature Review (2021–2025): Pengembangan E-Book Interaktif dalam Pembelajaran IPA di Sekolah Dasar. *EDUTECH: Jurnal Inovasi Pendidikan Berbantuan Teknologi*, 5(3), 567–574.
- Pratama, B. A. (2024). Pengembangan Aplikasi Mobile Learning IPA Terpersonalisasi Berdasarkan Gaya Belajar Siswa. *Seminar Nasional Pendidikan dan Teknologi Informasi (SENAPTI)*, 8, 45–53.
- Saputra, A., & Lestari, D. (2025). Implementasi Algoritma Personalisasi dalam Aplikasi Pembelajaran Sains untuk Meningkatkan Kemandirian Belajar Siswa Sekolah Dasar. *Jurnal Teknologi Pendidikan Digital*, 6(1), 12–25.