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Transforming English Learning: Developing Interactive Media Grounded in Problem-Based Learning

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Abstract: This research aims to develop interactive learning media based on the Problem-Based Learning (PBL) model to improve English learning outcomes, particularly in reading comprehension of recount texts. The study employs a Research and Development (R&D) approach using the ADDIE model, which includes analysis, design, development, implementation, and evaluation. The product was developed using Canva and integrated with tools such as Quizizz, FlipHTML5, and Google Forms to create an engaging and student-centered learning experience. Validation was conducted by content, media, and instructional design experts, who rated the product as highly feasible. Implementation trials, including individual, small group, and field testing, indicated that the media was very practical and well-received by students. Effectiveness was assessed through a quasi-experimental design involving pre-tests and post-tests in control and experimental groups. The results showed a significant improvement in the experimental group's performance, supported by a mean N-Gain score of 0.5845. The findings suggest that the developed media not only enhances learning outcomes but also promotes active, independent, and meaningful learning. The research contributes to digital learning innovation by offering a practical and effective instructional tool that aligns with 21st-century education goals.

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Introduction

The current landscape of education demands not only technological adaptation but also pedagogical innovation that aligns with the competencies required in the 21st century. Students today are expected to master more than just academic knowledge; they must develop critical thinking, creativity, collaboration, and communication skills the 4Cs that are essential for success in the global knowledge economy. These competencies reflect the four pillars of education emphasized by UNESCO: learning to know, learning to do, learning to live together, and learning to be (Sebu, 2023; Thornhill-Miller et al., 2023; Wulansari et al., 2022). In this context, the integration of information and communication technology (ICT) has become not just beneficial, but essential. ICT enables new forms of engagement, interaction, and

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personalization in learning through the use of digital media, e-learning platforms, and multimedia tools (Clark & Mayer, 2011; Martin & Betrus, 2020).

However, despite the global push toward innovation, there remains a substantial gap between this educational vision and actual classroom practices, especially in developing countries such as Indonesia. While the discourse surrounding 21st-century education promotes interactive, technology-supported, and student-centered approaches (Termit Kaur & Samli, 2014), many classrooms particularly in rural areas still rely on conventional, teacher-dominated instruction (Vonkova & Hrabak, 2015). This pedagogical gap limits students' opportunities to develop essential skills and undermines the transformative potential of education. The discrepancy suggests a need to reevaluate current instructional models and introduce innovations that are both practical and context-sensitive.

One area where this gap is particularly visible is in English language instruction. English plays a critical role in international communication, education, and career advancement (Ramadhani et al., 2020). Yet, Indonesian students continue to show low proficiency levels. According to the English Proficiency Index (EPI) 2023 by First (2023), Indonesia ranks 79th out of 113 countries with a score of 469, placing it in the "low proficiency" category. This is concerning, as inadequate English skills can hinder students' access to higher education, global opportunities, and international discourse (Y. J. Jin & Yoo, 2019). This condition is not only an outcome of student limitations but is more deeply rooted in the lack of engaging, communicative, and authentic language learning experiences.

The problem is further compounded in rural areas, where instructional practices are often outdated and uninspiring. In schools like SMP Negeri 2 Kualuh Selatan, English is still taught through rigid, teacher-centered methods with minimal use of digital tools or active learning strategies. Students often perceive English as a difficult and uninteresting subject, partly because it is presented through grammar drills and abstract vocabulary without real-life context (Krishnan & Shah, 2020; Pun, 2024). Such approaches fail to accommodate diverse learning styles and reduce students' motivation and engagement. Learning difficulties are not necessarily linked to intelligence but may result from developmental, motivational, or contextual factors such as limited exposure, lack of appropriate media, and instructional mismatches (Bolourian et al., 2022).

This disconnect between student needs and teaching methods is especially evident in reading comprehension tasks, particularly in understanding recount texts. Students frequently struggle to identify the structure, main ideas, and sequence of events in such texts (Rosalinah et al., 2020). These difficulties are exacerbated by the lack of visual or interactive tools that could help contextualize reading materials. Internal evaluation at SMP Negeri 2 Kualuh Selatan shows that only 41% of eighth-grade students reached the minimum competence threshold (KKTP) in English during the 2023/2024 academic year. This indicates not only low achievement but also the urgent need for pedagogical interventions that are both innovative and accessible.

To respond to these challenges, this study proposes the development of interactive learning media based on the Problem-Based Learning (PBL) model as a solution to improve students' English learning outcomes (Munawaroh et al., 2023). PBL is rooted in constructivist theory and emphasizes student-driven inquiry, collaboration, and real-world problem solving. This model has been shown to enhance not only academic performance but also communication, decision-making, and critical thinking skills (Sulistiani & Sudikan, 2020). When integrated with interactive media featuring animations, audio, video, and tasks the PBL

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model becomes a powerful approach to deliver meaningful, contextualized, and engaging English instruction.

Previous studies have reported positive outcomes from using PBL combined with digital media in language classrooms, including increased motivation and deeper understanding (Reinita et al., 2023). However, most of these implementations have been conducted in urban or well-resourced schools. There remains a gap in research and practice regarding how such methods perform in rural or underfunded contexts like SMP Negeri 2 Kualuh Selatan. Therefore, this study aims to design, implement, and evaluate an interactive learning media product based on the PBL model, specifically targeting eighth-grade students' reading comprehension of recount texts. The product will be assessed in terms of feasibility, practicality, and effectiveness. The findings of this research are expected to provide practical benefits for English teachers seeking innovative teaching solutions, support student learning outcomes in rural schools, and serve as a replicable model for other similar educational environments, contributing to the broader development of equitable English language education in Indonesia.

Research Method

This research employed a Research and Development (R&D) approach with the aim of producing an educational product in the form of interactive media based on the Problem-Based Learning (PBL) model (Kothari, 2004). The development process followed the ADDIE model, which includes five stages: Analysis, Design, Development, Implementation, and Evaluation (Budoya et al., 2019). Each stage was conducted systematically to ensure the resulting product met criteria of feasibility, practicality, and effectiveness in enhancing students' English learning outcomes, specifically in reading comprehension of recount texts as seen in Table 1 below, which is the product development stage with the ADDIE model

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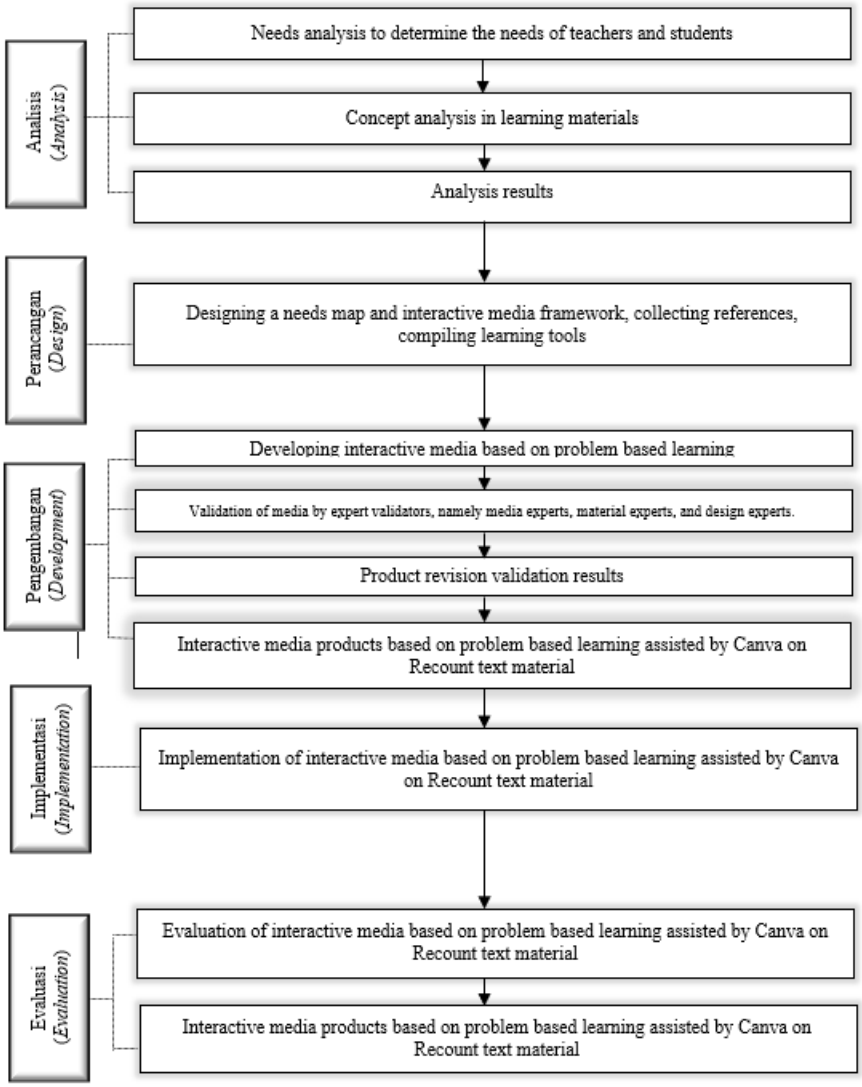

Figure 1. Product Development Stages

The study was carried out at SMP Negeri 2 Kualuh Selatan, located in North Labuhanbatu Regency, North Sumatra, during the second semester of the 2024/2025 academic year. The research subjects were involving two main groups: class VIII-3 as the experimental group and class VIII-2 as the control group. Both groups consisted of 29 students each. Additionally, class IX-1 was involved in the preliminary product tryouts, including three students for individual trials, ten for small group trials, and twenty-nine for field testing. The sampling technique used was purposive sampling (Sibuea et al., 2021), based on the teacher's recommendations and the researcher's consideration that the selected subjects reflected the required characteristics for the study. English subject teachers and three independent experts—on material, media, and instructional design—were also involved in validating the developed product.

The development process began with the analysis stage, which included identifying students' learning needs, reviewing existing instructional media, analyzing the current curriculum, and understanding the characteristics of learners. Data were collected through

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interviews with school stakeholders, classroom observations, and curriculum documentation to ensure the media would align with actual classroom conditions and the Merdeka Curriculum standards. Following the analysis, the design stage focused on structuring the media content and layout. A storyboard was created to guide the development process, and learning objectives, instructional strategies, and assessment instruments were defined. The design included various interactive elements such as video explanations, digital worksheets, quizzes using Quizizz, reflective tasks via Padlet, and audio-visual components. These elements were intended to support active learning, foster problem-solving, and increase student engagement with the English learning material, particularly recount texts.

In the development stage, the media was created using Canva, incorporating the instructional framework established during the design stage. The resulting media integrated text, images, animations, audio narration, and interactive navigation. The product underwent validation by three experts: one in instructional material, one in media design, and one in instructional design. These validations assessed the clarity, accuracy, relevance, usability, visual appeal, and pedagogical soundness of the media. Based on the feedback from the experts, revisions were made to improve the product before classroom implementation. Implementation took place in the form of classroom trials. In the experimental group (class VIII-3), students engaged in learning using the developed media, while the control group (class VIII-2) received conventional instruction using printed materials and videos. Observations were conducted during implementation, and feedback was gathered from students and teachers through structured questionnaires. The learning process in the experimental group was designed to follow the principles of Problem-Based Learning, beginning with contextual problems, group investigations, collaborative learning activities, and culminating in student reflections and presentations.

The final stage was evaluation, which aimed to assess the feasibility, practicality, and effectiveness of the developed interactive media. Feasibility and practicality were measured through expert validation and user response data, which were analyzed quantitatively using mean score interpretation criteria. To determine effectiveness, the researcher conducted a post-test with both experimental and control groups, measuring students' reading comprehension on recount texts. Statistical analysis was conducted using normality tests (Shapiro-Wilk), homogeneity tests (Levene's test), and an independent sample t-test to determine whether significant differences existed between the two groups. Additionally, N-Gain analysis was used to assess the level of improvement in students' learning outcomes. The criteria for interpretation categorized learning gains as high, moderate, or low based on the gain score values. Throughout the research process, a mixed-methods approach was employed, combining qualitative and quantitative data. Qualitative data were obtained from interviews, observations, and expert feedback, while quantitative data came from post-tests, questionnaire scores, and statistical evaluations. This triangulation ensured a comprehensive understanding of the media's impact and provided a solid foundation for concluding its effectiveness in supporting English language learning through interactive and problem-based strategies.

Result and Discussion

Result

The development process of the interactive media based on the Problem-Based Learning (PBL) model followed the ADDIE framework, beginning with a needs analysis involving 3 English teachers and 30 eighth-grade students at SMP Negeri 2 Kualuh Selatan. Both groups reported a very high demand for interactive media, with an overall average score

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of 4.63 (93%), indicating that such media are "highly needed" for improving English learning outcomes. This finding reflects the inadequacy of existing learning resources to support independent and engaging language learning, particularly in reading comprehension.

Curriculum analysis confirmed the selection of *recount text* as the main material due to low achievement rates in this area over the past two academic years. The developed media aligned with the *Merdeka Curriculum* and aimed to support the "reading-viewing" element of English learning. The interactive media was designed using Canva and integrated tools such as FlipHTML5, Quizizz, YouTube, Google Form, and Wordwall, providing various components like animated videos, learning modules, interactive quizzes, digital worksheets, assessments, and reflective tasks. Ater the media has been made, the media is tested by experts, namely media experts, material experts and design experts. The following are the results of the feasibility test by the experts available in Table 1. as follows:

Table 1. Results of Expert Validation of the Interactive Media

Validator Type	Assessment Aspect	Mean Score	Percentage	Feasibility Criteria
Content Expert	Content quality & clarity	4.04	81%	Feasible
Media Design Expert	Layout, navigation	4.64	93%	Highly Feasible
Instructional Design Expert	Learning objectives, instructional flow	4.37	88%	Highly Feasible

Product validation by three experts—content, media, and instructional design—demonstrated that the media was highly feasible. The material expert gave a final score of 4.04 (81%), the media expert gave 4.64 (93%), and the instructional design expert gave 4.37 (88%), confirming the product's eligibility for classroom trials. Subsequent implementation involved one-on-one, small group, and field trials. One-on-one testing yielded a score of 4.64 (93%), small group testing scored 4.51 (90%), and field testing scored 4.62 (92%), all indicating that the media was "very feasible" and well-received by students. then after being tested for feasibility by experts, it was tested on students and teachers to see the practicality of the media. The following are the results of the practicality test presented in Table 2.

Table 2. Practicality Test Results from Teachers and Students

Respondents	Mean Score	Percentage	Practicality Criteria
Teachers	4.33	87%	Very Practical
Students	4.69	89%	Very Practical

The practicality of the media was evaluated by both teachers and students. Teachers rated the practicality at 4.33 (87%) and students at 4.69 (89%), confirming that the media is "very practical" in terms of accessibility, usability, and integration into learning activities. Both teachers and students found the interactive media easy to use and suitable for classroom instruction. The high scores reflect its accessibility, content organization, and support for independent learning, indicating that the media is not only effective but also convenient and engaging to implement.

To determine its effectiveness, a quasi-experimental post-test was conducted comparing students in the experimental group (who used the interactive PBL media) and the control group (who used slideshow presentations). The post-test average for the experimental group was 77.09, significantly higher than the control group's average of 70.94. The independent sample t-test produced a significance value of 0.000 < 0.05, indicating a

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statistically significant difference in learning outcomes. Furthermore, the N-Gain score for the experimental group was 0.5845, categorized as "moderately effective."

Table 3. Pre-Test and Post-Test Results

Group	Pre-Test Mean	Post-Test Mean	N-Gain Score	Interpretation
Experimental	51.23	77.09	0.5845	Moderate Improvement
Control	46.47	70.94		Lower Improvement

The experimental group, which used the developed media, showed a significant increase in their post-test scores compared to the control group. The N-Gain score of 0.5845 indicates a moderate but meaningful improvement. This suggests that integrating Problem-Based Learning into interactive media significantly enhances reading comprehension in English.

Table 4. Independent t-Test Result (Post-Test Scores)

Test	t-value	df	Sig. (2-tailed)	Conclusion
Independent t-test	4.325	55	0.000	Significant Difference Exists

The independent t-test shows a statistically significant difference between the experimental and control groups ($p < 0.05$). This supports the hypothesis that the interactive media based on the PBL model positively affects students' English learning outcomes.

Discussion

The results of this study confirm that the development of interactive media based on the Problem-Based Learning (PBL) model is effective in improving English reading comprehension among eighth-grade students at SMP Negeri 2 Kualuh Selatan. The development process, which followed the ADDIE model, began with a rigorous needs analysis revealing a very high demand for engaging, accessible, and student-centered English learning resources. Both teachers and students reported average scores above 90% in the needs assessment, indicating that existing instructional tools were insufficient to support comprehension, especially for recount texts.

This finding reinforces the contextual urgency for innovation in English learning media, particularly in rural schools where teaching remains predominantly conventional and teacher-centered. The feasibility results from expert validation content (81%), media design (93%), and instructional design (88%) demonstrate that the developed media is pedagogically sound, visually coherent, and aligned with student cognitive levels. Revisions were made based on expert suggestions, resulting in a refined product that integrates learning goals, user-friendly navigation, and engaging design. When implemented in classroom settings, the media was rated "very practical" by both students and teachers (87% and 89% respectively), indicating its suitability for day-to-day use. These findings highlight that the media not only meets technical standards but also supports usability, independence, and learner autonomy. Students found it intuitive and interactive, while teachers appreciated its integration with the Merdeka Curriculum and its ease of incorporation into existing lesson plans.

Effectiveness testing via a quasi-experimental design further confirmed the media's positive impact. Students in the experimental group, who used the PBL-based interactive media, achieved a significantly higher post-test mean score (77.09) than the control group (70.94), with a significance value of 0.000 ($p < 0.05$). The N-Gain score of 0.5845 indicates a moderate but meaningful improvement in reading comprehension. These results demonstrate

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that the PBL approach when supported with interactive media effectively enhances students' engagement and comprehension of recount texts. Theoretically, these findings align with cognitive theory of multimedia learning (Bandura, 1985; Sternberg, 2008), which posits that dual-channel input (verbal and visual) promotes deeper cognitive processing and retention. The media developed in this study encouraged learners to interact with the content actively through problem scenarios, animations, quizzes, and reflective tasks. This not only supported comprehension but also fostered collaboration and independent learning. Furthermore, the flexibility of the media accessible via both mobile and desktop devices supports blended learning, a necessity in the post-pandemic educational environment.

In addition, the study supports prior research that emphasizes the role of PBL and multimedia in improving learning outcomes. For instance, (M. Jin et al., 2023) found that interactive and problem-based environments enhance students' motivation and comprehension. Astawa et al. (2017) and Kartikasari (2018) also reported that multimedia combined with PBL increases learning achievement. The present findings further validate this body of literature, especially by showing its applicability in under-resourced school settings. This research is beneficial in several ways. Practically, it offers teachers a ready-to-use, validated learning tool that supports active and independent learning. For students, it provides a more engaging and flexible way to learn English, allowing for self-paced exploration and reinforcement. Strategically, the media aligns with national curriculum goals and supports the shift toward digital and competency-based education. It also serves as a replicable model that other educators in similar contexts can adopt or adapt.

However, this study is not without limitations. The research was conducted in a single rural school with a relatively small sample size, limiting generalizability. In addition, the media focused on reading comprehension without integrating kinesthetic or project-based components that might further support diverse learning styles. Future studies should explore the scalability of this media across different regions and grade levels, and consider incorporating features for hands-on learning, gamification, or social learning dynamics. The study provides strong empirical support for the integration of PBL-based interactive media in English instruction. It confirms that such innovation not only improves learning outcomes but also promotes student-centered, meaningful, and flexible learning. As schools transition to more blended and digital modes of learning, this research contributes to a growing need for effective, scalable, and context-relevant educational technology interventions.

Conclusion

This study has demonstrated that the development of interactive media based on the Problem-Based Learning (PBL) model significantly contributes to improving English learning outcomes, particularly in reading comprehension of recount texts among eighth-grade students. The media was found to be highly feasible, practical, and effective, as supported by expert validation and classroom trials. The experimental group, which used the developed media, showed a statistically significant improvement in post-test scores compared to the control group, validating the claim that the PBL-integrated interactive media enhanced students' learning outcomes. These findings align with existing literature emphasizing the benefits of technology-enhanced, student-centered learning and reinforce theories such as Mayer's multimedia learning theory. The results not only confirm the importance of integrating contextual and interactive digital tools into language education but also advance educational

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practice by providing an effective model for technology-based learning design in English as a Foreign Language (EFL) contexts.

Recommendation

Based on the findings of this research, several recommendations are proposed. First, educators and school administrators are encouraged to adopt and support the implementation of interactive, PBL-based digital media in English instruction to foster student engagement, autonomy, and achievement. Second, further development of this media should be pursued to include other language skills and text genres beyond recount texts, ensuring broader applicability across curricula. Third, future studies are recommended to involve larger and more diverse populations to enhance the generalizability of the findings and to assess long-term impacts on learning retention. Moreover, the integration of emerging technologies such as augmented reality (AR) and virtual reality (VR) could be explored to enrich students' learning experiences further. Lastly, it is crucial to provide ongoing professional development for teachers, enabling them to design, implement, and evaluate digital learning media effectively and innovatively in their classrooms.

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