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Enhancing Junior High School Students' Learning Outcomes through a Differentiated PjBL-Based Interactive E-Module with Flipped Classroom Approach

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Abstract

Background: The integration of technology into education, especially in language learning, plays a vital role in improving student engagement and understanding. Procedure texts, a common genre in English classes, often pose comprehension challenges when taught using traditional methods.
Aims: This study aims to develop and evaluate an interactive e-module based on the Project-Based Learning (PjBL) model and the flipped classroom approach to enhance students' cognitive abilities and engagement in learning procedure texts.
Methods: The e-module was developed using the ADDIE model (Analyze, Design, Develop, Implement, Evaluate). Data collection involved pre- and post-tests, expert validations, and surveys administered to both students and teachers. Effectiveness was measured using statistical analyses, including t-tests and N-Gain calculations.
Results: Findings revealed a significant improvement in students' performance, with the experimental group's mean score increasing from 14.50 (pre-test) to 20.93 (post-test) and an N-Gain score of 0.66, indicating a high level of learning effectiveness. Expert validation and user feedback confirmed the e-module's practicality, interactivity, and educational value.
Conclusion: The developed e-module effectively enhanced students' understanding of procedure texts, demonstrating the benefits of combining digital tools with active learning models like PjBL and the flipped classroom. This research contributes to the advancement of interactive learning media in language education.

A. Introduction

Education is undergoing a transformative shift worldwide, driven by advancements in Technology and Information Communication (TIC) (Alakrash & Razak, 2021; Kuswara & Mustofa, 2022). In many regions, including Indonesia, these innovations are reshaping traditional educational methodologies, fostering new learning environments that promote engagement and interactivity (Salim & Onjure, 2020). As technology continues to evolve, the demand for digital tools that enhance learning experiences is becoming increasingly apparent (Almén & Bagga-Gupta, 2023; Rawat et al., 2024). Among these tools, e-modules are emerging as pivotal resources in modern classrooms, offering dynamic, flexible, and interactive learning experiences that traditional textbooks often lack.

The need for high-quality educational resources is particularly pressing in secondary education, where students face the challenge of adapting to the globalized world (Hanif et al., 2018). In Indonesia, the implementation of the Merdeka Curriculum is a notable reform aimed at improving educational standards by emphasizing student empowerment and the development of 21st-century skills (Sibuea et al., 2023).

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This curriculum fosters learner-centered education, promoting self-directed learning and critical thinking among students (Prakoso et al., 2023). However, despite these efforts, challenges persist in ensuring that all students have access to engaging and effective learning materials, particularly in subjects like English, which remain essential for academic and professional success on a global scale (Fitriana et al., 2022; Walsh & Rísquez, 2020).

In the context of Junior High Schools, English language learning often encounters obstacles such as limited resources, insufficient practice opportunities, and short classroom durations (Shandu-Omukunyi, 2023; Shukr & Jameel, 2022). These issues are compounded by the widespread need for more motivating and interactive learning tools that cater to diverse student needs. According to recent surveys conducted at SMP Unggul YPPU Sigli, students have expressed a strong preference for learning tools that are not only engaging but also accessible, interactive, and capable of supporting independent learning. Moreover, traditional teaching methods that rely on passive forms of learning, such as rote memorization, fail to effectively engage students, particularly in the area of speaking skills, which are crucial for language acquisition.

To address these issues, this research proposes the development of a differentiated, Project-Based Learning (PjBL)-based interactive e-module, incorporating the Flipped Classroom approach, to support English learning in Junior High School (Ma et al., 2024; Purnamasari, 2023). This model promises to provide a more personalized, engaging, and flexible learning experience, encouraging active participation and independent learning outside of the classroom while optimizing face-to-face class time for interactive, skill-building activities (Santikarn & Wichadee, 2018). By integrating these innovative teaching strategies, the e-module aims to bridge the gap between students' expectations and the reality of their educational experiences, providing a comprehensive solution to the challenges identified (Zou, 2020).

Previous studies Deng (2018) have explored the efficacy of blended learning approaches, including PjBL and the Flipped Classroom, in enhancing language learning outcomes. However, gaps remain in the application of these models, specifically in the development of interactive e-modules that cater to diverse learning styles and language skills. This study aims to contribute to the field by addressing this gap, developing a differentiated e-module that utilizes PjBL and the Flipped Classroom, and incorporating feedback from students and educators to ensure its practicality and effectiveness. The novelty of this research lies in its focus on creating a tailored, interactive, and student-centered learning tool that can be adapted to meet the varied needs of English learners.

The primary objective of this study is to develop an e-module that can effectively enhance the speaking skills of Junior High School students by providing an engaging, interactive, and differentiated learning environment. Furthermore, this study will evaluate the feasibility, practicality, and effectiveness of the e-module in improving student outcomes, with the aim of providing a valuable contribution to the field of educational technology and language learning.

B. Research Methods

This research employs the Research and Development (R&D) approach to design and develop the e-module. R&D was chosen because it is ideal for creating and refining educational products through iterative design, testing, and evaluation, ensuring the product's relevance and effectiveness. The ADDIE model (Analyze, Design, Develop, Implement, Evaluate) was then used as the framework to systematically design and develop the e-module, ensuring it aligns with clear educational objectives and is effectively tested and improved based on feedback. The ADDIE model was chosen due to its systematic and structured approach, which facilitates the gradual and directed development and evaluation of learning products (Zhang, 2020). The stages of product development can be seen in Figure 1 below:

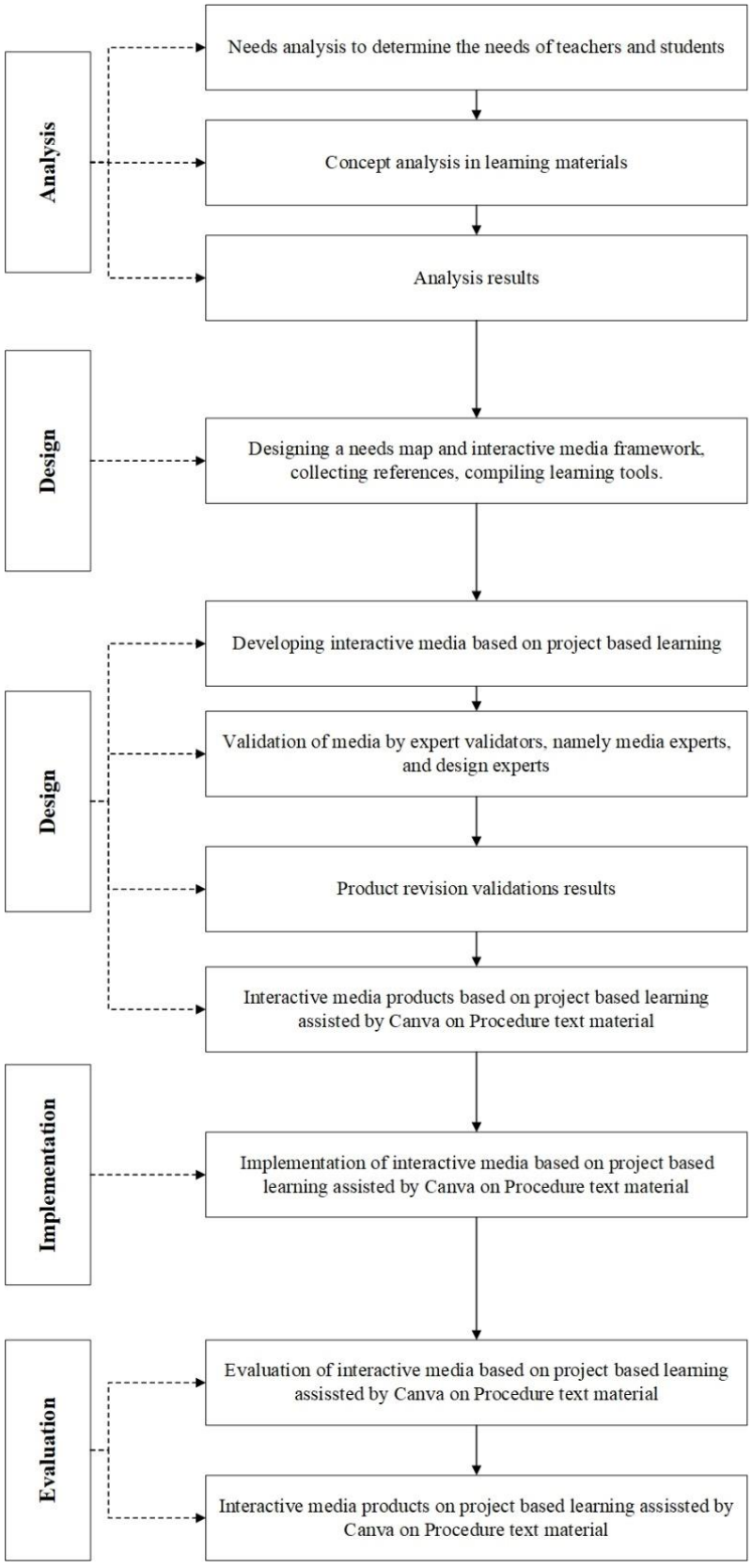

Figure 1. Stages of Development E-module

The research follows the ADDIE model's five stages. The first stage, Analyze, involves identifying the learning needs, styles, and preferences of grade VIII students through surveys, observations, and

discussions with both students and teachers. Additionally, curriculum analysis ensures that the e-module aligns with the established learning objectives. The second stage, Design, focuses on creating the structure of the e-module, ensuring it includes interactive elements such as videos, animations, quizzes, and collaborative activities, all of which support the PjBL and Flipped Classroom approaches. In the Develop stage, the design is transformed into a working e-module using a platform like Canva, ensuring it is visually appealing, user-friendly, and accessible across various devices, including smartphones and laptops. The implementation stage begins with the experimental group using the e-module while the control group follows traditional learning methods. During this stage, data on learning outcomes, motivation, and student engagement are collected. Finally, the Evaluate stage analyzes the effectiveness and feasibility of the e-module using both quantitative and qualitative data, including pre- and post-assessments, surveys, and observations.

The research was conducted at SMP Unggul YPPU Sigli, located in Sigli, Pidie. This period allowed for the completion of all stages of the research, from needs analysis to product evaluation. The research participants were selected through clustering random sampling and included grade VIII students, specifically from class VIII-3 (a small group of 3 to 7 students for preliminary trials), class VIII-2 (an experimental group of 32 students), and class VIII-1 (a control group of 32 students). These students were the target users for the e-module and experienced the implementation of the Flipped Classroom model.

Data collection is carried out using various methods aligned with the stages of the ADDIE model. During the Analyze phase, questionnaires will be distributed to students and teachers to gather information on learning needs, preferences, and the initial usability of the e-module. Observations will also be conducted to assess the students' engagement, interactions with the e-module, and collaboration during PjBL tasks. These observations will provide insights into the learners' needs and classroom dynamics.

In the Design phase, feedback from the questionnaires and initial observations will be used to refine the e-module design. During the Develop phase, observation sheets will monitor classroom interactions, student participation, and the actual use of the e-module in the learning process. Pre-tests and post-tests will be administered to measure changes in students' English language proficiency, particularly their speaking skills, and will help evaluate the effectiveness of the e-module in improving learning outcomes.

In the Implement phase, the e-module will be tested in a real classroom setting, and expert validation sheets will be used to assess the technical and pedagogical quality of the e-module. Experts will evaluate the content, design, and usability of the e-module. Finally, the Evaluate phase will include the analysis of feedback from expert validation, post-tests, and observation sheets to assess the overall success and effectiveness of the e-module, and any necessary revisions will be made.

For data analysis, both quantitative and qualitative methods will be used. Quantitative data, including pre- and post-test results, will be analyzed using descriptive statistics and inferential methods such as paired t-tests. These will compare learning outcomes between the experimental and control groups to determine the e-module's effectiveness. Qualitative data from surveys and observations will be analyzed thematically to identify patterns in student engagement and interaction with the e-module. Expert feedback will also be analyzed using a rating rubric to identify areas for improvement in the e-module. The analysis will involve calculating the average score for each criterion provided by the experts, which includes content relevance, design, interactivity, and alignment with student needs. This data will be analyzed both quantitatively to assess whether the e-module meets the expected standards, and qualitatively to gather feedback and suggestions for further improvement. The results of this analysis will be used to refine the e-module before further implementation.

C. Results and Discussion

1. Results

This research employed the ADDIE development model, which consists of five stages: Analyze, Design, Development, Implementation, and Evaluation. The development process of the interactive e-module aimed to enhance students' understanding of procedure text in English language learning for grade VIII students at SMP Unggul YPPU Sigli.

1.1. Analysis Phase

In the analysis stage, data were gathered through surveys distributed to 32 students in grade VIII to explore their needs and preferences regarding an English language e-module. The results, which can be seen in

Table 1 below, highlight a clear demand for the development of an interactive and accessible e-module, with the majority of students expressing strong support for its potential to enhance their learning experience.

Table 1. Student Preferences and Needs for the English Language E-Module

Question	Percentage of Students in Agreement
E-module would be beneficial for learning English	80%
Desire for an interactive e-module	100%
Need for media that can be accessed anytime	100%
Belief that using e-modules would improve English skills	80%

1.2. Design Phase

The e-module was designed using the Canva platform, followed by Heyzine Flipbook for the digital version. The link was shared through s.id. The design focused on interactivity, including video lessons, content presentations, digital books, and audio, along with questions that encouraged active student participation. The e-module was structured with a variety of learning activities, including quizzes, project assignments, and video tutorials, all designed to foster independent learning through the flipped classroom model. The initial design followed a detailed structure, including content on procedure texts and interactive features such as navigation links and multimedia components. The following is a flowchart for media production, which is shown in Figure 2 below.

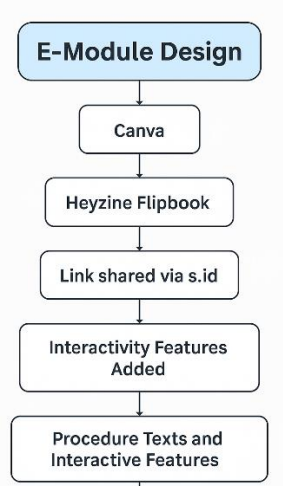

Figure 2. Design Flow

The e-module, as illustrated in Figure 3 below, presents the key components and structure designed to enhance student learning. It showcases interactive elements, including video lessons, quizzes, and multimedia components, integrated within the platform, which collectively aim to facilitate independent learning through the flipped classroom model.

Figure 3. E-Module

1.3. Development Phase

The e-module was then tested for feasibility by experts in three areas: media, content, and instructional design. The e-module can be accessed at the following link: https://s.id/E-Modul_ProcedureText. The results from the expert validation were compiled to refine and enhance the quality of the e-module. The results of these validations are presented in the following tables, which outline the feedback and evaluation from the experts at both Stage 1 and Stage 2.

Content Expert Validation

Table 2. Results of Content Expert Validation (Stage 1)

No	Criteria	Validator 1	Validator 2	Average Score	Percentage	Criteria
1	Content Suitability	3.8	3.4	3.6	72%	Feasible
2	Relevance to Learning Goals	3.6	4.0	3.8	76%	Feasible
3	Interactivity and Differentiation	3.6	3.8	3.7	74%	Feasible
4	Relevance to Student Context	3.2	3.8	3.5	70%	Feasible

Table 3. Results of Content Expert Validation (Stage 2)

No	Criteria	Validator 1	Validator 2	Average Score	Percentage	Criteria
1	Content Suitability	4.8	4.8	4.8	96%	Very Feasible
2	Relevance to Learning Goals	4.8	4.6	4.7	94%	Very Feasible
3	Interactivity and Differentiation	4.0	4.6	4.3	86%	Very Feasible
4	Relevance to Student Context	4.4	5.0	4.7	94%	Very Feasible

The results of the content expert validation in Stage 1 indicate that all evaluated aspects of content suitability, relevance to learning goals, interactivity, and differentiation, as well as relevance to student context, received average scores ranging from 3.5 to 3.8, with eligibility percentages between 70% and 76%. Therefore, all aspects were categorized as "Valid." After revisions were made based on the experts' feedback, the validation results in Stage 2 showed a significant improvement, with average scores increasing to a range of 4.3 to 4.8 and eligibility percentages ranging from 86% to 96%. All aspects were categorized as "Very Valid," indicating that the revisions effectively enhanced the overall quality of the content. Input from experts in Stage 1 revealed several areas for improvement, including ensuring the alignment of the e-module content with the curriculum, enhancing the depth and clarity of the material, and incorporating more relevant examples for the target student group. Additionally, the experts recommended improving the differentiation of learning activities to cater to the diverse needs of students. These suggestions were incorporated in Stage 2, resulting in a more focused, comprehensive, and accessible e-module that better met the educational objectives and the students' learning requirements.

Media Expert Validation

Table 4. Results of Media Expert Validation (Stage 1)

No	Criteria	Validator 1	Validator 2	Average Score	Percentage	Criteria
1	Media Quality	3.8	3.8	3.8	76%	Valid
2	Content and Material	3.6	3.6	3.6	72%	Valid
3	Differentiation and Interactivity	3.2	3.6	3.4	68%	Less Valid
4	Technical Aspects	3.4	4.0	3.7	74%	Valid

Table 5. Results of Media Expert Validation (Stage 2)

No	Criteria	Validator 1	Validator 2	Average Score	Percentage	Criteria
1	Media Quality	4.8	4.8	4.8	96%	Very Valid
2	Content and Material	4.8	4.6	4.7	94%	Very Valid
3	Differentiation and Interactivity	4.0	4.6	4.3	86%	Very Valid
4	Technical Aspects	4.4	5.0	4.7	94%	Very Valid

The results of the media expert validation in Stage 1 show that three out of four aspects—media quality, content and material, and technical aspects—were rated as "Valid" with average scores ranging from 3.6 to 3.8 and percentages between 72% and 76%. However, the criterion of differentiation and interactivity was rated "Less Valid" with a lower average score of 3.4 (68%). Following revisions based on expert input, the Stage 2 validation results demonstrate significant improvement, with all aspects achieving average scores between 4.3 and 4.8 and percentages ranging from 86% to 96%. Consequently, all aspects were categorized as "Very Valid," confirming that the media revisions effectively enhanced its quality and appropriateness. Following revisions based on expert input, the Stage 2 validation results demonstrate significant improvement. In Stage 1, the content experts suggested refining the alignment of the e-module content with the curriculum, simplifying complex explanations, and increasing the interactivity of the learning activities. They also recommended adjusting the layout for better navigation and visual appeal. In Stage 2, these suggestions were implemented, leading to clearer content, more engaging interactive features, and a more user-friendly design, all of which contributed to the e-module's improved overall quality.

Instructional Design Expert Validation

Table 6. Results of Instructional Design Expert Validation (Stage 1)

No	Criteria	Validator 1	Validator 2	Average Score	Percentage	Criteria
1	Content Suitability	3.6	3.6	3.6	72%	Valid
2	Instructional Design	3.6	3.6	3.6	72%	Valid
3	Technology and Media	3.4	3.8	3.6	72%	Valid
4	Evaluation and Assessment	3.4	3.8	3.6	72%	Valid

Table 7. Results of Instructional Design Expert Validation (Stage 2)

No	Criteria	Validator 1	Validator 2	Average Score	Percentage	Criteria
1	Content Suitability	4.4	4.6	4.5	90%	Very Valid
2	Instructional Design	4.4	4.6	4.5	90%	Very Valid
3	Technology and Media	4.4	4.8	4.6	92%	Very Valid
4	Evaluation and Assessment	4.0	4.8	4.4	88%	Very Valid

The results of the instructional design expert validation in Stage 1 show that all evaluated aspects content suitability, instructional design, technology and media, and evaluation and assessment received the same average score of 3.6 with a percentage of 72%, which categorized them as "Valid." After implementing revisions based on expert suggestions, the results in Stage 2 demonstrated marked improvement, with average scores ranging from 4.4 to 4.6 and percentages between 88% and 92%. All aspects were then classified as "Very Valid," indicating that the improvements made significantly enhanced the instructional design quality of the product. The validation results from all experts in content, media, and instructional design confirm that the e-module met the necessary standards for educational quality and effectiveness. After revisions based on feedback from Stage 1, the e-module was found to be very valid, with average scores of 93% or higher across all criteria in Stage 2, indicating its readiness for implementation.

1.4. Implementation

The e-module was then tested with a small group of 10 students, followed by a larger group of 30 students. The first round of testing indicated that 73% of students found the e-module practical, while the second round showed a significant improvement with 88% of students rating it as "very practical." Interviews with teachers confirmed that the e-module was effective and practical, particularly in schools with good access to computer labs and the internet. The feedback highlighted that the e-module provided a flexible and engaging learning experience, allowing students to study independently at their own pace.

1.5. Evaluation

The final stages of the ADDIE model, Evaluation, play a critical role in determining the success and impact of the developed e-module. In this research, the evaluation process was integrated with effectiveness testing to assess both the quality and educational outcomes of the e-module. This approach ensured that the e-module not only met the required instructional standards but also significantly improved students' understanding and engagement with the content. A statistical analysis was conducted to evaluate the effectiveness of the e-module in enhancing students' comprehension of procedure texts. A comparison of pre-test and post-test scores revealed significant differences between the experimental and control groups.

Table 8. Pre-test and Post-test Results for Experimental and Control Groups

Group	Mean Pre-test Score	Mean Post-test Score	Mean Difference	Standard Deviation	t-value	p-value
Experimental	14.50	20.93	+6.43	3.37	3.54	0.00079
Control	14.50	15.20	+0.70	2.80		

The experimental group, which used the e-module, showed a notable improvement from a mean pre-test score of 14.50 to a post-test score of 20.93, yielding a mean difference of +6.43 points. On the other hand, the control group, which did not use the e-module and relied on traditional learning methods, showed a much smaller increase in their post-test score, from 14.50 to 15.20, with a mean difference of just +0.70 points.

A t-test was conducted to examine the statistical significance of the difference between the two groups' mean scores. The calculated t-value was 3.54, with a corresponding p-value of 0.001, which is less than the significance threshold of 0.05. This indicates that the difference between the groups' post-test scores is statistically significant, confirming the effectiveness of the e-module in improving students' understanding of procedure texts.

For the experimental group, the N-Gain was 0.66, reflecting a high level of improvement. In contrast, the control group had an N-Gain of 0.50, indicating medium-level effectiveness. These findings demonstrate that the e-module had a high positive impact on students' learning outcomes. The significant difference between the experimental and control groups, along with the higher N-Gain for the experimental group, shows that the e-module effectively improved students' understanding of procedure texts, making it a valuable educational tool.

2. Discussion

In this section, we analyze the results of the development and effectiveness testing of the interactive e-module based on Project-Based Learning (PjBL) with the flipped classroom approach. The findings presented in the previous chapter highlight the e-module's potential to enhance students' understanding of procedure texts and provide practical implications for its use in educational settings. This discussion aims to explore the implications of these findings, the contributions of this research to the field of education, the limitations encountered during the study, and suggestions for future research and development in this area.

2.1. Implications

The successful development and implementation of the e-module have significant implications for English language teaching, particularly in the context of teaching procedure texts. First, the e-module demonstrates that digital tools can enhance the learning experience by offering interactive and engaging content that supports self-directed learning. The use of multimedia elements such as videos, quizzes, and interactive tasks provides a rich learning environment that caters to different learning styles and needs, making learning more accessible and personalized.

Additionally, the positive impact of the flipped classroom approach, combined with PjBL, shows that active learning methodologies can be effectively integrated into digital platforms. By encouraging students to

engage with the material independently at home and focus on collaborative problem-solving in the classroom, the e-module fosters a deeper understanding and enhances critical thinking skills. This approach has the potential to shift the traditional passive learning model towards one that is more student-centered, where learners take responsibility for their learning and apply their knowledge in real-world contexts.

Moreover, the findings emphasize the importance of differentiating learning materials to cater to diverse student needs. The e-module's ability to provide differentiated tasks allows students to engage with content at their own pace and according to their individual learning preferences. This approach is particularly useful in addressing the challenges posed by mixed-ability classrooms, where students have varying levels of proficiency and different learning styles.

This research aligns with recent trends in educational technology, which emphasizes the role of interactive and multimedia-rich content in enhancing student engagement and understanding. For instance, Djamas et al. (2018) and Sriadhi et al. (2021) highlight the significant impact of responsive, interactive learning environments in boosting student engagement, which is consistent with the findings of this study.

2.2. Research Contribution

This research makes several significant contributions to the field of educational technology and instructional design. First, it adds to the growing body of knowledge on the integration of e-modules in English language learning, particularly in the context of teaching procedure texts. The study highlights how a well-designed digital learning tool can support both independent and collaborative learning, enhancing students' engagement and understanding.

Second, expanding the sample size and including diverse student populations would provide more robust data, allowing for comparisons between different types of learners. Future research could also examine the effectiveness of e-modules across different subject areas and educational levels, helping to determine their generalizability and applicability in various contexts.

Additionally, the findings contribute to the understanding of the practical application of e-modules in a secondary school setting. The research provides valuable insights into the development, validation, and implementation of digital tools for English language teaching, offering a roadmap for future e-module development in other subject areas. This research contributes to existing literature, as it supports the findings of Marpaung & Rosmen (2022), who emphasize the benefits of differentiated e-modules in accommodating diverse learning styles and improving learning outcomes. Furthermore, the study corroborates the work of Prasetya et al. (2022), which suggests that interactive e-modules can significantly enhance student motivation and engagement, aligning with the needs of modern educational practices.

2.3. Limitations

While the study provides valuable insights, it also has several limitations that should be considered. First, the research was conducted in a single school with a limited sample size of students, which may limit the generalizability of the findings. Future research could expand the study to include a larger, more diverse sample from multiple schools to provide a broader understanding of the e-module's effectiveness.

Second, the study focused primarily on the cognitive outcomes of using the e-module, such as students' understanding of procedure texts. However, the research did not explore other dimensions of student learning, such as affective (motivation, engagement) and psychomotor (skills development) outcomes. Further research could investigate the impact of the e-module on these additional areas to provide a more comprehensive evaluation of its effectiveness.

Another limitation is the lack of long-term follow-up to assess whether the improvements observed in the post-test are sustained over time. A longitudinal study would help determine whether the benefits of using the e-module are lasting and whether students continue to engage with the content independently beyond the classroom setting. Furthermore, the study did not explore the full potential of 21st-century skills development, such as collaboration, communication, and creativity, within the e-module. Future studies could extend the assessment to include these skills, as they are crucial for preparing students for modern challenges.

2.4. Suggestion

Based on the findings and limitations of this research, several suggestions can be made for future studies and improvements in e-module development. First, it is recommended that future research explore the long-term effects of using e-modules on students' learning outcomes. A follow-up study could assess whether

the improvements in students' understanding of procedure texts are sustained over time and whether the e-module contributes to continued learning outside the classroom.

Second, expanding the sample size and including diverse student populations would provide more robust data and allow for comparisons between different types of learners. Future research could also examine the effectiveness of e-modules across different subject areas and educational levels, helping to determine their generalizability and applicability in various contexts.

Additionally, incorporating more interactive elements and features such as real-time feedback, peer collaboration, and gamification could enhance the learning experience. Future iterations of the e-module could also include more in-depth assessments of students' critical thinking and problem-solving skills, particularly within the context of Project-Based Learning. Finally, teachers should be provided with more professional development and training on how to effectively integrate e-modules into their teaching practices. By equipping educators with the necessary skills and knowledge, e-modules can be more effectively used to complement traditional teaching methods and enhance student learning outcomes.

D. Conclusion

This research aimed to develop and assess the effectiveness of an interactive e-module based on Project-Based Learning (PjBL) and the flipped classroom approach for teaching procedure texts in English. The e-module was designed to enhance students' understanding of procedure texts and provide an engaging, flexible learning experience that caters to different learning styles. The findings of this study indicate that the e-module significantly improved students' understanding of procedure texts. A comparison of pre-test and post-test scores showed a significant improvement in the experimental group's performance compared to the control group. The t-test confirmed the statistical significance of the improvement, and the N-Gain for the experimental group indicated a high level of improvement, while the control group showed a medium level of improvement.

The expert validation process also demonstrated that the e-module was both valid and practical, with positive feedback from content, media, and instructional design experts. The e-module was rated highly in terms of content relevance, interactivity, and usability, meeting the necessary educational standards for teaching English at the secondary school level. Based on these findings, it can be concluded that the e-module developed in this study was highly effective in improving students' understanding of procedure texts. The integration of PjBL and the flipped classroom model within the e-module enhanced student engagement and facilitated a deeper learning experience. This research contributes to the growing body of knowledge on digital learning tools in education, particularly in the context of language learning.

The results also highlight the potential of digital tools, such as e-modules, to support differentiated learning, provide opportunities for independent study, and promote active learning. As such, the e-module developed in this research has the potential for broader application in educational settings, offering a valuable resource for both students and teachers. Future research could explore the long-term effects of e-modules, expand the sample size, and include more comprehensive assessments of students' development in the affective and psychomotor domains.

E. Acknowledgment

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F. Author Contribution Statement

RFR was responsible for the overall conceptualization of the study, designing the research methodology, and analyzing the data. RM contributed to the development and design of the e-module, as well as the validation process with experts. ST assisted with data collection and literature review, and provided substantial feedback on the research findings. All authors reviewed and approved the final manuscript.

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