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Developing and Evaluating a Project-Based Academic Vocabulary Flipbook Integrating Papuan Local Wisdom: Validity, Practicality, and Effectiveness

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Abstract
Academic vocabulary is essential for university students' success in scientific reading and writing, yet instructional approaches remain largely conventional and insufficiently connected from students' cultural contexts. This study aimed to develop and evaluate a project-based academic vocabulary flipbook integrating "Papuan local wisdom" for the English Education Study Program at Universitas Muhammadiyah Sorong. The flipbook was developed using the ADDIE model through needs and curriculum analysis, instructional design, multimedia content creation using "Canva", "YouTube", and "Heyzine", limited implementation with 20 students, and expert as well as user evaluation. Data were collected via questionnaires, expert validation rubrics, interviews, and pre- and post-tests, and were analyzed descriptively and using a paired-sample t-test. The findings show high validity, with subject matter experts assigning a mean of 3.85 ("excellent") for content, and media experts 3.82 ("excellent") for technical quality; students rated the flipbook "good" (mean 3.41) across instructional and technical aspects. For practicality, experts and students reported overall scores of 96.18%, 95.57%, and 84.94% ("very practical"). Pre- and post-tests showed an average gain of 10.30 points (from 55.10 to 65.40) in academic vocabulary scores, with t(19) = -3.884, p = 0.001, indicating a significant improvement. Qualitative feedback highlighted the flipbook's "clarity, engagement, and cultural relevance" and its role in helping students correctly use academic vocabulary in meaningful, project-based contexts. In sum, the developed flipbook is valid, practical, and effective for enhancing academic vocabulary learning in a culturally responsive manner.
Keywords: *Academic Vocabulary, Digital Flipbook, Project-Based Learning, Local Wisdom, Papuan Culture*

1. Introduction

The advancement of science and technology necessitates learning that not only focuses on mastery of subject matter, but also on the development of critical thinking skills, independent learning, and an appreciation for local cultural values. Therefore, in the context of English language instruction at the tertiary level, the mastery of academic vocabulary serves as a crucial foundation for students' success in comprehending scientific texts, producing academic writing, and building comprehensive academic literacy (Lawrence et al., 2019).

One persistent challenge in tertiary English language instruction is the limited effectiveness of conventional methods in fostering deep academic vocabulary mastery, especially when instruction lacks cultural relevance and authentic engagement (Guo et al., 2024). This highlights a critical gap: conventional, one-way approaches inadequately connect learning materials to real-life contexts and students' cultural backgrounds (Dewsbury et al., 2022). The main challenge in academic vocabulary instruction is the lack of context relevant to students' lives (Nation, 2013; Schmitt, 2008). Integrating project-based learning and local cultural content is theorized to enhance vocabulary acquisition by situating learning in meaningful, context-rich experiences that resonate with students' identities and lived realities (Zhou & Goh, 2025). Meanwhile, the literature on PBL emphasizes the importance of learning that is relevant to students' cultural contexts to increase engagement and understanding (Eka Daryati et al., 2024).

As educational technology continues to advance,, various innovative media and approaches have been developed, such as the use of digital flipbooks and the implementation of project-based learning (PBL). Flipbooks, as interactive visual media, have the potential to enhance students' motivation and understanding through engaging displays and flexible access when integrated with digitalization. On the other hand, PBL encourages active student engagement, collaboration, problem-solving, and learning centered on authentic projects relevant to their experiences. Several studies have reported that the integration of digital technology and PBL can improve student engagement, conceptual understanding, and knowledge retention across various fields of study (Li et al., 2024; Tahang, 2021; Tavares, 2022). However, while previous studies demonstrate that digital technology and PBL independently enhance student engagement and understanding, few have explored how their combined use specifically addresses the unique challenges of academic vocabulary acquisition in culturally diverse settings. This suggests a gap in understanding the synergistic potential of these approaches, particularly when contextualized with local cultural content.

The integration of local wisdom in education is increasingly recognized as vital for fostering cultural identity, enhancing material relevance, and bridging global and local values. In Papua, cultural traditions, artifacts, and folklore offer authentic resources for English language instruction, particularly academic vocabulary. However, interactive digital materials such as flipbooks that incorporate Papuan local wisdom remain limited, especially in academic vocabulary courses. This lack of integration is significant, as theory suggests that culturally contextualized, project-based digital resources may not only improve vocabulary retention but also promote cultural identity and relevance. Therefore, investigating this integration is crucial for developing effective, context-sensitive instructional strategies. Previous studies show that flipbook-based and local wisdom-based materials can enhance critical thinking, numeracy, and character development (Chan et al., 2021; Eka Daryati et al., 2024; Hasni et al., 2024; Ke et al., 2023), while PBL effectively increases student engagement and independent learning (Bergmann & Sams, 2014; Guo et al., 2024; Lee et al., 2024; Stentoft, 2019; Zarouk et al., 2020).

Although prior studies have established the benefits of digital flipbooks, PBL, and local wisdom-based materials in isolation, there is a lack of research examining their combined impact on academic vocabulary instruction, particularly in culturally rich contexts like Papua. Previous research generally only highlights the benefits of digital flipbooks in increasing student motivation and understanding, without directly linking them to academic vocabulary instruction based on local culture or the Project-Based Learning (PBL) approach (Sargent & Casey, 2020). Similarly, studies on the integration of local wisdom mostly discuss the

strengthening of cultural identity, but have not explicitly connected it to academic vocabulary instruction (Deliz et al., 2020; Kula et al., 2021). This indicates a clear theoretical gap and the need for a more critical synthesis of previous findings to justify the integration of Papuan local wisdom and PBL in academic vocabulary instruction. Theoretically, integrating PBL with local wisdom in a digital format could address both cognitive and cultural dimensions of learning, making vocabulary instruction more meaningful and relevant. Therefore, the development of a digital flipbook that integrates PBL and local culture becomes important to fill this theoretical gap and offer innovative solutions to the challenges of academic vocabulary instruction at the university level.

Through the systematic development and evaluation of this integrated instructional medium, the present study not only fills a critical gap in the literature but also offers a replicable framework for other culturally rich and under-researched contexts. The findings are expected to contribute new insights into the design of effective, culturally responsive academic vocabulary instruction and inform future educational technology development in Indonesia and beyond.

To date, there has been no development and evaluation of a digital Academic Vocabulary flipbook based on PBL that specifically integrates Papuan local wisdom in the English Education Study Program at Universitas Muhammadiyah Sorong. This lack of research is significant because students in Papua face unique linguistic and cultural challenges that are not addressed by conventional or non-contextualized instructional materials. Developing and evaluating a digital academic vocabulary flipbook that integrates PBL and Papuan local wisdom can provide a model for culturally relevant language instruction, potentially improving both academic outcomes and cultural identity among students. This gap highlights the need for the development of instructional media that is not only innovative in terms of technology and pedagogical approach, but also sensitive to local cultural contexts and the real needs of students in the classroom.

In response to this need, the present study offers the development of a PBL-based Academic Vocabulary flipbook integrating Papuan local wisdom as an effort to provide more contextual, meaningful, and relevant academic vocabulary learning for students. This medium is designed to connect academic vocabulary concepts with projects rooted in Papuan culture, thereby strengthening language comprehension while fostering cultural pride and awareness. Specifically, the aim of this study is to develop and evaluate a project-based learning (PBL) Academic Vocabulary flipbook integrated with Papuan local wisdom for academic vocabulary instruction in the English Education Study Program at Universitas Muhammadiyah Sorong.

2. Method

This study employed a mixed-method approach using an Embedded Mixed Methods design, in which the primary data consisted of quantitative measures (pre-test, post-test, validation questionnaires, and practicality assessments) supported by qualitative data from interviews. The main analysis focused on quantitative data to assess validity, practicality, and improvements in students' academic vocabulary comprehension, which was then further explored through interviews to clarify and strengthen the quantitative findings. In this way, qualitative data complemented the comprehensive interpretation of research results, consistent with the principle of integration in embedded mixed-method designs, where qualitative data serve to enrich the primary quantitative findings (Fetters et al., 2013).

Additionally, this study implemented Research and Development design by applying the ADDIE development model (Analyze, Design, Development, Implementation,

Evaluation) by (Borg & Gall, 1983) to develop and evaluate a Project-Based Learning (PBL) Academic Vocabulary flipbook integrating Papuan local wisdom. The following are the research procedures following the ADDIE process.

2.1. Analyze

At this stage, three types of analysis were conducted:

a. Material Analysis: Identifying and designing learning materials relevant to the Academic Vocabulary by reviewing the existing curriculum;
b. Situational and Condition Analysis:
    1) Analyzing students' needs especially related digital skills and whether the environment supports the application of the developed flipbook.
    2) PBL Analysis: Analyzing PBL activities integrated into the textbook.
    3) Local Wisdom Analysis: Analyzing local wisdom integrated into the textbook, for example: creating example and writing vocabulary/images related to Papuan culture.

2.2. Design

After completing the analysis phase, the next phase was the development of a Project-Based Learning (PBL)-based flipbook that integrates local wisdom, with the aim of improving students' understanding of academic verbs and independent learning. An initial design was developed and validated with two experts (media and material), and made revisions based on the feedback provided

After completing the analysis stage, the next step was the development of a Project-Based Learning (PBL) flipbook that integrates the local wisdom of Southwest Papua to support students' understanding of academic verbs and foster independent learning in the Academic Vocabulary course. In this stage, the researcher systematically designed the flipbook structure for each chapter by incorporating measurable learning objectives, academic content, exercises, and context-based projects rooted in Papuan culture. Additionally, validation instruments in the form of questionnaires and Likert scale (1–4) rubrics were prepared for both experts and students.

The initial design was then validated by two experts: a subject matter expert (an English Education lecturer) and a media expert (an Informatics Engineering lecturer). The flipbook was also piloted with 20 students, and the assessment results were used to determine the feasibility of the flipbook as well as to inform revisions prior to its implementation in the course.

2.3. Development

In the initial development stage, the Flipbook based on Project-Based Learning (PBL) integrating local wisdom for the Academic Vocabulary course was developed. Afterward, an evaluation or validation process was conducted to ensure the Flipbook was truly valid and practical effective for use in the learning process, taking into account input from experts (material and media experts) and the results of limited trials.

2.4. Implementation

During the implementation phase, the validated flipbook was piloted with a small group of 20 students enrolled in the Academic Vocabulary course in the English Language Education Study Program at Universitas Muhammadiyah Sorong over four sessions. In the classroom, instruction followed the sequence of materials organized in the flipbook, beginning with the introduction of its features and the presentation of academic vocabulary content integrated with Papuan local wisdom, and proceeding to several vocabulary usage exercises. The flipbook served as the primary source of materials and assignment guidelines, while extended exercises and project-based learning (PBL) projects contained

within it were completed as out-of-class assignments according to the project instructions in the flipbook, such as essay writing, poster creation, short video production, and simple reports themed on Papuan culture.

A pre-test in the form of multiple-choice questions was administered before the teaching and learning process using the flipbook commenced, to assess students' initial proficiency in academic vocabulary usage. A post-test was given after the completion of the entire instructional sequence to measure improvement in academic vocabulary comprehension. Throughout the learning process, the lecturer acted as a facilitator, monitoring student engagement, providing feedback on projects, and addressing technical issues related to flipbook use. At the end of the implementation, students completed a questionnaire covering Subject Matter, Auxiliary Information, Affective Consideration, Pedagogy, Interface, Navigation, Robustness, Project-Based Learning, and Local Wisdom Integration, and were interviewed regarding the effectiveness of the PBL-based flipbook integrated with Papuan local culture in Academic Vocabulary instruction.

2.5. Evaluation

In the evaluation phase, the quality of the flipbook was assessed using two methods: expert validation and user testing. Expert validation involved English Education lecturers for Material, Supporting Information, Affective Considerations, and Pedagogy, and IT experts for Interface, Navigation, and Robustness. Assessments used questionnaires and checklist rubrics on a 1–4 Likert scale. User testing involved 20 students using the flipbook in academic vocabulary learning, who then completed an evaluation questionnaire covering nine aspects: Material, Supporting Information, Affective, Pedagogy, Interface, Navigation, Robustness, Project-Based Learning, and Local Wisdom Integration. Validity and practicality data were analyzed descriptively (means and percentages) to determine the flipbook's feasibility and identify areas for revision before wider implementation. The detailed evaluation can be seen in Table 1.

Table 1. What to evaluate for every ADDIE stage

No	ADDIE stage	To evaluate
1	Analysis	a. Alignment with the Academic Vocabulary curriculum and student needs; b. Appropriate integration of local wisdom and project-based learning (PBL) according to the instructional material; c. Digital literacy and contextual factors (device ownership, Wi-Fi access).
2	Design	a. Logical structure of the 16 chapters; b. Clarity of learning objectives (SMART criteria); c. Integration of PBL and local wisdom in each chapter/project; d. Appropriateness of the flipbook format (text, images, videos, links) with pedagogical principles.
3	Development	a. Alignment of actual content with the design (materials, exercises, projects, rubrics); b. Technical quality of the flipbook; c. Consistency of language (explanations in Indonesian, academic vocabulary in English).
4	Implementation	a. Feasibility of flipbook use across four sessions; b. Clarity of instructions and workload for assignments/projects (in-class and out-of-class);

		c. Initial student responses regarding the effectiveness of flipbook use.
5	Evaluation	a. Validity: evaluation by subject matter and media experts (Subject Matter, Auxiliary Information, Affective Consideration, Pedagogy, Interface, Navigation, Robustness) using a 1–4 scale; b. User evaluation: assessment by 20 students on nine aspects (Subject Matter, Auxiliary Information, Affective Consideration, Pedagogy, Interface, Navigation, Robustness, Project-Based Learning, Local Wisdom Integration); c. Practicality: percentage of practicality on the same aspects.

At this stage, a summative evaluation was also conducted to assess the final quality of the Academic Vocabulary digital flipbook. Material and media experts evaluated seven aspects (Material, Supporting Information, Affective, Pedagogy, Interface, Navigation, Robustness) using a 1–4 scale. Twenty students also assessed these seven aspects, plus Project-Based Learning and Local Wisdom Integration, and rated practicality. Quantitative criteria were set: mean score <2.5 (Poor to Fair, major revision), 2.5–<3.5 (Good, minor revision if needed), ≥3.5 (Excellent). For practicality: <70% (Not Practical to Practical Enough, major revision), 70–<85% (Practical, needs improvement), ≥85% (Very Practical). The flipbook was considered feasible if all aspects reached at least Good (M≥2.5) and Practical (P≥70%) categories without critical issues from experts or students.

This study involved students enrolled in the Academic Vocabulary course within the English Language Education Study Program at Universitas Muhammadiyah Sorong, selected using proportionate stratified random sampling. The participant group comprised 20 students under the age of 20, predominantly female (17 students, 85%), with 3 male students (15%). The flipbook trial was implemented over four class sessions using a pre-experimental design. Both quantitative and qualitative data were collected. Quantitative data were obtained from expert validators (media and content experts) with qualifications as specified in Table 2, using questionnaires to assess product validity and practicality, a limited user evaluation questionnaire for students, as well as pre-tests and post-tests to measure improvements in academic vocabulary comprehension. Qualitative data were gathered from expert suggestions and student feedback through interviews, providing deeper insights into their perceptions of the PBL-based flipbook integrating local wisdom and its impact on students' academic vocabulary usage. These suggestions and feedback were utilized to further refine the developed flipbook product. Validator qualification can be seen in Table 2.

Table 2. Validators Qualification

No.	Gender	Education	Keahlian	Affiliation	Validator
1.	Male	Doctorate	Englis	Universitas Muhammadiyah Sorong	Material
2.	Male	Masters' Degree	Multimedia	Universitas Muhammadiyah Sorong	Media

This study employed both non-test and test data collection techniques and instruments. The non-test techniques included the assessment of flipbook validity by subject matter and media experts through validation questionnaires, as well as the evaluation of flipbook practicality by students using student response questionnaires. The test techniques

involved administering pre-tests and post-tests to measure the effectiveness of the PBL-based flipbook incorporating local wisdom in enhancing students' academic vocabulary proficiency.

The research instruments used included expert validation questionnaires employing a 1–4 Likert scale to assess material, media, affective, and pedagogical aspects by subject matter experts, as well as interface, navigation, and robustness aspects by media experts. In addition, user evaluation questionnaires were utilized to assess the same aspects, with two additional components: the implementation of PBL and the integration of local wisdom. Interviews were also conducted to evaluate the effectiveness of the flipbook.

Pre-tests and post-tests in the form of multiple-choice questions were administered to measure changes in students' academic vocabulary comprehension before and after using the flipbook. To ensure instrument validity, content validity was evaluated by subject matter and media experts for the student response questionnaire, the subject matter expert questionnaire, and the media expert questionnaire. Reliability testing of the questionnaires was conducted using Cronbach's Alpha analysis, yielding a result of 0.732, which was considered reliable as it exceeded the threshold value of 0.444. The pre-test and post-test were also validated by subject matter experts to ensure their appropriateness for measuring students' academic vocabulary proficiency.

The data analysis techniques employed consisted of both quantitative and qualitative approaches. Quantitative analysis was conducted to assess validity by calculating the mean expert validation scores using the formula by Kurnianto & Mundilarto (2023), and to evaluate practicality by determining the percentage of practicality scores based on the formula by Nasrah et al. (2017). Qualitative analysis was performed through thematic analysis of student interview results regarding the effectiveness of flipbook use. The effectiveness of the flipbook was assessed by analyzing the results of the T-test using SPSS.

The following is the validity formula and categories of material and media (Kurnianto & Mundilarto, 2023).

$$\boldsymbol{K_i} = \frac{\sum_{j=1}^{n} \boldsymbol{V_{ij}}}{\boldsymbol{n}}$$

with

K_i= the average score of the i-th criterion,

V_{ij}= the score of the j -th assessor on the i -th criterion,

n= number of validators.

Table 3. Multimedia Validity Level Categories

No.	Average Answer Score	Criteria
1	3,5 ≤ M ≤ 4	Excellent
2	2,5 ≤ M < 3,5	Good
3	1,5 ≤ M < 2,5	Fair
4	M < 1,5	Poor

A product is declared valid by material and media experts if the average validity score for all criteria meets the minimum Good category.

The following is the practicality formula and categories for Flipbook (Nasrah et al., 2017):

$$P = \frac{\text{Total score obtained}}{\text{Maximum total score}} \times 100\%$$

Table 4. Practicality Criteria

No.	Average Answer Score	Criteria
1	85% ≤ P	Very Practical
2	70% ≤ P < 85%	Practical
3	50% ≤ P < 70%	Practical Enough
4	P < 50%	Not Practical

The expected category result is at least Practical for its average percentage.

3. Results

3.1. Findings

This section reports and interprets quantitative data from expert (multimedia and English education) and student questionnaires, as well as pre-test and post-test results from 20 Academic Vocabulary students. Qualitative data were also collected through post-implementation interviews. The study involved two experts (one subject-matter, one media) and 20 students, all of whom completed the instruments, yielding a 100% response rate. Data collection spanned five months and followed the five ADDIE stages: needs analysis, design, development, implementation, and evaluation. Integrating quantitative and qualitative data strengthens the validity and contextual relevance of the findings for academic vocabulary instruction.

3.1.1 Analysis

At the initial stage, a material needs analysis was conducted by reviewing the graduate learning outcomes for the Academic Vocabulary course, as outlined in the English Language Education curriculum at Universitas Muhammadiyah Sorong. This course aims to broaden and deepen students' mastery of academic vocabulary relevant across disciplines and professional contexts, emphasizing strategic use in both oral and written communication, with intensive practice to enhance fluency, accuracy, and appropriateness in academic language.

The six main instructional components are systematically accommodated within sixteen flipbook chapters: introduction to academic vocabulary, use of nouns, verbs, adjectives, adverbs, phrasal verbs, and quantifying expressions. Chapters 8–16 focus on application, reflection, and integrative assessment, including independent projects and topics such as polysemous words, idioms, word combinations, prepositional phrases, and a final project for comprehensive assessment.

To support SDG 10, seven chapters are specifically designed to enhance digital literacy through technology-based projects, such as workshop videos, digital booklets, interactive infographics, creative posters, digital word cards, narrative photo albums, and digital leaflets highlighting Papuan local wisdom. These projects strengthen students' academic competence, local insight, and digital skills.

A questionnaire was administered to 20 students to assess their interest in integrating local wisdom, project-based learning, and their ability to use digital devices. Student responses are presented in Table 5.

Table 5. Need Analysis Questionnaires Result

No.	Statements	Strongly Agree (%)	Agree (%)	Disagree (%)	Strongly Disagree (%)
1.	I am interested in learning with materials related to culture or local wisdom.	40	50	10	0
2.	I fit well with project-based learning	25	70	5	0
3.	I hope the implementation of PBL and local wisdom-based e-modules and flipbooks improves my academic vocabulary understanding.	45	45	10	0
4.	I am capable in using digital tools such as handphone or laptop	60	40	0	0

Based on Table 5., ninety percent of students indicated interest in learning with materials related to local culture or wisdom (40% strongly agreed, 50% agreed). At Universitas Muhammadiyah Sorong, no flipbook previously integrated Papuan culture into academic vocabulary instruction, highlighting the need for such resources. In response, Papuan culture was pedagogically embedded in the flipbook through academic sentences and images addressing Papuan cultural topics. Projects and exercises were linked to local cultural elements such as *Noken* preservation, Sago processing, *Tifa* music, the *Baliem* festival, *Honai* houses, folklore, and community diversity. Project themes, scientific references, and academic vocabulary (nouns, verbs, adjectives, adverbs, prepositional phrases, metaphors, idioms) were contextualized within Papuan life and traditions. Additionally, 95% of students (25% strongly agreed, 70% agreed) found project-based learning suitable, supporting the use of PBL in the Academic Vocabulary course and 90% of them also hoped to get academic vocabulary improvement after applying the flipbook.

Based on the results of the PBL analysis, the following are the project activities applied in the Flipbook:

Table 6. Project Based Learning Integrated into Flipbook

Chapter	Material	Project Title	Learning Objectives
1	Academic Vocabulary	Writing a Short Academic Essay on the Preservation of Papuan Culture	By the end of this chapter, students will accurately use at least 10 academic vocabulary items and noun phrases to write a short essay (150–200 words) about Papuan cultural preservation within one week.
2	Key Nouns	Creating an Academic Poster on Key Nouns in Papuan Culture	By the end of this chapter, students will identify and use a minimum of 8 key nouns with correct prepositions in 5 academic sentences on a poster describing aspects of Papuan culture within one week.
3	Key Verbs	Creating a Mini-Workshop Video on Papuan Cultural	By the end of this chapter, students will create a 2–3-minute video demonstrating at least 5 key academic verbs to explain a process related to

		Processes Based on Academic Key Verbs	Papuan culture in English within one week.
4	Key Adjectives	Creating a Digital Mini-Booklet Describing Papuan Culture Using Academic Key Adjectives	By the end of this chapter, students will use at least 7 academic adjectives, including opposites and comparatives, to describe Papuan culture in a digital booklet with 100–150 words within one week.
5	Key Adverbs	Writing an Academic Narrative on Papuan Cultural Procedures Using Academic Key Adverbs	By the end of this chapter, students will write a narrative containing at least 5 academic adverbs to explain a procedure or story related to Papuan culture in 120–180 words within one week.
6	Phrasal Verbs	Creating an Interactive Infographic Story on Phrasal Verbs in Papuan Cultural Life	By the end of this chapter, students will produce an infographic story that applies 7 academic phrasal verbs to illustrate Papuan cultural processes or traditions, submitted as a digital file within one week.
7	Quantifying Expressions	Mini-Survey Report on Papuan Culture Inventory Using Quantifying Expressions	By the end of this chapter, students will compose a mini-survey report using at least 5 quantifying expressions and present summarized survey data about Papuan cultural elements within one week.
8	Middle Term Project	Creative Poster Promoting Papuan Local Wisdom Using Academic Vocabulary	By the end of this chapter, students will design and present a creative poster using at least 12 academic vocabulary items to effectively promote a Papuan local wisdom topic within one week.
9	Polysemous	Creating Polysemous Word Choice Cards on Papuan Culture	By the end of this chapter, students will construct 6 word choice cards demonstrating polysemous words and correctly use them in context about Papuan culture in brief written examples within one week.
10	Metaphors and Idioms	Collection of Reflections on Metaphors and Idioms in Academics and Papuan Culture	By the end of this chapter, students will submit 3 written reflections or short stories, each using at least 2 metaphors or idioms relevant to Papuan culture or academics within one week.
11	Word Combinations	Creating Academic	By the end of this chapter, students will write 10 academic sentences applying

		Sentences Based on Collocations Themed Papuan Culture	correct collocations related to Papuan culture and avoid at least 3 common collocation mistakes within one week.
12	Prepositional Phrases	Narrative Photo Album with Prepositional Phrases Themed Papuan Culture	By the end of this chapter, students will create a photo album with 8 captions, each including at least one academic prepositional phrase to describe Papuan culture elements within one week.
13	Verbs & Nouns + Preposition Expressions	Creating a Collection of Academic Dialogues Using Verb, Noun, and Prepositional Expressions	By the end of this chapter, students will compose and perform 3 short academic dialogues using at least 6 target verb, noun, or prepositional expressions relevant to Papuan culture within one week.
14	Fixed Expressions	Creating a Leaflet Using Fixed Expressions for Academic Writing on Papuan Culture	By the end of this chapter, students will develop a leaflet that includes at least 8 academic fixed expressions for linking, emphasizing, or illustrating information about Papuan culture within one week.
15	Academic Vocabulary: US vs UK	Applying US vs UK Academic Vocabulary in Thematic Academic Paragraphs on Papuan Culture	By the end of this chapter, students will compose one paragraph (100–150 words) that correctly includes at least 5 US and 5 UK academic vocabulary terms about Papuan culture within one week.
16	Final Project	Writing an Article Using Academic Vocabulary with the Theme of Papuan Culture	By the end of this chapter, students will write an academic article (300–400 words) on a Papuan cultural topic, applying at least 15 academic vocabulary items from previous chapters within one week.

Furthermore, a situational analysis, based on Table 5., showed that all students possessed capability in digital competency, as they stated that 100% students are capable in using gadgets such as mobile phones or laptops. Furthermore, Muhammadiyah University of Sorong also provides free Wi-Fi access for all students, supporting the use of flipbooks in the teaching and learning process for the Academic Vocabulary course.

3.1.2 Design

During the design phase, the researcher developed a flipbook that integrates the Project-Based Learning (PBL) approach with the local wisdom values of Southwest Papua in the Academic Vocabulary course. The flipbook's structure is systematically and consistently organized across chapters to provide a coherent learning experience. Each chapter, except Chapters 8 and 16 which function as integrative projects, includes measurable learning objectives (SMART), essential academic content with scholarly explanations, supporting texts that link concepts to local culture, visual and multimedia

elements, varied exercises, reflective conclusions on learning achievements, contextually relevant projects based on Papuan culture, and transparent, measurable assessment rubrics (Figure 1.). Through this consistent structure, each academic vocabulary topic is directly connected with elements of local wisdom, from traditions and cultural artifacts to the social values of Papuan society (Figure 2.), while maintaining a project-based learning approach that promotes collaboration, creativity, and transfer of knowledge to real-life contexts (Figure 3.). The flipbook is constructed using text, images, and video to cater to diverse student learning styles. In the content development process, the researcher utilized Canva, YouTube, and Heyzine; instructional videos are embedded via YouTube links, and the final interactive flipbook is published through Heyzine before validating, as illustrated in Figure 4.

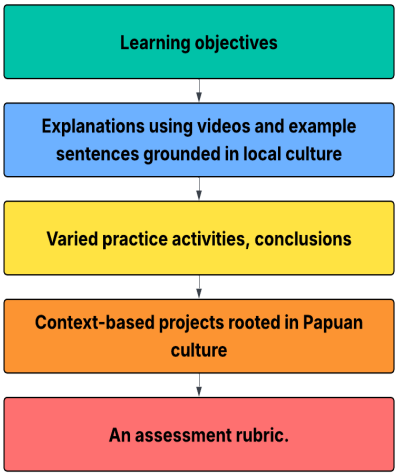

Figure 1. Flipbook Chapter Structure Diagram

hand down	transmit/pass on/inherit	"Traditional weaving skills are handed down from mothers to daughters in Papuan villages." Penjelasan: Frasa ini sangat cocok dipakai untuk membahas pewarisan nilai, keterampilan, atau cerita rakyat antargenerasi.
carry out	conduct	"Researchers carry out fieldwork to document rituals involving tifa music." Penjelasan: Menandakan suatu kegiatan penelitian/pelaksanaan aktif terkait dokumentasi budaya.
get together	gather/assemble	"Families usually get together to prepare for harvest festivals, sharing food and stories." Penjelasan: Menjelaskan kebersamaan atau gotong royong dalam tradisi Papua.
bring up	raise/mention	"During discussions, elders often bring up stories about the origin of sago cultivation." Penjelasan: Digunakan ketika seseorang menyinggung/mengangkat topik budaya dalam forum komunitas.
break down	separate/analyse	"Participants break down the steps of noken production to teach newcomers." Penjelasan: Digunakan untuk menjelaskan proses pemecahan/menganalisis tahapan-tahapan dalam tradisi/prosedur budaya.

Contoh Penggunaan dalam Kalimat

"In Baliem, young people are encouraged to take part in annual dance competitions. Villagers set up the event area the day before, and elders hand down traditional stories as part of the opening ceremony. Students help put on musical performances using tifa drums. Through these activities, core values are handed down from generation to generation."

Phrasal verbs seperti *take part in, set up,* dan *hand down* mencerminkan aktivitas nyata dalam pelestarian budaya Papua. Kalimat seperti *villagers get together to plan the Baliem Festival* memberi gambaran dinamis tentang kolaborasi komunitas dalam menjaga tradisi secara kolektif. Penggunaan *phrasal verbs* ini membuat narasi akademik menjadi lebih hidup dan mudah dipahami secara kontekstual (Liu, 2021).

Gambar 6. Pakaian Adat Wanita Papua pada Festival Lembah Baliem (http://bit.ly/3Vmc40R)

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Figure 2. Local Wisdom Integration Example

2. Comparing Numbers and Quantities

a. exceeding: lebih dari angka tertentu, misal "Dishes exceeding 100 documented."
b. in excess of: melebihi jumlah besar, misal "In excess of 250 ethnic groups."
c. fewer and fewer: jumlah menurun, misal "Fewer and fewer youths skilled in tifa-making."
d. more and more: jumlah meningkat, misal "More and more tourists visit Baliem festival."
e. more or less: kurang lebih, misal "More or less 30 sago cake recipes."
f. no fewer than: minimal angka besar, misal "No fewer than 100 traditional dances catalogued."

E. Proyek

Laporan Mini Survei Inventarisasi Budaya Papua dengan *Quantifying Expressions*

Petunjuk Pelaksanaan Proyek

1. Tentukan Fokus Survei Mini (Inventarisasi Data)

Pilih salah satu tema pengumpulan data sederhana dari lingkungan sekitar atau riset daring (contoh):

a. Ragam makanan tradisional Papua di satu wilayah/kelompok.
b. Jumlah partisipan/tim/festival budaya di lingkungan atau keluarga.
c. Variasi alat musik/pakaian adat/aspek budaya yang dikenal teman/kerabat.
d. Atau: gunakan data yang sudah tersedia dari referensi akademik/website resmi.

2. Riset Referensi & Data

a. Temukan minimal 2 referensi (jurnal, artikel, website resmi) berisi data/informasi terkait tema pilihanmu.
b. Jika memungkinkan, lakukan mini-survei ke 3–5 responden di sekitarmu untuk memperkaya data (boleh observasi sederhana atau tanya jawab singkat).

3. Susun Laporan Mini

Tulis laporan (200–300 kata) berisi:

a. Pembukaan singkat tentang tujuan inventarisasi dan pentingnya data tersebut
b. Paparkan minimal 7 quantifying expressions dari materi (misal: *the number of, in excess of, a significant proportion of, only a minority, more and more, no fewer than, as a whole, fewer and fewer, the bulk of, etc.*)
c. Laporkan data jumlah, kecenderungan, proporsi, atau tren terkait budaya/aktivitas yang diteliti.
d. Setidaknya 2 kalimat harus berupa perbandingan kuantitas (misal: *more and more, fewer and fewer, more or less*)
e. Sisipkan minimal 1 data atau kutipan/parafrase dari referensi ilmiah

Contoh kalimat untuk laporan:

a. A significant proportion of youths in the area have attended Baliem Valley Festival at least once.
b. There are in excess of 30 culinary traditions catalogued in the highlands; more and more dishes are introduced each year.
c. Only a minority of families still hand down traditional sago recipes directly. Researchers have documented no fewer than 90 varieties of Papuan musical instruments.

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Figure 3. PBL Integration Example

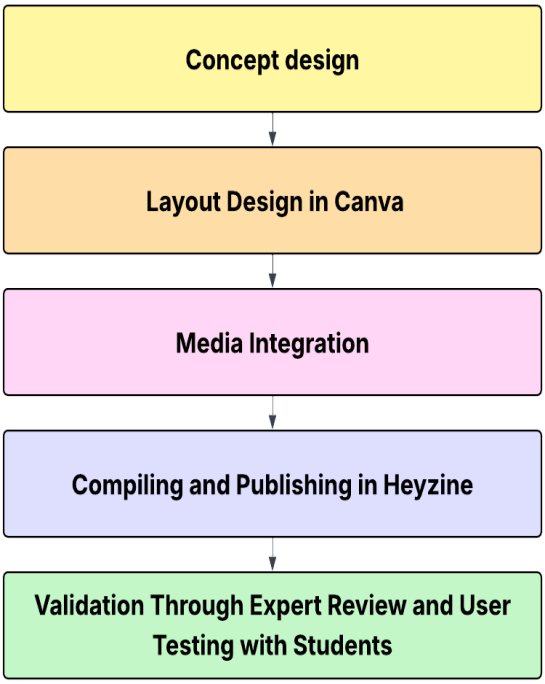

Figure 4. Production Workflow Diagram

At the design stage, the researcher also developed validation instruments in the form of a structured questionnaire and a 1–4 Likert-scale checklist rubric, to be used by two types of experts and by students. The material expert (English Education Lecturer) evaluated aspects such as Subject Matter, Auxiliary Information, Affective Consideration, and Pedagogy, while the media expert (Informatics Engineering Lecturer) reviewed Interface, Navigation, and Robustness. In addition, 20 students participated in user testing by evaluating nine aspects, including Project-Based Learning and Local Wisdom Integration. The results of these assessments were used to determine the feasibility of the flipbook and to identify areas requiring revision prior to implementation in the Academic Vocabulary course.

3.1.3 Development

During the development phase, all instructional materials and multimedia components were systematically prepared in accordance with the chapter structure established during the design stage. Content was produced using design software (e.g., Canva) and integrated with YouTube video links, then consolidated into a cohesive digital product via the Heyzine flipbook platform. Conceptual explanations were provided in Indonesian, while academic vocabulary was retained in English to facilitate comprehension.

Following assembly, a functionality assessment was conducted to ensure optimal display, navigation, and multimedia interactivity. The draft flipbook underwent expert validation by subject matter and media specialists using a 1–4 Likert-scale instrument. Revisions were implemented based on evaluative feedback, addressing both content and interface. The revised version was then subjected to limited user testing with students, who evaluated aspects such as subject matter, auxiliary information, affective considerations, pedagogy, interface, navigation, robustness, project-based learning, and integration of local wisdom. The development phase concluded upon completion of validation, revision, and user testing, resulting in a digital flipbook ready for instructional implementation. The final

product, as depicted in the subsequent figure, exemplifies the integration of Project-Based Learning and Papuan local culture within an Academic Vocabulary context.

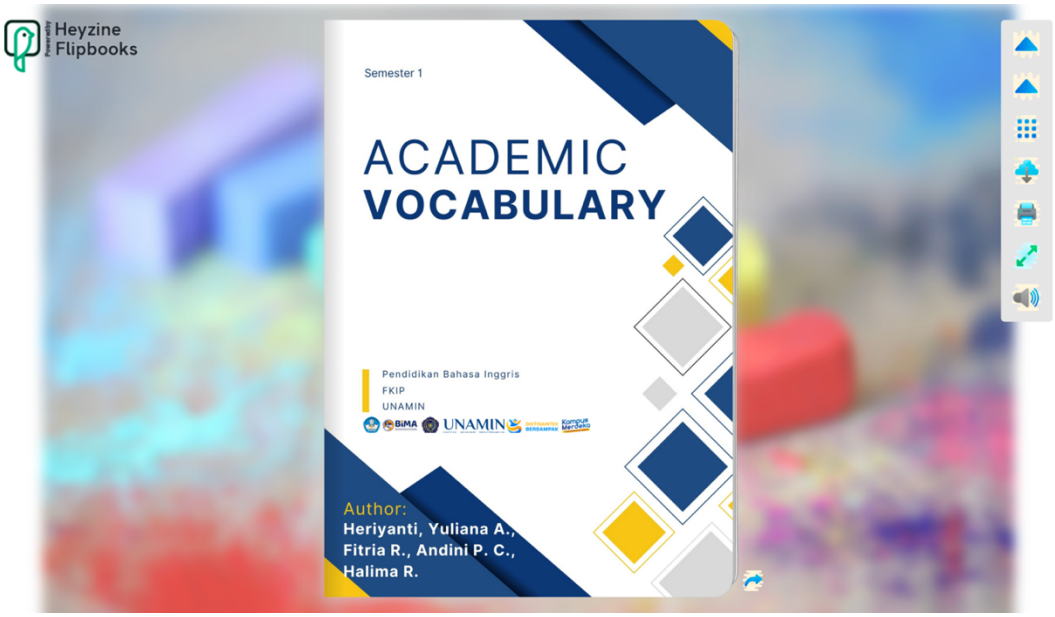

Figure 5. Flipbook cover with navigation buttons on the upper right corner and the page preview button at the down right corner

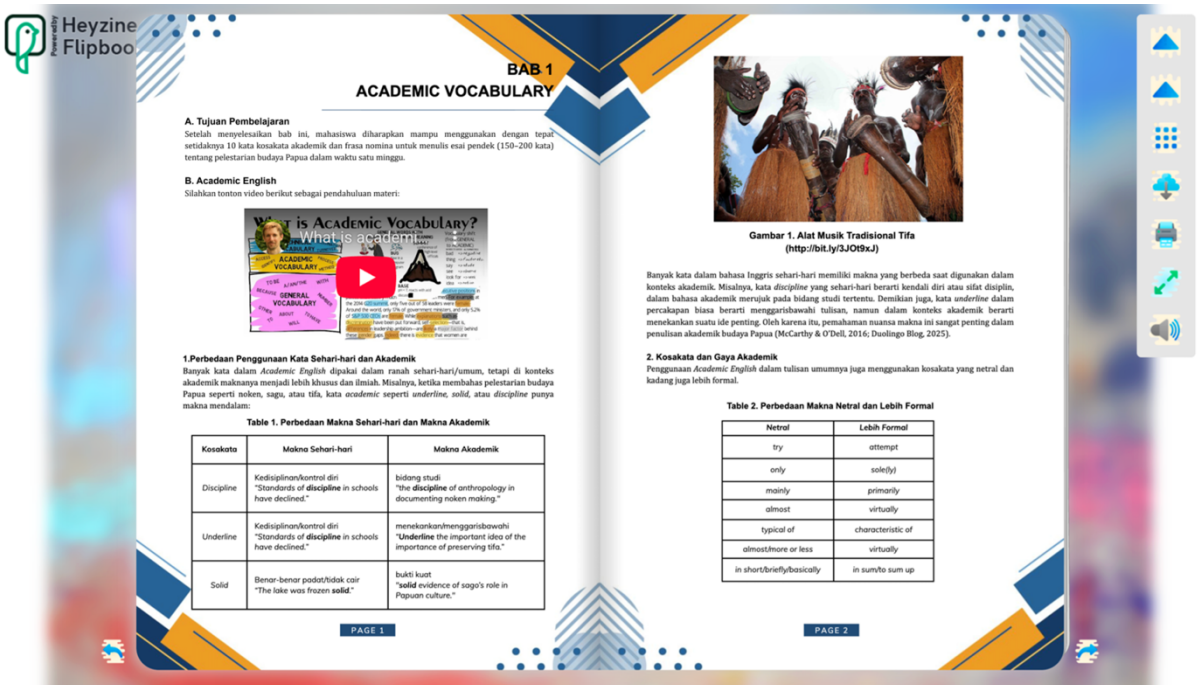

Figure 6. Examples of embedded video and image of Papuan culture with its integration example

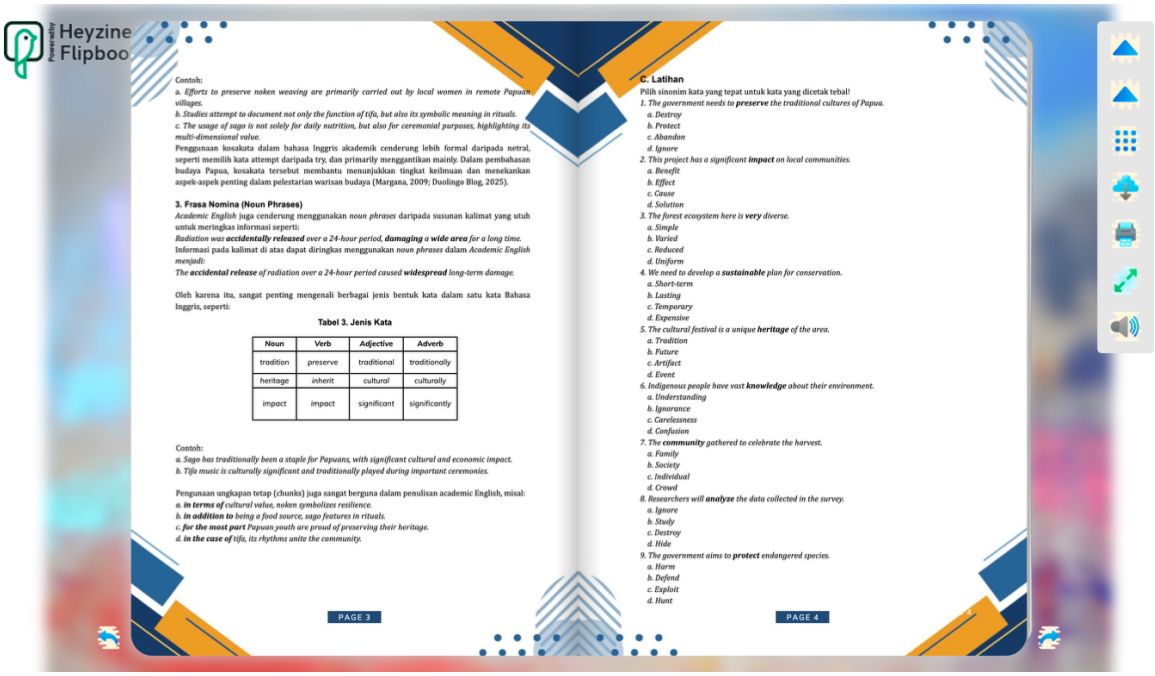

Figure 7. Material explanation and excercise in Chapter 2

Figure 8. Project based learning and evaluation criteria in Chapter 2

3.1.4 Implementation

During the implementation phase, 20 students from the Academic Vocabulary course at Universitas Muhammadiyah Sorong participated in four instructional sessions utilizing a Project-Based Learning (PBL) flipbook integrating Papuan local wisdom. A pre-test was administered to assess baseline academic vocabulary knowledge, followed by a post-test after the intervention. The mean pre-test score was 55.10 (SD = 15.90), increasing to 65.40 (SD = 14.34) post-intervention, reflecting a mean gain of 10.30 points. Paired sample t-test results ($t(19) = -3.884$, $p = 0.001$) indicated a statistically significant improvement in academic vocabulary comprehension.

Qualitative interview data reinforced these findings. Students reported that the flipbook's clear structure and use of Indonesian for explanations made academic vocabulary more accessible: "The learning strategies using the flipbook are quite good and easy to understand… the explanations in this flipbook use clear and easily understood Indonesian, so I find it easier to understand the meaning and use of academic vocabulary" (R.V.K.). The integration of Papuan local culture was also highlighted as beneficial: "Papuan local culture really helped me… I could relate many English vocabulary words to objects, activities, and traditions familiar to Papuan society. For example, when learning the word 'tradition', I immediately connected it to traditions such as the Cakalele dance, Honai house, or the Bakar Batu ceremony" (R.V.K.). Another student noted, "After using the flipbook, I found the process of learning academic vocabulary more interesting and not boring. The visual presentation made the material easier to follow and helped me remember new vocabulary" (J.J.M.).

3.1.5 Evaluation

The evaluation the flipbook design comprised two primary stages involving multiple stakeholders' validation. In the first stage, expert validation was conducted by two specialists: a material expert and a media expert. The material expert assessed Subject Matter, Auxiliary Information, Affective Consideration, and Pedagogy, ensuring content quality, curriculum alignment, and appropriate integration of local culture. The media expert evaluated Interface, Navigation, and Robustness to guarantee technical quality and user experience.

The second stage, user testing, engaged 20 students who evaluated the flipbook in authentic academic vocabulary learning contexts. Students assessed nine aspects: Subject Matter, Auxiliary Information, Affective Consideration, Pedagogy, Interface, Navigation, Robustness, Project-Based Learning, and Local Wisdom Integration. Data from structured questionnaires and rubric checklists (1–4 Likert scale) were analyzed to determine validity, feasibility, and areas for refinement. Practicality was also evaluated by both experts and students using the same criteria. As seen in Table 7., validation results indicated excellent ratings from experts for Subject Matter (3.9), Auxiliary information (3.83), affective consideration (3.8), pedagogy (3.85), interface (3.86), navigation (3.8), and robustness (3.8). Student ratings ranged from good to excellent across all aspects, with scores between 3.3 and 3.6. These consistently high scores demonstrate the flipbook's strong validity, feasibility, and practicality for instructional use.

Table. 7. Validity Mean Score

Aspect	Material Experts	Media Expert	Students
Subject Matter	3,9	-	3,4
Auxiliary Information	3,83	-	3,6
Affective Consideration	3,8	-	3,5
Pedagogy	3,85	-	3,6

Interface	-	3,86	3,3
Navigation	-	3,8	3,4
Robustness	-	3,8	3,3
Project Based Learning	-	-	3,3
Local Wisdom Integration	-	-	3,3
Mean	3.85 (Excellent)	3,82 (Excellent)	3,41 (Good)

In terms of practicality, the evaluation was conducted using a rubric instrument in percentage form by both experts and students. As seen from Table 8., the subject matter experts assigned as very practical for all aspects: main material (97.5%), supporting information (95.8%), affective consideration (95%), and pedagogy (96.4%). For the media expert's assessment, the scores were 96.7% for interface, 95% for navigation, and 95% for robustness. Meanwhile, student evaluations indicated that the subject matter aspect was considered practical with a score of 84.94%, supporting information 89.1%, affective consideration 87.1%, pedagogy 90.4%, interface 81.3%, navigation 84.4%, robustness 83.1%, project-based learning 82.3%, and local wisdom integration 81.8%. These results demonstrate that the flipbook is not only substantively and technically valid but also very practical and easy to implement in real learning contexts. The assessment also identified that pedagogical aspects and supporting information were particularly prominent in facilitating ease of use, while certain aspects such as local wisdom integration could be further developed.

Table. 8. Practicality percentage

Aspect	**Material Expert**	**Media Expert**	**Students**
Subject Matter	97,5	-	85
Auxiliary Information	95,8	-	89,1
Affective Consideration	95	-	87,1
Pedagogy	96,4	-	90,4
Interface	-	96,7	81,3
Navigation	-	95	84,4
Robustness	-	95	83,1
Project Based Learning	-	-	82,3
Local Wisdom Integration	-	-	81,8
Mean	96,18 (Very Practical)	95,57 (Very Practical)	84,94 (Practical)

3.2. Discussion

This study aimed to develop and evaluate a project-based learning (PBL) academic vocabulary flipbook integrating Papuan local wisdom for English language instruction at Universitas Muhammadiyah Sorong. The findings demonstrate that the flipbook, developed through the ADDIE model, achieved standard validity and practicality, and provided initial evidence of improved student academic vocabulary comprehension. This indicates that a systematic approach to the development of instructional media can effectively address vocabulary learning needs in higher education, particularly within local contexts.

The development of a flipbook fully integrated with the Academic Vocabulary curriculum emhasizes the importance of aligning instructional content, learning outcomes, and the specific needs of the English Language Education program. Its systematic organization into sixteen chapters embodies outcomes-based education principles,

ensuring that each topic contributes to the progressive and integrated mastery of academic vocabulary. This approach aligns with best practices in curriculum mapping and outcomes-based learning, which emphasize the integration of authentic, contextually relevant materials to support effective vocabulary acquisition (Antón-Solanas et al., 2021; Day & Beard, 2019; Mokel & Canty, 2020).

The integration of technology-based and locally relevant projects, especially those centered on Papuan culture, places vocabulary learning in authentic and meaningful contexts. This approach not only enhances digital literacy and helps bridge the digital divide, but also increases motivation, engagement, and vocabulary retention, particularly when learning is connected to students' real-life experiences and cultural backgrounds (Antón-Solanas et al., 2021; Chuane, 2025; Limoges et al., 2019; Tosun et al., 2021; Zhou & Goh, 2025; (Fachruddin, 2022)). Project-based activities such as essays, presentations, and discussions on local traditions encourage the practical use of academic vocabulary. The use of rubrics, examples, making online posters or videos and exercises that link every day and academic meanings further strengthens language development and cultural understanding within a 21st-century educational framework (Andargie et al., 2025; Lee et al., 2024).

Thematic analysis of student interviews reveals that integrating Papuan cultural elements deepens the understanding of academic vocabulary by connecting terms to familiar objects, activities, and traditions, such as the Papuan dance, Honai house, and Bakar Batu ceremony. Students reported that this contextual approach made it easier to grasp word meanings and usage in real-life situations, accelerated memorization, and improved their ability to write about and analyze Papuan culture academically. These findings are supported by research showing that culturally connected learning increases motivation, engagement, and vocabulary retention (Andargie et al., 2025; Chuane, 2025; Shih & Tsai, 2017; Stentoft, 2019; Zhou & Goh, 2025). This aligns with the principles of culturally responsive pedagogy, which emphasize the importance of linking instructional content to students' cultural backgrounds to foster deeper engagement and learning (Stentoft, 2019). By embedding Papuan local wisdom into project-based tasks, the flipbook operationalizes key tenets of project-based language learning theory, advocating for authentic, context-rich activities that promote meaningful language use and skill transfer (Tosun et al., 2021). This theoretical foundation helps explain the observed increases in motivation, engagement, and vocabulary retention.

Students' feedback also revealed that tasks involving the description of Papuan cultural practices not only increased engagement but also provided concrete contexts for using and internalizing new vocabulary. For instance, students reported that describing the steps of a traditional ceremony in English required them to apply academic terms in meaningful, context-rich ways, which deepened their comprehension. This aligns with evidence that connecting vocabulary to students' experiences and culture fosters authentic learning contexts and enhances vocabulary retention (Bates et al., 2019; Edwards et al., 2025; Limoges et al., 2019; Tosun et al., 2021).

Expert validation showed excellent ratings across all aspects, with content scoring 3.9/4, pedagogy 3.85/4, and technical components, such as interface, navigation, and robustness, each receiving scores around 3.8/4. The overall mean of 3.85 indicates excellent validity. Student evaluations also reflected strong acceptance, with scores ranging from 3.3 to 3.6 and an average of 3.41. In terms of practicality, experts rated all aspects above 95%, while students gave ratings above 81%, resulting in a mean practicality score of 84.94%. The consistently high scores highlight not only the statistical validity and practicality of the flipbook, but also its relevance and usability in classroom settings. These

findings confirm the flipbook's effectiveness and feasibility for broad instructional use, particularly in terms of pedagogical value and supporting information. The positive assessments from both experts and students underscore the importance of collaboration between developers and end-users in creating relevant and applicable digital learning media. Furthermore, these results are consistent with research indicating that structured, interactive digital media with clear presentation and contextual relevance are well-received and effective in language learning (Andargie et al., 2025; Chuane, 2025; Zhou & Goh, 2025).

Pre-test and post-test analysis showed a statistically significant improvement in students' academic vocabulary comprehension, with mean scores increasing from 55.10 (SD = 15.90) to 65.40 (SD = 14.34), $t(19) = -3.884$, $p = 0.001$. The mean gain of 10.30 points corresponds to a large effect size (Cohen's $d = 0.68$), indicating that the intervention had a substantial and meaningful impact on students' vocabulary mastery. These results suggest that the PBL flipbook not only produced statistically significant outcomes but also led to a practically important improvement in students' academic vocabulary understanding. This supports the effectiveness of repeated, purposeful vocabulary use in project-based tasks, making the flipbook a valuable tool for language instruction (Andargie et al., 2025; Lee et al., 2024). Nevertheless, it is important to consider that factors such as the teacher's facilitation skills and students' prior digital literacy may have also influenced these results. All participants were digitally literate, which could have made them more receptive to technology-based interventions, and the instructor's familiarity with project-based learning (PBL) may have further enhanced the learning experience. Therefore, future studies should control for these variables to better isolate the specific impact of the flipbook intervention.

Qualitative feedback highlighted increased engagement, clarity, and contextual understanding, particularly through the integration of local culture, indicating that culturally relevant learning can enhance student motivation and comprehension. This qualitative insight is strongly supported by quantitative data: students' academic vocabulary scores improved significantly after the intervention, with the mean pre-test score rising from 55.10 to 65.40 (mean gain = 10.30, $t(19) = -3.884$, $p = 0.001$), and student evaluations of the flipbook's practicality and relevance were consistently high, with local wisdom integration and project-based learning aspects each receiving scores above 81%, and overall practicality rated at 84.94%. These converging findings from both qualitative interviews and quantitative measures demonstrate that the integration of Papuan local culture not only made learning more engaging and relatable for students but also resulted in measurable improvements in academic vocabulary mastery and instructional effectiveness.

The study's limitations include a small, non-randomized sample, a short intervention duration, and a focus limited to vocabulary comprehension rather than broader academic skills. These factors restrict the generalizability of the findings beyond the specific context of Universitas Muhammadiyah Sorong and may not adequately capture long-term retention or transfer of academic vocabulary skills. Additionally, concentrating solely on vocabulary comprehension narrows the study's scope, excluding broader academic or communicative competencies. To enhance the applicability and sustainability of culturally responsive, project-based vocabulary instruction, future research should utilize larger and more diverse samples, adopt randomized controlled designs, and incorporate longitudinal follow-up to better assess broader impacts.

The findings suggest that integrating PBL, local wisdom, and digital technology in academic vocabulary instruction is a promising strategy for higher education, particularly in culturally diverse regions. This model can inform the development of similar materials in other contexts and supports the theoretical proposition that culturally contextualized, project-

based digital media enhance vocabulary learning and student engagement (Hidayah et al., 2021; Ridho et al., n.d.; Wiradnyana et al., 2022).

4. Conclusion

The Academic Vocabulary flipbook, developed using the ADDIE model and integrating project-based learning with Papuan local wisdom, was systematically created and meets the criteria as an effective academic vocabulary learning medium. Excellent validity, very hipracticality, improved student vocabulary comprehension, and positive student responses show the product's objectives were achieved and it benefits classroom users. These achievements are situated within the specific context of the Academic Vocabulary course at a Papuan university and, given the small, non-randomized sample and short intervention period, should therefore be interpreted primarily as contributions to this local setting. Theoretically, these findings suggest that project-based learning embedded in Papuan local wisdom can strengthen academic vocabulary development in EFL settings and enrich understandings of culturally responsive pedagogy. Practically, the flipbook can guide lecturers and material developers in designing relevant, culturally integrated, and digital academic vocabulary instruction, and its adaptable structure allows careful adaptation to other contexts that share similar cultural and institutional conditions. Potential transfer to other institutions or regions should therefore be considered cautiously, as variations in learner characteristics, instructional practices, and technological infrastructure may influence their applicability.. As a research implication, further studies should test similar flipbooks with larger, more diverse groups and longer implementation, and explore impacts on other academic skills for a fuller understanding of project-based, local wisdom-based learning's contributions.

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