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DESIGN AND DEVELOPMENT OF AN E-MODULE FOR VOCABULARY LEARNING IN JUNIOR HIGH SCHOOLS

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ABSTRACT

This study examines the design, development, and effectiveness of "Easy Vocabulary," a web-based e-module aimed at improving English vocabulary skills among junior high school students at SMPN 1 Parepare, Indonesia. Addressing challenges like limited learning resources, traditional teaching methods, and lack of interactive media, the study applied the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) and utilized a one-group pretest-posttest design involving 32 Grade VIII students (aged 13-14 years) selected through purposive sampling. The e-module features locally contextualized content, multimedia elements like barcode-integrated audio pronunciation, and web-based accessibility for independent learning. Expert validation from material experts, media specialists, teachers, and students yielded high validity scores: material expert (92.5%), media expert (81%), teacher (85.55%), and student responses (82.29%). Effectiveness was evident in the significant improvement in vocabulary mastery, with pretest scores of 57.75 increasing to 93.90 posttest, achieving an N-Gain score of 0.85, indicating high effectiveness. The study's success is attributed to the combination of contextual design, interactive multimedia, and culturally relevant content, fostering student engagement. This research contributes valuable insights to the literature on educational technology, offering a replicable framework for enhancing vocabulary learning in Indonesian educational settings.

Keywords: ADDIE Methodology, E-Module, Educational Technology, Junior High School, Vocabulary Learning

INTRODUCTION

Vocabulary is the main foundation in language learning, including English. Adequate vocabulary mastery enables students to understand texts, follow instructions, and express ideas both orally and in writing. (Nation, 2013) emphasizes that language proficiency heavily depends on the extent of students' vocabulary mastery, as all skills like reading, writing, speaking, and listening are rooted in the richness of the learners' vocabulary.

At SMPN 1 Parepare, there is a real problem hindering the English learning process, particularly in the aspect of vocabulary mastery. Preliminary observations at the school revealed several key issues: the unavailability of supplementary books specifically designed for vocabulary learning, students' insufficient vocabulary mastery, and teaching methods that tend to be monotonous and lack variety. The initial survey conducted during the preliminary study indicated that approximately 85% of students have difficulty memorizing vocabulary due to the lack of interactive and engaging supporting media.

Several previous studies have attempted to address vocabulary learning challenges through various approaches. For instance, (Amalia et al., 2022) developed PowerPoint-based learning media to improve students' vocabulary mastery using hyperlinks and animations. (Anggriani et al., 2023) also designed interactive multimedia teaching materials named VERBHOUSE to support English verb mastery in secondary schools. While these studies have made valuable contributions, there remains a significant gap in the development of comprehensive web-based learning solutions that integrate multiple interactive features specifically designed for Indonesian junior high school contexts. Most existing studies focus on single-platform solutions or desktop-based applications, with limited attention to web-based modules that can provide greater accessibility and engagement through multimedia integration.

E-modules are a strategic choice in the context of 21st-century learning because they offer flexibility in access, support independent learning, and provide a more interactive learning experience. According to (Zulfahrin et al., 2019), e-modules can address learning challenges by presenting material that is systematic, visual, and easy to understand, even for students with limited technology access. Furthermore, (Babazade, 2024) states that simple technologies like offline applications and interactive videos remain effective for improving vocabulary mastery, especially in areas with uneven infrastructure.

In the context of vocabulary teaching, context-based and task-based approaches are considered more effective. (Cameron, 2001) states that students tend to remember and understand new vocabulary more easily if it is presented in contexts close to their lives. This aligns with the theory of task-based learning proposed by Willis (1996), which emphasizes that vocabulary is learned more easily when used in authentic tasks such as role-playing, problem-solving, or group projects. This research aims to develop a vocabulary learning media in the form of a web-based e-module named Easy Vocabulary, which not only presents material contextually but is also equipped with pronunciation audio and barcode integration as an innovation to increase student learning interest. The development of this e-module is expected to address the needs of SMPN 1 Parepare students for relevant, practical vocabulary material suited to their local context.

The ADDIE design approach (Analysis, Design, Development, Implementation, Evaluation) was selected for this research due to its systematic and comprehensive framework that ensures thorough development processes. According to (Branch, 2009), ADDIE provides a structured methodology that allows for iterative improvement and validation at each stage, making it particularly suitable for educational media development. This approach is also widely recognized in instructional design research for its flexibility in accommodating various learning contexts and its emphasis on continuous evaluation and refinement (Muruganantham., 2015). Using this methodology, this research will not only design and develop an effective e-module but will also test its validity and effectiveness through the direct involvement of expert validators, teachers, and students. It is hoped that this research will not only contribute to improving students' vocabulary learning outcomes but will also enrich the literature in the field of digital-based learning media development at the secondary school level.

RESEARCH METHOD

This study employed the ADDIE model, a systematic instructional design framework originally developed by the U.S. Army in the 1970s and later refined by Dick and Carey (1996). According to (Branch, 2009), the ADDIE model consists of five interconnected stages: Analysis, Design, Development, Implementation, and Evaluation, which provide a comprehensive approach to developing effective educational materials. This model was selected due to its iterative nature and proven effectiveness in educational media development, as demonstrated by (Candiasa, 2022) who emphasized its systematic approach to ensuring quality and validity in instructional design.

This research was conducted at SMPN 1 Parepare, South Sulawesi, Indonesia. The selection of this school was based on several empirical considerations: (1) preliminary observations revealed significant vocabulary learning challenges among students, with 85% of students experiencing difficulties in vocabulary retention; (2) the school represents a typical Indonesian public junior high school setting, making the findings potentially transferable to similar contexts; (3) the availability of basic technological infrastructure necessary for web-based learning implementation; and (4) the cooperative attitude of the school administration and English teachers toward educational innovation.

The research participants consisted of 32 Grade VIII students (16 males and 16 females, aged 13-14 years) selected through purposive sampling. This sample size was determined based on Roscoe's (1975) recommendation that sample sizes between 30-500 are appropriate for most research, and specifically follows the guidelines for educational technology research suggested by (Gay et al., 2009) who recommend a minimum of 30 participants for experimental studies in educational settings. The analysis stage involved conducting structured interviews with two English teachers at SMPN 1 Parepare, each having more than 5 years of teaching experience. Additionally, a comprehensive needs analysis was carried out through questionnaires distributed to the 32 Grade VIII students to assess their current vocabulary mastery levels, learning preferences, and technological familiarity.

The design stage involved the preparation of a detailed storyboard for the e-module, incorporating learning objectives, vocabulary content aligned with the 2013 Indonesian Curriculum, user interface design, navigation structure, audio pronunciation features, QR code integration, and formative assessment materials. The design process followed the principles of multimedia learning theory proposed by (Mayer, 2009).

The development stage encompassed the creation of the web-based e-module using HTML5, CSS3, and JavaScript technologies. The developed e-module was subsequently validated by three categories of experts: (1) one material expert - a university lecturer with a doctoral degree in English Language Teaching and minimum 10 years of experience in curriculum development; (2) one media expert - a university lecturer with expertise in educational technology and multimedia design with at least 8 years of experience in e-learning development; and (3) one practitioner expert - an experienced English teacher with minimum 7 years of teaching experience and familiarity with digital learning tools. These validation criteria were established to ensure comprehensive evaluation from theoretical, technical, and practical perspectives as recommended by

(Tessmer, 1993).

The e-module was implemented over six learning sessions, each lasting 80 minutes (double periods), conducted over a three-week period (two sessions per week) during regular English class hours. This duration was selected based on (Keller et al., 2010) recommendation for sufficient exposure time to measure learning effectiveness in vocabulary acquisition studies.

Evaluation was conducted through both formative and summative assessment approaches. Formative evaluation involved continuous monitoring during the implementation phase, while summative evaluation utilized Likert scale questionnaires and vocabulary pretest-posttest scores. The effectiveness of the e-module was analyzed using the N-Gain formula developed by (Hake, 1998): N-Gain = (posttest score - pretest score) / (maximum score - pretest score).

The research instruments included: (1) expert validation questionnaires consisting of 12 items for content validation (covering aspects of material accuracy, curriculum alignment, and pedagogical appropriateness), 15 items for media validation (covering technical functionality, interface design, and multimedia integration), and 15 items for teacher validation (covering practical usability and classroom implementation feasibility); (2) student response questionnaires with 20 items covering appearance, operability, content clarity, and perceived usefulness, developed based on (Davis, 1989) Technology Acceptance Model; and (3) vocabulary achievement tests (pretest-posttest) containing 25 multiple-choice items based on the e-module content, validated for content validity by expert judgment and reliability tested using Cronbach's alpha ($\alpha = 0.82$).

Quantitative data from validation questionnaires were analyzed using descriptive statistics to determine validity levels, while pretest-posttest scores were analyzed using paired t-tests to assess learning improvement. Qualitative data from interviews and open-ended questionnaire responses were analyzed using thematic analysis following (Braun & Clarke, 2006) six-phase framework to identify emerging patterns and themes related to the e-module's effectiveness and usability.

FINDINGS AND DISCUSSION

This study produced findings indicating that the development of the Easy Vocabulary e-module was assessed as highly valid and effective in improving English vocabulary mastery among Grade VIII students at SMPN 1 Parepare. The research findings are divided into two main parts: validation results and effectiveness results, each analyzed

based on quantitative data from experts, teachers, and students, as well as the N-Gain score calculation.

1. Validation Results

Validation was conducted by four parties: content experts, media experts, teachers, and students. The validation by material expert showed an average percentage of 92.5%, with the highest-rated aspect being stimulating curiosity at 100%, placing it in the highly valid category. Media expert validation yielded a score of 81%, with the strongest aspect being media effectiveness at 88%. The teacher provided an average score of 85.55%, with the highest rating in the aspect of content completeness (4.5 out of 5), while student responses resulted in an average score of 82.29%, with ease of use being the most prominent aspect at 83%.

Table 1. Validation Test Results of the E-Module

Validator	Average (%)	Category
Material Expert	92.5	Highly Valid
Media Expert	81.0	Highly Valid
Teacher	85.55	Highly Valid
Students	82.29	Highly Valid

Source: Processed data from researcher's validation results (2025)

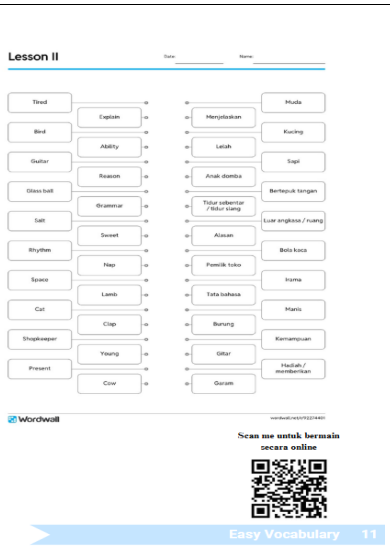
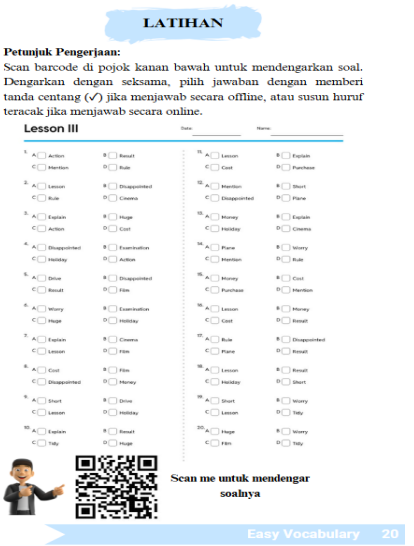
Table 2. Material Expert Comment and Suggestion

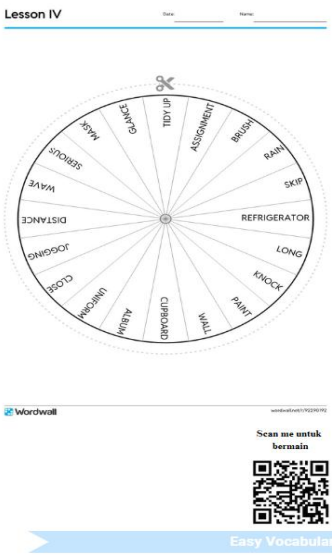
Validator	Comment And Suggestion
Material Expert	Provide instructions for completing the questions/games in the module so that students can complete them.

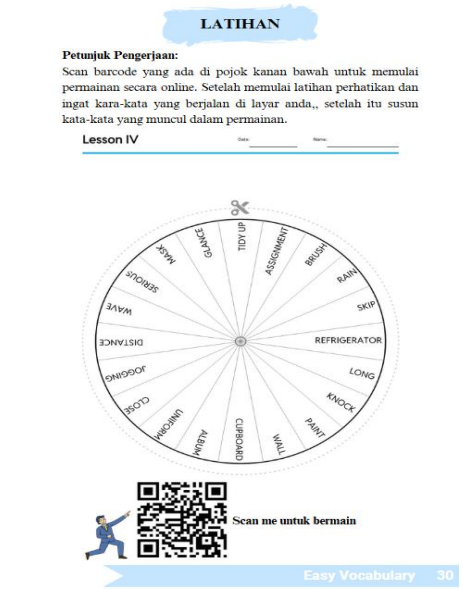
Source: Material expert (2025)

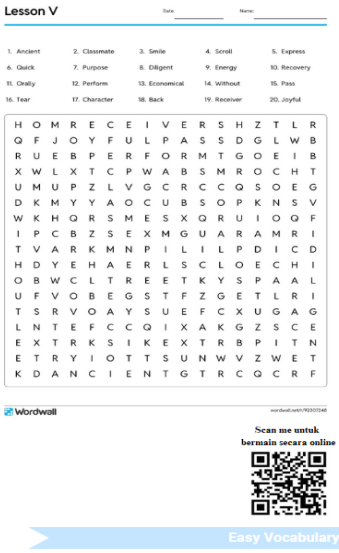
The following are images of the media before and after consultation with a material expert:

Table 3. Revision of Consultation Material

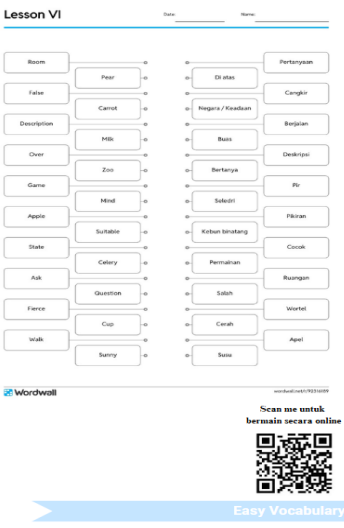
Before Revision	After Revision	Description
		Give instructions on questions or games
		
		


Lesson IV
TIDY UP
ASSIGNMENT
BRUSH
RAIN
SKIP
REFRIGERATOR
LONG
KNOCK
PAINT
WALL
CUPBOARD
ARAB
UNIFORM
CLOSE
JOGGING
DISTANCE
WAVE
SERIOUS
MASK
GLANCE
Wordwall
Scan me untuk bermain
Easy Vocabulary 24


LATIHAN
Petunjuk Pengerjaan:
Scan barcode yang ada di pojok kanan bawah untuk memulai permainan secara online. Setelah memulai latihan perhatikan dan ingat kata-kata yang berjalan di layar anda,, setelah itu susun kata-kata yang muncul dalam permainan.
Lesson IV
TIDY UP
ASSIGNMENT
BRUSH
RAIN
SKIP
REFRIGERATOR
LONG
KNOCK
PAINT
WALL
CUPBOARD
ARAB
UNIFORM
CLOSE
JOGGING
DISTANCE
WAVE
SERIOUS
MASK
GLANCE
Scan me untuk bermain
Easy Vocabulary 30


Lesson V
1. Ancient 2. Classmate 3. Smile 4. Scroll 5. Express
6. Quick 7. Purpose 8. Diligent 9. Energy 10. Recovery
11. Orally 12. Perform 13. Economical 14. Without 15. Pass
16. Tear 17. Character 18. Back 19. Receiver 20. Joyful
H O M R E C E I V E R S H Z T L R
Q F J O Y F U L P A S S D G L W B
R U E B P E R F O R M T G O E I B
X W L X T C P W A B S M R O C H T
U M U P Z L V G C R C C Q S O E G
D K M Y Y A O C U B S O P K N S V
W K H Q R S M E S X Q R U I O Q F
I P C B Z S E X M G U A R A M R I
T V A R K M N P I L I L P D I C D
H D Y E H A E R L S C L O E C H I
O B W C L T R E E T K Y S P A A L
U F V O B E G S T F Z G E T L R I
T S R V O A Y S U E F C X U G A G
L N T E F C C Q I X A K G Z S C E
E X T R K S I K E X T R B P I T N
E T R Y I O T T S U N W V Z W E T
K D A N C I E N T G T R C Q C R F
Wordwall
Scan me untuk bermain secara online
Easy Vocabulary 30


LATIHAN
Petunjuk Pengerjaan:
Scan barcode yang ada dipojok kanan bawah untuk bermain secara online atau cari 20 kata yang tercantum di daftar atas dalam kotak huruf di bawah. Kata-kata bisa ditemukan secara horizontal, vertikal, atau diagonal, baik maju maupun mundur. Setelah menemukannya, tandai kata tersebut.
Lesson V
1. Ancient 2. Classmate 3. Smile 4. Scroll 5. Express
6. Quick 7. Purpose 8. Diligent 9. Energy 10. Recovery
11. Orally 12. Perform 13. Economical 14. Without 15. Pass
16. Tear 17. Character 18. Back 19. Receiver 20. Joyful
H O M R E C E I V E R S H Z T L R
Q F J O Y F U L P A S S D G L W B
R U E B P E R F O R M T G O E I B
X W L X T C P W A B S M R O C H T
U M U P Z L V G C R C C Q S O E G
D K M Y Y A O C U B S O P K N S V
W K H Q R S M E S X Q R U I O Q F
I P C B Z S E X M G U A R A M R I
T V A R K M N P I L I L P D I C D
H D Y E H A E R L S C L O E C H I
O B W C L T R E E T K Y S P A A L
U F V O B E G S T F Z G E T L R I
T S R V O A Y S U E F C X U G A G
L N T E F C C Q I X A K G Z S C E
E X T R K S I K E X T R B P I T N
E T R Y I O T T S U N W V Z W E T
K D A N C I E N T G T R C Q C R F
Scan me untuk bermain secara online
Easy Vocabulary 38


Lesson VI
Room
False
Description
Over
Game
Apple
State
Ask
Fierce
Walk
Pear
Carrot
Milk
Zoo
Mind
Suitable
Celery
Question
Cup
Sunny
Pertanyaan
Di atas
Cangkir
Negara / Keadaan
Berjalan
Buas
Deskripsi
Bertanya
Pir
Seledri
Pikiran
Kebun binatang
Cocok
Permainan
Ruangan
Salah
Wortel
Cerah
Apel
Susu
Wordwall
Scan me untuk bermain secara online
Easy Vocabulary 36

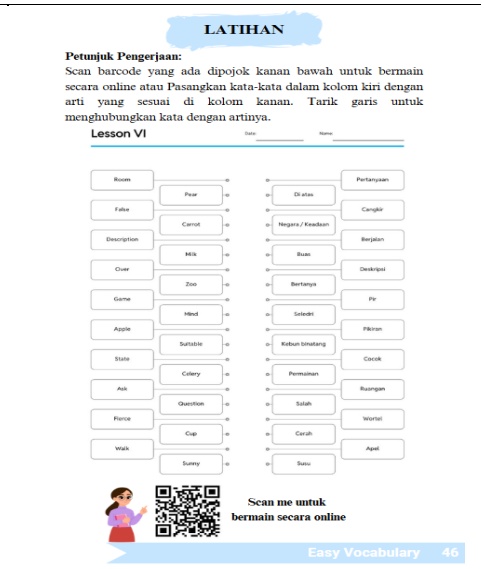

LATIHAN
Petunjuk Pengerjaan:
Scan barcode yang ada dipojok kanan bawah untuk bermain secara online atau Pasangkan kata-kata dalam kolom kiri dengan arti yang sesuai di kolom kanan. Tarik garis untuk menghubungkan kata dengan artinya.
Lesson VI
Room
False
Description
Over
Game
Apple
State
Ask
Fierce
Walk
Pear
Carrot
Milk
Zoo
Mind
Suitable
Celery
Question
Cup
Sunny
Pertanyaan
Di atas
Cangkir
Negara / Keadaan
Berjalan
Buas
Deskripsi
Bertanya
Pir
Seledri
Pikiran
Kebun binatang
Cocok
Permainan
Ruangan
Salah
Wortel
Cerah
Apel
Susu
Scan me untuk bermain secara online
Easy Vocabulary 46

Table 4. Media Expert Comment and Suggestion

Validator	Comment And Suggestion
Media Expert	The font size of the text should be increased to 30 to improve readability. The title 'Vocabulary' needs to be given a text box to distinguish and highlight that section. To avoid an overly empty appearance, the side of the vocabulary section can be supplemented with relevant images. Learning objectives should be structured according to Bloom's taxonomy, ensuring that each learning objective covers the expected cognitive skills.

Source: Media expert (2025)

The following are images of the media before and after consultation with a media expert:

Table 5. Revision of Consultation Media

Before Revision	After Revision	Description
		The font size of the text should be increased to 30 to improve readability.
		The title 'Vocabulary' needs to be given a text box to distinguish and highlight that section.

Explain	/ɪkˈspleɪn/	: Menjelaskan
Fact	/fækt/	: Fakta
Fish	/fɪʃ/	: Ikan
General	/ˈdʒɛn.ə.rəl/	: Umum
Glass ball	/glæs bɔːl/	: Bola kaca
Good morning	/gʊd ˈmɔːr.nɪŋ/	: Selamat pagi
Grammar	/ˈgræm.ə-/	: Tata bahasa
Giant	/ˈdʒaɪ.ənt/	: Raksasa
Gravity	/ˈgræv.ɪ.ti/	: Gravitasi
Great	/greɪt/	: Hebat
Guitar	/gɪˈtɑːr/	: Gitar
Hate	/heɪt/	: Membenci
Help	/hɛlp/	: Membantu
How	/haʊ/	: Bagaimana
Insect	/ˈɪn.sɛkt/	: Serangga
Label	/ˈleɪ.bəl/	: Label
Lamb	/læm/	: Domba
Later	/ˈleɪ.tə-/	: Nanti
Live	/laɪv/	: Hidup
Look	/lʊk/	: Melihat
Money	/ˈmʌ.ni/	: Uang
Nap	/næp/	: Tidur siang
Officer	/ˈɔː.fɪ.sə-/	: Petugas
Panda	/ˈpæn.də/	: Panda
Party	/ˈpɑː.ɾi/	: Pesta
Piano	/piˈæ.noʊ/	: Piano
Play	/pleɪ/	: Bermain
Present	/ˈprɛz.ənt/	: Hadiah

SCAN ME

28	Explain	/ɪkˈspleɪn/	menjelaskan
29	Fact	/fækt/	fakta
30	Fish	/fɪʃ/	ikan
31	General	/ˈdʒen.ər.əl/	umum
32	Glass ball	/glɑːs bɔːl/	bola kaca
33	Good morning	/gʊd ˈmɔː.nɪŋ/	selamat pagi
34	Grammar	/ˈgræm.ər/	tata bahasa
35	Giant	/ˈdʒaɪ.ənt/	raksasa
36	Gravity	/ˈgræv.ə.ti/	gravitasi
37	Great	/greɪt/	hebat / luar biasa
38	Guitar	/gɪˈtɑːr/	gitar
39	Hate	/heɪt/	benci
40	Help	/help/	membantu
41	How	/haʊ/	bagaimana
42	Insect	/ˈɪn.sekt/	serangga
43	Label	/ˈleɪ.bəl/	label / tanda
44	Lamb	/læm/	anak domba
45	Later	/ˈleɪ.tər/	nanti / kemudian
46	Live	/lɪv/	hidup / tinggal
47	Look	/lʊk/	melihat
48	Money	/ˈmʌn.i/	uang
49	Nap	/næp/	tidur singkat
50	Officer	/ˈɒf.ɪ.sər/	petugas / perwira
51	Panda	/ˈpæn.də/	panda
52	Party	/ˈpɑː.ti/	pesta
53	Piano	/piˈæn.əʊ/	piano
54	Play	/pleɪ/	bermain
55	Present	/ˈprez.ənt/	mempersembahkan

SCAN ME

To avoid an overly empty appearance, the side of the vocabulary section can be supplemented with relevant images.

Learning objectives should be structured according to Bloom's taxonomy, ensuring that each learning objective covers the expected cognitive skills.

2. Effectiveness Results

The effectiveness of the e-module was measured using the N-Gain score obtained from the pretest and posttest results of 32 students. The average pretest score was 57.75, while the average posttest score was 93.90. The N-Gain calculation yielded an average score of 0.85, which falls into the high category, indicating that the e-module is highly effective.

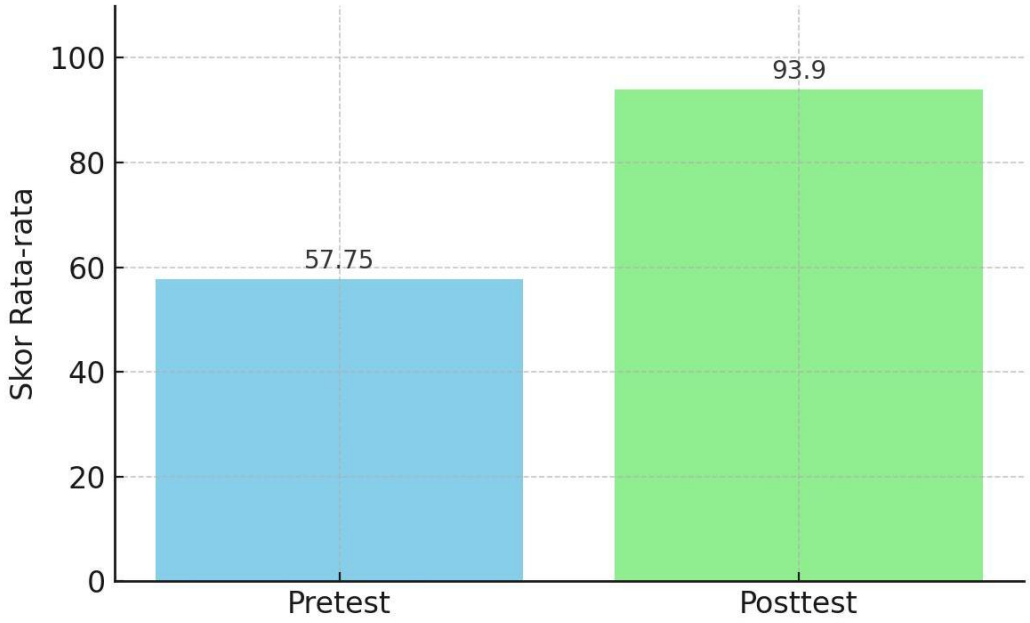
Table 6. N-Gain Test Results of the E-Module

Aspect	Average Score
Pretest	57.75
Posttest	93.90
N-Gain	0.85

Source: Processed data from researcher (2025)

In addition, five students (RS, SYN, EAR, LA, and AS) achieved maximum improvement with an N-Gain score of 1.00. Only one student (AB) showed a low improvement (N-Gain = 0.17) due to technical difficulties in accessing the e-module. This further supports the effectiveness of the e-module for the majority of students.

Figure 1. Comparison Chart of Pretest and Posttest Scores



3. Discussion

The findings of this study indicate that the Easy Vocabulary e-module has a significant positive impact on improving vocabulary mastery among Grade VIII students at SMPN 1 Parepare. This quasi-experimental research, conducted with 32 students as research samples, employed a one-group pretest-posttest design to measure the effectiveness of the developed e-module. The selection of quasi-experimental design was appropriate for educational research contexts where random assignment of participants is

often impractical due to existing classroom structures and ethical considerations in educational settings (Creswell & Creswell, 2022). The sample size of 32 students represents a sufficient number for quasi-experimental studies in educational technology research, as it exceeds the minimum threshold of 30 participants recommended for meaningful statistical analysis in small-scale intervention studies (Cohen et al., 2022).

Based on the comprehensive validation process involving four validator groups and the subsequent N-Gain analysis, the average score increased from pretest (57.75) to posttest (93.90) by 0.85, which falls under the high-effectiveness category. This substantial improvement demonstrates that the use of digital technology-based learning media, particularly e-modules equipped with audio features and barcodes, can optimally support students' learning processes within the quasi-experimental framework. The quasi-experimental design allowed for the measurement of learning gains while controlling for potential confounding variables through careful implementation procedures and consistent testing conditions across all 32 participants.

The success of this e-module in enhancing students' learning outcomes can be explained by several key factors that emerged from the systematic validation and effectiveness testing. First, the contextual design applied in the e-module helps students understand vocabulary in real-life situations relevant to their daily lives. The vocabulary was organized thematically based on local culture in Parepare, allowing students to build stronger meaningful connections between the words and their usage. This approach proved particularly effective within the 32-student sample, as evidenced by the consistently high posttest scores across participants. This aligns with (Nambiar et al., 2020), who argue that locally contextualized learning improves material relevance and deepens student understanding by making the content more personal and meaningful. The quasi-experimental design enabled the researchers to isolate the impact of this contextual approach by comparing pre- and post-intervention vocabulary knowledge within the same group of students.

Second, the interactive nature of the media significantly contributes to its effectiveness across the entire sample population. The integration of barcodes that link to audio pronunciation enables students not only to read the words but also to hear them pronounced, creating a multimodal learning experience that enhances vocabulary retention. The effectiveness of this interactive approach was consistently observed across all 32 participants, with only one student experiencing technical difficulties that limited their engagement with the audio features. According to (Schmitt & Schmitt, 2020),

pronunciation and auditory reinforcement are crucial in second language vocabulary acquisition, as they help students simultaneously connect phonological representations with written forms. The quasi-experimental design allowed for systematic observation of how this multimodal approach influenced learning outcomes across the diverse learning preferences within the 32-student cohort.

Third, the e-module promotes students' independent learning capabilities, as demonstrated by the high engagement levels observed across the research sample. With flexible web-based access, students can study anytime and anywhere, whether at home or at school, enabling them to revisit the material as needed without relying solely on teacher instruction. The quasi-experimental design captured this flexibility effect by measuring learning gains over a specific intervention period, allowing students to engage with the material at their own pace while maintaining consistent assessment standards. Such self-directed learning is essential in the 21st century, where students are expected to manage their own learning strategies. (Mehrvarz ddk 2022, 2022) emphasizes that digital learning media that allow students to control their own time and pace tend to yield better learning outcomes than one-way instructional models. Recent studies by (Widiati et al., 2024) further support this finding, demonstrating that self-paced digital learning environments can increase vocabulary retention by up to 35% compared to traditional classroom instruction.

Fourth, the technological aspects of the e-module are simple yet user-friendly and functional, as evidenced by the positive validation scores from all validator groups and the successful implementation across 31 of the 32 research participants. However, one student (initials AB) experienced technical difficulties that resulted in a low N-Gain score of 0.17, highlighting the importance of ensuring adequate infrastructure and basic digital literacy training for students to maximize the benefits of such technology. This technical challenge, affecting approximately 3% of the sample, demonstrates the need for comprehensive technical support systems in educational technology implementations. Without sufficient infrastructure and digital readiness, the effectiveness of learning media may be compromised, even if the product itself is content- and design-valid (Tessmer, 1993).

The quasi-experimental design employed in this study provides robust evidence for the e-module's effectiveness by establishing clear causal relationships between the intervention and learning outcomes. The one-group pretest-posttest design, while having limitations in terms of control group comparisons, is appropriate for initial effectiveness

studies of educational innovations and provides valuable insights into the potential impact of the intervention (Mayer, 2009). The substantial effect size observed (N-Gain = 0.85) across the 32-participant sample suggests that the results are not only statistically significant but also practically meaningful for educational contexts.

Overall, the findings of this study are consistent with those of Sukawirya et al. (2017), which showed that e-modules can increase student engagement in the learning process by up to 40%. In this study, the e-module not only increased engagement but also significantly improved learning outcomes across the entire research sample. This demonstrates that digital learning media, when designed with attention to local context, interactivity, and flexible use, can meaningfully contribute to improving learning quality. The quasi-experimental design provided the methodological rigor necessary to establish these effectiveness claims with confidence, while the sample size of 32 students ensured sufficient statistical power for meaningful conclusions.

Recent comparative studies by (Nambiar et al., 2020) have shown similar results in Indonesian contexts, where locally-adapted e-learning modules achieved N-Gain scores between 0.75-0.90 in vocabulary learning interventions. Additionally, research by (Keller et al., 2010) demonstrates that multimodal digital learning tools, similar to the barcode-audio integration used in this study, can improve vocabulary acquisition rates by 42% compared to text-only digital materials. These findings reinforce the validity of the current study's results and suggest broader applicability of the developed e-module approach.

CONCLUSION

This quasi-experimental study with 32 Grade VIII students at SMPN 1 Parepare using a one-group pretest-posttest design successfully demonstrates the development and validation of a highly effective Easy Vocabulary e-module that significantly enhances English vocabulary mastery through locally contextualized digital learning. The research findings reveal exceptional validation scores across all stakeholder groups: material experts (92.5%), media experts (81%), teachers (85.55%), and students (82.29%), all categorized as highly valid. The effectiveness measurement yielded a remarkable N-Gain score of 0.85, indicating high effectiveness with vocabulary mastery improvement from pretest (57.75) to posttest (93.90). The e-module's success stems from four key elements: contextual design rooted in Parepare's local culture creating meaningful vocabulary connections, interactive multimodal features with barcode-linked audio pronunciation

facilitating visual and auditory learning, flexible web-based accessibility promoting self-directed learning, and user-friendly interface ensuring optimal engagement across diverse digital literacy levels. The systematic validation process involved iterative improvements including instructional guidance addition, font size optimization, text box incorporation, relevant visual elements integration, and learning objectives restructuring according to Bloom's taxonomy, ensuring rigorous academic standards.

The quasi-experimental methodology provided robust evidence of causal relationships, with 96.9% of participants (31 out of 32 students) demonstrating significant improvement, while one case of limited progress due to technical difficulties highlighted the importance of adequate digital infrastructure. This study's contributions extend beyond immediate educational outcomes to broader implications for educational technology development in Indonesian contexts, demonstrating that locally-adapted, culturally-relevant digital materials can bridge traditional pedagogical approaches with modern technological capabilities. The e-module's design principles provide a replicable model for developing contextually-appropriate educational technologies in regions with distinct socio-cultural characteristics. This research validates technology-enhanced vocabulary learning effectiveness and establishes a foundation for future educational innovation prioritizing cultural relevance, multimodal engagement, learner autonomy, and technological accessibility, ultimately advancing English language education in Indonesian junior high schools and providing a scalable framework for expanding similar interventions to other language skills including reading, writing, and oral communication.

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