

## Development of E-Modules Learning Explanatory Text Writing Skill with Discovery Learning Approach for Grade XI

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### ABSTRACT

The integration of digital learning tools is essential in modern education. This study examines the effectiveness of e-modules using a discovery learning approach to enhance students' skills in writing explanatory texts. This research follows a development research model comprising four stages: (1) Defining, (2) Design, (3) Development, and (4) Deployment. Four instruments were used: needs analysis, e-module validation, e-module practicality assessment, and performance tests. The study was conducted with Class XI students in Tasik Putri Puyu. The findings indicate that the developed e-modules are valid, highly feasible, and effective for classroom use. The discovery learning approach within the e-modules facilitated students' active exploration and knowledge construction, leading to improved writing skills. The results support the use of e-modules as an effective digital learning tool. The discovery learning approach enhances student engagement and comprehension by encouraging investigative learning. These findings align with previous studies highlighting the benefits of digital resources in education. The study concludes that e-modules employing a discovery learning approach significantly improve students' ability to write explanatory texts. Educators are encouraged to integrate such digital tools into their teaching practices to enhance student learning experiences in the digital era.

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## 1. INTRODUCTION

Indonesian language learning, especially writing skills, currently utilizes many innovations in the field of education. Apply *problem-based learning* models in learning because this model is able to hone, test, and develop students' thinking skills continuously (Afnita, Saputra, Ulya, & Efrianto, 2021). Furthermore, the *bamboo dancing, discovery learning* model of learning writing skills makes students more enthusiastic in learning and can develop teamwork skills (Boeriswati, Lustyantie, & Ulya, 2021; Gani, & Ulya, 2022). Furthermore, the use of audio and audiovisual media in learning

can foster interest, concentration, and enthusiasm for learning and help students come up with new ideas for learning (Hayati, Ulya, Amazola, Hafrizal, Galuh, & El Husna, 2022).

Innovation in teaching and learning is essential for improving the quality of education. According to Gani and Ulya (2022), integrating innovation into the learning process makes teaching more engaging and meaningful for students. One such innovation is the development of e-modules as teaching materials. Teaching materials play a crucial role in learning, serving as a representation of the teacher's explanations in class. Effective mastery of teaching materials helps teachers achieve learning objectives more efficiently (Rasyid, Ulya, Hayati, & Asmawati, 2023). To enhance learning outcomes, teachers should utilize teaching materials that align with subject characteristics, student development, and instructional goals (Zuve et al., 2023).

An interview with an Indonesian language teacher at Tasik Putri Puyu revealed several challenges in students' writing skills. First, students rely solely on textbooks published by the Ministry of Education and Culture as their primary learning resource. The absence of diverse learning materials limits their exposure to different writing techniques. Second, the teaching methods used in writing instruction lack variety. The predominant approach is scientific, supplemented by teacher-created methods rather than established instructional strategies such as cooperative learning (Kariyati, Ramadhan, Mukhaiyar, & Ulya, 2024; Ferdiasnyah et al., 2023; Afnita et al., 2023). These limitations highlight the need for innovative teaching materials and diverse pedagogical approaches to enhance students' writing abilities.

Given these challenges, the primary issue lies in the limited learning resources available to students for writing instruction. Currently, students rely solely on a single textbook—*Indonesian Language for Grade XI*, published by the Ministry of Education and Culture in 2017. This lack of diverse resources underscores the need for development research aimed at creating instructional modules that align with students' learning and psychological needs. Learning modules serve as an alternative to traditional textbooks, addressing the limitations of available materials. The developed module has been evaluated as highly feasible and has received excellent qualifications from experts, including Indonesian language teachers and students (Henanggil et al., 2023).

Furthermore, learning modules can help improve students' writing skills. According to Ulya, Noveria, Henanggil, Nurizzati, and Rachman (2023), writing proficiency can be enhanced through continuous learning and practice. The implementation of learning modules has demonstrated significant benefits, with student learning activities categorized as highly active, achieving a participation rate of 84.4%. Additionally, student performance test results yielded an average score of 3.32, corresponding to a B+ grade. These findings indicate that learning modules are an effective tool for enhancing both student engagement and academic performance (Ulya, Syahrul, & Juita, 2013).

Therefore, researchers conduct or provide solutions by developing teaching materials in the form of e-modules specifically for learning explanatory texts. E-Modules for learning to write explanatory texts are prepared in accordance with the principles of module preparation, e-module characteristics, e-module elements, e-module structure, and e-module preparation stages. This e-module is prepared in accordance with the emotional development of students. The appearance of the e-module is designed to be as attractive as possible. The background colour used varies greatly on each sheet. Then, the use of letters that are not monotonous in each part of the e-module can attract students to read the e-module. In addition, the images presented also match the learning material in the e-module. E-Modules are also equipped with motivational words to instill character in students. Not only that, researchers also used the discovery learning model in making the e-

module (Rachman et al., 2023).

The focus of this research is the development of e-learning modules based on discovery learning in learning the skills of writing explanatory texts. Writing activities are intellectual activities which are a sign that a person has a high intellect with the ability to express their thoughts through writing (Ulya, 2016; Ulya, 2017; Ulya, 2022; Asmawati, Ulya, & Jasril, 2023). Ulya, Gani, & Noveria (2022). explains that writing is an activity of describing graphic symbols that describe a language so that it can be understood by readers. Writing is a skill to present ideas and ideas into a writing that aims to convey information to the reader (Nadhifah, 2018). As an indirect communication skill, writing is a creative activity that involves physical actions and mental processes in conveying experiences, events, knowledge, knowledge, and human thoughts (Nadhifah, 2018). The ability to write is a complex ability because writing activities demand the ability to master aspects of language, content, techniques and ideas or ideas that will be poured into writing (Puspitasari, 2017; Rachman, Hanifa, Ningsih, Putri, & Ulya, 2024).

Explanatory texts are texts that describe the process of formation of natural, social, scientific, and cultural phenomena with the aim of providing information about how and why things (phenomena) occur in nature (Anderson, 1997). This opinion is reinforced by Priyatni (2014), who revealed that "explanatory texts are texts that contain explanations of processes related to natural, social, scientific, cultural and other phenomena". An explanatory text comes from the researcher's questions related to 'why' and 'how' a phenomenon of formation or activities related to natural, social, scientific, or cultural phenomena. The social function of an explanatory text is to explain or analyze the process of the emergence or occurrence of something (Mahsun, 2014).

Next, Sari & Kosasih (2019) explains that an explanatory text is a text that contains processes related to natural, social, scientific, cultural, and other phenomena. In writing an explanatory text, there are several rules or regulations. Yustinah (2018) explains that the linguistic rules of explanatory text consist of general nouns, verbs, answering why and how questions, presenting facts, and using the passive voice.

E-modules are digitally designed modules, used as learning resources in the teaching and learning process, and their application is tailored to the needs of students at school. Churiyah, Safitri, & Sutjipto (2020) explained that technological developments encourage module development, which originally conventional modules will be developed into digital-based modules (*e-modules*). digital-based modules that combine technological developments and teaching can provide meaningful learning experiences to create student knowledge and skills (Jaenudin, Baedhowi, & Murwaningsih, 2017).

E-modules are digital-based learning materials that offer flexibility, accessibility, and interactive learning experiences, making them an effective alternative to traditional teaching methods (Afifah, 2020; Budiarti, Nuswowati, & Cahyono, 2017). Their implementation fosters creativity, enhances student engagement, and helps students develop technological literacy (Wilujeng & Putri, 2020). However, to ensure their effectiveness, e-modules must be systematically developed following structured models. This study adopts the 4-D model (Define, Design, Develop, Disseminate) for e-module development, specifically targeting explanatory text writing skills using the discovery learning approach. Discovery learning is designed to encourage active exploration, problem-solving, and meaningful knowledge construction, allowing students to gain new insights based on their findings (Pernandes & Asmara, 2020; Hosnan, 2014; Susana, 2019).

Despite extensive research on e-modules and discovery learning, studies integrating both approaches in explanatory text writing instruction remain limited. Existing research focuses on general

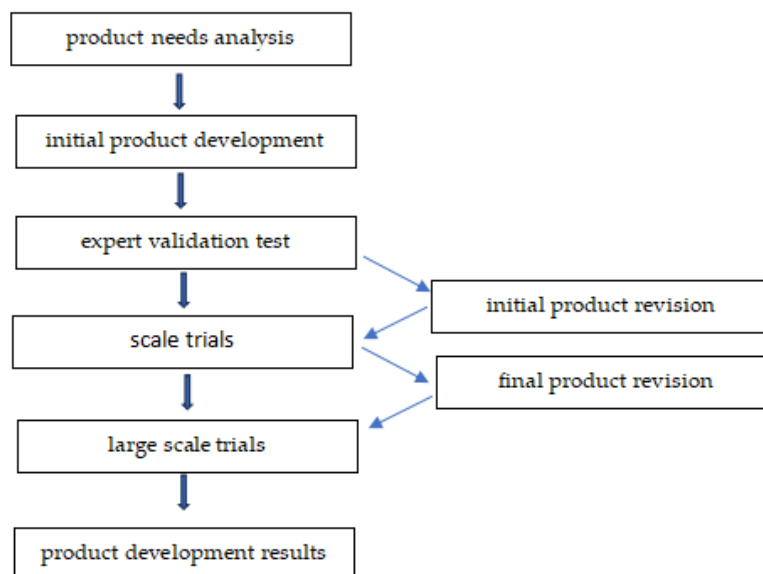
writing skills rather than structured text types such as explanatory texts, which require specific scaffolding techniques. Additionally, while many studies highlight the benefits of discovery learning, few have empirically examined its effectiveness when embedded within digital learning resources. This study bridges this gap by developing and evaluating an e-module specifically designed to improve explanatory text writing skills through a structured discovery learning framework. The novelty of this research lies in its integration of e-modules with discovery learning principles, emphasizing student-centred inquiry and self-guided knowledge construction to enhance writing proficiency.

To address these gaps, this study investigates three key questions: How valid is the discovery learning-based e-module for teaching explanatory text writing? How practical is the developed e-module for teachers and students? How effective is the e-module in improving students' explanatory text-writing skills?

The objective of this research is to develop, validate, and evaluate the effectiveness of a discovery learning-based e-module for enhancing explanatory text writing skills among Grade XI students at SMA Negeri 1 Tasik Putri Puyu. The e-module's validity, practicality, and effectiveness are tested through expert validation, teacher and student feedback, and learning outcome assessments. The findings contribute to innovative digital learning strategies by demonstrating the feasibility of integrating discovery learning within e-modules to improve students' writing competencies in the digital age.

## 2. METHODS

This study employs a Research and Development (R&D) approach to gather information on user needs through a needs assessment, followed by the development and evaluation of a product to determine its effectiveness. The development model adopted in this research is the 4-D model, introduced by Thiagarajan and Semmel, which consists of four systematic stages: (a) Define, (b) Design, (c) Develop, and (d) Disseminate. Each phase in this model plays a crucial role in ensuring the quality and applicability of the developed product. The following steps outline the development process undertaken in this study:



**Figure 1.** Research Procedure

The define stage involves determining and defining the learning requirements. This stage begins with a needs analysis of subject teachers, syllabus analysis, analysis of teaching materials. The design stage aims to prepare a prototype of the learning materials. In this study, the prototype refers to an e-module for teaching explanatory text writing skills based on the discovery learning approach. The development stage is intended to produce a revised version of the e-module, incorporating feedback from validators, to obtain the final version that is ready for trial implementation. This stage includes assessing the validity, practicality, and effectiveness of the e-module. To ensure the product's validity, the researcher conducted a content validation process involving four experts in the fields of learning and language. Additionally, practicality testing was conducted by students and teachers, while effectiveness was measured through a limited trial in one class at the target school. The dissemination stage is the final phase of this research and development process. It involves the broader implementation of the developed product, such as its use by other classes. At this stage, the e-module—once deemed valid, practical, and effective—is distributed to relevant parties. In this study, dissemination was carried out by providing the e-module to other Indonesian language teachers.

The population in this Research and Development (R&D) study consists of all Grade XI students at SMA Negeri 1 Tasik Putri Puyu, totaling 339 students. From this population, a sample of 33 students from Class XI MIA was selected for the study. Data collection was conducted during the define and develop stages through interviews and questionnaires. The research data was obtained from expert validation questionnaires, practicality questionnaires from teachers and students, and an effectiveness assessment based on students' learning outcomes.

Several research instruments were used to collect data, including student analysis questionnaires, product validation questionnaires, e-module practicality questionnaires, writing performance tests, and writing performance assessment rubrics. The collected data were analyzed using descriptive statistics to calculate average scores and percentages. The analysis aimed to evaluate the validity, practicality, and effectiveness of the e-module in improving students' explanatory text writing skills.

### 3. FINDINGS AND DISCUSSION

#### 3.1 Findings

##### 3.1.1 Define Stage

This stage begins with interviews conducted with subject teachers, syllabus analysis, analysis of teaching materials. Based on the results of interviews with grade XI Indonesian language subject teachers, it is known that in learning explanatory texts, the teacher uses lecture and discussion methods to deliver the material. The media used in learning textbooks and student work sheets (LKS). This causes students to be less active in the learning process. The development of e-modules based on discovery learning is designed so that students do not only receive explanations from the teacher but with the e-modules are expected to stimulate students' thinking skills. Next is the analysis of the syllabus, it is known that in learning the Indonesian language the learning media used are less innovative and the methods used are less appropriate. Furthermore, the analysis of Indonesian teaching materials. It is known that the teaching materials used lack exploration of students' abilities because what is used is textbooks and Student Worksheets (LKS). It is expected that the development of e-modules based on discovery learning, students can be helped in understanding or building the concept of skills in writing explanatory texts.

### 3.1.2 Design Stage

This section starts with creating an e-learning module framework. Next is writing the draft of the learning e-module. This section is the development of the learning e-module framework. The process of developing the learning e-module framework is developed as interestingly as possible in order to be able to attract and arouse students' interest and motivation in learning the learning e-module. Starting with the design of the front cover, inside cover, preface, table of contents, content description chart of the learning e-module, introduction, activities, materials, exercises and worksheets, summary, evaluation, and reference list.

### 3.1.3 Develop

This stage is carried out to test the draft of the e-learning module that has been prepared. Testing the draft e-learning module was carried out in three stages, namely, validity test, practicality test, and effectiveness test. The Discovery Learning-based e-module was developed using E-Learning software for teaching explanatory text writing skills to Grade XI students in the first semester at SMA Negeri 1 Tasik Putri Puyu. The following presents the expert validity results of the Discovery Learning-based e-module.

**Table 1.** Expert Validity Results of the Discovery Learning-Based E-Module

Question Item	Score	S	N (C-1)	Validity	Description
1	4	3	3	1.00	Very High
2	3	2	3	0.67	High
3	4	3	3	1.00	Very High
4	3	2	3	0.67	High
5	4	3	3	1.00	Very High
6	3	2	3	0.67	High
7	4	3	3	1.00	Very High
8	3	2	3	0.67	High
9	4	3	3	1.00	Very High
10	3	2	3	0.67	High
11	3	2	3	0.67	High
12	4	3	3	1.00	Very High
13	4	3	3	1.00	Very High
14	4	3	3	1.00	Very High
15	4	3	3	1.00	Very High
16	3	2	3	0.67	High
17	4	3	3	1.00	Very High
18	3	2	3	0.67	High
19	4	3	3	1.00	Very High
20	4	3	3	1.00	Very High
21	4	3	3	1.00	Very High
22	4	3	3	1.00	Very High
23	4	3	3	1.00	Very High
24	4	3	3	1.00	High
25	4	3	3	1.00	Very High
26	4	3	3	1.00	Very High
<b>Total</b>		<b>70</b>	<b>78</b>	<b>0.897</b>	<b>Very High</b>

Based on the analysis results from the table above, it can be concluded that the final validation score obtained from the average percentage of the instrument filled out by validators resulted in a validity coefficient of 0.897. This means that the validation results from material experts indicate a "Very High" category with minor revisions. Therefore, the content in the e-module can be used to help improve students' understanding of explanatory text writing skills.

The practicality of the e-module was assessed through a questionnaire filled out by teachers. The questionnaire contained statements regarding the practicality of the e-module as a learning resource to help teachers facilitate the teaching process of explanatory text writing skills. The analysis results of the teacher's response questionnaire regarding the practicality of the Discovery Learning-based e-module are summarized in Table 2.

**Table 2.** Teacher Practicality Assessment of the Discovery Learning-Based E-Module

Question Item	Score	Max Score	Percentage	Description
1	4	4	100	Very Practical
2	3	4	75	Practical
3	4	4	100	Very Practical
4	4	4	100	Very Practical
5	3	4	75	Practical
6	3	4	75	Practical
7	4	4	100	Very Practical
8	3	4	75	Practical
9	3	4	75	Practical
10	3	4	75	Practical
11	4	4	100	Very Practical
12	4	4	100	Very Practical
13	3	4	75	Practical
14	3	4	75	Practical
15	4	4	100	Very Practical
16	3	4	75	Practical
<b>Total</b>		<b>64</b>	<b>85.93</b>	<b>Very Practical</b>

Based on Table 2, the analysis results indicate that the teacher response questionnaire regarding the practicality of the Discovery Learning-based e-module falls into the "Very Practical" category with a percentage of 85.93%. This confirms that the e-module is highly practical for enhancing students' learning outcomes in Bahasa Indonesia, particularly in explanatory text writing skills.

The student practicality assessment was collected after students completed learning activities using the e-module. The questionnaire contained 25 statements regarding the e-module's practicality in helping students learn explanatory text-writing skills. Students evaluated aspects such as ease of use, material presentation style, technical quality, and the time required for learning.

**Table 3.** Student Practicality Assessment of the Discovery Learning-Based E-Module

Question Item	Score	Max Score	Percentage	Description
1	144	160	90	Very Practical
2	148	160	92.5	Very Practical
3	150	160	93.75	Very Practical
4	150	160	93.75	Very Practical
5	151	160	94.375	Very Practical
6	140	160	87.5	Very Practical
7	146	160	91.25	Very Practical
8	149	160	93.125	Very Practical
9	136	160	85	Very Practical
10	150	160	93.75	Very Practical
11	149	160	93.125	Very Practical
12	152	160	95	Very Practical
13	144	160	90	Very Practical
14	149	160	93.125	Very Practical
15	152	160	95	Very Practical
16	143	160	89.375	Very Practical
17	146	160	91.25	Very Practical
18	132	160	82.5	Practical
19	152	160	95	Very Practical
20	147	160	91.875	Very Practical
21	134	160	83.75	Practical
22	149	160	93.125	Very Practical
23	152	160	95	Very Practical
24	149	160	93.125	Very Practical
25	152	160	95	Very Practical
<b>Total</b>	<b>3666</b>	<b>160</b>	<b>91.65</b>	<b>Very Practical</b>

After analyzing the student practicality questionnaire, a practicality score of 91.65% was obtained, categorizing the e-module as "Very Practical". This confirms that the Discovery Learning-based e-module effectively supports the learning process in Bahasa Indonesia, particularly in explanatory text writing skills.

The effectiveness of the e-module was evaluated by analyzing students' learning outcomes, specifically their ability to write explanatory texts. To assess these outcomes, a performance test (psychomotor) was administered to both the experimental and control groups, where students were required to compose explanatory texts. The test results were analyzed using the Ngain Score test, with statistical processing conducted through SPSS, as shown in Table 4. By comparing the improvement in writing skills between the two groups, the study aimed to determine whether the e-module had a significant impact on students' learning progress. Additionally, qualitative observations and feedback from students and instructors were considered to provide a more comprehensive evaluation of the e-module's effectiveness in enhancing learning engagement and skill development.

**Table 4.** SPSS Output for Ngain Score

Descriptives		Class	Statistics	Std. Error
Experiment		Mean	.7468	.02349
		95% Confidence Lower Bound	.5986	
		Interval for Mean Upper Bound	.6950	
		5% Trimmed Mean	.6469	
		Median	.6667	
		Variance	.015	
		Std. Deviation	.12429	
		Minimum	.43	
		Maximum	.88	
		Range	.45	
		Interquartile Range	.19	
		Skewness	-.268	.441
		Kurtosis	-.656	.858
		Mean	.4209	.03624
		95% Confidence Lower Bound	.3465	
	Interval for Mean Upper Bound	.4953		
	5% Trimmed Mean	.4187		
	Median	.3818		
	Variance	.037		
Control		Std. Deviation	.19176	
		Minimum	.09	
		Maximum	.82	
		Range	.73	
		Interquartile Range	.30	
		Skewness	.183	.441
		Kurtosis	-.789	.858

The experimental class, which used Discovery Learning, achieved a higher Ngain Score (0.7468, categorized as "High"), while the control class, which used conventional learning, had an Ngain Score of 0.4209 (categorized as "Medium"). This significant difference in Ngain Scores between the two classes indicates that the Discovery Learning-based e-module is more effective than the conventional model.

Further significance testing using the Mann-Whitney test in SPSS confirmed a significant difference between the two learning methods (Asymp. Sig. = 0.01). Therefore, it can be concluded that the Discovery Learning-based e-module effectively enhances students' learning outcomes in explanatory text writing skills.

### 3.1.4 Disseminate Stage

The dissemination stage is the final phase in the development process of the discovery learning-based e-module for teaching explanatory text writing skills to Grade XI students at SMA Negeri 1 Tasik Putri Puyu. Before dissemination, the e-module was revised based on feedback from the practicality and effectiveness tests. The revised e-module was then distributed through online media. The dissemination process was carried out following the recommendations provided by the collaborating teacher from the trial class.

The dissemination of the e-module was conducted by providing the e-module link to teachers and students. The e-module was distributed on a limited scale to teachers other than the collaborating teacher in the trial class, specifically those teaching in other classes. The teachers received a link or barcode to access the Explanatory Text Writing Skills e-module. In addition, they were given a questionnaire regarding the dissemination process. Meanwhile, the e-module was distributed to students by sharing a barcode or link with each student in the trial class.

The aspect examined in this dissemination stage is the benefits provided by the e-module for teachers and students. The analysis of the e-module dissemination questionnaire results can be explained as follows. First, the discovery learning-based e-module for explanatory text writing skills is a practical learning solution for explanatory text writing materials. Second, the e-module meets students' learning resource needs by providing learning activities relevant to text-based learning and the scientific approach. Third, the e-module is assumed to support learning activities in explanatory text writing for Grade XI students. Fourth, this e-module serves as an alternative supplementary learning resource that students should have. Fifth, this e-module helps teachers achieve the learning objectives of the Bahasa Indonesia subject in the 2013 Curriculum.

### **3.2 Discussion**

This research successfully developed an e-module for teaching explanatory text writing to 11th-grade high school students. The e-module was developed using a discovery learning approach and followed the Four-D Model (Define, Design, Develop, and Disseminate). The validity, practicality, and effectiveness of the e-module were comprehensively evaluated, providing important insights into its educational impact and potential application.

The e-module achieved a high validity score of 84.75%, which is categorized as "very valid" according to Riduwan's criteria (2019). This high validity reflects the module's alignment with established educational standards and the completeness of its content, language, presentation, and graphical feasibility. This indicates that the e-module has been carefully designed and evaluated to ensure that every element contained within it aligns with educational goals and student needs.

Content validity was ensured by following guidelines from the Depdiknas (2008) and considering input from educational experts. This guarantees that the material delivered through the e-module is not only accurate and relevant but also aligns with the applicable curriculum. Feedback from educational experts helped identify strengths and weaknesses in the content and provided suggestions for improving the quality of the e-module.

A well-structured e-module, with procedural organization and clear instructional design, is crucial in meeting the developmental needs of 11th-grade students. As explained by Kapitan, Harsiati, & Basuki (2018), an organized structure helps students follow the learning flow more easily and effectively. The e-module is designed with a logical and systematic sequence of material, allowing students to build their knowledge gradually and consistently.

Furthermore, the use of attractive visual presentations and appropriate language plays a significant role in enhancing the validity of the e-module. This aligns with the research findings of Ningsih and Mahyuddin (2021), which concluded that the use of informative and aesthetic graphics helps students better understand the material presented, while clear and communicative language ensures that the message intended to be conveyed is well-received by students. This is consistent with the views of Emzir (2016) and Daryanto (2016), who emphasize the importance of visual and linguistic elements in teaching materials.

The e-module's high validity score also demonstrates that the material presented is not only easily accessible but also appropriately challenging for the target audience, which is 11th-grade students. This aligns with the research findings of Wulandari, Pamelasari, & Hardianti (2023), which concluded that engaging and challenging material helps maintain student motivation and encourages them to think critically and creatively in understanding explanatory texts.

Overall, the high validity of the e-module reflects its successful development in creating an effective and efficient learning tool. By ensuring the module's alignment with educational standards, content completeness, and quality presentation, this e-module has successfully met the educational needs of 11th-grade students and has the potential to be more widely applied in diverse learning contexts (Gufran and Mataya, 2020).

The practicality of the e-module was rated very high, with an overall score of 89.48%. This assessment indicates that the e-module is easy to use by teachers and students and effective in facilitating learning. This high practicality score demonstrates that the e-module is not only theoretical in its design but also applicable in daily classroom use. The e-module is designed with a user-friendly interface, enabling teachers to easily integrate it into their lesson plans without requiring extensive specialized training.

The practicality test was conducted through the direct application of the e-module in actual classroom environments, encompassing various learning conditions such as individual, group, and classical learning. This is consistent with the research findings of Widiyanto (2021), which concluded that the e-module allows students to explore the existing features and integrate them into the teaching-learning process. The results showed that teachers found the clear step-by-step guidance and ready-to-use teaching materials helpful, which could be tailored to student needs.

On the other hand, students found the e-module engaging and interactive, which increased their motivation to learn. Interactive features such as quizzes, videos, and animations helped students better understand the material and made learning more enjoyable. Additionally, the e-module supports independent learning, allowing students to learn at their own pace and time. This is especially beneficial in the context of distance learning or blended learning, where flexibility is key. The e-module also provides immediate feedback to students, enabling them to promptly identify and correct their mistakes.

Overall, the high practicality score of this e-module indicates that it has successfully met the practical needs of education, both from the teaching perspective of teachers and the learning perspective of students. This success also underscores the importance of user-focused design in the development of digital educational tools, ensuring that technology truly supports the teaching-learning process effectively and efficiently (Zuve, Atmazaki, Ardoni, Amir, Afrita, Ulya, & Henanggil, 2023).

The effectiveness of the e-module is demonstrated by its ability to enhance students' skills in writing explanatory texts. Research by Hafizah (2024) showed that structured learning activities, self-assessment instruments, and performance tests provided in the e-module allow students to measure and reflect on their learning progress. This aligns with Bizry's (2022) statement, which revealed that the discovery learning approach helps students develop not only their writing skills but also their critical and independent thinking abilities. This method encourages students to explore and understand the fundamental principles of explanatory texts, leading to more meaningful and long-lasting learning outcomes.

The successful development and implementation of this e-module highlight several important implications for future educational practices. Firstly, it demonstrates the feasibility and benefits of integrating discovery learning-based e-modules into the curriculum. Such e-modules can provide flexible and effective means to enhance traditional teaching methods, offering additional resources to support

student learning. Secondly, the high validity and practicality scores underscore the importance of a rigorous development and testing process in creating educational materials. By adhering to established guidelines and incorporating expert feedback, developers can create high-quality resources that meet the needs of both students and teachers.

Further research is needed to optimize and expand the use of discovery learning-based e-modules. Future studies could explore the long-term impact of using such e-modules on students' academic achievement and their overall engagement with subjects. Additionally, the research could investigate the application of this approach to other subjects and educational levels, potentially extending the benefits of discovery learning to a broader range of learners (Gufran and Mataya, 2020; Widiyanto, 2021; Wulandari, Pamelasari, & Hardianti, 2023; Hafizah, 2024).

The development of an e-module for writing explanatory texts based on discovery learning has proven to be a significant advancement in educational resources. Its high validity and practicality make it a valuable tool for enhancing students' writing skills and overall learning experience. These findings underscore the potential of innovative and research-based educational materials to improve teaching and learning outcomes. As education continues to evolve, such resources will play a crucial role in preparing students to face the complexities of the ever-changing world.

#### 4. CONCLUSION

This research successfully developed discovery learning-based e-modules for teaching explanatory text writing in Indonesian language instruction. The development followed the 4-D model—Define, Design, Develop, and Disseminate—ensuring a systematic approach. The Define stage involved analyzing the syllabus, student characteristics, and teaching materials. The Design stage focused on developing and validating instruments aligned with the discovery learning syntax. The development stage included expert validation and practicality assessments, confirming the module's feasibility. Finally, the dissemination stage involved implementing the e-module for classroom use at SMA Negeri 1 Tasik Putri Puyu. The research findings indicate that the developed e-module is valid, practical, and effective, demonstrating that discovery learning-based e-modules enhance learning outcomes more effectively than conventional methods.

Despite these positive results, the study has several limitations. The sample size was limited to a single school, restricting the generalizability of the findings. Additionally, the research focused only on explanatory text writing, leaving other writing skills unexplored. The study also did not extensively analyze long-term learning retention and student engagement over extended periods.

For future research, it is recommended to expand the sample size across multiple schools to increase generalizability. Further studies should also explore the effectiveness of e-modules in other types of writing skills and investigate long-term retention and engagement. Additionally, integrating multimedia elements such as interactive videos and gamification features could enhance the effectiveness of discovery learning-based e-modules in digital education.

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