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Differentiated Literacy Modules Based on Student Interests: Enhancing Procedural Writing in Indonesian Primary Schools

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Abstract

This study aims to develop and evaluate differentiated literacy modules based on student interests to enhance procedural writing skills among fifth-grade students in Indonesian primary schools. In alignment with the Merdeka Curriculum, the modules were created using the 4D development model (Define, Design, Develop, Disseminate). Each module was designed to accommodate individual learning preferences, including visual, auditory, and kinesthetic styles, and was enriched with diagnostic assessments of student interests and readiness. The content addressed four key language components: reading, listening, writing, and speaking, supported by multimedia features such as QR codes linked to videos and audio recordings. Expert validation indicated that the modules were highly feasible, with ratings ranging from 75 percent to 100 percent across media, content, and language aspects. Initial small-scale testing revealed minimal improvement in student outcomes, with a mean score increase of only 0.667 points and an N-Gain of 1.67 percent. Following revisions, a large-scale trial involving 27 students demonstrated significant effectiveness. The posttest mean rose to 80.93 from 47.78, with a statistically significant result (t = 27.671, Sig. = 0.000) and an average N-Gain of 63.75 percent. These findings confirm that interest-based differentiated instruction can effectively improve student achievement in procedural writing and offers a scalable model for inclusive literacy development in primary education.

Keywords: differentiated instruction, student interests, procedural writing, primary education

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Introduction

The increasing recognition of learner diversity in today's classrooms necessitates a fundamental shift from uniform teaching practices toward more personalized and inclusive instructional strategies. In primary education, students bring varying levels of readiness, learning preferences, socio-cultural backgrounds, and cognitive capacities into the classroom (Fernandez-Rio & Menendez-Santurio, 2017; Hanaysha, Shriedeh, & In'airat, 2023; Hilmi, 2024). These differences must be considered not as barriers but as essential components of effective pedagogy. In Indonesia, the Merdeka Curriculum responds to this need by promoting student-centered learning that acknowledges individual potential and growth. This orientation draws from the philosophy of Ki Hajar Dewantara, who emphasized that each child must be guided according to their natural disposition to achieve personal fulfillment and societal well-being (Setioyuliani & Andaryani, 2023; Widyawati, et al., 2024).

Despite such philosophical and policy foundations, classroom practices often remain homogenized. Teachers frequently deliver the same instructional materials and tasks to all students, based solely on age or grade level, and assume a common level of readiness and interest among learners (Wahyuni, 2019). Observations from fifth-grade Bahasa Indonesia classrooms indicate that

this approach fails to meet students' individual learning needs, particularly in developing writing skills for more complex genres such as procedural texts (Şentürk, 2021; Zaki, Mulbar, Husniati, & Naufal, 2024). Procedural writing is a key component of functional literacy. It demands logical sequencing, clarity of expression, and creativity in communicating step-by-step instructions (Purba, Purnamasari, Soetantyo, Suwarma, & Susanti, 2021). Nevertheless, student performance in this domain remains suboptimal, with many failing to reach basic competency thresholds (Hanaysha et al., 2023; Lemmrich & Ehmke, 2024).

To address this gap, instructional innovations must move beyond one-size-fits-all methods and embrace differentiated learning strategies. Differentiated instruction enables teachers to adapt content, process, and product based on students' readiness, interests, and learning styles (Poonputta & Nuangchalerm, 2024). This approach aligns with the principles of constructivist, progressive, and humanistic educational philosophies, all of which emphasize meaningful learning rooted in prior knowledge, personal experience, and learner agency (Akihary, Maruanaya, Lestuny, & Maruanaya, 2023; Tarigan & Fadillah, 2021). Empirical studies have demonstrated the effectiveness of differentiated instruction in improving student engagement, motivation, and achievement across various disciplines and education levels (Purba et al., 2021; Rosidin, Kadaritna, & Hasnunidah, 2019; Wardani, Haryani, & ., 2023).

However, several gaps in the implementation and evaluation of differentiated instruction remain. First, relatively few studies have developed differentiated modules that are explicitly based on student interests, despite the critical role of interest in fostering intrinsic motivation and creative thinking (karensky, poulin, & davis, 2023). Second, diagnostic assessments of readiness and learning profiles are often absent in the design process, limiting the personalization and responsiveness of instruction (Kalkashev et al., 2024; Wolterinck, Poortman, Schildkamp, & Visscher, 2024). Third, while some studies focus on learning outcomes, they rarely evaluate students' creative output, particularly in literacy contexts where the quality of writing is both a product and a reflection of deeper learning (Hanifah, 2024; Ninsiana, Septiyana, & Suprihatin, 2024; Olanipekun, 2024).

This study seeks to address these gaps by developing and evaluating an interest-based differentiated literacy module to enhance fifth-grade students' ability to write procedural texts in Bahasa Indonesia. The module was designed using Canva to improve accessibility, visual engagement, and ease of use. It incorporated initial diagnostics of student interests and learning styles to create differentiated pathways in content and tasks. Conducted in SD Negeri Kuningan 01, Semarang, the study examines the module's validity, practicality, and effectiveness in improving both procedural writing skills and creative output. The findings are expected to provide practical insights for educators and curriculum developers working to integrate differentiated strategies into primary education, in support of Indonesia's ongoing curricular transformation

Methods

This study employed a research and development (R&D) design to create and validate a differentiated literacy module based on student interests for procedural text writing in primary education. The development model used was ADDIE (Analysis, Design, Development, Implementation, and Evaluation), which allows systematic instructional design tailored to learner needs (Devra Raihan, Wardani, & Isdaryanti, 2023; Mukaromah, Sutarto, Subali, & Raihan, 2024).

The research was conducted at SD Negeri Kuningan 01 in Semarang, Indonesia, involving fifth-grade students during the 2024/2025 academic year. The participants consisted of 27 students in class 5A for the main trial and 25 students in class 5B for the preliminary testing. Initial data collection involved a diagnostic assessment to identify students' interests, readiness, and learning styles, which formed the foundation for differentiation within the module.

The module was developed in the form of a teacher's guide and student worksheets, designed using Canva to ensure visual clarity and learner engagement. Content differentiation was implemented by offering tasks aligned with students' declared interests, learning preferences (visual,

auditory, kinesthetic), and readiness levels. Expert validation was conducted by curriculum specialists and pedagogical experts to assess content validity, clarity, and instructional feasibility (Aida, Sumarni, Marwoto, Subali, & Ellianawati, 2022).

To assess the module's effectiveness, a quasi-experimental pre-test and post-test design was applied. The effectiveness was measured through students' learning outcomes in procedural text writing, using an analytic rubric evaluating structure, clarity, sequence, and creativity. Quantitative data from pre- and post-tests were analyzed using descriptive statistics and normalized gain scores (n-gain) to determine learning improvements.

The study ensured ethical compliance by obtaining approval from the school and consent from participating students and teachers. The development and evaluation process aimed to provide a valid, practical, and effective instructional tool to support differentiated instruction in Bahasa Indonesia classrooms.

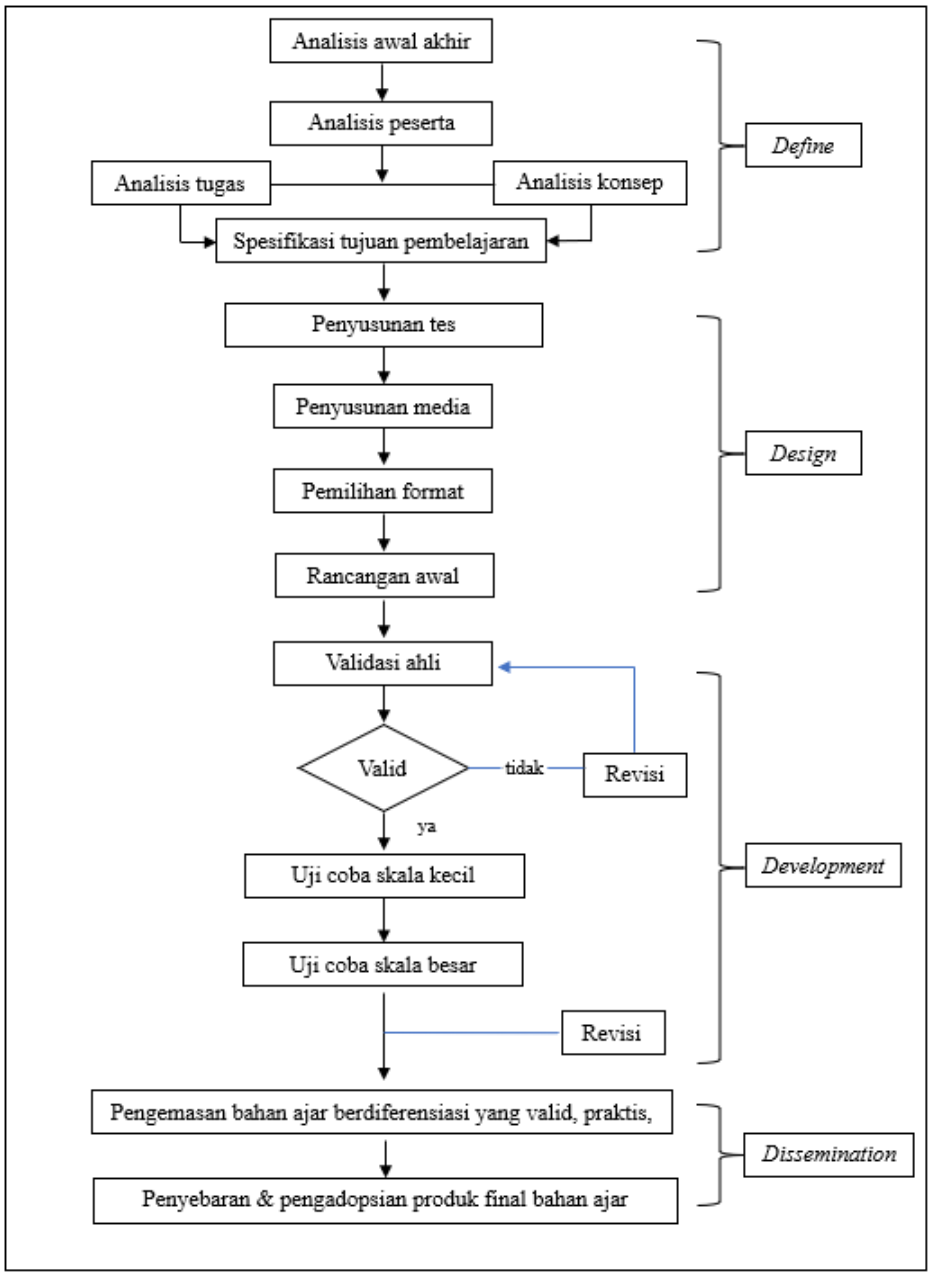


Figure 1. ADDIE Flow

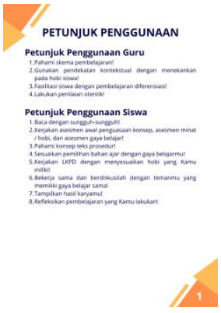
Results and Discussions

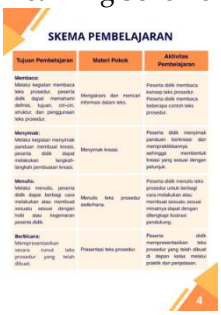
1. Results

The conducted research and development produced an instructional product in the form of a differentiated teaching module based on student interests, focusing on procedural text writing in Bahasa Indonesia instruction. The module was specifically designed for fifth-grade students and centered on procedural text material. This study explored three main aspects: (1) the development process of the instructional module, (2) the feasibility of the module, and (3) the improvement of student learning outcomes following the implementation of the interest-based differentiated module on procedural writing. These issues were addressed in accordance with the formulated research questions.

The instructional module was initially designed in the form of a prototype, which served as a conceptual model or preliminary version of the final product. This prototype functioned as the foundation for further development. A detailed overview of the prototype for the interest-based differentiated instructional module on procedural text writing is presented in Table 1.

Table 1.
Prototype of Differentiated Interest-Based Teaching Materials
Procedural Text Materials

No	Prototype	Information
1.	Cover  Figure 2 Cover	1. Author's name 2. Unnes logo 3. Title of teaching material 4. Study program 5. Subject 6. Class
2.	Instructions for use  Figure 3 Instructions for use	1. Instructions for teacher use 2. Instructions for student use

3.	Learning Scheme  Figure 4 Learning Scheme	1. Learning objectives 2. Main material 3. Learning activities
4.	Initial Assessment Concept Mastery  Figgure 5 Initial Assessment Concept Mastery	1. Procedure text 2. Initial assessment questions for concept mastery
5.	Concept Understanding  Figgure 6 Concept Understanding	1. Definition of procedural text 2. Example of procedural text 3. Characteristics of procedural text 4. Sequence of procedural text 5. Verbs -lah and -kan 6. Purpose of writing procedural text
6.	Reading Elements  Figgure 7 Reading Elements	1. Procedure text “How to Make Fruit Soup” 2. Images that clarify the text 3. Barcode containing the YouTube video “How to Make Fruit Soup” 4. Essay questions related to the title, purpose of writing, tools and materials, steps for making, and tips or suggestions
7.	Listening Elements	1. Picture of the steps of

	 Figgure 8 Listening Elements	"Learning to Focus with the Pomodoro Technique" 2. Barcode containing audio of the steps of "Learning to Focus with the Pomodoro Technique" 3. Short answer questions to complete sentences with -lah and -kan
8.	Elements of Writing  Figgure 9 Elements of Writing	1. Procedure text "How to Play Angklung" 2. Youtube video barcode "How to Play Angklung" 3. Descriptive questions related to the title, purpose of writing, tools and materials, steps, and tips or suggestions
9.	Speaking Elements  Figgure 10 Speaking Elements	1. Picture of the steps of "How to Make Pancakes" 2. Barcode recording of the explanation of the steps of "How to Make Pancakes" 3. Short answer questions to complete sentences with -lah and -kan 4. Instructions for reading the completed procedural text

The instructional product developed in this study followed the 4D development model, consisting of Define, Design, Develop, and Disseminate, as introduced by Thiagarajan, Semmel, and Semmel. This model was selected because it offers a systematic and detailed framework for instructional development. The development of the interest-based differentiated module was motivated by the low level of students' procedural writing skills in Bahasa Indonesia, which was further exacerbated by the lack of instructional materials aligned with students' personal interests. To address this issue, the study adopted Tomlinson's differentiated instruction approach to meet the individual learning needs of students, with a particular emphasis on improving their productive language abilities within the context of procedural text writing.

The instructional module was designed to incorporate initial assessments of students' conceptual understanding, interests, and learning styles, including visual, auditory, and kinesthetic modalities. The materials were created using Canva and printed in A4 format, containing comprehensive content covering reading, listening, writing, and speaking components. Student worksheets were adapted to match individual learning styles, and interactive barcodes linked to videos and audio recordings were embedded to enrich the learning experience.

The feasibility of the module was evaluated through expert validation and a small-scale trial. The validation process addressed media, content, and language aspects, resulting in high ratings. Three validators rated the module as highly feasible with scores ranging from 94 percent to 100 percent, while one validator rated it feasible with a score of 75 percent. Experts also provided constructive feedback, including improvements to references, assessment items, spelling and grammar, and the inclusion of additional elements such as reading journals and presentation activities.

Table 2.
Small Scale Normality

Tests of Normality						
	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	.204	6	.200*	.902	6	.389
Posttest	.238	6	.200*	.950	6	.737

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Table 3.
Small scale t-test

Paired Samples Test									
		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Posttest - Pretest	.667	5.888	2.404	-5.512	6.846	.277	5	.793

Table 4.
Small scale Ngain

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
ngain	6	-.50	.40	.0167	.36621
ngain_persen	6	-50.00	40.00	1.6667	36.62118
Valid N (listwise)	6				

A small-scale trial was conducted using three main statistical analyses: normality testing, the Paired Sample T-Test, and the normalized gain (N-Gain) analysis. The results of the normality test indicated that the data were normally distributed. However, the Paired Sample T-Test revealed that the difference between pretest and posttest scores was not statistically significant, with a significance value of 0.793. The mean posttest score increased by only 0.667 points from the pretest. Furthermore, the N-Gain analysis showed an improvement of just 1.67 percent, which falls into the very low category, and even some students demonstrated a decline in performance. These findings reinforce the conclusion that the developed instructional module did not yet produce a significant impact on student learning outcomes in the small-scale trial, despite having been validated as feasible by expert reviewers. This indicates that further revisions are necessary before the module can be widely implemented.

Following expert validation and the small-scale trial, the study proceeded to conduct a large-scale effectiveness trial involving 27 fifth-grade students from class 5A at SD Negeri

Kuningan 01 in Semarang. The effectiveness of the interest-based differentiated instructional module was assessed through three main statistical procedures: a normality test, a Paired Sample T-Test, and an N-Gain analysis. These analyses aimed to provide a comprehensive understanding of the intervention's impact on improving students' learning outcomes.

Table 5.
Large Scale Normality

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		27
Normal Parametersa,b	Mean	.0000000
	Std. Deviation	4.37184634
Most Extreme Differences	Absolute	.132
	Positive	.132
	Negative	-.107
Test Statistic		.132
Asymp. Sig. (2-tailed)		.200c,d

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

Table 6.
Large Scale T-test

Paired Samples Test									
		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Posttest - Pretest	33.148	6.225	1.198	30.686	35.611	27.671	26	.000

Table 7 .
Large Scale N-gain

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
ngain	27	.43	.83	.6375	.09259
ngain_persen	27	42.86	83.33	63.7507	9.25904
Valid N (listwise)	27				

First, the results of the Residual Normality Test using the One-Sample Kolmogorov-Smirnov procedure indicated a significance value of 0.200, which exceeds the threshold of 0.05. This finding suggests that the residual distribution of the pretest and posttest data was normal, thereby meeting the assumptions required for the application of parametric statistical tests. Consequently, the analysis proceeded with the Paired Sample T-Test to determine the statistical significance of the differences in learning outcomes before and after the implementation of the instructional module. The results demonstrated a highly significant improvement, with the mean posttest score increasing to 80.93 from a pretest mean of 47.78. This mean difference of 33.15

points was supported by a significance value of 0.000 (Sig. 2-tailed) and a t-value of 27.671, with a 95 percent confidence interval ranging from 30.686 to 35.611. These results indicate that the improvement in student learning outcomes was not due to chance but rather to the use of the developed instructional module.

Subsequent analysis using the Normalized Gain (N-Gain) test was conducted to determine the proportional magnitude of learning improvement. The results showed an average N-Gain score of 0.6375, equivalent to a 63.75 percent increase. According to Hake's (1999) effectiveness classification, this score falls into the medium category and approaches the threshold for high effectiveness. The maximum score of 83.33 percent and the minimum of 42.86 percent suggest that the majority of students experienced relatively consistent improvements, as reflected in the low standard deviation. These findings reinforce the previous T-Test results and confirm that the interest-based differentiated instructional module was not only valid and feasible but also statistically and pedagogically effective in enhancing students' procedural writing skills.

Overall, the implementation of the interest-based differentiated learning module enabled students to engage in learning aligned with their individual styles and preferences, while also contributing significantly to the improvement of their academic performance. This intervention highlights the importance of designing instructional materials that are responsive to individual learner characteristics as a more humanistic and effective approach, particularly in primary education, which requires sensitivity to diverse learning styles and student interests. These findings provide empirical support for the use of interest-based differentiation as a strategic solution to address the persistent challenges in students' productive literacy, especially in the context of Bahasa Indonesia instruction.

2. Discussions

This study developed an instructional product in the form of an interest-based differentiated learning module, specifically designed to improve procedural text writing skills among fifth-grade primary school students. The product was created using the 4D development model (Define, Design, Develop, Disseminate) introduced by Thiagarajan and colleagues, which offers a systematic and context-sensitive framework for instructional design. The development was driven by the low performance of students in procedural writing and the absence of learning materials tailored to students' individual interests and learning preferences. Therefore, Tomlinson's concept of interest-based differentiation was adopted to foster a more inclusive, adaptive, and student-centered learning experience.

The instructional module includes several core components such as initial assessments of conceptual understanding, procedural text content, and language skill elements including reading, listening, writing, and speaking (Baker & Lastrapes, 2019; Green, 2024; Li, Chen, Huang, Hwang, & Cukurova, 2023). A key innovation of the product lies in the personalization of content based on learning styles, visual, auditory, and kinesthetic. Along with interactive features such as barcodes linked to videos and audio recordings. The module was designed using Canva to ensure visual appeal and functional clarity, and the prototype was structured to support active and contextual learning.

The feasibility of the module was validated by four experts in terms of media, content, and language, with results indicating high levels of appropriateness ranging from 75 percent to 100 percent. Despite these results, validators also provided constructive feedback including the need to improve references, revise evaluation items, and strengthen literacy elements such as reading journals and oral presentations. These suggestions confirm that while the product demonstrated strong initial quality, there remains room for further refinement.

A small-scale trial was conducted to assess the initial effectiveness of the module. Statistical analysis revealed that although the data were normally distributed, the difference between pretest and posttest scores was not statistically significant (Sig. = 0.793), with only a 0.667-point increase on average. The N-Gain analysis also indicated very low effectiveness, with a

mean gain of just 1.67 percent. These findings suggest that although the product was theoretically feasible, its practical effectiveness in small-group settings was insufficient, requiring further revision prior to broader implementation.

Following improvements, the revised module was tested in a large-scale trial involving 27 students in class 5A at SD Negeri Kuningan 01, Semarang. The results showed that the data met the assumptions for parametric testing. The Paired Sample T-Test revealed a statistically significant improvement between pretest and posttest scores, with an average gain of 33.15 points (Sig. = 0.000). The N-Gain analysis demonstrated moderate to high effectiveness, with a mean increase of 63.75 percent. These results confirm that the revised interest-based differentiated module was effective in enhancing students' procedural writing skills.

Overall, this research makes a valuable contribution to the development of innovative instructional materials in primary education. The intervention successfully integrated interest-based differentiation with a holistic approach to language skill development (Fakhruddin, Narulita, & Handrianto, 2024; Zaki et al., 2024). The findings support the argument that instruction tailored to students' preferences and learning styles not only increases motivation but also improves academic achievement. Therefore, this model of instructional material offers a strategic alternative for delivering more personalized, context-relevant, and productive literacy instruction in Bahasa Indonesia for primary school students.

Conclusion

This study confirms that developing differentiated literacy modules based on student interests can significantly enhance procedural writing skills among primary school students. The modules were developed using the 4D model (Define, Design, Develop, Disseminate) and tailored to accommodate students' learning preferences, including visual, auditory, and kinesthetic styles, specifically in the context of fifth-grade Bahasa Indonesia procedural texts. Expert validation indicated that the materials were highly feasible, with validation scores ranging from 75 percent for language to 100 percent for both content and media components. In the small-scale trial involving six students, the results showed normal data distribution but no statistically significant improvement in learning outcomes. The average increase from pretest to posttest was only 0.667 points with a significance value of 0.793, and the normalized gain (N-Gain) was merely 0.0167 or 1.67 percent, which falls into the very low category. However, the large-scale trial with 27 students revealed strong effectiveness. The mean posttest score rose to 80.93 from a pretest mean of 47.78, resulting in a mean gain of 33.15 points. The paired sample t-test indicated a highly significant difference (t = 27.671, sig. = 0.000), and the average N-Gain reached 0.6375 or 63.75 percent, classified as medium and approaching high. These findings suggest that interest-based differentiated instruction not only increases student engagement but also leads to substantial improvements in academic achievement. The approach is highly relevant to the goals of the Merdeka Curriculum and should be considered a scalable and effective innovation for literacy instruction in Indonesian primary education.

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