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Local Wisdom of The Larung Tumpeng Tradition in Telaga Sarangan : A Resource for Learning Biodiversity and Developing Argumentation Skills

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Abstract: This research aims to develop an e-book that explores biodiversity through the lens of the Telaga Sarangan Larung Tumpeng tradition, integrating local wisdom to enhance students' argumentation skills. Utilizing a development research method, the study follows the ADDIE framework, which consists of analysis, design, development, implementation, and evaluation phases. The data analysis technique employs validation tests and readability assessments for the e-book development outcomes, analyzed using a qualitative descriptive approach. The research utilized an e-book validation sheet evaluated by two lecturers—one an expert in content and the other in educational methods. Additionally, a readability test was conducted using Fry graphs. The validation results yielded an average score of 3.9, categorizing the e-book as very valid. This evaluation took into account various aspects such as presentation validity, content validity, and language validity. Additionally, the practicality of the e-book is evaluated through a readability test, which indicates a reading level appropriate for tenth-grade students. The e-book achieved a readability level of 12, classified as very positive and suitable for its intended audience. The study clearly demonstrated that the e-book focused on biodiversity, grounded in the local wisdom of the Larung Tumpeng tradition at Telaga Sarangan, is both valid and practical for enhancing the argumentation skills of X-grade high school students.

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Introduction

In the 21st century, education plays a crucial role in equipping students with the necessary skills to learn, innovate, and thrive in a rapidly evolving world. Students need to become adept in utilizing technology, accessing information, and developing vital life skills. As highlighted by Yuni et al., (2016), today's educational framework should encompass the 4Cs: Critical Thinking, Creativity, Collaboration, and Communication. This shift is further reinforced by Permendikbud No. 22 of 2016, which advocates for a transformative learning paradigm that transitions from mere information delivery to an inquiry-based approach where students actively engage in the process of discovery. A key indicator of success in this "finding out" process is the development of students' argumentation skills, which fundamentally align with the Communication aspect of the 4Cs, as noted by Widhi et al., (2021).

The key components of argumentation claim, data, warrant, backing, qualifier, and rebuttal serve as essential benchmarks for evaluating a person's argumentative skills, including those of students. A well-rounded argument that incorporates these elements reflects a strong ability in argumentation Ekanara et al., (2018). However, research by Anwar

et al., (2019) indicates that many students still struggle with both oral and written argumentation, often failing to effectively communicate their analyses. This gap may stem from a limited engagement with scientific arguments within the learning process. By enhancing opportunities for students to actively participate in such discussions, we can foster their skills and improve the overall quality of their argumentation. The findings of Karlina & Alberida, (2021) highlight an important aspect of student learning: while they excel in acquiring knowledge, there is often a missed opportunity for them to enhance their argumentation skills through reasoning and practical application. To address this, it is essential to integrate strategies that encourage students to engage in deeper thinking and application of their knowledge during the learning process.

The integration of technology in education, particularly through the use of e-books, offers a promising alternative for delivering learning materials that are both widely accessible and adaptable to students' needs. Research conducted by Fitria & Lisdiana (2022) highlights the positive impact of e-books on enhancing student motivation, demonstrating their effectiveness in the learning process. Additionally, e-books can serve as valuable tools for character development by weaving in the values of social interaction and local wisdom. By embedding these cultural elements into educational media, we can not only enrich students' learning experiences but also play a vital role in preserving and promoting our cultural heritage (Hunaepi et al., 2020). This approach encourages a deeper connection between education and culture, benefiting both students and society as a whole. Learning media that emphasize content related to local wisdom are notably scarce, as highlighted by Andriani & Hadijah, (2021). Local wisdom encompasses customs and practices that have been upheld by communities for generations, reflecting their rich cultural heritage. This significance is especially evident in certain areas where traditional customs continue to thrive within local communities.

A prime example of such a tradition can be observed in Sarangan Village, located near Sarangan Lake in the Plaosan District of Magetan Regency, East Java. Beyond the lake's natural beauty, the community celebrates the larung tumpeng Telaga Sarangan tradition, which takes place just before the holy month of Ramadan, specifically on Friday Pon during the month of Ruwah in the Javanese calendar. This event not only showcases the local culture but also strengthens community bonds and preserves their unique heritage. The tradition of Larung Tumpeng at Telaga Sarangan is a heartfelt expression of gratitude from the local community for the blessings bestowed by God Almighty. This event not only honors these blessings but also serves as a sincere request for the continued abundance of such gifts. The aim is to ensure the sustainability of Sarangan Lake while promoting peace, security, and tranquillity for its residents. To celebrate this tradition, the community organizes various events, starting with cooperative efforts to clean the area around the lake and its surroundings. This fosters a spirit of teamwork and environmental stewardship among the residents. The highlight of this activity is the display of four tumpeng. One of the tumpeng features an arrangement of rice, grilled chicken, and bananas. Another tumpeng consists of various types of polo pendem, which include sweet potatoes and cassava. The next tumpeng is made up of an assortment of local, natural vegetables. The last and largest tumpeng, named "Gono Bahu," stands 2 meters high and contains approximately 50 kilograms of rice. Each tumpeng not only showcases culinary diversity and biodiversity but also reflects the cultural values of the local community (Philips & Susilo, 2022; Putra, 2020).

Integrating local wisdom into biology education is highly relevant in today's context, as local culture embodies essential values related to the conservation and preservation of natural resources. Our younger generation needs to recognize, understand, and cherish these

values (Dewi et al., 2017). By incorporating local wisdom into biology learning, we can enhance students' critical thinking skills and engage them in practical problem-solving activities rooted in their cultural context (Febriani et al., 2020). A key topic in biological studies is biodiversity, which often gets taught in isolation from local culture. This separation can lead students to miss valuable opportunities to relate abstract concepts to their own experiences and surroundings (Suprapto et al., 2021). Therefore, fostering connections between biodiversity and local cultural practices can enrich the learning experience and promote a deeper understanding of these important issues.

This research aims to develop an an e-book that explores biodiversity through the lens of the Telaga Sarangan Larung Tumpeng tradition, integrating local wisdom to enhance students' argumentation skills. We hope that the results of our research, presented in this e-book, will integrate local wisdom into the educational curriculum. This integration aims to create a more engaging and relevant educational experience for students. By doing so, we can provide a real depiction of biodiversity that is maintained, preserved, and utilized by local indigenous communities through the enduring local wisdom they possess today.

Research Method

This research used the Research and Development (R&D) method with the ADDIE stage model, Analysis, Design, Development, Implementation, and Evaluation. These stages are organized systematically, providing clear and detailed steps that are easy to follow. The study was conducted within the Postgraduate Study Program of Biology Education at the Faculty of Mathematics and Natural Sciences, State University of Surabaya.

The analysis stage is comprised of two main components: student analysis and local wisdom analysis. Student analysis involves examining general characteristics, specific competencies, and individual learning styles through interviews with class teachers. In parallel, local wisdom analysis seeks to gather insights into the Telaga Sarangan larung tumpeng traditional event. This analysis highlights cultural values, attitudes, and biological roles that contribute to the agricultural diversity of farmers in the Telaga Sarangan area. This information is obtained through interviews with local traditional elders. The findings from both analyses are then integrated into a biodiversity e-book aimed at enhancing argumentation skills.

In the design stage, the focus is on systematic planning for the e-book. This includes determining the e-book format and creating draft versions. The developed e-book incorporates local wisdom within biodiversity content and features interactive elements, including questions designed to strengthen argumentation skills.

The development stage involves creating the script for the e-book. Initially, the e-book 1 script is reviewed by both material expert lecturers and education expert lecturers. Based on their feedback and suggestions, the manuscript is revised to enhance its quality. Following this process, the e-book 2 manuscript is produced, informed by the validation results provided by a validator lecturer.

The next phase is implementation, which focuses on conducting a readability test for the e-book, assessing the usability of each available feature. Finally, the evaluation stage assesses the product's effectiveness in educational contexts. The feedback obtained from this assessment is crucial for identifying areas for improvement, enabling further revisions to address any shortcomings and enhance the overall quality of the e-book.

Validation of e-books is conducted through the creation of a validation sheet, which is then evaluated by a team consisting of one material expert and one education expert from the Postgraduate Biology Education Seminary at the State University of Surabaya. This

validation process employs a specific e-book validation instrument designed to assess the overall feasibility of the e-book. The assessment results from the validators are analyzed descriptively using the e-book feasibility presentation format, with the data derived from the Likert Scale, as outlined in Table 1 (Arikunto, 2014).

Table 1. Likert Scale Criteria

Score	Category
1	Not good
2	Pretty good
3	Good
4	Very good

The results of the validity calculation are used to determine the feasibility of the biodiversity e-book based on local wisdom, then calculated using the following formula.

$$\text{Average score} = \frac{\sum \text{Scores for each criterion for all validators}}{\sum \text{validators}}$$

After the average score is obtained, to calculate the average score of the criteria the following formula is used (Riduwan, 2013):

$$\text{P validation score (\%)} = \frac{\sum \text{Score obtained}}{\sum \text{Maximum score}} \text{ x } 100\ \%$$

The results are subsequently categorized into four validity criteria, as illustrated in Table 2. An e-book is deemed valid if it achieves a score of 61% or higher.

Table 2. E-book Validity Criteria Based on Validation Results

Percentage (%)	Criterion
0%-20%	Very Invalid
21%-40%	Invalid
41%-60%	Fairly Valid
61%-80%	Valid
81%-100%	Very Valid

(Riduwan, 2013)

A comprehensive assessment of practicality was conducted by creating an e-book readability sheet focused on biodiversity material, specifically rooted in the local wisdom of the Telaga Sarangan Larung Tumpeng tradition. This assessment involved a sample group of 36 students from SMAN 13 Surabaya City. The data collection utilized the readability test method to evaluate the effectiveness of the developed e-book.

The readability analysis of electronic books in this study was conducted using the Fry Formula approach. This process involves selecting a passage from an e-book that consists of one hundred words. The data is then plotted on the Fry Graph, where the average number of sentences per hundred words is represented on the x-axis, and the number of syllables is represented on the y-axis (the number of syllables in the Indonesian text is multiplied by 0.6). The intersection of the x and y axes provides a value that is used to evaluate readability. For upper secondary education, readability is considered practical when it falls within levels 10 to 12 on the Fry Chart (Hidayati et al., 2018).

Results and Discussion

The conducted research has led to the development of an e-book focused on biodiversity, drawing from the local wisdom found in the Telaga Sarangan Larung Tumpeng tradition. This resource is designed to enhance argumentation skills among students. Analysis conducted by the researcher reveals that students in grade X at SMA Negeri 13 Surabaya have a significant need for electronic teaching materials to facilitate their learning process. During the analysis phase, the needs of the students and the learning objectives were thoroughly examined to ensure that the development of these teaching materials effectively

addresses their requirements and achieves the intended educational outcomes (Kusumaningtyas & Handayani, 2021).

The design stage of creating an e-book involves several key steps. First, it is essential to establish a systematic e-book plan and determine the appropriate format for the e-book. Following this, a draft version of the e-book is created. The content of the e-book focuses on various aspects of biodiversity, integrating local wisdom throughout. Topics covered include the definition of biodiversity, its different levels, the richness of Indonesia's biodiversity, the benefits that biodiversity provides, and strategies for biodiversity conservation. Additionally, the e-book is designed to enhance learning by incorporating features that encourage the development of argumentation skills. This is achieved through questions that address six fundamental elements: claim, data, warrant, backing, qualifier, and rebuttal.

The next stage of the project is the e-book development phase. Here, we present a comprehensive e-book focused on biodiversity, drawing from the rich local wisdom found in the Telaga Sarangan Larung Tumpeng tradition. This e-book includes a striking cover, a well-organized table of contents, clear indicators for assessing argumentation skills, and a detailed exploration of how local wisdom is intricately linked to biodiversity.

(a) (b) (c) (d)

Figure 1. showcases the e-book on biodiversity based on local wisdom: (a) the e-book cover, (b) the table of contents, (c) the argumentation skills indicator page, and (d) the section discussing the relationship between local wisdom and biodiversity.

The evolution of education calls for innovative learning media that enhance interaction between teachers and students, especially in situations where remote learning is necessary. In this context, e-books serve as a valuable resource, offering diverse features like images, videos, and links that can deepen students' understanding of the subject matter (Muhammad et al., 2017). A prime example is the e-book developed around biodiversity, which is enriched with local wisdom from the Telaga Sarangan Larung Tumpeng tradition. This e-book is equipped with several engaging features, ensuring an enriching learning experience for students.

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Figure 2. An example of an image on an e-book worksheet.

Figure 3. An example video with a link to the e-book worksheet.

In addition to the features mentioned above, this e-book also offers tools to help students develop their argumentation skills. The available features include:

Figure 4. The Bio-Kelok Feature (Local Wisdom) helps students learn about the local traditions surrounding the Larung Tumpeng ritual at Telaga Sarangan in Magetan and allows them to practice their argumentation skills using claims and data elements.

Figure 5. The Bio-Info Feature provides information and questions related to biodiversity sourced from journals and the web. It also encourages students to hone their argumentation skills focusing on claims and data elements.

Figure 6. The Bio-Think Feature includes questions about biodiversity that are designed to develop argumentation skills related to claims, data, and warrants.

Figure 7. The Bio-Fact Feature offers factual information about Sarangan Lake and presents biodiversity-related questions that enhance argumentation skills pertaining to claims and data elements.

Figure 8. The Bio-Watch feature allows students to view videos related to biodiversity, explore the tradition of larung tumpeng, and practice their argumentation skills by focusing on claims and data elements.

Figure 9. The Bio-Evaluation feature includes evaluation questions designed to enhance understanding of biodiversity concepts based on local wisdom, helping to develop six key elements of argumentation skills.

This e-book has been reviewed by two groups of experts: material experts and education experts. The review looked at three main areas: how well the content is presented, the quality of the content itself, and the clarity of the language used. Before the e-book was reviewed, it went through several revisions to identify and fix issues related to both the material and the design. The final version received feedback from the experts, highlighting some problems. These included mistakes in formatting, incorrect citations for images, and learning objectives that did not fully align with the skills related to argumentation.

We developed an e-book and asked expert lecturers to evaluate it to check if it is suitable for use. The evaluators assessed the e-book, and we analyzed their feedback using a simple scoring system with a scale from 1 to 4. A score of 1 means poor, 2 means fair, 3 means good, and 4 means excellent. We looked at various aspects, including how well the presentation works (see Table 3), the content quality (see Table 4), and the clarity of the language (see Table 5). Below are the results of the evaluation for our e-book on biodiversity, focusing on the local wisdom from the Telaga Sarangan Larung Tumpeng tradition, starting with the presentation validity found in Table 3.

Table 3. Serving Validity Components Table

Serving Validity Components	Total validation score		Total average validation score	Total validation score percentage	Category
	V1	V2			
Display Aspects	4	3.67	3.84	95.84%	Very Valid
Aspects of the Lesson	4	3.6	3.8	95%	Very Valid
Usage Aspects	4	4	4	100%	Very Valid
Image Aspects	4	3.67	3.84	95.84%	Very Valid
Video Aspect	4	4	4	100%	Very Valid

This e-book explores biodiversity materials based on the local wisdom of the Telaga Sarangan Larung Tumpeng tradition. It is designed with several important aspects in mind: appearance, layout, usability, imagery, and multimedia content. To make it more appealing, the e-book includes engaging visuals, informative videos, and links to additional resources (Azizah & Budijastuti, 2021). The design focuses on clear font choices and balanced colors to create an enjoyable reading experience. For usability, this e-book works on both modern laptops and smartphones, making it easy for users to access and navigate (Nahriyah & Rachmadiarti, 2023). These elements aim to promote deeper student engagement with the material.

The content of the e-book is aligned with specific learning objectives, ensuring that it covers the necessary scope and depth for a comprehensive understanding of biodiversity concepts. It effectively illustrates these concepts through the lens of the Telaga Sarangan larung tumpeng tradition, highlighting the unique relationship between local wisdom and biodiversity. The exploration of biodiversity within this cultural tradition serves as a valuable resource for educational development. The Larung Tumpeng tradition of Telaga Sarangan embodies significant local wisdom that offers valuable lessons about the use of biodiversity in daily community life. This tradition highlights the importance of diversity within the realm of cultural practices and serves as a prime example of the various forms of biodiversity manifested in tumpeng (a traditional rice dish). Moreover, it illustrates how the local community benefits from and actively engages in the conservation of biodiversity. The principles embedded in this cultural tradition provide an excellent foundation for developing argumentation skills among students. In the context of the biodiversity e-book focused on the

local wisdom of the Telaga Sarangan Larung Tumpeng tradition, the argumentation skills have been evaluated, receiving a score of 4. This rating indicates that the material is well-suited for training students in argumentation, particularly regarding the components of claims, data, warrants, backing, qualifiers, and rebuttals.

Table 4. Table of Content Validity Components

Content Validity Components	Total validation score		Total average validation score	Total validation score percentage	Category
	V1	V2			
Aspects of Material Compatibility with the Independent Curriculum	4	3.75	3.88	96.88%	Very Valid
Material Aspects	4	4	4	100%	Very Valid
Aspects of Local Wisdom	4	3.8	3.9	97.5%	Very Valid
Aspects of Argumentation Skills	4	4	4	100%	Very Valid
E-book Systematics:					Very Valid
E-book Cover	4	3.75	3.88	96.88%	Very Valid
Introduction	4	3.86	3.93	98.21%	Very Valid
Fill:					Very Valid
Sub-material on the Definition of Biodiversity	4	3.88	3.94	98.44%	Very Valid
Sub-material on Biodiversity Levels	4	3.88	3.94	98.44%	Very Valid
Sub-material on Indonesian Biodiversity	4	3.75	3.88	96.88%	Very Valid
Sub-material on Biodiversity Benefits	4	3.88	3.94	98.44%	Very Valid
Sub-material on Biodiversity Conservation	4	3.88	3.94	98.44%	Very Valid
Cover	4	4	4	100%	Very Valid

The introduction of the e-book includes instructions on how to use it and features that make it easier to navigate. It introduces argumentation skills in the bio-argumentation feature and connects the local wisdom of the Larung Tumpeng tradition from Telaga Sarangan with biodiversity in the bio-curve feature. This helps students better understand the e-book's content. The e-book's structure on biodiversity includes a bio-think feature that allows students to practice argumentation skills, such as making claims, providing data, and explaining warrants. Additionally, the bio-info feature offers information about biodiversity based on local wisdom and helps build argumentation skills through claims and data. The bio-watch feature offers videos on biodiversity and traditional events like the Telaga Sarangan larung tumpeng. The bio-fact feature provides information on local facts to deepen understanding. The bio-curve feature shares local management wisdom to support biodiversity conservation studies. Finally, the bio-evaluation feature offers exercises on

biodiversity that integrate local wisdom and hone skills in argumentation (claims, data, warrants, etc.).

Table 5. Language Validity Components Table

Language Validity Components	Total validation score		Total average validation score	Total validation score percentage	Category
	V1	V2			
Communicative	4	4	4	100%	Very Valid
Easy Sentences Understood	4	4	4	100%	Very Valid
Businesslike	4	3	3.5	87.5%	Very Valid
PUEBI compliant	4	4	4	100%	Very Valid

The validity of the language in an e-book is crucial and encompasses several key aspects that ensure it meets established standards and facilitates clear understanding for the reader. In our e-book, we rigorously assess the validity of the language by focusing on communication effectiveness, ease of understanding, clarity, and adherence to PUEBI (General Guidelines for Indonesian Spelling). Our biodiversity material, rooted in local wisdom, is developed using standardized language that is fully compliant with PUEBI, ensuring a high-quality reading experience. Using language that is easy to understand and appropriate for students' developmental levels makes it easier for them to grasp the concepts being taught (Mahrawi et al., 2023).

The practicality of e-books can be evaluated through the e-book readability test, which assesses the clarity and ease of understanding of the text. This test involves extracting a sample of one hundred words from the discourse and calculating the number of syllables in Indonesian. The total syllable count is then multiplied by 0.6, and the resulting figure is represented on a Fry Chart for further analysis. Several factors influence the readability level of a text, including the number of sentences, the total syllables, and the grammar used. When developing teaching materials, it is essential to ensure that students can comprehend the reading content effectively. This requires aligning the reading specifications with the readability level and cognitive abilities of the students. Consequently, adjustments must be made to language use, sentence structure, and word choice to match the maturity level of the learners (Umbaryati, 2016). For a clear overview of the e-book readability test results, please refer to Table 6, which summarizes the findings.

Table 6. Recapitulation Table of Readability Test Results

Sample Reading	Yard	Sentence Count	Syllable Count x 0.6	Level
Bio-argumentation features	IX	7	168	11
Bio-watch features	5	5	139.8	8
Bio-think features	8	5	157.2	10
Bio-info features	29	6	154.2	9
Bio-fact features	38	6	146.4	8
Bio-curve features	45	6	160.8	10
Bio-evaluation features	50	7	148.8	8
Average Amount		6	168	12

The calculation of the average number of sentences and syllables has been effectively transformed into a Fry graph, as illustrated in Figure 2.

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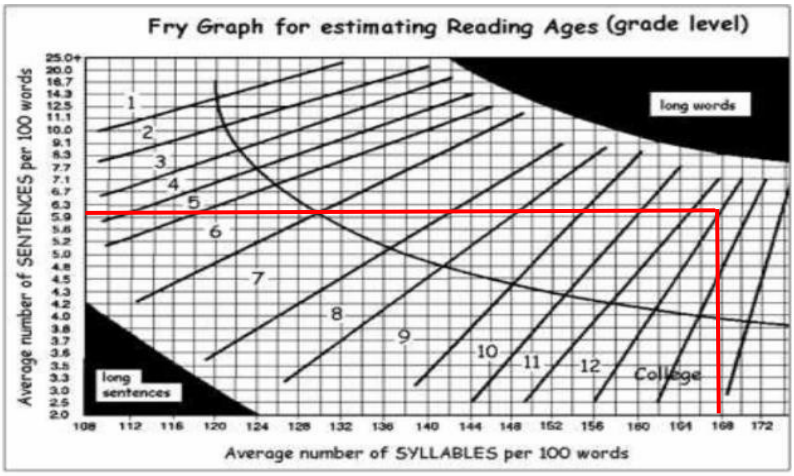

Figure 10. Readability Conversion Results on Fry Graph

The readability test results, as demonstrated by the Fry Graph (Figure 10), indicate that the biodiversity e-book centered on the local wisdom of the Telaga Sarangan larung tumpeng tradition is well-suited for high school students in class X, as it aligns with their cognitive development level. A higher readability level typically facilitates understanding, whereas a lower readability level can pose challenges. This emphasizes the importance of tailoring discourse to the appropriate readability level for the intended audience, ensuring that it effectively engages and educates the students (Nuryani, 2016).

E-books are considered feasible when they fulfill certain criteria, specifically theoretical feasibility and empirical feasibility (Ristanti & Rachmadiarti, 2018). The development of an e-book focused on biodiversity material, rooted in the local wisdom of the Telaga Sarangan larung tumpeng tradition, showcases strong theoretical feasibility. This is evident from the validity results across the key aspects of presentation, content, and language. Additionally, its empirical feasibility is affirmed through favorable outcomes from the readability test. The conceptual implication of this study's results lies in its contribution to developing learning media focused on biodiversity materials rooted in local wisdom. As noted by Andriani & Hadijah, (2021), there is still a scarcity of learning media with this type of content. On a practical level, it remains essential to reevaluate the effectiveness of this e-book as a learning medium for a broader audience of students.

Conclusion

The research shows that the validation results yielded an average score of 3.9, categorizing the e-book as very valid. This evaluation took into account various aspects such as presentation validity, content validity, and language validity. Additionally, the practicality of the e-book is evaluated through a readability test, which indicates a reading level appropriate for tenth-grade students. The e-book achieved a readability level of 12, classified as very positive and suitable for its intended audience. The study clearly demonstrated that the e-book focused on biodiversity, grounded in the local wisdom of the Larung Tumpeng tradition at Telaga Sarangan, is both valid and practical for enhancing the argumentation skills of X-grade high school students.

Recommendation

In biology learning activities, especially biodiversity materials, a teacher must be creative in using an approach that is able to make students grasp the lessons given, especially the demands of the "independent" curriculum to raise the theme of local wisdom. Then for

further research, we recommend testing the effectiveness of the use of the e-book "Biodiversity Material Based on Local Wisdom of the Telaga Sarangan Larung Tumpeng tradition to train argumentation skills in students" on the learning process in a much wider range of students.

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