



Development Local Culture-Based Science E-Supplements with “Gerakan Kebiasaan Anak Indonesia Hebat” on Additives Substance

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Abstract

Science learning on additive materials in schools has not yet utilized local culture as a learning context, resulting in a gap between students' real-life experiences and the scientific concepts studied in the classroom. “Gerakan 7 Kebiasaan Anak Indonesia Hebat” carried out by the Ministry of Primary and Secondary Education which is designed as a strategy in building positive habits in learning, especially the habits of liking to teach, eating healthy and nutritious, and socializing. This study aims to develop a science e-supplement based on the local culture of Kapuas Hulu Regency and to examine its feasibility and user responses. The development model used is ADDIE, limited to the Development stage. The research procedures include needs analysis through teacher interviews, design and development of the e-supplement, and validation by material, media, and language experts. Teacher and student responses were collected using questionnaires. The validation results indicate that the e-supplement is categorized as highly feasible, with scores of 95.50% (material), 95.21% (media), and 95.83% (language). Teacher response results reached 91.66%, while student responses in small-scale and large-scale trials reached 97.34% and 98.62%, respectively. These findings show that the local culture-based science e-supplement is easy to use, engaging, and helps improve conceptual understanding. Therefore, the e-supplement is suitable to be used as supplementary teaching material in science learning.

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INTRODUCTION

Education is an effort that must be passed down from one generation to another (Rahman *et al.*, 2022). According to Rahman *et al.*, (2022) ducation is a planned activity aimed at developing students' potential, including spiritual strength, self-awareness, personality, intelligence, noble character, and skills needed both individually and socially. Therefore, education plays an essential role in enhancing students' potential, both in soft skills and hard skills. The rapid development of technology in the globalization era requires the education sector to adapt, especially in the learning process (Lailan, 2024). The Ministry of Education, Culture, Research, and Technology has responded to this challenge by implementing the Merdeka Curriculum, which focuses on student-centered learning and the integration of technology (Zakso, 2023). The use of technology in learning can make teaching more

effective, interactive, and engaging for students (Suyuti *et al.*, 2023).

One important aspect of the Merdeka Curriculum is the development of innovative teaching materials that not only emphasize cognitive understanding but also connect learning with local cultural contexts and character education. E-supplement teaching materials function as a means of enriching knowledge and supporting students' multidimensional development beyond textbooks (Anharuddin & Prastowo, 2023). According to the Regulation of the Minister of Education, Culture, Research, and Technology of the Republic of Indonesia (Permendikbudristek No. 25 of 2022, Article 7 Paragraph 2), enrichment books both fiction and nonfiction serve to broaden students' knowledge and insight. In line with technological advancements, e-supplements are a relevant solution due to their

flexibility and accessibility anytime and anywhere (Istifadah *et al.*, 2020). The Merdeka Curriculum also provides flexibility in designing contextual learning that is relevant to students' lives and local characteristics (Wahyudin *et al.*, 2024). This approach helps students understand science in everyday life, one of which is through integrating local culture into the learning process. Previous studies have shown that the integration of local culture in learning is highly effective, as it increases students' interest, enthusiasm, motivation, and strengthens cultural identity (Azizah & Premono, 2021; Amaliyah *et al.*, 2023). Local culture-based teaching materials can serve as an alternative for teachers, motivating students to engage more actively in learning (Amalia *et al.*, 2023). However, observations at SMPN 3 Satu Atap Bunut Hilir indicate that teachers have not yet integrated local cultural contexts, especially in teaching additive materials. due to experiencing difficulties in designing learning that integrates local culture into the material to be taught. Teachers face challenges in integrating local culture into science learning due to the applied nature of science, students' limited prior knowledge of local traditions, and time constraints in preparing culturally-based learning (Khasanah *et al.*, 2025). This situation creates a gap between students' real-life experiences and the scientific concepts learned in class.

To bridge this gap, it is necessary to develop a science e-supplement based on the local culture of Kapuas Hulu Regency. This e-supplement utilizes examples of local foods such as kerupuk basah, balor, and dodol prenggi as learning contexts for additive materials. The integration of local culture aligns with the values of the "Gerakan 7 Kebiasaan Anak Indonesia Hebat" yang diusung oleh Kementerian Pendidikan Dasar dan Menengah yang dirancang sebagai suatu strategi dalam membangun kebiasaan positif dalam pembelajaran, diantaranya yaitu, bangun pagi, beribadah, berolahraga, makan sehat, gemar belajar, bermasyarakat, dan tidur cepat (Kemendikdasmen, 2025). Akan tetapi dalam penelitian ini hanya membahas khususnya kebiasaan gemar belajar, makan sehat dan bergizi, serta bermasyarakat.

The purpose of this study is to develop a local culture-based science e-supplement integrating the "Gerakan Kebiasaan Anak Indonesia Hebat" on additive material that is feasible for use in learning, based on validation results and responses from teachers and students. This product was chosen in PDF (Portable Document Format) format compared to print media because it has various advantages that

are relevant to learning needs in the digital era, one of which is flexibility that can be accessed anywhere and anytime via mobile devices and only needs to be downloaded once and can be accessed repeatedly without using the internet continuously so that it is suitable for areas that lack internet access. This product is expected to serve as an alternative contextual digital teaching material, enhance students' conceptual understanding, and foster appreciation for local culture.

METHODS

Population and Sample

This study was conducted at SMPN 3 Satu Atap Bunut Hilir and MTsN 2 Kapuas Hulu, West Kalimantan Province. The research subjects were Grade VIII and XI students in the 2024/2025 academic year. The total population consisted of 41 students. A small-scale trial involved 8 students selected based on high, medium, and low academic ability levels to examine their responses to the developed e-supplement. After receiving feedback and making revisions, a large-scale trial was conducted with 30 randomly selected students, along with responses from two science teachers.

Research Procedure

This study employed a Research and Development (R&D) method using the ADDIE development model (Analysis, Design, Development, Implementation, and Evaluation) (Branch, 2009). However, this study was limited to the Analysis, Design, and Development stages. The following development procedures can be seen in figure 1.

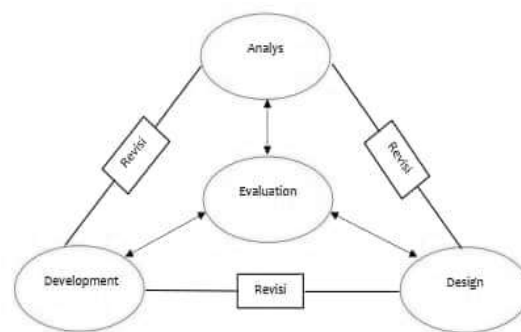


Figure 1. Development Research Procedures (Branch, 2009)

In the analysis stage, interviews were conducted with science teachers at SMPN 3 Satu Atap Bunut Hilir to identify problems and analyze needs. The findings revealed that local culture had not been integrated into science learning, particularly in additive material topics, and that e-supplements or enrichment books were not yet utilized effectively in determining learning outcomes and objectives.

In the design stage, a storyboard was created to systematically organize the media design from the beginning, ensuring that the flow of content aligns with the learning objectives. Furthermore, the product was designed in detail, starting from the cover layout to the main content, using Canva on both laptop and mobile devices to ensure that the appearance is attractive and relevant for the e-supplement being developed. At this stage, validation instruments and response questionnaires for teachers and students were also developed to ensure that the final product meets the quality standards and feasibility criteria of a well-developed e-supplement. Validation sheets play an important role in the product or instrument development process, as they function as tools to accurately measure what is intended to be measured (Delma *et al.*, 2023). The validation instruments consisted of material validation, language validation, media validation, and response questionnaires for teachers and students. These instruments obtained a validation coefficient value greater than 0.8, which falls under the “very valid” category. Therefore, it can be concluded that the research instruments are appropriate for use (Retnawati, 2016).

In the development stage, local culture-based chemistry teaching materials integrated with the “Gerakan Kebiasaan Anak Indonesia Hebat” dimension were developed using Microsoft Word and Canva. The content was designed in accordance with the themes and subthemes in science learning, particularly on the topic of additive substances. In addition, appropriate and engaging images and design elements were selected and integrated into the e-supplement to produce a local culture-based science e-supplement. The product was then validated by experts, covering material, language, and media aspects. Following the validation process, the product was revised based on the experts’ evaluations and suggestions. After revision, the e-supplement was tested through response trials involving teachers and students at SMPN 3 Satu Atap Bunut Hilir and MTsN 2 Kapuas Hulu.

Data Analysis

The developed science e-supplement was subsequently validated based on three aspects: material, language, and media, using a Likert scale with the following rating criteria: strongly agree (4), agree (3), disagree (2), and strongly disagree (1). The research data were analyzed using both qualitative and quantitative analysis techniques. The validation results were calculated using the Gregory matrix, as presented in Table 1. The Gregory validity coefficient

formula was applied to determine content validity based on evaluations from two experts using cross-tabulation analysis.

Table 1. Matriks Gregory

		Validator 1	
Cross-Tabulation		Irrelevant score 1-2	Very Relevant Score 3-4
Validaor 2	Irrelevant Score 1-2	A	B
	Very Relevant Score 3-4	C	D

(Gregory, 2000)

The assessment of the suitability of each expert can be calculated using following formula.

$$\text{Validity Coefficient} = (A+B+C+D)$$

- A : Both validators rate as irrelevant
- B : Validator 1 relevant, Validator 2 irrelevant
- C : Validator 1 irrelevant, Validator 2 relevant
- D : Both validators rate as relevant

This formula is used to determine the validation of a developed product based on the scores given by the validator. From these validity results, the calculation results are calculated according to the validity coefficient agreement index criteria in Table 2.

Table 2. Validity Criteria for Science E-supplements.

Coefficient	Validity
0,81 – 1,00	Very High Validity
0,61 – 0,80	High Validity
0,41 – 0,60	Moderate Validity
0,21 – 0,40	Low Validity
0,00 – 0,20	Very Low Validity

(Meivinia *et al.*, 2023).

The obtained index criteria are converted into the form of percentage intervals of the e-supplement eligibility criteria for IPA based on table 3.

Table 3. Science e-supplement eligibility criteria interval.

Interval	Criteria
81% - 100%	Very Feasible
61% - 80%	Feasible
41% - 60%	Fairly Feasible
21% - 40%	Not Feasible
0% - 20%	Highly Infeasible

(Riduwan, 2016).

Percentage intervals are used to clarify the feasibility value of the product being developed. The student response test was conducted after the validation of the science e-supplement by experts. The sampling technique employed a questionnaire as the response instrument. The use of questionnaires in this study provides the advantage of facilitating the collection and acquisition of the required data. The responses were then calculated to obtain the response scores of both teachers and students using the following formula (Akbar, 2015)

$$V\text{-pg} = TSe/TSh \times 100\%$$

V-pg : User validity score

TSe : Total empirical score obtained

TSh : Maximum possible score

Based on the results of the response test percentage obtained from the response test analysis, it can then be categorized into assessment criteria based on the Likert scale as in table 4.

Table 4. Interpretation Criteria for Response Test Assessment Scores.

Achievemnt Criteria	Category
85,01 – 100%	Very Good
70,01 – 85,00%	Good
50,01 – 70,00%	Fair
01,00 – 50,00%	Poor

(Akbar, 2015)

RESULTS AND DISCUSSION

The result of this study is a local culture-based science e-supplement of the Kapuas Hulu Regency community, integrating the “Gerakan Kebiasaan Anak Indonesia Hebat” dimension on additive material for junior high school students. The e-supplement is presented in PDF (Portable Document Format) to allow access anytime and anywhere without requiring an internet connection. The purpose of this study is to determine the validity level of the science e-supplement and to analyze the responses of teachers and students toward the developed product. The stages carried out in this study include three main steps: analysis, design, and development.

The analysis stage was conducted through interviews with science teachers at SMPN 3 Satu Atap Bunut Hilir. It was found that the school had implemented the Merdeka Curriculum in its learning process. However, in teaching additive material, teachers had not yet connected the content with the local culture of the Kapuas Hulu Regency community, such as the example of traditional food *kerupuk basah*. This finding is consistent with the study by Sumarni *et al.*, (2024), which states that the integration of local cultural values in the learning process can enhance students’ understanding, making learning more meaningful.

So far, teachers have relied solely on textbooks as the main teaching material and have not utilized supplementary materials. In addition, although the school has been designated as a *Sekolah Penggerak* (driving school), the implementation of the “Gerakan 7 Kebiasaan Anak Indonesia Hebat” program initiated by the Ministry of Primary and Secondary Education is still in the planning stage and has not been fully implemented in the classroom.

The results of this analysis indicate that there is still a gap between curriculum policy and classroom practice, particularly in the implementation of contextual learning based on local culture and the strengthening of students’ character. Based on these findings, a theoretical review was conducted, leading to the development of a local culture-based science e-supplement for the Kapuas Hulu Regency community integrated with the “Great Indonesian Children Movement” dimension.

In the design stage, a science e-supplement was developed to be relevant to learning outcomes, engaging, simple, and interactive, using a digital platform that is easily accessible via mobile devices and computers. This is in line with the study by Magdalena *et al.*, (2020), which states that good teaching materials should align with learning achievement standards, motivate students, be organized from simple to more complex concepts, and be easily accessible. The visual design of the science e-supplement was created using Canva by combining soft color schemes and illustrations characteristic of the Kapuas Hulu region to foster students’ sense of connection with local culture.

The design process included creating the layout of the e-supplement, organizing the learning materials, and integrating local cultural elements such as images, descriptions, and brief information about traditional Kapuas Hulu foods, namely *kerupuk basah*, *balor*, and *dodol prenggi*. Each section of the e-supplement is equipped with learning outcomes, learning objectives, material explanations, and structured tasks integrated with the “7 Habits of Great Indonesian Children” program.

In addition, during this stage, validation instruments were developed for material experts, language experts, and media experts to assess content feasibility, language appropriateness, presentation, and graphical aspects. This design framework then served as a reference in the development stage to produce an e-supplement storyboard that was ready for validation and limited response testing.

In the development stage, validation and response tests were conducted on the developed science e-supplement. The product feasibility test was carried out by experts to determine the level of feasibility of the e-supplement. In this study, the feasibility test involved six experts, consisting of two material experts, two media experts, and two language experts. The average percentage results of the feasibility assessment across the three aspects are presented in Figure 2.

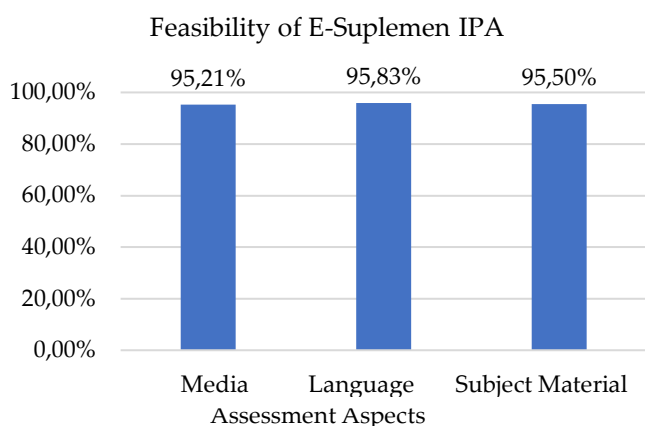


Figure 2. Percentage of Feasibility Assessment for Material, Media, and Language Aspects

The validation results indicate that the developed science e-supplement meets the feasibility criteria and is classified as “highly feasible” across the material, language, and media aspects, based on the Gregory coefficient calculation. A more detailed analysis of each feasibility aspect is presented as follows. Material validation was conducted by two subject-matter experts, covering three key aspects: presentation, content, and accuracy of the material. The results of the analysis show an average score of 95.5%, indicating a very high level of validity. These findings are illustrated in Figure 3.

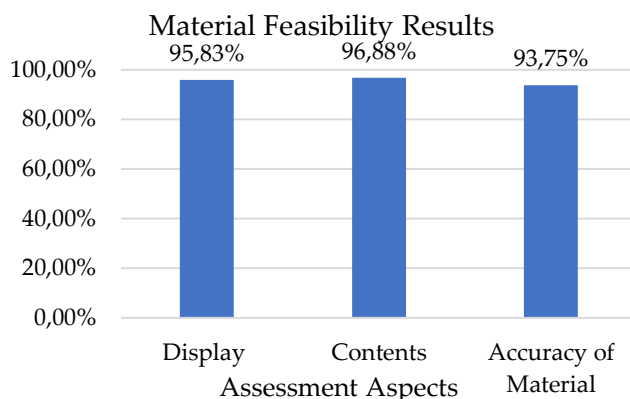


Figure 3. Bar Chart of Material Feasibility Results.

The results presented in the figure above show an average feasibility percentage of 95.83% for the presentation aspect, 96.88% for the content aspect, and 93.75% for the accuracy of the material. Thus, the material feasibility of the developed science e-supplement can be categorized as “highly feasible,” as it falls within the range of 81%–100% (Riduwan, 2016).

The material feasibility assessment consists of three aspects: presentation, content, and material accuracy. Therefore, it can be concluded that the material in the developed science e-supplement is classified as highly feasible. The presentation aspect









obtained a score of 95.83%, which falls into the “highly feasible” category. However, several suggestions and comments from experts indicated that the term “functional” in the material presentation needs to be clarified using simpler language to enhance students’ understanding.

The suggested revisions can be seen in Table 5. This improvement aims to ensure that the material is presented in an engaging, creative, simple, and clear manner. The content aspect achieved the highest score, with 96.88%, which is also categorized as “highly feasible.” However, several suggestions and comments were provided by the experts regarding the presented material. The concept of saturation in the addition of saltwater needs further clarification. In addition, the function of adding “tapioca flour” should be explained more clearly to ensure that the concepts are easier for students to understand. Structured tasks should also include a list of tools and materials in the procedure for preparing local traditional foods, as this would help students better prepare before starting the activity. The suggested revisions can be seen in Table 5.

These results indicate that the images presented are appropriate in function, aligned with the material, and easy to understand. This statement also aligns with research by Magdalena et.al., (2021), which states that images make the material presented easier for students to understand, and matching the images to the material can clarify the concepts presented. The assessment also shows that the e-supplement is capable of providing comprehensive conceptual understanding to students. Meanwhile, the material accuracy aspect obtained a score of 93.75%, which still falls within the “highly feasible” category. Several suggestions from experts were related to the inclusion of acceptable daily intake limits for MSG based on WHO and BPOM standards, so that students can better understand safe consumption levels.

These suggested improvements are also presented in Table 5. The obtained scores indicate that the material is consistent with expert concepts and is appropriate for the educational level of the students. This is in line with research from Satriani (2024), the material taught must be relevant and appropriate to the level of the educational unit. Although the score is slightly lower than the other two aspects, the results still confirm that the level of material feasibility in the science e-supplement is very high. The comparison of the e-supplement before and after revision can be seen in the Table 5.

Table 5. The Results of Improvement to the IPA e-Supplement are Based On Comments and Expert Advice of The Material.

Before Revision		After Revision	
	<p>In the section on understanding additives, we only discuss additives in the form of preservatives.</p>		<p>In the section on the definition of additives, it has been changed to be broader, not only acting as preservatives.</p>
	<p>The function of adding tapioca flour has not been presented clearly and simply. The theoretical basis for the use of MSG, according to the WHO and BPOM, has not been added.</p>		<p>The function of adding tapioca flour is presented more clearly and simply. The theoretical basis for the use of MSG according to the WHO and BPOM is also added.</p>
	<p>The concept of saturation has not been added to the wet salting method on balor.</p>		<p>The concept of saturation in the wet salting method pn balors has been added.</p>
	<p>The tools and materials used in the procedure for making wet crackers have not been added.</p>		<p>The tools and ingredients used in making Kapuas Hulu regional specialties are included, so readers can prepare the tools and ingredients before beginning the activity.</p>

Media validation was also conducted by two experts in the field of media. This validation covered three aspects: media design, layout, and design attractiveness. The data are presented in Figure 4. The media feasibility results indicate that the local culture-based science e-supplement obtained an average score of 95.21%, which falls into the “highly feasible” category for use as a supplementary teaching material. The assessment covered three main aspects: media design, layout, and design attractiveness. The results of the media feasibility assessment are further described for each aspect.

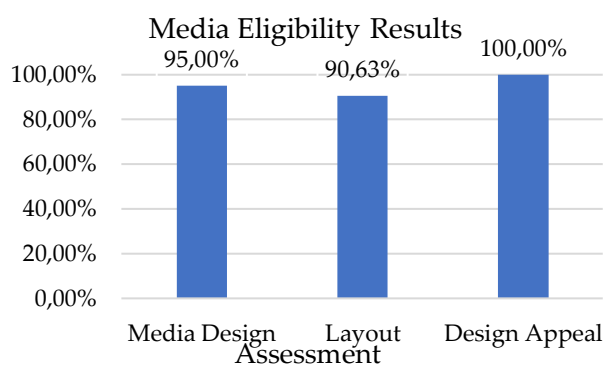


Figure 4. Bar Chart of Media Feasibility Results.





In the media design aspect, a score of 95% was obtained, which is categorized as highly feasible. Several suggestions and comments were provided regarding image size and visual appearance. For instance, the cover illustration should be adjusted, the class level should be added, and the images within the material should be enlarged to better utilize the available display space. The suggested revisions can be seen in Table 6. In addition, the score indicates that the use of text in the science e-supplement is appropriate and easy to understand, the font colors contrast well with the background, and the combination and composition of colors are harmonious according to expert validation. This is in line with research from Hulu DM et al. (2022), which states that harmony between color and text size is a crucial part in producing a clearer and more easily understood visual display in the product being developed. This demonstrates that the e-supplement effectively conveys information clearly and supports students' understanding.

Based on Figure 4, the layout aspect obtained a score of 90.63%, which is also categorized as highly feasible. However, several suggestions and comments were provided by experts regarding the positioning of title text, the placement of images using shapes to enhance clarity, the balance between text and images, the need to adjust font sizes proportionally, and the scaling and arrangement of logos according to their hierarchical levels. The suggested revisions can be seen in Table 6. The media

feasibility results indicate that the e-supplement has adhered to interface design principles that emphasize visual comfort and user-friendliness. This is in line with Amborse, (2005), who states that layout refers to the arrangement of design elements within a given space in accordance with overall design principles. In addition, according to Ismail & Yuniarti (2020) In Iwan et.al., (2025), the placement of well-structured and proportional elements can improve understanding of information well.

The design attractiveness aspect achieved the highest score of 100%, indicating that the e-supplement was considered highly attractive by the validators. High visual appeal is important for enhancing students' learning motivation, especially in science learning, which is often perceived as abstract (Febriana et al., 2024). Overall, the average feasibility score of 95.21% indicates that the developed e-supplement is suitable for use as an alternative teaching material. The high score in design attractiveness further reinforces that the integration of local culture in the science e-supplement is not only relevant but also effective in enhancing students' learning experiences. This is in line with research by Winda et.al.,(2025) which states that the presence of visually appealing teaching materials based on local contexts can increase love for local culture and knowledge. The comparison of the e-supplement before and after revision based on media feasibility results can be seen in the Table 6 below.

Table 6. Results of Improvements to The IPA e-Supplement Based On Suggestions and Comments from Media Experts.

Before Revision	After Revision
 <p data-bbox="414 1456 782 1624">On the cover, several regional ornamental elements are used, the logo design is not yet appropriate to the level and there is no class.</p>	 <p data-bbox="1069 1456 1436 1691">On the cover, the regional element was removed, a frame was placed on the cover, and a shadow photo was added to the cover, and a class was added, and the logo section was given a white rectangular element.</p>
 <p data-bbox="414 1780 782 1948">The image display is small so that the page space is not filled to the maximum, and the arrow color is black so that the part shown is not clearly visible.</p>	 <p data-bbox="1069 1780 1436 1948">The image display is enlarged to maximize the space, and the arrow color is changed to yellow so that the indicated part is clearly visible.</p>



Language validity was also assessed by two language experts. This validation covered four aspects: conformity with language rules, clarity, communicativeness, and overall language use. After the analysis, an average score of 95.83% was obtained. The data are presented in Figure 5.

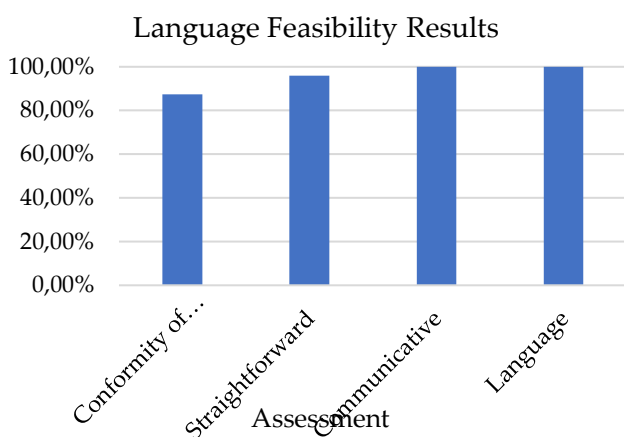


Figure 5. Bar Chart of Language Feasibility Results.

The assessment covered four aspects: conformity with language rules, clarity, communicativeness, and overall language use. In the aspect of conformity with language rules, a score of 87.50% was obtained, indicating that, in general, the use of spelling and punctuation is consistent with standard Indonesian language conventions. However, several parts were still recommended for revision to better align with proper language rules. The revised results can be seen in Table 7.

The clarity aspect obtained a score of 95.83%, which falls into the “highly feasible” category. However, there were several suggestions and comments, particularly regarding the cover title, where the word “Garakkan” needed to be corrected to “Gerakan” to ensure proper meaning and the use of standard language. This indicates that the language used should employ standard terminology, appropriate sentence structure, and effective sentence construction. In line with research by Riswati (2015), it states that the use of effective and systematic sentences can support the ideas or

concepts presented. This is especially important for junior high school students, who require simple yet informative language to enhance their understanding of science concepts. The revised results can be seen in Table 7.

The communicative aspect achieved a score of 100%, indicating that the language presentation in the e-supplement is easy to understand and effectively bridges communication between the material and students by connecting the content to real-life contexts. In line with research from Fitriani & Pranata (2021) in Iwan et.al.,(2025) it was stated that the use of communicative and easily understood sentences by students that link to relevant context can help students understand the material presented. Finally, the overall language aspect also received a score of 100%, confirming that the use of Indonesian language adheres to standard conventions, with clear and effective messaging that supports the learning process. This finding is in line with research from Handayani et.al., (2018), which states that the accuracy of the use of Indonesian in teaching materials greatly influences the level of user understanding.











It can be concluded that the language used in the science e-supplement helps students understand the presented material. This finding is consistent with Febriana et al. (2024), who state that the use of communicative and effective Indonesian language can facilitate students’ comprehension of learning materials. The comparison of results before and after revision can be seen in the Table 7.

After the science e-supplement had been validated and revised based on the suggestions and comments from the validators, a response test was conducted involving two science teachers and students who had studied the topic of additive substances. The participants consisted of 8 students in a small-scale trial at SMPN 3 Satu Atap Bunut Hilir and 30 students in a large-scale trial at MTsN 2 Kapuas Hulu. The purpose of this response test was to determine the perceptions of teachers and students

regarding the developed science e-supplement based on the assessed aspects. In the teacher response test, questionnaires were administered covering aspects

of display feasibility, material, and usability. The results of the teacher response questionnaire are presented in Figure 6.

Table 7. Results of Improvements to The IPA e-Supplement Based on Suggestions and Comments from Media Experts.

Before Revision		After Revision	
	<p>In the title section, the word "Gerakan" is still not standard, so it changes the meaning of a sentence.</p>		<p>In the title section, it was changed to "Gerakan" so that meaning of the sentence is correct.</p>
	<p>In the section on classifying additives, the use of the pin element differentiates the groups so that inappropriate punctuation is not used.</p>		<p>In the section on classifying additives, the use of pins is replaced with numbers so that it is in accordance with the rules in scientific writing.</p>
	<p>In the section on the function of additives, periods are used to explain their function, so the correct punctuation is not used according to scientific writing rules.</p>		<p>In the section on the function of additives, the use of dots is changed to numbers so that it is in accordance with scientific writing rules.</p>
	<p>In the section on additives, the use of dots aims to explain the function of the added substance, so it does not comply with writing rules.</p>		<p>In the additives section, the use of dots is changed to letters to better suit scientific writing rules</p>
	<p>In the glossary section, use dots to separate each word that needs to be explained.</p>		<p>The use of periods in the glossary has been changed to numbers to better comply with scientific writing rules.</p>

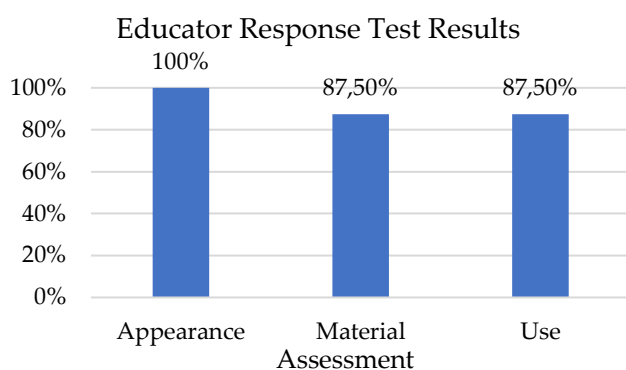


Figure 6. Results of The Average Percentage of Educator Response Tests

Based on Figure 6, the average percentage of the three assessed aspects was calculated, resulting in a score of 91.66%, which falls into the “very good” category. Thus, it can be concluded that the developed science e-supplement received a positive response from science teachers. The display feasibility aspect obtained a score of 100%, categorized as very good. This indicates that teachers perceived the visual design of the e-supplement as highly attractive, consistent, and appropriate for students’ characteristics. An appealing visual design not only enhances the appearance of teaching materials but also helps reduce students’ learning fatigue. In line with the findings of Fatniaton Adawiyah (2025), it was stated that interesting teaching materials such as pictures and project assignments can increase students’ interest in learning. The material aspect obtained a score of 87.5%, indicating that the content is considered good and relevant, although there is still room for improvement, such as adjusting the depth of the material or adding more contextual examples.

This finding is in line with Azizah & Premono, (2021), who state that local culture-based materials should be presented systematically and in an easily understandable manner to enhance meaningful learning. Furthermore, effective teaching materials present content aligned with learning outcomes, are systematically organized, accurate, and follow the development of knowledge, thereby providing comprehensive understanding and preventing misconceptions (Apriliani *et al.*, 2022).

The usability aspect also obtained a score of 87.5%, indicating that the e-supplement is easy for teachers to use in terms of navigation and accessibility. This suggests that the developed science e-supplement facilitates the learning process and can be adapted to meet students’ needs, both individually and in groups. Additionally, its ease of use supports its practical implementation in classroom learning.

The next step was a small-scale response test conducted with 8 students at SMPN 3 Satu Atap Bunut Hilir who had already studied the topic of additive substances. The small-scale response test of the science e-supplement covered aspects of display, language, material, and usability. The average percentage results of the students’ small-scale response test are presented in Figure 7.

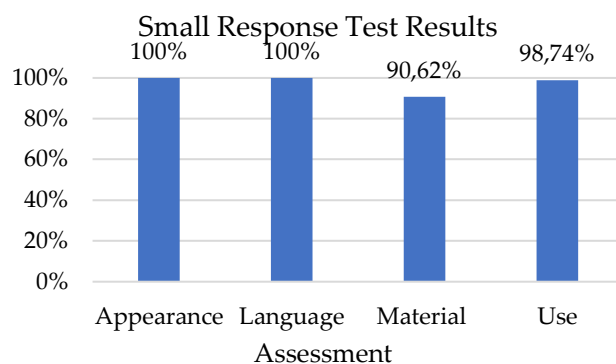


Figure 7. Results of The Average Percentage of Small-Scale Student Response Tests.

Based on Figure 7, after calculating the overall average of the four assessed aspects, the result obtained was 97.34%, which is categorized as “very good.” Therefore, it can be concluded that the developed science e-supplement is highly feasible for use in the learning process. The display aspect obtained an average score of 100%, categorized as very good. This indicates that students perceived the visual design of the e-supplement as highly attractive, clear, and supportive of readability.

Good visual design helps increase learning motivation and facilitates understanding. The language aspect also achieved a maximum score of 100%, indicating that the language used in the e-supplement is communicative, easy to understand, and appropriate for students’ characteristics. The use of appropriate language greatly assists students in understanding science materials, especially on the topic of additive substances. This finding is consistent with Febriana *et al.*, (2024), who state that appropriate language use can help students understand conceptual material in learning.

In the material aspect, the e-supplement obtained a score of 90.62%, which still falls within the “very good” category. This indicates that most students found the material to be relevant, well-structured, and easy to understand. The integration of material with local cultural contexts enables students to better comprehend science concepts, making science not merely theoretical but also practically applicable in real-life situations. This is in line with research by Azizah & Premono (2021), which states that a local

cultural approach in the learning process is very effective in increasing student interest in learning, enthusiasm, and motivation, and strengthening cultural identity.

The usability aspect obtained an average score of 98.74%, also categorized as very good. This indicates that students did not encounter difficulties in using or operating the science e-supplement, and that it can be accessed on electronic devices anytime and anywhere, both individually and in groups. Learning materials are considered easy to use if they meet the practicality criteria, namely, they are easy to use by both teachers and students, with a good level of implementation (Muktiranda et al., 2020).

Therefore, teaching materials are considered easy to use if respondents state that the developed teaching materials can be used easily, with a good category, as indicated by the results of the questionnaire responses. This ease of use further supports students in understanding the material presented in the e-supplement, whether independently or collaboratively.

The next step was a large-scale student response test conducted after the small-scale trial. This test involved 30 eighth-grade students at MTsN 2 Kapuas Hulu. An average score of 98.62% was obtained, which falls into the "very good" category. The average results are presented in Figure 8.

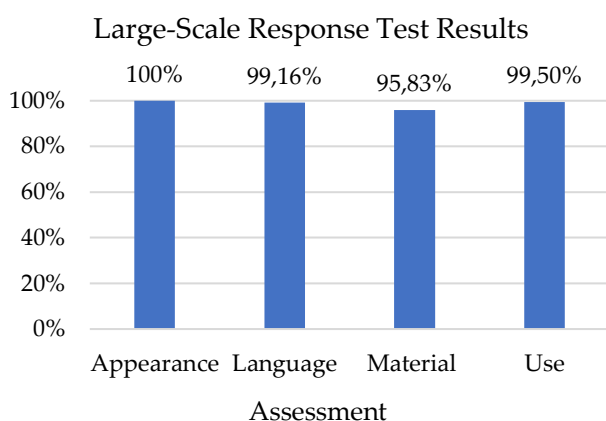


Figure 8. Average Results of Large-Scale Student Response Tests.

Based on Figure 8, the display aspect obtained an average score of 100%, which is categorized as "very good." This is attributed to the highly attractive design of the science e-supplement, with harmonious color combinations and well-organized layout elements. The visual design is engaging, with images, text, and elements arranged systematically and clearly, enabling students to understand the presented material more easily.

These findings are in line with research from Castro-Alonso & Sweller (2019) which states that well-organized visual design can attract students' attention and help students process information easily. The language aspect obtained an average score of 99.16%, which also falls into the "very good" category. This indicates that the language used in the e-supplement is clear, concise, and in accordance with proper Indonesian language rules. As a result, the language is easy for students to understand and does not create confusion in comprehending the material. In line with research from Sweller & Kalyuga (2011), it was emphasized that the use of simple and clear language can help students understand the material presented well.

In the material aspect, the e-supplement obtained an average score of 95.83%, which is categorized as very good. This achievement reflects that the content presented is easily understood by students and aligns well with the intended learning outcomes. This finding is consistent with Lestari and Wibowo (2022) in Handayani & Amrulloh, (2021), who state that contextualized material presentation can enhance students' conceptual understanding. The usability aspect obtained a score of 99.50%, also categorized as very good. This indicates that the developed science e-supplement can be used anytime and anywhere, and is accessible with adequate internet connectivity.

CONCLUSION

Based on the results of research and development, the science e-supplement based on local culture with the dimension of the movement of great Indonesian children on the material of additives was declared very valid with a score of 95.5% from the material aspect with an average score of 95.50%, the media aspect of 95.21% and the language aspect of 95.83% and received a very good response from educators and students with scores of 98.17% and 91.66% respectively. This research lies in the integration of local culture of the people of Kapuas Hulu Regency, especially on regional specialties by combining dimensions of 7 Kebiasaan Anak Indonesia Hebat program, namely, eating healthy and nutritious food, loving learning and being social. Thus, the science e-supplement based on local culture with the dimension of the movement of great Indonesian children on the material of additives was declared suitable for use in the learning process. Further research is recommended to be able to continue the trial of implementation thoroughly in the classroom to be able to assess the effectiveness of science e-

supplements on student motivation and learning outcomes.

RECOMMENDATION

The future development may extend to various educational levels, particularly in contexts with limited resources, by adjusting file complexity and access modes to ensure usability anytime and anywhere. The developed science e-supplement was implemented and evaluated.

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