Exploring Integrated Learning with Local Wisdom: Sendang Made Ecosystem E-book to Train Critical Thinking Skills for Class X High School Students

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Abstract: This research focuses on developing an integrated e-book that incorporates Sendang Made local wisdom into ecosystem material to enhance high school students' critical thinking skills. The study addresses the challenge of limited teaching materials due to the shortage of teachers capable of preparing suitable content for 21st-century learning, which emphasizes critical thinking and technology use. The Research and Development (R&D) method was employed using the ADDIE framework, encompassing analysis, design, development, implementation, and evaluation stages.nData was collected through validation by two biology lecturers, material experts, and media experts, as well as a readability test. The e-book received high validation scores: 3.73 for presentation, 3.73 for content appropriateness, and 3.54 for language appropriateness. The readability test indicated a level 10, aligning with the cognitive level of grade X high school students, and was categorized as very positive and appropriate. In conclusion, the integrated e-book is highly feasible and valid for enhancing critical thinking skills in grade X high school students, making it an effective tool for 21st-century learning.

Keywords: Critical thinking; E-book; Ecosystem; Local wisdom; Sendang made

Introduction

The independent curriculum in Indonesia is designed to equip students with 21st century skills, including critical thinking and digital literacy (Afandi et al., 2019; Isnaniah & Kurniawan, 2022). This curriculum is designed to provide freedom for educators in compiling learning materials that are contextual and relevant to local needs, as well as to encourage students to be active in the learning process. However, the implementation of this curriculum faces challenges, such as a lack of teacher understanding and students' dependence on traditional teaching methods (Yuhastina et al., 2020). To overcome these challenges, learning strategies were developed to improve students' learning skills, including information and digital literacy (Chaiyama, 2019). Through this, it is hoped that students can develop the skills needed to face various challenges in the future, including critical thinking and problem solving abilities.

Critical thinking is an important skill in the 21st century, especially in education (Raj et al., 2022). These skills include the ability to analyze information objectively, evaluate arguments, and make decisions based on logical reasoning (Indraswati et al., 2020). Critical thinking is a skill where students explore knowledge that has never been obtained before, both concepts and facts, by conducting direct experiments or trials in the field so that students do not only learn by memorizing activities. The critical thinking skills include 6 indicators, namely interpretation, inference, analysis, evaluation, explanation and self-regulation.

Research consistently shows the importance of critical thinking skills in understanding and solving environmental problems (Bustami et al., 2018; Purwanto, 2022) found that problem-oriented and contextual learning approaches, respectively, significantly improved students' critical thinking skills in the context of environmental issues (Supramono, 2010) further emphasizes the role of problem-based learning in developing these skills, particularly in creating a conducive learning environment (Straková & Cimermanová, 2018) highlights the need for teacher education programs to incorporate critical thinking skills training, particularly in the context of sustainable development. Teachers need to provide students with opportunities to think critically and develop their critical thinking skills through various activities and exercises that are relevant to the material being taught (Sulistyani et al., 2022).

Based on the results of an interview with one of the Biology teachers at MAN 1 Jombang, it shows that most students have not been able to master the learning material optimally, so that in some applicable problems, students sometimes make mistakes in answering and determining solutions to these problems. The use of teaching materials in Biology subjects has also not been integrated with local wisdom values in accordance with the demands of the Merdeka curriculum so that learning is not optimal because it is not contextual. Apart from that, the teaching materials used are limited to textbooks and PPTs provided by the teacher. The teacher has not provided examples of contextual and applicable material and questions around students in learning activities. The lack of teaching materials used is also due to the limited staff of teachers in preparing teaching materials that will be used in the classroom learning process.

To strengthen the lack of availability of teaching materials, researchers gave questionnaires to 76 randomly selected students. The results of the needs analysis showed that 52.6% of respondents (40 students) stated that material about ecosystems had not been integrated with local wisdom values in Jombang Regency. Then, related to the learning media used, 93.4% of respondents (71 students) used textbooks provided by the school; 36.8% of respondents (28 students) used PPT; 9.2% (7 students) used worksheets purchased independently by students; and as many as 1.3% (1 student) used smartphones and other sources considered relevant in classroom learning activities. From the questionnaire that was distributed to students, 100% of respondents (76 students) had smartphones and stated that they agreed to the development of e-books to support their learning process. Based on this information, it is very possible if researchers want to develop electronic teaching materials which can later be accessed by students via smartphones or laptops.

In facing increasingly complex environmental education problems, teaching materials are needed that are able to facilitate the development of critical thinking and problem solving skills. E-books as a digital learning medium offer an effective and flexible solution for this purpose. The use of e-books in environmental education has been proven to significantly improve students' cognition of the ecological environment (Jia et al., 2023). This is further enhanced when the problem posing framework is integrated into the e-book, leading to improved learning achievement, critical thinking, and deep motivation (Sung et al., 2019). Likewise, the integration of everyday problems and solutions regarding environmental pollution in e-books has been found to improve students' critical thinking (Nunaki et al., 2023). Furthermore, e-books can be easily accessed by students anytime and anywhere, thus supporting independent and continuous learning.

Learning based on local wisdom can then be integrated into Biology concepts, especially ecosystem material. The ecosystem is very closely related to the daily lives of students. Through this learning, students are given insight into ecosystems which can be raised as actual problems to think about and solve. The problem of diminishing local wisdom can be reduced and prevented by preserving it through formal learning (Mashami et al., 2023). Research has shown that integrating local wisdom into biology education can improve students' critical thinking skills (Ramdani et al., 2021), improve learning outcomes, and are effective in problem-based learning models (Wijaya & Yurnetti, 2023). This approach is particularly relevant in the context of ecosystem materials, as it can increase awareness and understanding of local environmental issues (Sarbaini et al., 2022). Therefore, integrating local wisdom into biological concepts, especially ecosystem material, can be a valuable strategy for improving students' learning experiences. it is necessary to develop a curriculum that includes identifying local wisdom in the environment where students live. This aims to ensure that educational goals can be achieved in accordance with the provisions of the law (Hikmawati et al., 2021).

The integration of local wisdom values in Biology teaching materials is very important for contextual and effective learning (Lestari et al., 2023; Ramdani et al., 2021; Wijaya & Yurnetti, 2023). Research has shown that the use of expedagogical models and Problem Based Learning (PBL) models based on local wisdom can increase student enthusiasm and improve learning outcomes (Lestari et al., 2023; Wijaya & Yurnetti, 2023). Furthermore, the development of a learning model

based on local wisdom has proven to be valid, practical and effective in improving student learning outcomes. The use of science teaching materials based on the 5E learning cycle which is integrated with local wisdom has also been proven to have a positive impact on students' critical thinking skills (Ramdani et al., 2021). These findings underline the importance of integrating local wisdom values in Biology teaching materials to improve the quality and relevance of learning.

One type of local wisdom in Jombang Regency is in Made Village, Kudu District. This local wisdom is in the form of community trust in components found in nature which are believed to have an influence on human life. For example, Made Village, Kudu District has a historical site in the form of Sendang Made which is still actively used by the community as a tourist destination and to meet community needs. around. Sendang Made itself is a pond ecosystem that was created during the Majapahit kingdom, whose water source is still sustainable today. Based on the results of an interview with the caretaker of Sendang Made (Mbah Supono), he said that there is trust from the local community to continue to maintain Sendang Made so that it remains beautiful and sustainable. Through the "Nguras Sendang" ritual which is held once a year in the ninth month of the Javanese calendar, as well as the belief not to cut down the tamarind and banyan trees in the area carelessly, the Sendang Made ecosystem remains maintained and sustainable.

This research develops an e-book that is integrated with the local wisdom values of Sendang Made, a cultural site that has historical and ecological significance for the local community. The integration of local wisdom values in teaching materials aims to provide a relevant and meaningful context for students, so that they can more easily understand and apply the concepts learned. Sendang Made, with the biodiversity and cultural values it contains, provides an ideal case study for learning ecosystem material. Through this approach, students not only learn about ecosystems theoretically, but also understand the importance of maintaining ecosystem balance in real life and minimizing the occurrence of misconceptions (Nurahman & Susantini, 2022).

Based on the description of the problem above, the researcher aims to develop an E-book on Integrated Ecosystem Material with Local Wisdom Values in Sendang Made to Train Critical Thinking Skills for Class

Method

The type of research used is research and development. Research and Development is a research method used to create or produce a particular product

according to research needs. To be able to produce certain products, research is used that is needs analysis and to test the effectiveness of the product (Sugiyono, 2015). The research carried out is development research, namely the development of an e-book integrated with local wisdom values in Jombang Regency to train students' critical thinking skills on ecosystem material. The development model that will be planned in this research is adapted from Seels et al. (1998) is ADDIE consisting of five stages, namely Analyze, Design, Development, Implementation, and Evaluation. The reason researchers use the ADDIE model is because the steps used are systematic, clear and easy to understand. The following is a picture of the ADDIE model.

In the analysis stage, curriculum analysis and concept analysis were carried out. The design stage was carried out by creating an e-book in the form of an electronic book by linking ecosystem material and local wisdom values of Jombang Regency. The Development stage is reviewed and revised by validator lecturers, media experts and material experts, up to expert validation of the revised draft. The implementation stage is to empirically determine the validity and reliability of the e-book being developed. The evaluation stage will produce data and suggestions regarding the e-book being developed. The resulting data is then analyzed and suggestions are used to improve the test instruments that have been developed.
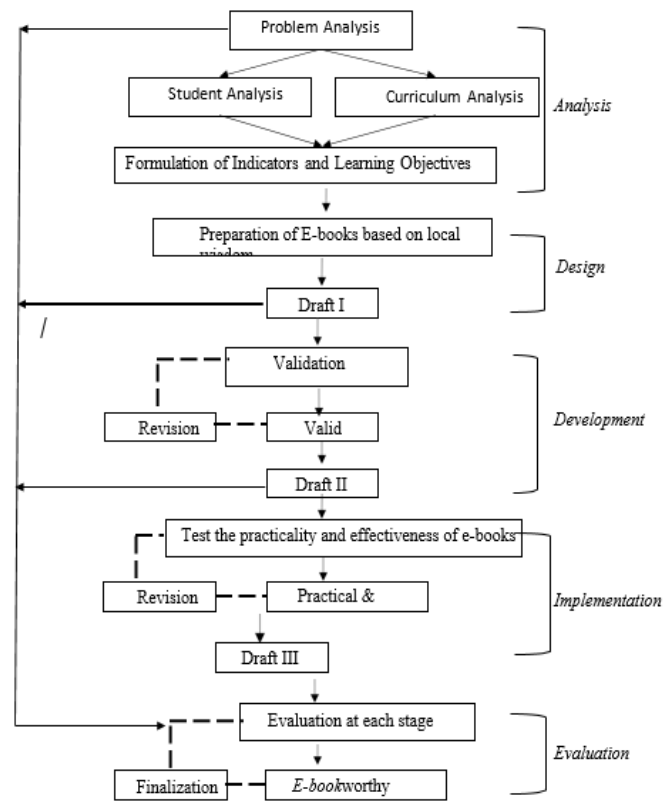

Figure 1. ADDIE development model

The instrument used to measure the suitability of e-books is the teaching material validation instrument. The feasibility in question includes the appropriateness components of content, presentation and language based on criteria adapted from Arifin et al. (2009). The validation sheet for this textbook is then assessed by validators, namely an education expert lecturer and a lecturer who is an expert in biology education at Surabaya State University. The validator assessment results were analyzed descriptively using an e-book feasibility presentation. Values are obtained from Likert Scale calculations which are presented in Table 1.

Table 1. Likert Scale Criteria (Riduwan & Akdon, 2008)

Scale Value	Evaluation
1	Not good
2	Pretty good
3	Good
4	Very good

The results of the validity calculation are used to determine the suitability of the e-book, which is then calculated using the following Equation 1.

$$\text{Average Score} = \frac{\sum \text{Score of each criteria of all validators}}{\sum \text{validators}} \quad (1)$$

After the average score is obtained, to calculate the average criteria score, the following Equation 2 is used:

$$\text{P validation score (\%)} = \frac{\sum \text{score obtained}}{\sum \text{maximum score}} \times 100\% \quad (2)$$

The calculation results obtained are then classified into 4 validity criteria which can be seen in table 2. An e-book is said to be valid if it obtains a score ≥ 62.75% (Riduwan & Akdon, 2008).

Table 2. E-book Eligibility Criteria Based on Validation Results (Riduwan & Akdon, 2008)

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

The e-book readability sheet is used to determine the level of practicality of the e-book Integrated local wisdom of Jombang Regency Ecosystem material being developed. Data collection techniques using the readability test method were used to determine the readability level of the e-book that had been developed. The readability method is carried out by selecting readings at the beginning, middle and end of the e-book totaling 100 words. The number of sentences (Y-axis)

and the number of syllables multiplied by 0.6 (X-axis) were calculated. The intersection of the X and Y axes will be determined using the Fry Chart and then interpreted based on categories (Table 3). The e-module can be read by class X students if the meeting point is in the 9th-12th zone as a difficult category.

Table 3. Fry Chart Interpretation (Kinanti & Raharjo, 2021)

Percentage (%)	Criteria
1st – 6th zone	Easy (1st – 6th grades)
6th – 8th zone	Medium (6th – 8th grades)
9th - 12th zone	Difficult (9th – 12th grades)

Result and Discussion

The research that has been carried out has produced a product in the form of an e-book that integrates the local wisdom values of Sendang Made, Jombang Regency into ecosystem material. From the analysis stage, the results obtained were that class At the analysis stage, curriculum analysis and material concept analysis are carried out to determine the problems and needs of students and teachers that are needed so that the development process is right on target. The design stage is carried out to design the contents of the e-book, starting from the layout to the draft material content in the e-book. The e-book developed contains several topics derived from ecosystems, including: ecosystem components, interactions in ecosystems, energy flow, biogeochemical cycles and ecosystem balance. E-book components include opening, content and closing.
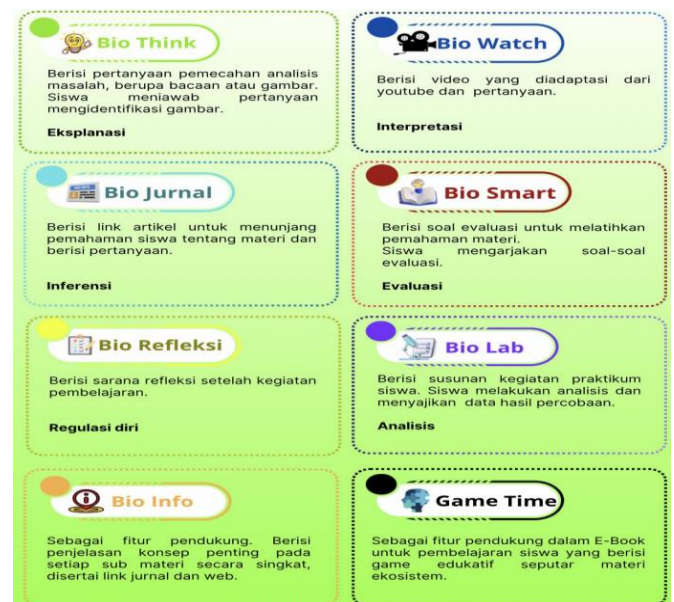
Figures 2. E-book features

E-book development stage. Developing the e-book design that has been created. An integrated e-book with

local wisdom and ecosystem material was developed containing a number of features. This feature helps students to improve their learning experience so that meaningful learning is created. The e-book that will be developed contains ecosystem material in Biology subjects. The features contained in the e-book being developed include Bio Watch to practice interpretive critical thinking indicators; Bio Lab to train analytical critical thinking indicators; Bio Think to train critical thinking skills with explanatory indicators; Biofer to train indicators of inferential critical thinking skills; Bio Smart to train evaluation indicators; and Bio Reflection to train critical thinking indicators for self-regulation. Apart from these three features, the e-book will also provide Game Time in the form of educational games that can support the learning process. E-books also not only contain text, but also contain images and videos that students can access independently.

E-books can increase interaction between teachers and students. A number of studies have shown the potential of interactive e-books to enhance the learning experience by incorporating local knowledge and interesting features. Learning that utilizes local wisdom, especially in science lessons, can facilitate students' understanding because they can directly observe based on their surroundings (Setianingrum et al., 2023). Dewi et al. (2021) and Mahfiroh et al. (2023) found that e-books containing local wisdom, such as those based on Balinese values, were very feasible and practical, with positive feedback from educators and students. Lillo (2023) emphasizes the need for e-books to be visually appealing and relevant to Generation Z's learning styles, while Nurmayanti et al. (2017) highlights the importance of expert validation and positive feedback from teachers and students in ensuring e-book quality. Instructional materials in the context of learning are one of the essential components because they are what will be analyzed, studied, and mastered by the students (Ramdoniati et al., 2018). This e-book contains various features mentioned above and can be used as teaching material that includes integration of local wisdom of Jombang district, Sendang made because it is close or contextual to students. In this e-book development stage, the e-book has been revised several times and reviewed to evaluate the e-book's shortcomings before being validated. Based on the results of the research that has been carried out, validation is used to determine the theoretical feasibility of the e-book that has been developed. The validation results were analyzed descriptively using the percentage of e-book suitability using a 1-4 Likert scale. Several aspects that are validated include aspects of appropriateness of presentation, aspects of content validity and aspects of language validity. The following are the results of the E-book validation Viewed from the aspect of feasibility of presentation, it can be seen in table 4.

Table 4. The Results of the E-book Validation are Reviewed from the Aspect of Feasibility of Presentation

Aspects of Presentation Feasibility Assessment	Validation Result Score		Average Score
	Validator 1	Validator 2	
E-book Display Quality	3.75	3.75	3.75
Layout Quality	3.75	3.75	3.75
Text Quality	3.75	3.75	3.75
Image Quality	3.75	3.50	3.66
Video Quality	3.25	3.75	3.50
E-book quality	4.00	4.00	4.00
Average Score			3.73
Validity Score (%)			93.1%
Interpretation of Validity Scores			Very Valid

The validity results are presented in Table 4, showing a total average validity score of 3.73 which is interpreted as very valid. These results include aspects that must be considered in developing e-modules, namely self-instructional, self-contained, stand-alone, adaptive and user-friendly aspects according to the Directorate General of Primary and Secondary Education (2017). These five aspects received scores ranging from 3.5-4, which indicates that they have been fulfilled and are declared very valid. Several aspects that are assessed on the appropriateness of presentation include the quality of the e-book display, the quality of the layout, the quality of the text, the quality of the images, the quality of the images and the quality of the e-book.

The developed e-book shows high feasibility in the presentation aspect based on several main indicators. In terms of display quality, the e-book describes the topic clearly, reflects the content and focus of the material to be discussed, with a score of 3.75. Moving between pages can be done easily, and there is a marker tone when switching pages which provides a better user experience. The choice of color composition is also appropriate, providing a contrast that is comfortable to read.

The quality of the e-book layout is also considered very good. The images and text are arranged neatly so that they do not cover each other, maintaining readability and clarity of information with a score of 3.75. Image layout is precise and proportional, ensuring that visual elements support understanding of the material. Page numbers start from the right side, according to numbering standards that make navigation easier. The e-book design is simple but attractive, attracting students' attention without reducing focus on the main content.

The quality of the text in e-books is also carefully considered. The combination of font type and size used is appropriate, using Times New Roman which is common and easy to read, with adequate font size. The choice of text color is also appropriate, ensuring that the text can be read clearly without distracting the eye.

The images included in the e-book are appropriate to the subject matter and clearly visible, with an average score of 3.6. Images are accompanied by name and source information, giving proper credit to the original owner and adding credibility to the e-book. Image displays that can be pop-up or clicked add interactivity and make it easier for students to see image details more clearly.

The videos included in the e-book also fit the subject matter, with an average score of 3.5. Videos display clear audio and visuals, can be displayed on full screen, and play smoothly. This provides a more dynamic and engaging learning experience for students.

Overall, the quality of the e-book is very good with features such as a table of contents that can be clicked to go to a specific page (score 4), as well as external links that provide access to additional resources on the internet. Easy operation of e-books also ensures that students can easily access and utilize all available content. This e-book can be accessed using a laptop or smartphone online or offline. The quality of e-books varies across studies. Kandriasari et al. (2023) and Susantini et al. (2021) found that electronic books can be effective in training students' metacognitive skills and improving their analytical skills. However, Korat et al. (2023) identified several areas that need improvement. Lillo, (2023) noted that e-books will have to better adapt to Generation Z's learning styles, meanwhile Korat et al. (2019) found that many children's e-books are overloaded with distracting multimedia effects. Despite these challenges, the potential of e-books in increasing digital literacy and supporting language and literacy development is clear. Taking all these indicators into account, this e-book is considered very worthy in terms of presentation. The display quality, layout, text, images and videos are all well integrated, providing an interactive, informative and fun learning experience for students.

Apart from the feasibility aspect of presentation, e-books are also validated from the aspect of content validity. The following are the results of the E-book validation from the content feasibility aspect, which can be seen in table 5.

The validity results are presented in Table 5, showing a total average validity score of 3.73 which is interpreted as very valid. Content validity in e-books refers to the validity and reliability of the information presented in the e-book content. It includes a number of factors that must be considered to ensure that the e-book content is trustworthy and conforms to established standards. The concept of content validity in e-books is explored in several studies (Sulistyani et al., 2022; Suprapto et al., 2022) both emphasize the importance of material quality, currency, and contextual relevance in e-books, with Suprapto specifically focusing on scientific literacy and Sulistyani on environmental awareness. Lillo (2023) adding that e-books must be in accordance with independent curricula and integrate local wisdom values, while also serving the learning style of Generation Z. Sadhu et al. (2019) extends this discussion to the development of integrated assessments to measure chemical literacy and critical thinking, highlighting the need for content validity in assessment tools. These studies collectively underscore the multifaceted nature of content validity in e-books, encompassing material quality, relevance, and alignment with learning objectives. Several aspects assessed for content validity are the quality of the material concept, the quality of the suitability of the material with the independent curriculum, the recency and contextuality of the concept, the systematicity of the e-book, the completeness of the material, and the integration of local wisdom values in the ecosystem material as well as the achievement of critical thinking skills.

Table 5. The Results of the E-book Validation are seen from the Aspect of Content Suitability

Aspects of Presentation Feasibility Assessment	Validation Result Score		Average Score
	Validator 1	Validator 2	
Quality of matter concept	3.33	3.33	3.33
Quality of material conformity with the Independent Curriculum	4	4	4
Recency and Contextuality of Concepts	4	3.60	3.80
E-book systematics	3.6	3.5	3.55
Completeness of ecosystem materials	4	3.6	3.80
Integration of Local Wisdom Values in Ecosystem Materials	3.6	4	3.8
Achievement of Science Literacy Ability	4	3.83	3.91
Average Score			3.73
Validity Score (%)			93.1%
Interpretation of Validity Scores			Very Valid

Product development can be said to be feasible in terms of content if the E-book is developed based on the applicable curriculum, appropriate theory, and the material is presented in detail according to the cognitive range of students who are studying. The development of learning products such as e-books has a relationship between learning strategies and the materials used. E-book development for educational purposes can be carried out if it is aligned with the curriculum, includes appropriate learning strategies, and suits students' cognitive range Krisnaresanti et al. (2018) and Rahmayani et al. (2024) emphasizes the importance of curriculum alignment. Mufit et al. (2022) and Susantini et al. (2021) highlighting the role of learning strategies, with Susantini et al. (2021) focuses on metacognitive skills and Mufit et al. (2022) focuses on cognitive conflict. The e-books developed are presented in accordance with the learning outcomes and learning objectives of the independent curriculum. The e-book developed also provides students with insight into local wisdom that can maintain the balance of the ecosystem in the Sendang Made area.

The e-book developed by integrating the local wisdom values of Sendang Made in ecosystem material shows high feasibility based on several main indicators. First, the choice of Sendang Made local wisdom as a topic for ecosystem material is very relevant. Sendang Made, with its ecological richness and cultural values, provides a deep and meaningful context for students in studying ecosystem concepts. Second, this e-book contains examples of the components that make up the ecosystem in the Sendang Made area. By presenting local flora and fauna as well as typical abiotic components, students can understand ecosystems more concretely and connect directly with the environment around them.

Furthermore, this e-book includes examples of interactions between ecosystem components that are integrated with the local wisdom values of Sendang Made. Interactions such as predation, symbiosis and competition are explained through real cases that occurred in Sendang Made, which are enriched with local stories and traditions. The subject of energy flow in ecosystems is also discussed in depth using examples from the Sendang Made area, which shows how energy flows from producers to consumers and decomposers in the environment.

Apart from that, this e-book presents material regarding biogeochemical cycles, such as the carbon and nitrogen cycles, which are connected to local wisdom values in Sendang Made. For example, agricultural and land management practices carried out by local communities are used as illustrations to explain these concepts. Finally, the local wisdom values of Sendang Made, especially the community's traditions in maintaining environmental balance, are thoroughly integrated into the e-book material. These traditions, such as the prohibition on destroying forests and ceremonial customs related to nature conservation, are highlighted as concrete examples of how local communities contribute to protecting the ecosystem.

The e-book developed with the integration of Sendang Made local wisdom values also shows high feasibility in training students' critical thinking skills. First, this e-book trains interpretation skills through the Bio Watch feature, where students are given relevant videos about the ecosystem and local wisdom of Sendang Made. Through this activity, students are able to describe and understand the information or data presented, connecting it to the concept of ecosystems.

Furthermore, this e-book trains analytical skills using the Bio Lab feature. In this feature, students carry out ecosystem observation activities that allow them to break down information into smaller components and identify relationships between these components. This approach helps students understand the structure and function of the ecosystem in depth, as well as the relationship between biotic and abiotic components in Sendang Made. Explanation skills are trained through the Bio Think feature. Here, students are required to explain information and arguments effectively, providing supporting reasons regarding the ecosystem phenomena that exist in Sendang Made. This feature helps students develop the ability to communicate scientifically and convey their thoughts in a clear and structured manner. Inference skills are trained through the Bio Journal feature, where students are asked to make reasonable conclusions based on information and evidence from scientific articles. This approach encourages students to think logically and use available evidence to make valid conclusions about the Sendang Made ecosystem.

The Bio Smart feature plays a role in practicing evaluation skills. Students are invited to evaluate the credibility, relevance and quality of the information provided through authentic questions related to ecosystem material and the value of Sendang Made's local wisdom. This activity trains students to be critical in assessing the information they receive.

Lastly, the Bio Reflection feature helps students practice self-regulation. Students are encouraged to monitor, understand and organize their own thoughts, as well as acknowledge the assumptions made after studying ecosystem material that is integrated with the local wisdom values of Sendang Made. This feature is important in helping students develop self-awareness and the ability to reflect on their learning process.

Overall, this e-book is very suitable for use because it successfully integrates local wisdom values with ecosystem material, as well as training various aspects of critical thinking skills.

A number of studies have shown the effectiveness of electronic books in improving students' critical thinking skills. Ramdani et al. (2021) found that science teaching materials integrated with local wisdom significantly improved students' critical thinking skills, especially in problem solving. As well as, Sinaga et al. (2022) reported that electronic interactive teaching materials (EITM) had a greater impact on critical thinking skills than electronic textbooks. Rahmayani et al. (2024) further supports these findings, showing that e-books integrated with augmented reality and STEM approaches are effective in improving students' critical thinking and multiple representation skills. Through specifically designed interactive features, this e-book not only provides comprehensive knowledge but also improves students' critical thinking skills effectively.

Apart from aspects of suitability of presentation and content validity, e-books are also validated from the aspect of language validity. The following are the results of the E-book validation from the content feasibility aspect, which can be seen in table 6.

Table 6. The Results of the E-book Validation are Seen from the Language Feasibility Aspect

Aspects of Presentation Feasibility Assessment	Validation Result Score		Average Score
	Validator 1	Validator 2	
Use of Language	3	3.25	3.12
Language Structure	3	3.25	3.12
Use of Terms	4	4	4
Average Score			3.42
Validity Score (%)			85.4%
Interpretation of Validity Scores			Very Valid

The validity of language in e-books refers to the correctness, accuracy and clarity of language use in e-book content. It covers several aspects that need to be considered to ensure that the language used conforms to established standards and allows readers to understand well. Several aspects assessed in language validity are language use, language structure and term use.

The developed e-book shows the suitability of good language based on various assessment indicators. First, in terms of language use, this e-book is considered quite communicative with a score of 3.12. The sentences used are easy for students to understand, ensuring that the message to be conveyed can be received clearly. The language used is also straightforward and informative, helping students to immediately understand the concepts being explained without confusion.

The language structure in this e-book is in accordance with the General Guidelines for Indonesian Spelling (PUEBI), getting a score of 3.12. This shows that the writing of the e-book has followed correct grammar and spelling rules, thereby minimizing errors that could interfere with understanding. The sentences in this e-book are designed so as not to create double meanings, ensuring that the information conveyed does not confuse the reader. Each sentence represents a clear delivery of the content, and the integration of sentences between paragraphs is well maintained, making the flow of the discussion coherent and easy to follow.

The use of terms in this e-book also shows excellent quality. The biological terms used are appropriate to the context and material discussed, getting a score of 4. These terms are used consistently throughout the e-book, supporting the delivery of concepts more effectively. Consistency in the use of these terms is very important to help students understand and remember terminology relevant to the topic of ecosystems and local wisdom of Sendang Made.

Overall, this e-book shows high language suitability. The use of communicative language, sentences that are easy to understand, straightforward and informative, as well as language structures that comply with PUEBI and do not give rise to double meanings, ensure that the material can be understood well by students. The use of appropriate and consistent terms supports the delivery of concepts clearly, helps students master ecosystem material which is integrated with local wisdom values. Language is able to motivate by increasing interest in reading, the presentation of the material contained in the features presented is able to train students' literacy (Safitri et al., 2023). Thus, this e-book is not only visually appealing and easy to use, but also effective in conveying complex information and concepts in an easy-to-understand manner.

A recapitulation of the validation results of the e-book developed can be seen in Table 7.

Table 7. Results of E-book Validation by Material Expert Lecturers and Media Expert Lecturers

Aspect	Validation Result Score (%)		Average (%)	Category
	V1	V2		
Feasibility of Presentation	92.7	93.7	93.1	Very Valid
Content Validity	94.75	92.3	93.1	Very Valid
Language Validity	83.3	87.5	85.4	Very Valid
Average			90.5	Very Valid

Based on the three validators of the interactive e-book on the Ecosystem material developed, an average percentage of 90.5% was obtained with a very valid and feasible interpretation (Riduwan & Akdon, 2008). Thus, this interactive e-book is declared valid and suitable for

use and meets the aspects of suitability of presentation, content and language.

The implementation of e-books is seen from the e-book readability test. The readability test results are seen by counting the number of sentences and the number of syllables, then multiplying them by 0.6 out of 100 words at the beginning, middle and end of the e-book, then the results are converted to a fry graph. The following is a recapitulation table of the e-book readability test results, which can be seen in table 8.

Table 8. Recapitulation Table of Readability Test Results

Reading Samples	Page	Number of Sentences	Number of Syllables x 0.6	Levels
Text 1 (Initial part)	2	7	158.4	10
Text 2 (Middle part)	26	5	155.4	10
Text 3 (Final part)	44	5	153.6	10
Average Amount		5.6	155.8	10

The results of calculating the number of sentences and syllables that have been averaged are then converted into the fry graph presented in Figure 3.
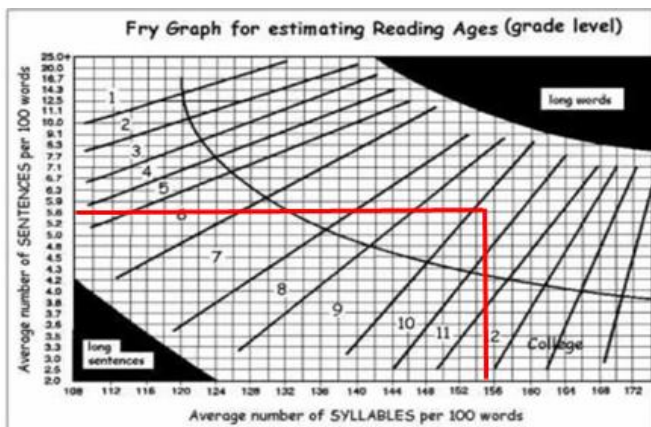
Figures 3. Readability conversion results on fry charts

These results show that all track samples are considered difficult according to Kinanti et al. (2021) (Table 3). The readability level must be appropriate to the intended reader because the use of language will affect the level of understanding (Susantini et al., 2021). This is related to the level of student development, where according to Flint et al. (2021) high school students are considered to be well developed intelligently and emotionally, so they must be able to understand information from any text with difficult and complex vocabulary. Because the intended readers for the problem-based learning e-module being developed are class X students, the readability results are in the correct readability category. The higher the readability level of a discourse, the easier it is to understand, and conversely, the lower the readability level, the more

difficult it is to understand. This shows that discourse with a low readability level is not suitable to be presented at the target level (Nuryani, 2017).

Based on the results of developing teaching materials in the form of e-books integrated with local wisdom in Jombang Regency, Sendang Made, descriptive e-book data was obtained. The theoretical feasibility of e-books is seen from the validity results through aspects of presentation, content and language, as well as the empirical feasibility of e-books seen from readability tests. An e-book can be called feasible if it meets the requirements, namely theoretically feasible and empirically feasible (Ristanti & Rachmadiarti, 2018). So, the E-book integrated with Sendang Made's local wisdom has been declared feasible.

Conclusion

The integrated e-book of Sendang Made's local wisdom in ecosystem material is stated to be very feasible theoretically and empirically. This can be seen from the validation score obtained in the very valid category. Readability at level 10 corresponds to the level of thinking of class X high school students.

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