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Development of Biodiversity E-Booklet Based on Local Wisdom of Jepara Regency

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ABSTRACT

This type of research is Research and Development (R&D) which aims to develop biodiversity e-booklets based on local wisdom of Jepara Regency for grade X high school students. The method used in this research is a case study and data collection through observation and interviews is then analyzed descriptively and statistically. Jepara Regency is one of the districts in Central Java that still has a lot of local wisdom. Local wisdom in Jepara Regency can be associated with biodiversity material and used as a contextual and interesting biology learning resource. The results of this study indicate that the validity of material experts in the criteria is very valid with a percentage of 92.18%, the results of the validity of media experts in very valid criteria with a percentage of 97%. From the feasibility test of the students' response, it shows very valid criteria with a percentage of 90%, and the feasibility test of the teacher's response shows very valid criteria with a percentage of 93%. Based on expert validity, initial testing, and feasibility testing, it can be concluded that the biodiversity e-booklet based on local wisdom of Jepara Regency is feasible to use on biodiversity material.

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Introduction

Education is related to the development of globalization which is developing very quickly so that aspects of education are also developing. One of the evidences of the times now

experienced by the Indonesian state is the existence of 21st century challenges or better known as 21st century skills¹. The learning paradigm in the 21st century learning perspective emphasizes aspects of digital technology literacy and has the main principle that learning must be student-centered, collaborative, contextual, and integrated with the community². Referring to various national and international studies related to education, Indonesia is experiencing a learning crisis due to the Covid-19 pandemic and causes learning loss, namely students losing previously learned competencies, not being able to complete learning at grade level and experiencing compound effects due to not mastering learning at each level³. Changes can be seen in the learning process, which initially relied on face-to-face methods to shift to distance learning (PJJ). The intensity of teaching and learning has also decreased significantly, both the number of study days in a week and the average number of study hours in a day. One of the efforts to overcome the learning crisis in 2022, Minister of Education and Culture Nadiem Anwar Makarim launched an independent learning policy that is flexible and allows learning activities to be more contextual, meaningful, relevant, and fun for students⁴.

Learning resources are components that must exist in learning activities, through the process of being studied, examined, studied and used as material or material to be mastered as well as being used as a guide for students to learn⁵. Learning resources can function properly if they meet the criteria for good learning resources, namely economical, practical, flexible, according to learning objectives, and easy to obtain⁶. Cultural or local wisdom-based learning resources are important to apply to 21st century learning while supporting the vision of promoting culture in the 13th episode of the independent learning policy. Various research results on the effect of using culture-based learning resources in improving student learning outcomes have been conducted. The results of research conducted by Rahmawati show that there is an increase in activity in the moderate category and learning outcomes in the good category when students learn in local wisdom-based learning⁷.

E-booklet is one of the learning resources in the form of digital books that can be accessed using computer or mobile devices. Farkhana states that booklets can be used by students to learn independently and can increase student activity and learning outcomes⁸. The development of contextual e-booklet media can be sourced from the surrounding environment such as regional local wisdom.

The results of interviews and observations with SMAN 1 Welahan teachers show that the learning resources used so far are the environment around the school, package books, and LKS which still have various limitations, such as examples that are not contextual and the appearance of the images is less attractive. Teachers of SMAN 1 Welahan have never used learning resources for biodiversity e-booklets based on local wisdom of Jepara Regency.

The learning results of biodiversity material in 2021/2022 show that the average daily test scores are still below the KKM 70. Limited learning resources and media make it difficult for students to understand the concepts in biodiversity material, especially when the last few years have faced the covid-19 pandemic and KBM must be carried out online or PJJ.

The Ministry of Education and Culture said that every lesson can utilize culture and local wisdom in the surrounding environment as a source of learning, where the knowledge that exists in the community integrated in a culture can be related to the concepts of the subject matter⁹. Integration of local wisdom in learning as to increase the sense of local wisdom in the environment and as an effort to maintain the existence of local wisdom amid the swift flow of globalization. The utilization of local wisdom as a contextual and interesting biodiversity learning resource can be packaged in the form of an E-Booklet.

Jepara Regency is one of the districts in Central Java that still has a variety of local wisdom. This local wisdom is formed as a cultural advantage of the local community and geographical conditions in a broad sense¹⁰. The local wisdom of Jepara Regency that can be

associated with biodiversity materials such as the tradition of lomban parties, jembul tulakan, torch wars, carving arts, and durian festivals.

Relevant research that has been conducted by several researchers includes Jufrida, et al in their research local wisdom has the potential to be used as a science learning resource¹¹ and the results of Dwiyantri's research state that the use of local wisdom-based learning media can increase student interest and learning outcomes¹². In addition, research on the development of local wisdom-based booklets has been conducted by Melati, et al on plantae material which states that the development of these booklets can have an effectiveness on student learning outcomes¹³. The results of Paramita's research show that the development of booklets on biodiversity material can improve student learning outcomes¹⁴.

Based on this background, the purpose of this study is to develop learning resources in the form of local wisdom-based biodiversity e-booklets that are feasible and effective for learning biodiversity. This e-Booklet contains content sourced from Jepara local wisdom which is associated with biodiversity material in high school.

Method

This research is a research and development (R & D) study to produce products. The product produced in this study is the Biodiversity E-Booklet Based on Jepara Local Wisdom. The research and development (R&D) research procedure on the development of local wisdom-based biodiversity E-Booklets is carried out by referring to the research steps¹⁵.

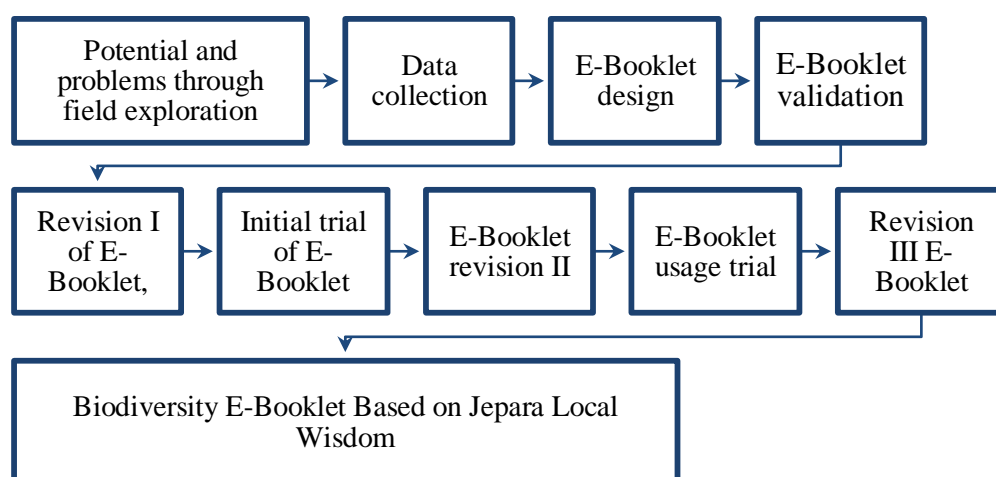


Figure 1. Research Design of Biodiversity E-Booklet

Data sources of local wisdom of Jepara Regency were obtained from community leaders, secondary data exploration with photo inventory sheet instruments and interview sheets. Data sources of biodiversity of Jepara Regency based on local wisdom are obtained from the exploration of primary data and secondary data using a photo inventory sheet instrument. Source of expert validity data obtained from media experts and material experts using validation sheets, source of feasibility test data based on student and teacher responses using student and teacher response questionnaire sheets.

The scores of the validation results were then analyzed descriptively by percentage using the Widoyoko formula as follows¹⁶:

$$P = \frac{f}{n} \times 100\%$$

Description:

P: percentage of product validity

f : score obtained

n : the maximum number of scores

The feasibility test based on the responses of biology teachers and students was measured using student response questionnaires and teacher response questionnaires. The questionnaire of students' responses to the appearance and presentation of biodiversity E-Booklet material based on Jepara local wisdom consists of 14 indicators. The teacher response questionnaire consists of 3 aspects, namely: material aspects, linguistic aspects, appearance and implementation with a total of 15 indicators. The percentage of student and teacher responses was calculated using a modified formula from Sudijono¹⁷

$$NP = \frac{\text{Total Score obtained}}{\text{Total Maximum Score}} \times 100\%$$

Results and Discussion

Biodiversity e-booklet based on local wisdom of Jepara Regency has specific characteristics, different from other learning resources. The characteristics of the ebooklet in this study are 1) compiled based on needs analysis and observation results at school, 2) biodiversity material and images are the result of exploration of species richness related to local wisdom, 3) ebooklet preparation material is partly obtained from the analysis of the utilization of biodiversity based on local wisdom of Jepara Regency.

Jepara Regency is one of the districts in Central Java that still has a variety of local wisdom. Local wisdom is formed as a cultural advantage of the local community and geographical conditions in a broad sense¹⁰. There are 5 local wisdoms of Jepara Regency used as a source of ebooklet preparation in this study, namely the lomban party tradition, jembul tulakan, torch war, carving art, and durian festival. The following data are the results of the analysis of species richness exploration based on local wisdom in Jepara Regency.

Table 1. Analysis of Jepara Local Wisdom

| Kearifan Lokal | Keanekaragaman Hayati yang Khas |
|--------------------|---|
| Feast of Lomban | Ubo rampe offerings: <ol style="list-style-type: none"> 1. Ketupat made from rice and wrapped in coconut leaves, 2. lepet made from sticky rice/rice and coconut as the main ingredients 3. red and white porridge made from rice/rice, 4. larungan kepala kerbau which comes from the body parts of buffalo animals 5. Ayam dekem/ingkung which is made from chicken as the main ingredient |
| Torch War | Using torches made of: <ol style="list-style-type: none"> 1. Coconut leaves, and 2. Banana leaves |
| Jembul Tulakan | Using jembul made of bamboo |
| Durian Festival | Various varieties of local Jepara durian |
| Jepara Carving Art | Typical Jepara carving motifs are depictions of: <ol style="list-style-type: none"> 1. Wuni fruit 2. Banana Fan |









Based on the results of the exploration of biodiversity based on local wisdom of Jepara Regency, several species of flora and fauna were found. The exploration results are presented in table 2.

Table 2. Recapitulation of Biodiversity Exploration Results Based on Jepara Local Wisdom

| Local Wisdom | Species Diversity (Local Name) | Species Diversity (Scientific Name) | Gene Diversity (Variety/Race) |
|------------------|--------------------------------|-------------------------------------|---|
| Pesta Lomban | Coconut | <i>Cocos nucifera</i> | Cengkir Variety Genjah Variety Hybrid Variety |
| | Rice | <i>Oriza sativa</i> | Inpari-32 Variety Ciherang Variety IR-64 Variety |
| | Chicken | <i>Gallus gallus</i> | Jawa breed Bangkok breed Petelur breed |
| | Swamp buffalo | <i>Bubalus bubalis L</i> | - |
| Perang Obor | Coconut | <i>Cocos nucifera</i> | Cengkir Variety Genjah Variety Hybrid Variety |
| | Banana | <i>Musa paradisiaca</i> | Sobo Pipit Variety Raja Variety Susu Variety Ambon Variety |
| Jembul Tulakan | Betung Bamboo | <i>Dendrocalamus asper</i> | - |
| | Yellow Bamboo | <i>Bambusa vulgaris</i> | - |
| | Wulung Bamboo | <i>Gigantochloa atrovioleacea</i> | - |
| | Apus Bamboo | <i>Gigantochloa apus</i> | - |
| | Ater Bamboo | <i>Gigantochloa atter</i> | - |
| Festival Durian | Durian | <i>Durio zibethinus</i> | Petruk Variety Telur Ayam Variety Mentega Variety Subandi Variety Sukarman Variety Nenek Variety |
| Seni Ukir Jepara | Wuni | <i>Antidesma bunius</i> | - |
| | Banana Fan | <i>Ravenala madagascariensis</i> | - |

The results of biodiversity are grouped into gene-level, species-level, and ecosystem-level diversity. Some pictures of the results of the exploration analysis can be seen in Table 3.

Table 3. Results of Biodiversity Exploration Analysis Based on Jepara Local Wisdom

| Biodiversity Level | Picture of Exploration Results | | |
|---|---|--|---|
| 1. Gene-level biodiversity based on the local wisdom of the lomban party |  |  |  |
| | <i>Cocos nucifera</i> | | |
| 2. Species-level biodiversity based on the local wisdom of torch warfare |  |  |  |
| | <i>Bambusa vulgaris</i> | <i>Dendrocalamus asper</i> | <i>Gigantochloa apus</i> |
| 3. Ecosystem-level biodiversity based on the local wisdom of torch wars 3 |  |  | |
| | Rice fields | Beach | |

The results of exploration and analysis are used to compile a biodiversity e-booklet based on local wisdom of Jepara Regency. The exploration results are displayed in original images (photos) making it easier for students to observe biodiversity so that learning becomes contextualized. Sinaga stated that the contextual learning approach can improve student learning activities and outcomes. The contextual approach in learning is a holistic process and aims to help students understand the meaning of teaching material by linking to the context of everyday life. The images are displayed in full color to make it more interesting for students to learn. This is in accordance with the statement of Paramita et al, that a clear image display in the booklet is very important so that the learning message is conveyed effectively¹⁴.

The Jepara local wisdom-based biodiversity e-booklet consists of an introduction, content, and cover. The introduction includes a front cover, preface, learning outcomes, subject matter, and table of contents. The content section includes an introduction to biodiversity, levels of biodiversity, biodiversity based on local wisdom of Jepara, gene-level biodiversity based on local wisdom of Jepara, species-level biodiversity based on local wisdom of Jepara, ecosystem-level biodiversity in Jepara, benefits of biodiversity, threats to biodiversity, efforts to conserve biodiversity, and student activities. The closing section includes the author's bio, bibliography, and back cover.

The Jepara local wisdom-based biodiversity ebooklet was designed using canva and flipbook with A4 size. Students can easily access the ebooklet with a cellphone or laptop. The following is the design of the Jepara local wisdom-based biodiversity E-booklet in Figure 1.



Figure 2. Design of biodiversity e-booklet based on local wisdom of Jepara

The biodiversity e-booklet based on Jepara's local wisdom was validated to determine its validity as a learning resource for class X high school biodiversity material. The validity test was carried out by 2 expert validators, namely material expert validators and media expert validators who were lecturers at the Postgraduate Program of Science at Semarang State University (UNNES). The validation instrument adapted from the National Education Standards Agency (BNSP) instrument includes material validation instruments and media validation instruments. The material validation instrument consists of 11 criteria from 4 aspects, namely: knowledge aspect, language aspect, presentation technique aspect, and presentation completeness aspect. The media expert validation instrument consists of 12 criteria from 3 aspects, namely: size, cover design, and content design. The material expert validation analysis can be seen in table 4, the results of the media expert validation analysis can be seen in table 5, the results of the expert validation analysis can be seen in table 6.

Table 4. Analysis of Material Expert Validation of Biodiversity E-Booklet Based on Jepara Local Wisdom

| Validation Component | Percentage (%) | Criteria |
|------------------------|----------------|------------|
| Knowledge dimension | 87,5 | Very valid |
| Language | 93,75 | Very valid |
| Presentation technique | 87,5 | Very valid |
| Completeness | 100 | Very valid |
| Average | 92,18 | Very valid |

Table 5. Analysis of Media Expert Validation of Biodiversity E-Booklet Based on Jepara Local Wisdom

| Validation Component | Percentage (%) | Criteria |
|----------------------|----------------|------------|
| Size | 100 | Very valid |
| Cover design | 95 | Very valid |
| Content design | 96 | Very valid |
| Average | 97 | Very valid |

Table 6. Recapitulation of Expert Validation Analysis of Biodiversity E-Booklet Based on Jepara Local Wisdom

| Expert Validator | Percentage (%) | Criteria |
|------------------|----------------|------------|
| Material | 92 | Very valid |
| Media | 97 | Very valid |
| Average | 94,5 | Very valid |

The feasibility analysis of e-booklets is based on responses from students and teachers. The students who responded were X MIPA 8 class totaling 36 students. The results of the feasibility test aspect analysis based on learner responses can be seen in Figure 2.

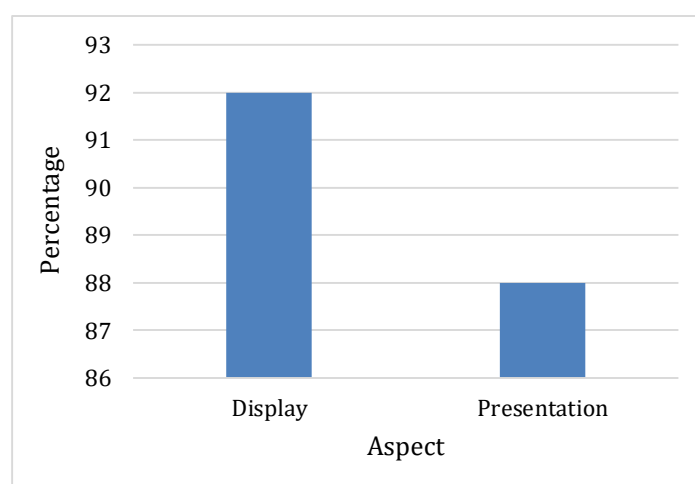


Figure 3. Analysis Results of Feasibility Test of Biodiversity E-Booklet Based on Local Wisdom of Jepara Regency Based on Learner Response

The results of the feasibility test analysis showed that the display aspect obtained 92% and the material presentation aspect obtained 88%, and the average was 90% with very valid criteria. Analysis of the feasibility of e-booklets based on the response of biology teacher SMAN 1 Welahan who followed the learning process as well as acting as an observer. The results of the feasibility analysis of Biodiversity E-Booklet Based on Local Wisdom of Jepara Regency based on teacher responses can be seen in Figure 3.

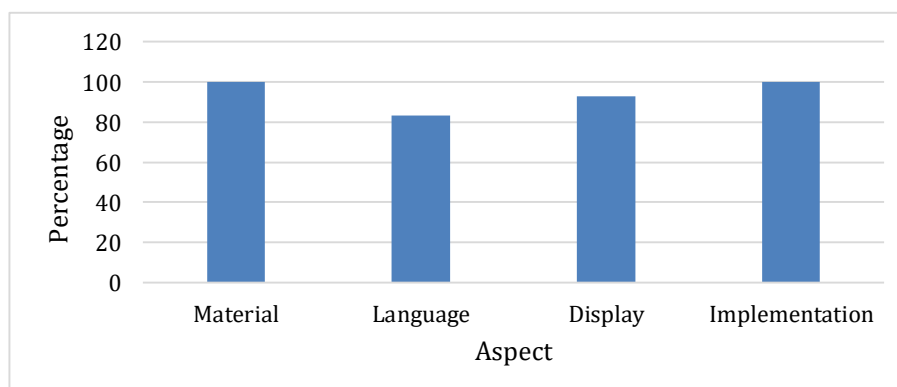


Figure 4. Results of Feasibility Test Analysis of Biodiversity E-Booklet Based on Local Wisdom of Jepara Regency Based on Teacher Response

The feasibility test results from the teacher's response showed that the material aspect obtained 100%, the language aspect obtained 83%, the display aspect obtained 93%, the implementation aspect obtained 100%, and the average percentage of 93% with very valid criteria. Based on this analysis, the Biodiversity E-booklet Based on Local Wisdom of Jepara Regency is suitable for use as a learning resource. Source means everything that exists around the environment of learning activities that can be functionally used to help optimize learning outcomes¹⁸. All places or surroundings, objects and people that have information so that they can be used as a vehicle for students to carry out the learning process are called learning resources. Ong'amo stated that learning resources can improve students' academic achievement in learning biology¹⁹.

Conclusion

This study can be concluded that the characteristics of biodiversity e-booklets based on local wisdom of Jepara Regency are prepared based on needs analysis, exploration results, and results of analysis of biodiversity based on local wisdom in Jepara Regency. Biodiversity e-booklets based on local wisdom of Jepara Regency are feasible to use on biodiversity materials based on expert validity and feasibility testing based on student and teacher responses.

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