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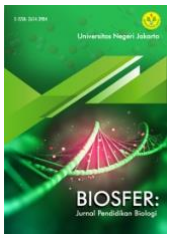

Development of electronic worksheet of biodiversity based on local wisdom and culture to enhance student's learning motivation

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ABSTRACT

The Covid-19 pandemic has caused the teaching and learning process to be shifted to online learning. Many digital media that can be used for online learning. However, student learning motivation has decreased, even though many digital media can be used for online learning. Therefore, choosing good, effective, efficient, and attractive learning media is necessary. This research aimed to produce an electronic worksheet of biodiversity based on local wisdom and culture to enhance student's learning motivation that is valid and practical. This research was used a 4D research model without a disseminate stage. The validity of electronic student worksheet was obtained from the validation results conducted by media experts, education experts, and material experts with validation instruments consisting of presentation, content, and language aspects. The practicality was obtained from teachers (n=5) and students (n=20) responses with response questionnaire instrument consisting of 20 statements, and student learning motivation questionnaire result with the ARCS model consisting of 9 statements. The data was analyzed descriptively and quantitatively. The result showed that the electronic student worksheet developed using the liveworksheets website obtained a validation score of 4 (very valid). Electronic student worksheet was declared practical with an average score from teachers 98% (very practical) and from students 96% (very practical). The results of the student learning motivation questionnaire using the ARCS model were 3.27 (very strong). Thus, it can be concluded that the electronic biodiversity worksheet based on local wisdom and culture to enhance student's learning motivation is valid and practical.

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INTRODUCTION

Pandemic Covid-19 has infected almost all countries in the world, including Indonesia (Suripah & Susanti, 2022). There are many impacts caused by the spread of the Covid-19 virus, such as in the field of education (Hernawati, Bayu, Nandiyanto, & Mohammad, 2021). Educational activities, namely the teaching and learning process from the lowest to the highest level of education, are transferred to online or distance learning using existing technology such as digital learning media (Suripah & Susanti, 2022). Digital media plays a very important role in the online learning process to facilitate teacher and student interaction so that learning runs smoothly (Elistiyaningsih, Untari, & Kustiyah, 2021).

There are many digital media that can be used for online learning, such as the LMS platform (Learning Management System) Google Classroom, video conferencing Zoom, and others (Suripah & Susanti, 2022). However, students' learning motivation tends to decrease even though many digital learning media can be used for online learning. Based on research, Cahyani et al. (2020) showed that as many as 52.6% of students at the high school level admitted that their enthusiasm for learning decreased during online learning. The factor that causes students' learning motivation decrease when online learning is that students have difficulty learning independently well in order to understand the subject matter. Some of the factors causing the decrease in learning motivation of other students are the internet network connection is less stable, the selection of learning media that is not appropriate, and less conducive learning (Gustiani, 2020). Research of Muslimin & Harintama (2020) states that students are lazy to provide responses during the learning process with Whatsapp media because Whatsapp does not provide flexible features to interact in the learning process. Students must wait for a response from the teacher or other students so that the discussion is appropriate. It shows that learning media must be considered so that students remain motivated in learning.

Learning media has a role in increasing students' learning activities and motivation. Interest, desire, and motivation to learn can be raised through the learning process using learning media (Febrita & Ulfah, 2019). This inaccuracy in the selection of learning media can also be caused by teachers who are not ready to provide online learning quality and have low digital capabilities (Adedoyin & Soykan, 2020). Therefore, it is important to choose learning media to achieve learning objectives.

One of the learning media that can increase students' learning motivation is student worksheets. Generally, student worksheet is given by the teacher in printed form during face to face learning. However, it is ineffective if it is still applied in this online learning. Printed student worksheets or paper-based can be converted into electronic student worksheets with the help of the website Liveworksheets. When the desire or interest of students in learning decreases, electronic student worksheets can be an interesting tool to apply in learning (Syafitri & Tressyalina, 2020).

Many studies have been conducted on developing electronic student worksheets with various bases and other electronic media. Study Elistiyaningsih et al. (2021) show that electronic student worksheets with Liveworksheets can increase the activities of students, teachers, and student learning motivation. In contrast to the research of Elistiyaningsih et al. (2021), which used an electronic student worksheet, Dazrullisa & Hadi (2018) developed a paper-based student worksheet for normal learning based on local wisdom, and the results can improve learning outcomes and motivate students to discuss actively. Other research, namely Sudirman et al. (2020) applied the latest innovative technologies such as AR (Augmented Reality) based on local wisdom and can increase student motivation in learning. Based on this, learning by applying the latest innovative technology and local wisdom can increase students' learning motivation, especially in online learning.

Researches on developing learning tools or biology learning media based on local wisdom and culture in Indonesian schools are still limited (Ramdiah, Abidinsyah, Royani, H.Husmah, & Fuzi, 2020). For example, there are few student worksheets contain local wisdom at this time (Khotimah, 2019). Local wisdom is local ideas or thoughts embedded in and followed by the local community, and it is full of wisdom and good value (Prasetyo, 2013). Local wisdom is also defined as knowledge of various strategies of local people's lives to deal with their problems and fulfil their life needs (Rachmadiarti, Faizah, & Kuntjoro, 2017). In comparison, culture is a thought or something that has become a habit of a community group that is difficult to change and is passed down from generation to generation. Examples of culture are artistic beliefs, morals, law, and mores (Rachmadiarti et al., 2017). According to Khabibah & Hanifah (2016), integrating local wisdom into science learning makes it easier for students to understand modern scientific concepts. Science learning and local wisdom also aim to

provide students with knowledge that can be applied in real life and is not limited to conceptual knowledge (Mulyani & Julianto, 2018).

This local wisdom-based learning can be integrated into biological material, one of which is biodiversity. The basic competence 3.2 in biodiversity topic is to analyze various levels of biodiversity in Indonesia along with threats and preservation (Permendikbud, 2016). Biodiversity is closely related to various forms of local wisdom. The level of environmental and species damage can be controlled through local wisdom. The biodiversity utilization based on local wisdom that our ancestors have developed in the past, can guarantee the fulfilment of life needs that come from nature for now and future (Silalahi, 2015). Through local wisdom and culture-based learning that is integrated into biodiversity materials in schools, it is hoped that it can help maintain sustainable biodiversity. Therefore, this research aimed to produce electronic student worksheets (E-LKPD) on biodiversity topics based on local wisdom and culture to enhance students learning motivation that is valid and practical.

METHODS

Research Design

This development research referred to the 4-D development research design, consisted four stages namely define, design, develop, and disseminate. However, the fourth stage, namely the dissemination stage, was not carried out due to the limited time of the study.

Instrument and Participants

Data collection methods used were validation methods and questionnaires. Electronic student worksheet validation was carried out by three expert lecturers, namely material experts, media experts, and education experts, to determine the electronic student worksheet's validity level. The instrument used was a validation sheet consisting of three aspects, namely aspects of presentation, content, and language. Score aspects of validity assessment using a Likert scale with four-choice scale model. The response questionnaire was used to determine the practicality of the electronic student worksheet. The electronic student worksheet response questionnaire was addressed to biology teachers (n=5) and students of class X SMA Al-Islam Krian Sidoarjo (n=20), consisted of 20 statements. This questionnaire used a Guttman scale with answer choices Yes and No. The student motivation questionnaire using the ARCS model (Attention, Relevance, Confidence, and Satisfaction) was used to measure students' learning motivation consists of 9 statements. Each answer the questionnaire statement was scored by four choices Likert scale, 1 (strongly disagree), 2 (disagree), 3 (agree), 4 (strongly agree).

Procedure

The stages in this research referred to the 4D research model. The first stage was the define stage. At this stage, several steps are taken to determine learning objectives. The steps taken in this stage include curriculum analysis, student analysis, concept analysis, task analysis, and formulating learning objectives. The second stage was the design stage. At this stage, the electronic student worksheet draft was prepared based on the information obtained in the first stage. Electronic student worksheets were developed with the help of the website Liveworksheets. The third stage was the develop stage, carried out from January to May 2022 at the Department of Biology, Faculty of Mathematics and Natural Sciences, State University of Surabaya, and produced electronic student worksheet on biodiversity topic based on local wisdom and culture. At this stage, the electronic student worksheet validation was carried out by three validators. Then, revisions were made based on suggestions from validators. The next step was a limited trial conducted on 20 students of class X MIPA 2 SMA Al-Islam Krian Sidoarjo.

Data Analysis Techniques

The data obtained were analyzed descriptively and quantitatively. Validity analysis was carried out after acquiring the value of the three validators to find the mode score of each component and aspect. After that, the overall mode score or the score of the validation results was obtained. The results of the validity were adjusted to the criteria for the validation results namely: 1 (not valid), 2 (quite valid), 3 (valid), and 4 (very valid). An electronic student worksheet was declared valid if it gets

a score of 3 with a valid to very valid category (Riduwan, 2013).

The response data of students and teachers after using the electronic student worksheet were analyzed based on Guttman scale scores 1 (Yes) and 0 (No). The score that obtained from the questionnaire results was calculated using the formula (1).

$$\% \text{ Positive responses each criterion} = \frac{\Sigma \text{ Answer "YES"}}{\Sigma \text{ Participant (teacher or student)}} \text{x } 100\% \quad (1)$$

Results percentage overall teacher and student responses are obtained by calculating the average percentage of positive responses to each criterion. Furthermore, these results are interpreted with the category of student and teacher response scores, namely: 0%-25% (less practical), 26%-50% (quite practical), 51%-75% (practical), 76%-100% (very practical). Electronic student worksheet was declared practical if the response score reaches 51% (Sugiyono, 2016).

The results of the student motivation questionnaire obtained can be calculated using formula (2) and then interpreted with the criteria for learning motivation, ie: 1 ,00 -1.75 (weak), 1.76-2.50 (fair), 2.51-3.25 (strong), 3.26-4.00 (very strong). The level of learning motivation of students is declared strong if it reaches a score of 2.51 (Widoyoko, 2020).

$$\text{Score of each component} = \frac{\Sigma \text{ Score obtained by each component}}{\Sigma \text{ Number of statements items for each component}} \quad (2)$$

RESULTS AND DISCUSSION

The results of this development research are electronic student worksheets on biodiversity topics based on local wisdom and culture to enhance student learning motivation. Electronic student worksheets in the form of a website Liveworksheets (https://www.liveworksheets.com/) contain features and learning activities for students. Two electronic student worksheets were developed, namely E-LKPD 1, which contains material on levels of biodiversity, and E-LKPD 2, which contains material on threats and efforts to conserve biodiversity in Indonesia. Each electronic worksheet consists of an electronic worksheet for students and an electronic worksheet for teachers (Figure 1). The teacher's electronic worksheet is in the form of a PDF file that can be accessed by entering a code or password. The teacher's electronic worksheet contains instructions for access and use of the electronic worksheet Liveworksheets for teachers and answers keys. This section of the electronic student worksheet based on local wisdom and culture consists of cover, introduction, content, and closing. The electronic student worksheet cover contains the identity of the electronic worksheet, material's title, education unit's level, student's identity, and compiler's name. The cover display contains images of culture in Indonesia, namely the gunungan tradition, which consists of various kinds of plants that describe the biodiversity in Indonesia. The introduction consists of preface, table of contents, and introduction to the features of the electronic student worksheet. The content consists of the identity of the electronic student worksheet, essential competencies, learning indicators, learning objectives, instructions for using the electronic worksheet, materials, activities, and tasks (Figure 2). The closing section consists of bibliography and back cover.

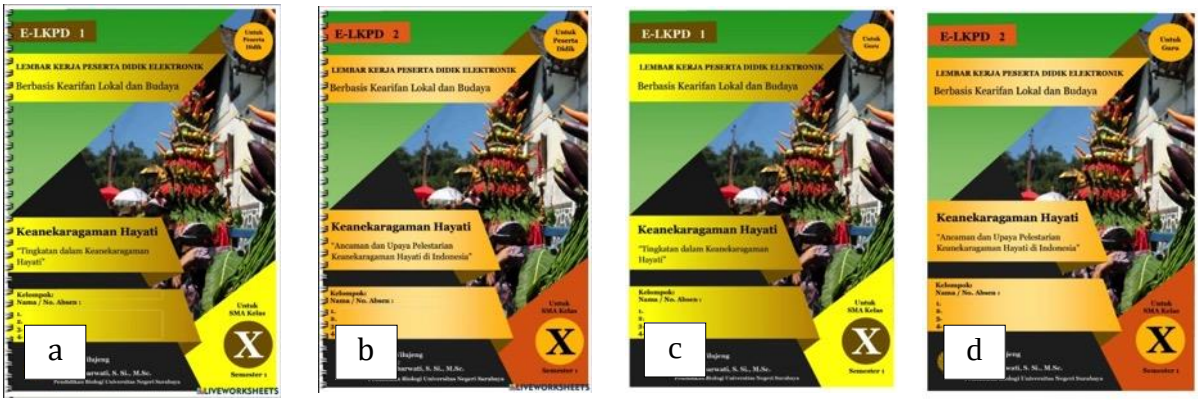
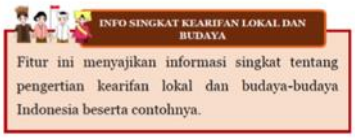
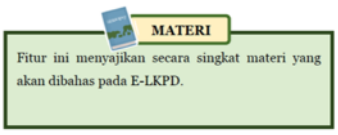


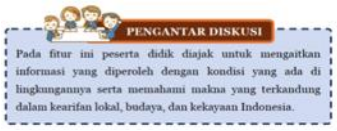
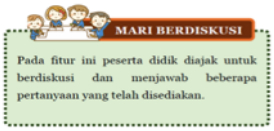
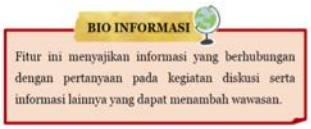
Figure 1. E-LKPD Profile (a) Cover of E-LKPD 1 for student; (b) Cover of E-LKPD 2 for student; (c) Cover of E-LKPD 1 for teacher; (d) Cover of E-LKPD 2 for teacher.

Figure 2. Some parts of E-LKPD (a) Introduction of features; (b) Materials; (c) Article Feature; (d) Bio Gallery feature; (e) Observational media on the Let's Discuss feature; (f) Observational media on the Let's Discuss feature; (g) Videos in the Let's Watch feature; (h) Observation table on the Let's Discuss feature.

The electronic student worksheet on biodiversity topics contains Indonesian local wisdom and culture content, which is contained in the features and activities in this electronic worksheet. The features used in this electronic worksheet are Brief Information of Local Wisdom and Culture, Materials, Article, Introduction to Discussion, Let's Discuss, Bio Gallery, Bio Information, Let's Watch, and Let's Summarize (Table 1).

Table 1
Display of Electronic Student Worksheet Features Based on Local Wisdom and Culture.

No.	Feature	Description
1.		The Brief Information of Local Wisdom and Culture feature provides brief information about the meaning of local wisdom and Indonesian cultures, with examples that attract students to study biodiversity in Indonesia.
2.		The Materials feature presents a summary of the material discussed in the electronic student worksheet. The material contains levels of biodiversity, threats, and efforts to conserve biodiversity in Indonesia.
3.		The Article feature presents articles that contain local wisdom or culture of a region in Indonesia. This article is a discussion material for students and can motivate students to learn local wisdom and Indonesian culture.

No.	Feature	Description
4.		The Bio Gallery feature presents images related to the Articles feature to help students know the forms of local wisdom and culture. This feature is also used as a medium of observation for students.
5.		In the introduction to discussion feature, several questions can motivate students to learn about local wisdom, culture, and the richness of Indonesia.
6.		In the Let's Discuss feature, students are invited to discuss and answer some of the questions actively.
7.		The Bio Information feature presents information related to questions in discussion activities and other information that can increase students' knowledge.
8.		The Let's Watch feature presents video as an absorbing observational medium. Students can view and observe the video by clicking on the video that has been provided.
9.		In the Let's Summarize feature, students are expected to conclude based on the learning that has been done.

This electronic student worksheet was developed using the website Liveworksheets. Liveworksheets is a website that makes interactive worksheets that can be presented online (Fitriani, Hidayah, & Nurfauziah, 2021). This online worksheet site can be accessed easily with pc or smartphone. Liveworksheets also provide an access menu for students and teachers. The teacher could monitor and score student answers. According to Ratnawati (2021), electronic worksheet by using Liveworksheet is practical in use.

Electronic Student Worksheet Validity

The development of electronic student worksheet based on local wisdom and culture was validated by three expert lecturers, namely education experts, media experts, and material experts. The aspects assessed are the aspect of presentation, content, and language. Electronic student worksheet validation results based on local wisdom and culture are stated in the very valid category (Table 2).

Table 2
Validation Results of Electronic Student Worksheet (n=3).

No.	Component	Score V1	Score V2	Score V3	Component Mode	Category Validity
A.	**PRESENTATION**					
1.	Access of electronic student worksheet	4	4	4	4	Very valid
2.	The suitability of the electronic	4	4	4	4	Very valid

No.	Component	Score V1	Score V2	Score V3	Component Mode	Category Validity
	student worksheet cover with the content of the material					
3.	Layout quality	4	4	4	4	Very valid
4.	Image and video quality	3	4	4	4	Very valid
5.	Completeness of the electronic student worksheet	4	4	4	4	Very valid
Overall Component Mode					4	Very valid
B. CONTENTS						
6.	Suitability of content in electronic student worksheet with biodiversity theory	4	4	4	4	Very valid
7.	Suitability of concept with 2013 Curriculum	4	4	4	4	Very valid
8.	Suitability of the material with the concept of local wisdom and culture	4	4	4	4	Very valid
9.	Suitability of electronic student worksheet to enhance student learning motivation	4	4	4	4	Very valid
Overall Component Mode					4	Very valid
C. LANGUAGE						
10.	Language compatibility	4	4	4	4	Very valid
11.	Use of the term	4	4	4	4	Very valid
12.	Quality of identity and sources of information	4	4	4	4	Very valid
Overall Component Mode					4	Very valid
Overall Mode					4	Very valid

Information: V1 : Validator 1 (material expert); V2 : Validator 2 (education expert); V3 : Validator 3 (media expert)

Electronic student worksheet on biodiversity topics based on local wisdom and culture gets an overall mode value of 4, categorized in the very valid category (Table 2). It shows that the electronic student worksheet has met the elements and requirements of an excellent electronic student worksheet. Electronic student worksheet elements include titles, study instructions, essential competencies or subject matter, supporting information, and assignments (Prastowo, 2014). The requirements for a good LKPD, according to Umbaryati (2016) that have been fulfilled based on (Tabel 2) including 1) didactic requirements, namely the developed E-LKPD can be used by all students and contains a variety of stimuli from various media and activities; 2) construction requirements, namely the E-LKPD use appropriate language; 3) technical requirements, namely the E-LKPD has an appearance such as the appropriate layout of pictures, letters, and videos.

The presentation aspect gets the overall component mode value of 4, which is classified as a very valid category (Table 2). As for comments and suggestions from the validator on the presentation aspect, namely the title on the electronic student worksheet is not visible when accessing electronic student worksheet one (E-LKPD 1) or electronic student worksheet two (E-LKPD 2). The cover model is the same, so it isn't easy to distinguish electronic worksheet 1 and electronic worksheet 2 (Figure 3). This is in line with the statement of Prastowo (2014) that one of the LKPD elements is the title, so the title must be clear. The solution is to fix the title size and give different colors to the background cover (Figure 3). If the title of the electronic worksheet is still not visible, it can be caused by the user display browser being too small. The solution is to enlarge the page browser used by the user. Another comment is that some images have poor quality (Figure 4). The images in the electronic worksheet are digital photos produced by the camera smartphone, and there are pictures from journals and the internet. According to Hendrawati (2016), images displayed on web media are sufficient with a resolution of 72 dpi (dots per inch). Before being converted into Liveworksheets, the images on the electronic worksheet had good quality, with a resolution of around 96 dpi to 72 dpi. However, after being converted into Liveworksheets, the image quality decreased slightly. Therefore,

the solution is to upload images in the form of a google drive folder so that the image quality remains good (Figure 4).

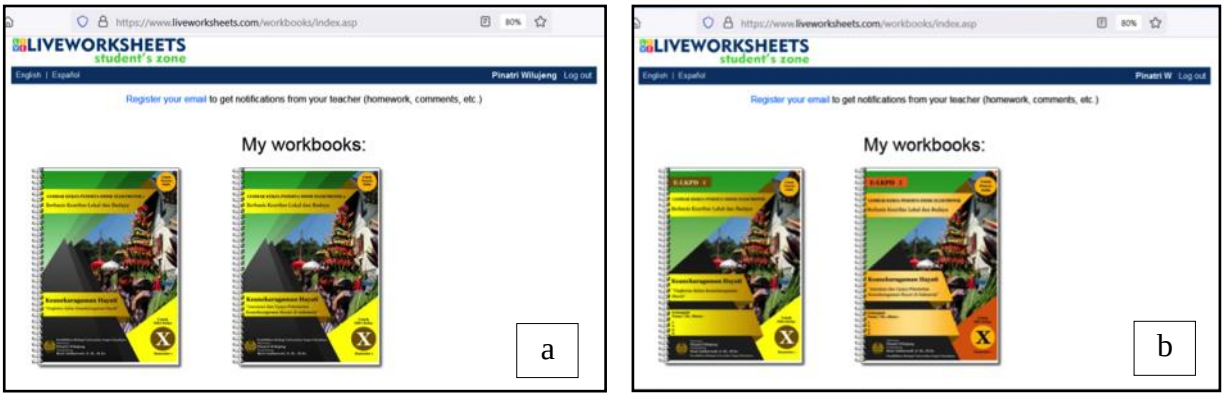


Figure 3. Cover of electronic student worksheet on Liveworksheets (a) Electronic student worksheet display cover before revision; (b) Electronic student worksheet cover display before revision

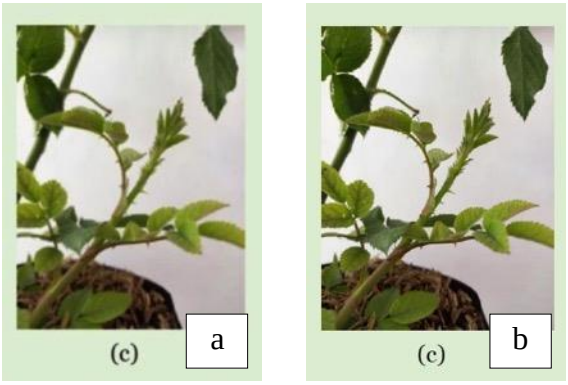


Figure 4. Image quality improvement (a) Image on electronic student worksheet with Liveworksheets; (b) Image on electronic student worksheet with google drive

The content aspect obtained the overall component mode value of 4, which is a very valid category (Table 2). It shows that the electronic worksheet content is appropriate for the biodiversity topic and 2013 Curriculum concept. This electronic worksheet is based on local wisdom and culture in Indonesia. Through this material on local wisdom and culture, students can learn about local wisdom and culture in Indonesia and enhance their nationalism sense. As for comments and suggestions from the validator on the content aspect, the learning objectives are almost identical to indicators and have not met the ABCD elements (Audience, Behavior, Condition, and Degree). The formulation of learning objectives is essential because the learning objectives are beneficial in the measurement process or evaluation of learning outcomes (Octaviani, 2018). According to López-González (2019), the formulation of learning objectives can use the ABCD method, which is proven to be the most effective method to be applied. The solution is to improve the learning objectives according to the ABCD element (Tabel 3). Another comment is that there is no definitive motivation word in the electronic worksheet. The solution is to explicitly add a word of motivation in this electronic worksheet's features and other activities section.

Tabel 3
Improvement of Learning Objectives on Electronic Student Worksheet.

Learning Objectives Before Improvement		Learning Objectives After Improvement	
3.2.1	Students can classify various organisms based on diversity at the level of genes, species and ecosystems.	3.2.1	Students can appropriately classify several types of organisms used as materials for cultural activities or local wisdom based on the concept of
3.2.2	Students can distinguish biodiversity at		

Learning Objectives Before Improvement	Learning Objectives After Improvement
the gene, species, and ecosystem levels.	biodiversity at the gene, species and ecosystem levels.
3.2.3 Students can analyze the diversity of genes, species and ecosystem levels.	3.2.2 Learners can appropriately distinguish biodiversity at the gene, species, and ecosystem levels by observing the character of objects or materials used in cultural activities and local wisdom.
3.2.4 Students can analyze threats to animals in Indonesia.	3.2.3 Students can appropriately analyze biodiversity at the gene, species and ecosystem level by observing the character of objects or materials used in cultural activities and local wisdom.
3.2.5 Students can analyze threats to plants in Indonesia.	3.2.4 Students can appropriately analyze threats to animals in Indonesia by presenting data from an incident that threatens the existence of animals in Indonesia.
3.2.6 Students can analyze efforts to conserve biodiversity in Indonesia with local wisdom.	3.2.5 Students can appropriately analyze threats to plants in Indonesia by presenting data from an incident that threatens the existence of plants in Indonesia.
	3.2.6 Students can appropriately analyze efforts to preserve or conserve biodiversity in Indonesia by presenting data on local wisdom from an area in Indonesia.

The linguistic aspects gets an overall component mode value of 4, which is a very valid category (Tabel 2). As for comments and suggestions from the validator in the linguistic aspect, some words are not raw and have incorrect wording. The solution is to correct the word according to PUEBI.

Practicality of Electronic Student Worksheet

The practicality of electronic student worksheets in terms of the results of several respondents' questionnaires, namely teachers and students, and the results of students' learning motivation questionnaires. The practicality of electronic worksheets is based on five high school biology teachers as a user in terms of several aspects, namely the presentation, content, and linguistic aspects**.** The presentation aspect gets an average percentage of 97.14%, categorized as very practical. The content aspect gets an average percentage of 98.18%, categorized as very practical. The linguistic aspect gets an average percentage of 100%, categorized as very practical. Two components get the lowest score. The lowest are the image quality and the learning indicator components, which get a score of 80% in the practical category. However, electronic worksheets received a positive response from teachers namely 98% and categorized as very practical (Table 4)**.**

Table 4
Teacher's Response to Electronic Student Worksheet (n=5).

No.	Component	Percentage of Positive Response (%)	Practicality Category
A.	**PRESENTATION**		
1.	Electronic student worksheets with Liveworksheets can be accessed quickly and well	100	Very practical
2.	The display of electronic student worksheets with Liveworksheets is user-friendly (easy to understand).	100	Very practical

No.	Component	Percentage of Positive Response (%)	Practicality Category
3.	Title, topic, and subtopic are displayed clearly to describe the contents of the electronic student worksheet	100	Very practical
4.	The electronic student worksheet has an identity to facilitate its administration	100	Very practical
5.	Colors, image layout, and text are combined and proportioned well.	100	Very practical
6.	The apparent font size and style make it easier for students to read the electronic student worksheet.	100	Very practical
7.	Images and videos are not blurry and can be seen clearly	80	Very practical
$\bar{X}$ Presentation Aspect Percentage		97.14	Very practical
B. CONTENTS			
8.	Instructions for activities in the electronic student worksheet are clear to make it easier for students to carry out activities in the electronic student worksheet	100	Very practical
9.	The learning indicators in the electronic student worksheet are appropriate with the essential competencies to be achieved.	80	Very practical
10.	The learning process using electronic student worksheets based on local wisdom and culture makes it easier for teachers to deliver learning materials.	100	Very practical
11.	The display of electronic student worksheet based on local wisdom and culture motivates students to learn about biodiversity	100	Very practical
12.	Activities and features in the electronic student motivation based on local wisdom and culture make it easier for students to understand the biodiversity topic	100	Very practical
13.	The Articles feature on the electronic student worksheet can provide information and insight to students about local wisdom and Indonesian culture.	100	Very practical
14.	The Articles feature on the electronic student worksheet can provide information to students about the benefits of preserving local wisdom and Indonesian culture	100	Very practical
15.	Electronic student worksheet makes students complete the tasks given well and satisfactorily	100	Very practical
16.	Discussion activities with groups can motivate students to be more active in learning process	100	Very practical
17.	Observation activities on electronic student worksheet based on local wisdom and culture can practice students ability to identify	100	Very practical
18.	The activities in electronic student worksheet based on local wisdom and culture help students to achieve learning goals.	100	Very practical
$\bar{X}$ Content Aspect Percentage		98.18	Very practical
C. LANGUAGE			
19.	Electronic student worksheet uses communicative language	100	Very practical
20.	Electronic student worksheet uses sentences that do not cause double meaning	100	Very practical
$\bar{X}$ Percentage of Language Aspect		100	Very practical
$\bar{X}$ Percentage of Positive Responses		98	Very practical

The practicality of the electronic student worksheet based on student responses was obtained after the electronic student worksheet was tested on 20 10th-grade students. The presentation aspect got an average percentage of 92.5%, categorized as very practical. In this aspect, two components get the lowest percentage. They are image quality and video duration in electronic student worksheet.

Both components get a score of 85%, categorized as very practical. The content aspect gets an average percentage of 99.29%, categorized as very practical. The language aspect gets an average percentage of 100%, categorized as very practical. The electronic student worksheet received a positive response from students, namely 96% categorized as very practical (Table 5).

Table 5
Student Responses to Electronic Student Worksheet (n=20).

No.	Component	Percentage of Positive Response (%)	Practicality Category
A.	**PRESENTATION**		
1.	Electronic student worksheet with Liveworksheets well and easily accessible	100	Very practical
2.	Electronic student worksheet with Liveworksheets can be understood easily	100	Very practical
3.	Switching pages on electronic student worksheet can be done easily	90	Very practical
4.	Appearance and design of electronic student worksheet is attractive	95	Very practical
5.	Font size is appropriate and easy to read	90	Very practical
6.	Font styles used can be read clearly	95	Very practical
7.	The image content in the electronic student worksheet looks clear and attractive	85	Very practical
8.	Video content on the electronic student worksheet have high resolution and clearly visible	90	Very practical
9.	The images and videos presented are accordance with the content of the material discussed and can provide information	95	Very practical
10.	The video duration is appropriate and not too long	85	Very practical
$\bar{X}$ Presentation Aspect Percentage		92.5	Very practical
B.	**CONTENTS**		
11.	Electronic student worksheet based on local wisdom and culture makes students more active and independent	100	Very practical
12.	The material on electronic student worksheet based on local wisdom and culture is easy to understand	100	Very practical
13.	Electronic student worksheet based on local wisdom and culture helps add insight and knowledge of local wisdom in Indonesia	100	Very practical
14.	Learning becomes more interesting by using electronic student worksheet based on local wisdom and culture.	100	Very practical
15.	Learning using electronic student worksheet based on local wisdom and culture makes students understand the biodiversity concept (gene, species, and ecosystem level)	95	Very practical
16.	Learning using electronic student worksheets based on local wisdom and culture makes students think deeply about the causes of biodiversity problems in Indonesia and how to overcome them	100	Very practical
17.	Electronic student worksheet based on local wisdom and culture can add students insight about the benefits of local wisdom for the preservation of Indonesia's biodiversity	100	Very practical
$\bar{X}$ Content Aspect Percentage		99.29	Very practical
C.	**LANGUAGE**		
18.	The language used in electronic student worksheet based on local wisdom and culture is clear and easy to understand	100	Very practical
19.	Local or foreign terms used in electronic student worksheet based on local wisdom and culture are written clearly and in italics	100	Very practical
20.	Sentences and instructions in electronic student worksheet based on local wisdom and culture do not cause double meaning	100	Very practical
$\bar{X}$ Percentage of Language Aspect		100	Very practical
$\bar{X}$ Percentage of Positive Responses		96	Very practical

Electronic student worksheet on biodiversity topic based on local wisdom and culture is also used to enhance students' learning motivation. Questionnaire results of students' learning motivation based on the ARCS model are also used to measure the practicality of the electronic student worksheet. Student learning motivation results get an average score of 3.27 categorized as very strong (Figure 5). As many as 35% of students got very strong learning motivation results, and 75% got strong learning motivation results after the electronic student worksheet was applied (Figure 6). The Confidence component gets the lowest class average score of 3.20, but it is still in the strong category (Figure 5).

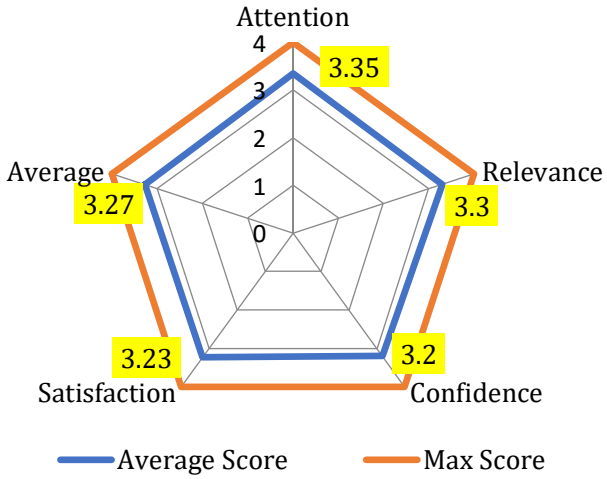


Figure 5. Students' learning motivation responses (n=20) according to the ARCS motivation model

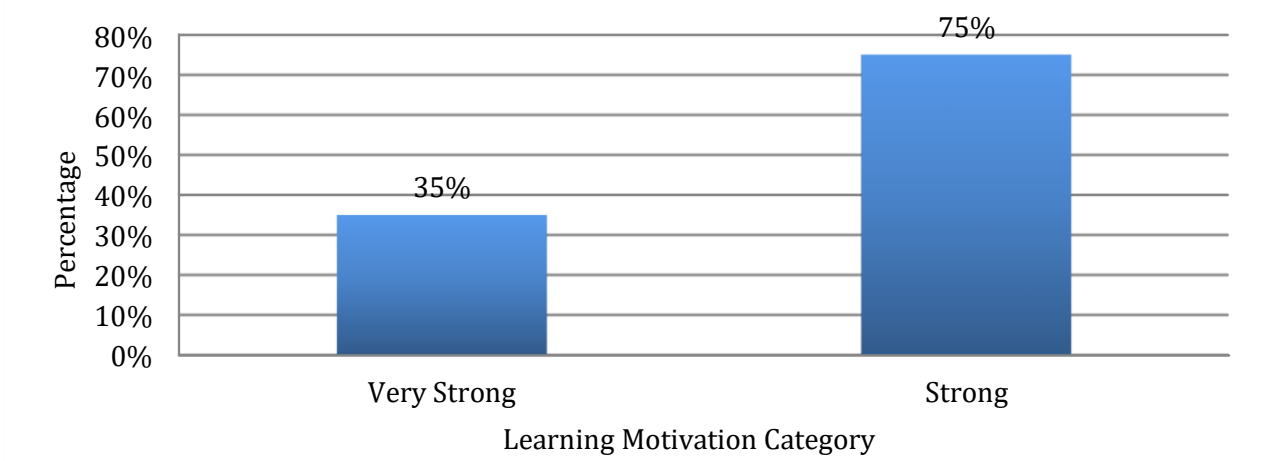


Figure 6. The results of student's learning motivation

The electronic student worksheet on biodiversity topic received a positive response from teachers. However, several components get the lowest score, namely the image quality component and learning indicators (Tabel 4). This electronic student worksheet does not describe learning indicators in basic competency four. Basic Competency four measures psychomotor skills or student work skills. According to Prastowo (2014), there are five forms of student worksheets, namely 1) student worksheet that helps students find concepts; 2) student worksheet that helps students to apply concepts; (3) student worksheet as a learning guide; (4) student worksheet as reinforcement; (5) student worksheet as a practical guide. The developed electronic student worksheet is a type of student worksheet as a learning guide because this worksheet helps students understand the material and contains questions that must be answered. Furthermore, reinforcement is given after students learn the material. Therefore, basic competency four is not described in this electronic student worksheet.

Electronic student worksheets on biodiversity topics based on local wisdom and culture to enhance students' learning motivation received positive comments from teachers, namely:

"*The pictures and colors in the electronic student worksheet are good, so it is interesting to read and see the electronic student worksheet".*

"Electronic student worksheet is good and interactive in terms of content, presentation, and language. Electronic student worksheet features are also interesting and can stimulate student insight".

In addition, E-LKPD also received a suggestion from teachers, namely:

"The material discussed must be adjusted to the time specified by the RPP".

"There are some pictures that are not given a detailed description".

"Indicators and learning objectives in Core Competency 4 should be described to measure student skills".

"Students should be directed to bring plant materials that are readily available so that students can observe directly and not only observe from pictures".

This electronic student worksheet was developed as an online learning media that can also be used for offline learning. However, this electronic student worksheet will be very effective and efficient for online learning, especially when a pandemic is happening. Students can observe using pictures and videos in the electronic student worksheet and minimize students leaving the house. Teachers must also provide exciting activities for students during this online learning period. One of them is implementing an electronic student worksheet with a website Liveworksheets. According to Hidayah & Asari (2022), learning websites like Liveworksheets can form effective learning similar to classroom learning. In addition, Mispa et al. (2022) who also used the electronic student worksheet with Liveworksheets website in their research. Stated that the electronic student worksheet provides convenience for teachers and students because it can save time and costs. Although using the same media, namely the Liveworksheets website, there are differences between the electronic student worksheet on biodiversity topics based on local wisdom and culture and the electronic student worksheet that other researchers have developed. The difference lies in the learning material, learning base, and learning experience.

Electronic student worksheet on biodiversity topic based on local wisdom and culture has received a positive response from students. However, the electronic student worksheet obtained the lowest score of the two components. They are image quality and video duration (Table 5)**.** The video duration on the electronic student worksheet averages about 6 minutes. According to Brame (2016), the ideal average video length is 6 minutes. While in research by Susanti et al. (2018), the ideal duration of the instructional video is 5 to 10 minutes so that students stay focused on learning. The video duration in the electronic student worksheet is still included in the ideal video duration for learning.

Learning using electronic student worksheets on biodiversity topics based on local wisdom and culture with Liveworksheets can enhance student learning motivation. This is evidenced by the average data on students' learning motivation results, which is included in the very strong category (Figure 5)**.** However, the student motivation questionnaire results on the confidence component get the lowest score (Figure 5). Confidence in ARCS is a component that helps students have confidence in their success (Keller, 2010). According to students, the time provided is insufficient to do the task well. So that students are a little in a hurry to complete the task. The processing time provided for completing the electronic student worksheet follows the learning hours at Al Islam High School Krian. The current learning hours are pandemic learning hours. It is about 30 minutes each learning hour. In one week, the biology subject has 3 hours of learning, equivalent to 90 minutes. In addition, some students complained about the types of questions that were difficult to answer. This was evidenced by student comments stating that:

"The learning is interesting using the electronic student worksheet, but the graphic part is confusing for us".

"Too many questions with graph and some a little difficult to understand. Maybe three questions is better".

Questions with graphs in the electronic student worksheet are types of analyzing questions. Some groups have a little difficulty answering these questions (Figure 7)**.** The solution is to explain to students how to read and understand the graphs and questions on the electronic student worksheet.

The difficulties students experience in answering questions can be caused by students are not trained to work on analytical-type questions at school (Firmansyah, Patandean, & Rusli, 2018).

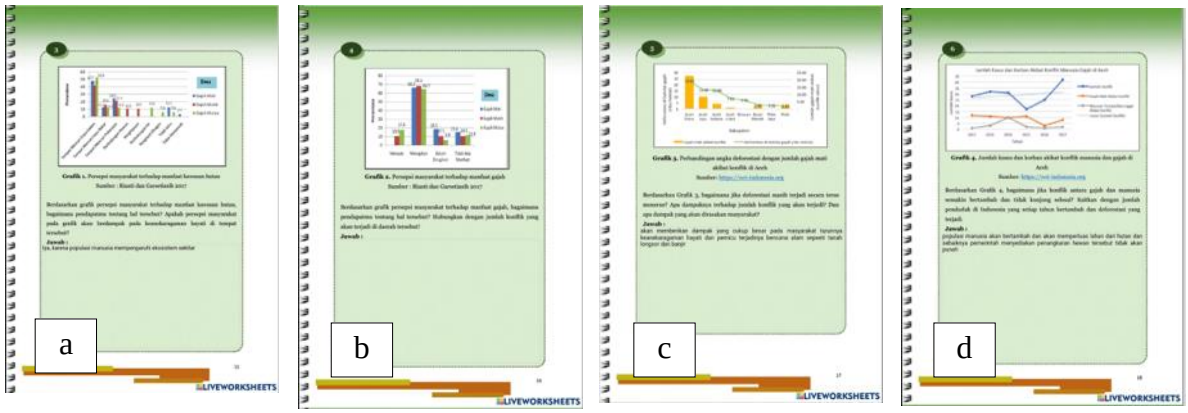


Figure 7. Questions with graphs on Electronic student worksheet 2 (a) Question number 3; (b) Problem number 4; (c) Problem number 5; (d) Question number 6

Motivation is essential in increasing learning efforts to achieve learning objectives. One of the efforts to increase students' learning motivation is to use good and interesting learning media (Febrita & Ulfah, 2019). Electronic student worksheet on biodiversity topic based on local wisdom and culture is a learning media with a website Liveworksheets, which contains attractive features and can motivate students in learning (Table 1). Some of the electronic student worksheet respondents, namely students stated that:

"Overall, these Liveworksheets are pretty good because they look attractive, the content is explicit, and they add insight".

"First time using liveworksheets, how it looks interesting, learning becomes more exciting, and the teachers are also friendly and kind".

These comments from the students indicate that the electronic student worksheet is exciting and fun compared to the paper worksheet. So that students are more motivated when learning to use the website Liveworksheets. Study Tomalá & Carrión (2021) also shows that learning through Liveworksheets can improve student performance and interest in learning. The use of innovative and latest technology can increase students' learning motivation. This is in line with research by Chang et al. (2019) that use innovative technologies such as AR technology (Augmented Reality) to boost student interest in learning.

This electronic student worksheet based on local wisdom and culture can also enhance students' learning motivation with the content of local wisdom and culture so that learning becomes more exciting and fun. This is in line with Sari & Fitriah (2015) that learning with local wisdom and culture can form active and creative interactions among students, affecting motivation and learning outcomes. Study of Husin & Darsono (2018) also state that using local wisdom-based teaching materials in learning activities can be carried out well and increase students' learning motivation. This is also evidenced by several comments from students after the implementation of an electronic student worksheet on biodiversity topics based on local wisdom and culture, which states that:

"Learning biology with dances is very interesting and adds insight".

"Electronic student worksheets can be studied easily because the content is interesting".

Electronic student worksheet on biodiversity topics based on local wisdom and culture also includes an Introduction to Discussion feature. This feature is located after the Articles and Bio Gallery features. The Introduction to Discussion feature contains several questions that motivate students to learn about biodiversity through Indonesian local wisdom and culture (Figure 8).

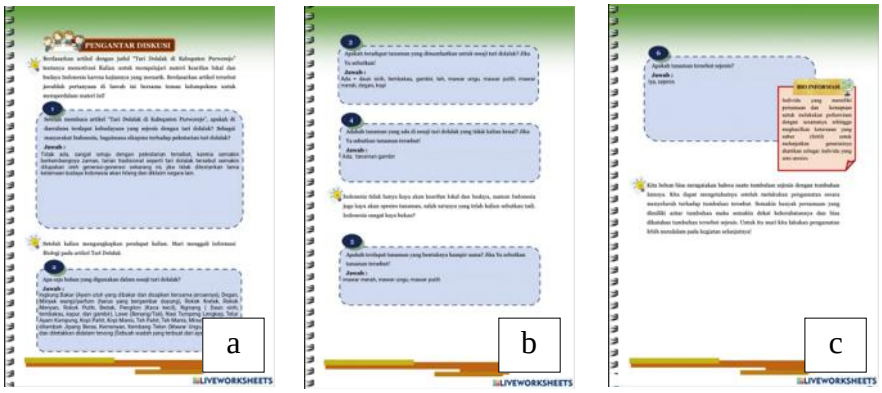


Figure 8. Introduction to Discussion feature on electronic student worksheet 1 (a) First page; (b) Second page; (c) Third page

Students can learn the biodiversity topic through objects or materials used in cultural activities and objects protected in local wisdom. One example of cultural activities is the Dolalak dance culture of the Purworejo community, presented in electronic student worksheet one or E-LKPD 1. This culture uses materials from nature as a complementary activity. One of the materials used is kembang telon, which means a three-coloured flower consisting of white, red, and purple roses (Adinugraha, 2018). Students can learn the level of biodiversity through these materials (Adinugraha, 2018). In addition, local wisdom can also be used as biology teaching materials. One example is the local wisdom of the community at Telaga Rambut Monte, Krisik Village, Gandusari District, Blitar Regency, which is presented in electronic student worksheet two or E-LKPD 2. People around the lake believe that Sengkaring fish are sacred fish, so local people do not dare to take or disturb the fish. People also believe cutting down trees around the lake will bring disaster to the loggers (Fitrahayunitisna, 2019). This trust can serve as an educational tool to instil the value of conservation awareness (Fitrahayunitisna, 2019). Through local wisdom that the people of Krisik Village trust, it can be used as biology teaching materials. Especially in the sub material of biodiversity conservation.

CONCLUSION

Based on the study results, it can be concluded that the electronic student worksheet on biodiversity topics based on local wisdom and culture to enhance students' learning motivation is valid and practical. This is supported by the electronic student worksheet research results obtaining a validation score of 4 with a very valid category. The electronic student worksheet obtained a positive response score of 98% from teachers and 96% from students categorized as very practical. Furthermore, the motivational questionnaire student learning using the ARCS model obtained an average score of 3.27, categorized as very strong. Further research suggests that electronic worksheets can be developed on other topics, local wisdom, and culture because development of student worksheet based on local wisdom and culture is still limited.

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