

Development of Discovery Learning Worksheets Integrating Traditional Dance for Biology Instruction on the Human Movement System

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ABSTRACT: This study aims to develop LKPD on a biology subject that is based on local culture, Sirih Kuning Traditional Dance to make it easier for students to understand the concept of movement material and introduce the local culture "Tari Sirih Kuning". This research used Research and Development (RnD) with 4D development methods to develop learning media, the methods are Define, Design Develop, and Disseminate. Data Aggregation methods used in this study are direct and indirect. Media used in this study are observation sheets, interviews, and questionnaires. Data Analysis Methods of this study used the percentage of LKPD reviews based on expert validation results then being described. Based on the LKPD validation result that used local wisdom on developed movement material, The result shows that in term of overall materials and media have worthy criteria with 90,8% for material expert value and 95% for media expert. Therefore, It can be concluded that LKPI is worthy enough and give advantages as teaching materials that can help students understand movement system concept and increase students' knowledge about local culture's value.

KEYWORDS: Biologi learning, Cultural dance, Discovery Based Learning, Movement system, Worksheets

I. INTRODUCTION

Rapid growth has happened in various fields, including education, culture, and technology development in this modern era. Globalization has changed the arrangement of society in terms of traditions, culture, and social systems (Kurniawan, 2023). This globalization process influenced the character and behaviour of students, such as individualism and Western lifestyle, even to the point of promiscuity (Kholillah, 2022). This can fade the students' spirit of nationalism and even cause them to forget about the traditions, culture, and norms in the local area. Indonesia has implemented an Independent Curriculum (Kurikulum Merdeka) to strive for more advanced education since 2022. In the implementation, the Independent curriculum emphasizes innovation in education, the use of technology, and school readiness. It is not only the students who are required to transform but also the teachers who are required to take part in important roles in implementing the Independent Curriculum. Through the Independent curriculum, teachers have been given the independence to prepare their teaching materials based on the characteristics and necessity of the students in the specific school while still referring to achievements and objectives of learning (Noorhapizah, 2023).

There has been a change in the independent curriculum teaching media, namely from the lesson plan to teaching modules. The teaching modules contain attachments like a Student Worksheet, which helps guide learning (Pengestuti, 2023). Student worksheets are a teaching media used to guide and evaluate students. Using student worksheets can be one solution for reaching the efficiency and effectiveness of learning. Based on the observation results and biology teachers interviews in November 2022 in three schools, It showed that the teachers used their worksheets in the learning process. However, the use of worksheets was still limited, which made the served materials not yet contextual and monotonous, so it influenced the students' motivation and learning results.

In biology learning, several materials are not concrete, so they need more understanding of concepts (Ariyanto, 2018), one of which is movement system materials. In an independent curriculum, this material is studied in the F phase: understanding organ systems and mechanisms. Movement system materials are categorized as material that tends to be challenging to understand because they require strong imagination and memorization, so students consider these movement materials difficult to learn (Rustaman, 2004; Ade, 2021; Pengestuti, 2023). Based on the problem, the making of biology teaching materials based on creative and innovative movement system material can be done by media and local wisdom, for example, by making worksheets

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based on local wisdom, namely dance, which is applied to support biology learning. Combining local wisdom and biology teaching can create a practice learning experience for students. Therefore, biology learning sources can be more contextual and meaningful (Nambiar dkk, 2020).

This local wisdom-based learning not only increases students' knowledge but also can instill love and interest of local diversity in the local area; apart from that, it also encourages understanding, which makes it easier for students because it provides real examples in everyday life (Alam dkk, 2021; Rummar, 2022). Based on the interviews done with biology teachers, culture-based teaching materials are still rarely developed and have never even been applied during teaching. This study aims to explore how integrating traditional cultural practices, especially movement-based activities such as dance, can enhance the learning process of complex biological concepts. This approach aims to make abstract and challenging material more concrete, relevant, and engaging for students by connecting scientific content with cultural heritage. In addition, this approach supports the preservation of local culture in line with the educational goal of developing character through culturally responsive learning.

II. METODE

This study used a research and development (R&D) method with a 4D development design (Thiagarajan, 1974) to develop learning devices, which consist of four steps, namely Define, Design, Develop, and Disseminate. This research begins with an analysis of learning needs through observation and in-depth interviews with biology teachers at the school. The results of this analysis can be used to formulate learning objectives that are in accordance with the needs of students. Then the design stage is carried out by designing the initial design (prototype) worksheet. The third stage is development, where the product is validated by experts and revised based on suggestion or recommendations from the validation results. Validation was carried out by three validators, namely, two expert lecturers and one biology teacher. The assessment of each validator was used to improve and refine the product until it met the validity requirements. This research was only conducted up to the third stage, Develop. The main reason the Disseminate stage was skipped due to limited time and available resources so this research focused more on developing worksheets.

The data collection method used the validation method. The instruments used in this research are interview guidelines, a student needs questionnaire, a product validation sheet, and a practicality questionnaire. The validation results were analysed quantitatively and descriptively. Data analysis was calculated using the percentage of validation sheet results with Likert scale calculations. The percentage of validation sheet data was obtained based on likert scale calculations, the results of the validity of the worksheet which was developed with score interpretation criteria according to Akbar (2013), which is presented in Table 1.

Table 1. Validation criteria

Percentage (%)	Criteria
$01,00 \leq P \leq 50,00$	No validity
$50,01 \leq P \leq 70,00$	Low validity
$70,01 \leq P \leq 85,00$	Valid
$85,01 \leq P \leq 100,00$	High validity

The practicality test was conducted after the worksheet was declared valid. The practicality test score obtained using Formula 1 is then categorised according to Riduwan (2010) as presented in Table 2.

$$\text{Practicality percentage} = \frac{\text{Score obtained}}{\text{Maximum score}} \times 100\%$$

Table 2. Practicality category

Percentage (%)	Criteria
$00,00 \leq P \leq 20,00$	Very impractical
$20,01 \leq P \leq 40,00$	Impractical
$40,01 \leq P \leq 60,00$	Fairly practical
$60,01 \leq P \leq 80,00$	Practical
$80,01 \leq P \leq 100,00$	Very practical

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III. RESULTS AND DISCUSSION

The definition step is the initial step conducted and is the reference for developing a learning tool. This step is conducted through the needs analysis of learning objectives. The needs analysis step aims to determine the conditions and problems related to local wisdom-based worksheets that support learning. At this step, the researcher interviewed biology teachers and observations at high school. Based on the results of the interviews, information was obtained that the teaching materials in the form of worksheets are still monotonous and less interactive. The activities contained in the worksheet are still not contextual, and none are related to local potential.

Curriculum analysis aims to formulate indicators and learning objectives. Based on the results of observations, the school had implemented an independent curriculum. Then, the biology learning objectives according to the independent curriculum were analyzed and adjusted to the worksheet's needs based on the dance's local wisdom. The average age of XI class students is 17-18 years, and it is in the teenage development period. In biology learning class, it shows that some students still have difficulties understanding the material presented by the teacher. Many factors influence this, such as biology material that is explained abstractly and also the learning methods used. Therefore, teachers should develop learning methods appropriate to students' ages by designing learning strategies that encourage students' enthusiasm for learning, assisted by innovative teaching materials, such as worksheets based on local wisdom.

After conducting observations at school, learning objectives were formulated by the independent curriculum's learning objectives. Based on the flow of learning objectives, the indicators for developing this worksheet are: 1) students can identify the type of joints and direction of movement by the various movements of the dance, and 2) students can understand the various types of muscle movements that exist in humans according to the various movements in the dance. Each dance has various kinds of movements. The second step in this development is the design step (planning). At this stage, the researcher begins to design the worksheet, which will be developed based on the needs analysis results. According to Thiagarajan (1974), several steps need to be taken to organize the material, organize the content format, and design the initial appearance.

This worksheet was made according to the needs of the movement system material that needs to be studied in phase F. It is also based on the competencies to be achieved and the formation of concepts. The material studied in this worksheet is divided into sub-materials for joints and muscles. The worksheet content framework is formed based on the worksheet component guidelines by the Ministry of Education and Culture (2022). The components of the local wisdom-based worksheet framework for movement system material consist of a cover, foreword, table of contents, instructions for use, learning components, concept map, introduction, worksheet 1: joints, worksheet 2: muscles, evaluation questions, and bibliography.

The appearance and design of the worksheet are made to be attractive and straightforward to make it easier for teachers and students to use them. The colours of the cover and contents are made in harmony so that they are comfortable to look at, with the dominant colour being brown. This design was created using Canvas applications. The following is a view of the front and back covers of the developed worksheet.



Figure 1. The front cover of worksheet

The worksheet development aims to make the learning process more contextual but combined with local and regional wisdom. A contextual approach can be realized through local wisdom so that through this, students will understand better that what they learn at school can be helpful in everyday life, and a contextual approach that uses local wisdom can enable students to gain meaningful learning (Ramdani, 2018; Yusnidar & Epinur, 2021).

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The next step is created an instrument to validate the product assessment that has been developed. This assessment is product validity, consisting of material and media aspects. The instrument that has been prepared refers to the instrument issued by Badan Standard Nasional Pendidikan (BNP) in 2014.

The first validation that was done was material expert validation, which provided the product that had been developed and a validation sheet to the validator. This validation sheet consists of 30 questions, including aspects of the suitability of the content, presentation and language of the worksheet.

Table 3. Result validation of worksheet material

No	Aspects	Score
1	Eligibility of content	46
2	Feasibility of presentation	27
3	Language eligibility	36
Total		109
Eligibility percentage		90,8%
Criteria		High Validity

Based on the results of material experts on the developed worksheet, an overall average score percentage of 90.8% was obtained with the criteria "high validity." The material expert validator concluded that the development of the worksheet was worth testing. The aspects that have been assessed include the eligibility of content, feasibility of the presentation, and language eligibility aspect. These aspects were chosen to produce a worksheet that is easy for students to understand, motivates students to learn, and the material presented is by students' abilities but is still able to develop students' thinking ability in formulating concepts of the material. This is in line with the statement of Faizah and Astutik (2017), a good worksheet is one that can help and guide students in determining appropriate material concepts for themselves so that the material can be understood easily.

In the content feasibility aspect, the score was 95.8%; this shows that the worksheet developed aligns with the learning objectives. Good learning resources and learning media are in accordance with basic competencies and learning objectives (Panjaitan et al., 2020). For the feasibility aspect of the presentation, the percentage value was 84.3%. Based on the assessment of this aspect, the movement system material in the worksheet is in accordance with the discovery learning syntax, and there are supporting presentations such as a foreword, table of contents, instructions for use, and a bibliography. A worksheet that matches the syntax used is included in a good worksheet (Muskania & Wilujeng, 2017). Meanwhile, from the aspect of language appropriateness, it received an assessment percentage of 90%, which shows that the language used in the worksheet is by linguistic rules.

There is a validation of media suitability, which aims to find out the opinion of media experts regarding the worksheet, which has been developed as a basis for fixing and improving its quality afterwards. Validation is conducted by providing the product and a validation sheet consisting of 25 questions with cover and content design aspects. The results of the validation of teaching materials are presented in Table 4.

Table 4. Worksheet Media Validation Results

No	Aspects	Score
1	Cover Design	31
2	Design of the display content	64
Total		95
Eligibility percentage		95%
Criteria		High Validity

The validator decides that this teaching module has "high validity" with a percentage of 95%. The validator of the teaching materials also concluded that the teaching modules that were developed were worthy of being tested in the field with revisions according to the suggestions given. Several suggestions and input provided by expert validators need to be followed up to improve the product that has been developed; these are related to font colour, the format of the paragraph, and clearer image selection. From the design aspect, the worksheet cover has a percentage value of 86.1%. The average percentage value for the

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cover design aspect shows the attractiveness of variations in the use of colours, letters, and images (Rustan, 2013; Aldila, 2017). Meanwhile, the design aspect of the display content got a percentage of 94.1%. This shows that the local wisdom-based worksheet has spacing that makes it easier to read; the spacing between letters and the spacing between lines is used normally. The regular use of spacing aims to make the material not too dense, which can give students a feeling of boredom (Faishol et al., 2018).

In the development stage, a practicality test was also conducted by students. The results of the practicality test showed that the worksheet obtained an average score of 88%, which was included in the “very practical” category.

Table 5. Worksheet Media Validation Results

No	Aspects	Score
1	Construct	70
2	Language	70,6
3	Visual	70,5
4	Usefulness	70,5
Total		70,4
Eligibility percentage		88%
Criteria		Very practical

The construct aspect evaluates the content and organisation of the learning material. A score of 70 shows that this worksheet has a clear, logical structure and is in accordance with the learning objectives. This is similar to the findings of Wahyuni et al. (2020), who concluded that systematic constructive design improves the efficiency of media use by instructors and students. The language aspect of this worksheet received a score of 70.6, showing that its contents satisfied the standards of standardisation, clarity, and fit for the student's cognitive development level. According to Sukardi (2018), practical media is distinguished by the use of communicative and simple language, which reduces ambiguity and improves comprehension. This worksheet visual aspect, which had a score of 70.5, is regarded as having images that enhance reading and pique viewers' attention. Hikmah & Susilana (2021) support this by highlighting how crucial effective visualisation is to helping pupils grasp concepts more quickly. The usability aspect evaluates how simply and realistically people can use the media without the need for extra training. With a score of 70.5, this worksheet satisfies the ease of use criteria. According to Plomp and Nieveen (2010), there is a high degree of practicality in media that instructors and students may utilise directly without any technological obstacle.

Based on the results of the development research, this local wisdom-based worksheet is suitable to be used as a learning resource for students in phase e to understand the concepts of movement system material. Innovative and creative learning resources can support success in learning, providing an understanding of concepts and increasing students' creativity (Nurmahudina, 2019; Pane, 2022).

V. CONCLUSIONS

The results of the analysis and discussion of local wisdom-based worksheet on the movement system material that has been developed in terms of material validity and media validity, all results have high eligibility criteria with a material expert score of 90.8% and a media expert score of 95%. The practicality test by students resulted in an average score of 88%, which was categorized as very practical. So it can be concluded that this worksheet is feasible and can provide benefits as teaching material that can help students understand the concept of movement systems and increase students' knowledge related to local wisdom values. For further research, it is recommended to implementing it in the classroom learning process to determine the effectiveness of the worksheet.

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