

Starling Lawu Dance as a Learning Resource for Movement System for Junior High School Students

Tasya Novian Indah Sari^{1*}, Suhartini², Suyitno Aloysius³ 

^{1,2}. Biology Education Masters Program, Faculty of Mathematics and Natural Sciences, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

ARTICLE INFO

Article history:

Received January 12, 2023

Revised January 20, 2023

Accepted May 23, 2023

Available online June 25, 2023

Kata Kunci:

Biologi, Gerakan Sendi, Gunung Lawu, Jenis Tulang, Jenis Otot

Keywords:

Biology, Joint Movement, Mount Lawu, Types of bones, Types of muscles



This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.

Copyright ©2023 by Author. Published by Universitas Pendidikan Ganesha.

ABSTRAK

Pembelajaran materi sistem gerak memerlukan pengalaman langsung untuk menemukan konsep dan mengaitkannya dengan dunia nyata. Kebutuhan bahan ajar berbasis budaya lokal dalam pembelajaran biologi merupakan salah satu kebutuhan penting untuk membawa siswa pada pengetahuan dan nilai-nilai tradisional di lingkungan masyarakat. Tujuan penelitian ini adalah untuk menganalisis gerak tari jalak lawu sebagai sumber belajar pada materi sistem gerak siswa kelas VIII SMP. Penelitian ini merupakan jenis penelitian deskriptif eksploratif. Informan penelitian ini adalah guru IPA di SMP. Teknik pengumpulan data dilakukan dengan wawancara, FGD, dan penilaian kelayakan sumber belajar. Teknik analisis data yang digunakan dalam penelitian deskriptif melalui tahapan reduksi data, penyajian data, dan penarikan kesimpulan data. Hasil penelitian menunjukkan bahwa terdapat 22 vektor gerak tari Jalak Lawu yang berpotensi menjadi sumber pembelajaran sistem gerak. Hasil analisis gerak penari jalak lawu dapat dijadikan sebagai dasar pengembangan bahan ajar selanjutnya. Perlu upaya lebih lanjut untuk mengemas bahan ajar berbasis budaya lokal yang disesuaikan dengan kebutuhan pembelajaran.

ABSTRACT

Movement system material learning requires direct experience to find concepts and associate them with the real world. The need for teaching materials based on local culture in learning biology is one of the important needs to bring students in traditional knowledge and values in the community environment. The purpose of this study was to analyze the motions of starling's lawu dance as a learning resource in the movement system material for grade VIII Junior High School students. This research is a type of exploratory descriptive research. The informant of this study was a science teacher at Junior High School. Data collection techniques were carried out by interviews, FGDs, and assessment of the feasibility of learning resources. Data analysis techniques are used in descriptive research through the stages of data reduction, data presentation, and data conclusion. The results of the study show that there are 22 motion vectors for the starling lawu dance which have the potential to become a source of learning the motion system. The results of the motion analysis of the starling lawu dancers can be used as a basis for further development of teaching materials. Further efforts are needed to package teaching materials based on local culture that is tailored to learning needs.

1. INTRODUCTION

The cultural diversity that exists throughout Indonesia has various local wisdoms and traditions. Cultural diversity must be maintained and preserved, especially for local communities. In fact cultural riches tend to apply to the older generation (Azahari, 2017; Budiarto, 2020). The lack of attention of the younger generation in maintaining local culture, traditions and wisdom can have an impact on the loss of cultural wealth as a regional characteristic. Referring to the points above, education is the right tool to prepare the younger generation to have a creative, wise, open minded and constructive attitude. Indonesian education needs to be integrated with culture in Indonesia to build early awareness of students towards awareness of local culture (Fuad et al., 2020; Rosala et al., 2021).

Education is a place that has considerable potential in developing students' knowledge and insights. Education can be used as a forum for empowering human potential to pass on, develop and build

*Corresponding author

E-mail addresses: tasyanovian@gmail.com (Tasya Novian Indah Sari)

culture in the future (Eny, 2013; Suastra, 2010). Education can be used as a forum for preserving cultural values that are integrated with the education system, one of which is in the learning system. The education system has an important role in terms of education and culture (Hamdi, 2020; Mansyur et al., 2019). An educator is required to create a creative and innovative learning scope in presenting learning material. It is intended that students do not feel bored in learning activities. According to previous study one of the efforts that teachers can make is to create learning that is not boring and monotonous by integrating local potential and culture in learning activities (Munawar et al., 2013). Develop teaching materials creatively and innovatively based on the local potential of each region (Alimah, 2019; Zuriah et al., 2016).

The Starling Lawu dance is one of the local dances originating from the Magetan Regency and will only be officially inaugurated in 2022. The Magetan Regency Government is intensively socializing this dance with students in Magetan Regency. This socialization effort seeks to raise awareness as well as introduce students as the younger generation to the dance that is the pride of Magetan Regency. This is in line with the opinion state that integrating local culture into the learning process in schools needs to be done as part of efforts to preserve local culture in learning activities (Fuad et al., 2020). According to other study that there are various dances such as the Tanggai dance which utilize the movements of the hands and feet and can nourish the function of the movements of the hands and feet (Anjelia et al., 2018).

The results of preliminary observations at one of the Junior High Schools in Magetan Regency, namely Junior High School 1 Bendo, showed that the science biology learning resources used by teachers still used textbooks and worksheets in general. The teacher said that learning biology at school was still not integrated with local culture and potential in the school environment, one of which was in the movement system material. Students still find it difficult to learn motion in the motion system, especially about the names of the motion and types of movement in the motion system. The motion system material is one of the interrelated materials. This material requires students to be able to identify the types of muscles, describe the structure of the muscles, know the function of the muscles, explain their location, and how they work that are interrelated. For students who do not study this material well, then the next motion system material cannot be understood properly (Mukaromah, 2021; Rohmah & Setiani, 2022).

The material for the human locomotion system in grade VIII Junior High School students is found in Basic Competency 3.1 Analyzing motion in living things, the locomotor system in humans, and efforts to maintain the health of the locomotor system. This competency requires students to be able to analyze the movement system in humans which includes types of the skeleton, joint motion, muscle performance, and movement system disorders. In line with the research state that learning the movement system tends to be carried out using the lecture method and practice regarding the movement system is still minimal (Suryani et al., 2016). The results showed that the movement system material was the most difficult material in learning biology by 54%. Movement system material is considered difficult because in this material there is a lot of memorizing the names of bones which are foreign terms. The visualization contained in the learning materials or learning resources used also contributes to the ease/difficulty of students (Nisak, 2021). Biology learning, which is included in the movement system, requires direct experience to find concepts and relate them to the real world. This can be realized through contextual learning, by presenting concrete and authentic learning resources that are close to students through the use of local culture-based learning resources (Eurika & Hapsari, 2017; Nisak, 2021). Results of previous study shows that the need for teaching materials based on local culture in learning biology is one of the important needs to bring students to gain wisdom from traditional knowledge and values that surround the community (Ardan et al., 2015).

Studies on teaching materials for movement system material have been carried out a lot. However, studies on movement system teaching materials for Junior High School students that are integrated with local culture are still minimally carried out. Research conducted regarding the use of the local culture of the Tambelan community for the development of ecosystem modules, it shows that students are quite enthusiastic and enthusiastic in learning biology that integrates local wisdom (Zulkarnain et al., 2022). Furthermore, similar research was also carried out regarding local culture-based ethnoscience learning in biology material can increase students' scientific knowledge (Andini et al., 2020). Shows that the use of environmental knowledge modules based on local potential of West Kalimantan is used to create more contextual learning. Last research conducted regarding the ethnobotany-based biology module for the people of Penorogo, Trenggalek and Tulungagung, it shows that local culture-based ethnobotanical knowledge-based modules can be used as a forum for introducing the environment around students, and maintaining culture.

Maintaining local culture that is lagging behind in industrial and technological developments encourages education in schools to integrate local culture in learning (Goldman et al., 2018; Marhayani, 2016). Integration of cultural values in the learning process is important for schools and teachers. Learning can be developed according to traditional knowledge, natural resources and local culture, so that teachers can make optimal use of it in the learning process (Ardan et al., 2015; Hidayati et al., 2020). Combining local

knowledge with scientific knowledge can make students' understanding more comprehensive. In line with this previous study conveyed that the integration of local culture into learning activities can improve the quality of learning (Jayanti et al., 2017). The study of local potential and culture has challenges to make this potential an appropriate source of learning. This challenge is related to the accuracy of the analysis of the study related to regional characteristics and students' daily experiences (Eny, 2013; Susilo, 2018). The selection of learning resources must be adjusted to the learning objectives to be achieved. Good learning resources are learning resources that can provide meaningful experiences for students so that they can improve students' thinking skills (Eurika & Hapsari, 2017).

From the description presented, a bridge is needed between local culture and modern scientific knowledge and a way to integrate it into the formal learning system in schools so that students understand and will never forget their local cultural values. Thus, it is necessary to conduct an initial study to analyze the potential of the local culture of the Starling Lawu dance movement as a source of learning. The purpose of this study is to analyze the motions of the starling's lawu dance to serve as a learning resource on the movement system material for class VIII Junior High School students' motion systems in the Magetan Regency Middle School. The results of the initial potential analysis are expected to be able to become the basis for further research in developing teaching materials for movement system materials for class VIII Junior High School that are integrated with local culture.

2. METHOD

This research is a type of exploratory descriptive research. Explorative descriptive research aims to describe the state of a phenomenon and is not intended to test certain hypotheses, it only describes what a variable (Caya & Mosconi, 2022; Huberman & Miles, 2012). Researchers studied and described the local potential of the starling lawu dance as a source of learning the human movement system for grade VIII Junior High School students. The research was conducted from October 2022 to January 2023 at Junior High School 1 Bendo Magetan. The purpose of this study was to analyze the motions of the starlings lawu dance as a learning resource in the movement system material for class VIII Junior High School students. Research informants are people who are used to provide information about the situation and background conditions of the research. The informants of this study were science teachers at Juniro High School 1 Bendo Magetan. The considerations of the informants from this study were 1) the last education of a junior high school science teacher, 2) a Junior High School teacher who taught science subjects especially with a background in biology education, 3) a science teacher who mastered the starling lawu dance, Magetan Regency.

Data collection techniques were carried out by interviews, FGD (Forum Grub Discussion), and assessment of the feasibility of learning resources by Junior High School teachers. The instrument used in this study was an interview sheet with a Junior High School science teacher adopting from (Wulandari & Djukri, 2021). Interviews were conducted in conjunction with discussions with teachers covering local culture as a source of learning biology and the linkage of local culture-based learning resources with the basic competencies used. The interviews and FGD activities aim to obtain data related to local culture by biology teachers. The instrument for evaluating the eligibility criteria for learning resources by Junior High School teachers adopted from (Lidi et al., 2021). Assessment of the feasibility of learning resources by the teacher is assessed using a Likert scale (1) not good, (2) good enough, (3) good and (4) very good (Table 1). The results of the assessment of the feasibility of learning resources from assessors are averaged to find out the criteria for evaluating learning resources is show in Table 1.

The data analysis technique used in this research is descriptive data analysis technique. The data obtained is described to determine the feasibility of learning resources through the stages of data reduction, data presentation, data inference. The data reduction stage includes data selection activities through an analysis of the feasibility of the local culture of the starling lawu dance as a source of high school biology learning on movement system material. As for some of the criteria for learning resources include potential clarity, conformity with learning objectives, target clarity, clarity of disclosed information and clarity of expected gain. The appropriateness of local culture is carried out through two stages, namely the stage of scoring local culture based on criteria through an assessor, namely a junior high school science teacher and the stage of converting the score into a quality value for the feasibility of learning resources in Table 2.

Table 1. Learning Resource Feasibility Assessment Criteria

Aspect	Indicator
Content Eligibility	The local potential presented is in accordance with the material, core competencies and basic competencies of Junior High School The accuracy of the material according to the level of junior high school education Local potential as learning support material

Aspect	Indicator
Presentation Eligibility	The technique of presenting local potential as a source of learning Presentation of local potential learning as a learning resource Presentation equipment.
Language Eligibility	The suitability of language use with the level of development of junior high school students Use of communicative language The use of language fulfills the requirements of coherence and integrated flow of thought

Table 2. Learning Resource Feasibility Rating Scale

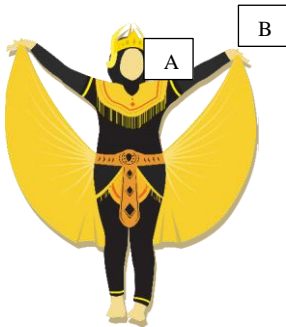
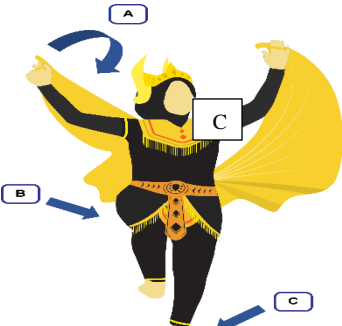
Rating Range	Rating Description
3,1-4	Fully Meets the Criteria
2,1-3	Meet the criteria
1,1-2	Does not meet criteria
0-1	Very Does not Meet the Criteria

3. RESULT AND DISCUSSION

Result


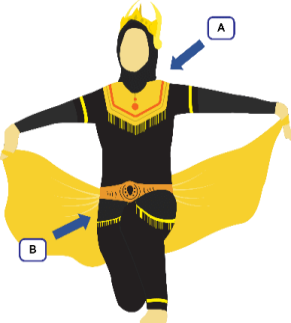
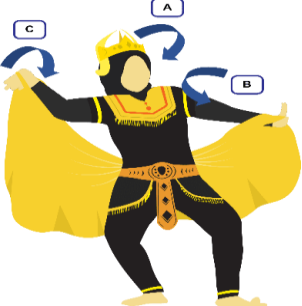
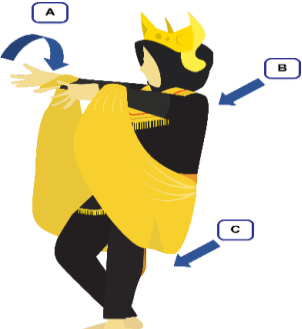
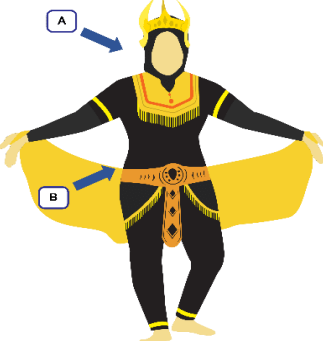
The results of the FGD with the science teacher produced 22 vector images of the motion sequences of the starling lawu dancers which can be used as a source of student learning on movement system material including types of bones, joint and muscle motion in basic competence 3.1 of class VIII Junior High School students. The human movement system is a complex unit aimed at achieving a system, namely motion. From the results of the vector illustration, it shows that the dancer's movements involve the bones of (A) the arm bones, the radius and ulna bones, (B) the wrist bones and (C) the toe bones. Then the joint motions involved in this motion are (A) ball joints, (B) roll joints and (C) joints. shear (C). Finally, from the dancer's series of movements, the types of muscles involved are striated muscles. The result is shown in Table 3.



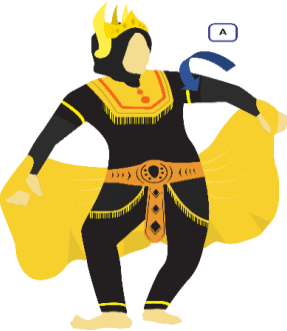
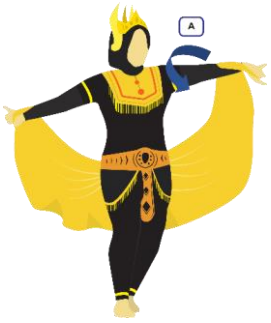

Table 3. Results of Motion Analysis on Starling Lawu Dance

No.	Motion Pictures	Bone Type	Joint Movement	Muscle Type
1		A. Arm bones, ulna bones and ulna B. Wrist bones C. Ankle bones	A. Bullet joints B. Roll joint C. Sliding joints	Striated muscle
2		A. Arm bones, ulna bones and ulna B. Thigh bones, knee bones, shin bones and fibula bones C. The bones of the toes	A. Bullet joints B. Hinge joints C. Sliding joints	Striated muscle

No.	Motion Pictures	Bone Type	Joint Movement	Muscle Type
3		<p>A. The bones of the palm, wrist and knuckles B. Hip bones and spine</p>	<p>A. Saddle and roll joints B. Sliding joints</p>	<p>Striated muscle</p>
4		<p>A. Wrist bones, palm bones and knuckle bones B. Upper femur, tibia and fibula</p>	<p>A. Shear joints and roll joints B. Hinge joints</p>	<p>Striated muscle</p>
5		<p>A. Wrist bones B. Collarbone and spine C. Hip bones and spine</p>	<p>A. Roll joints B. Swivel joint C. Sliding joints</p>	<p>Striated muscle</p>
6		<p>A. Wrist bones B. Palm bones</p>	<p>A. Roll joints B. Sliding joints</p>	<p>Striated muscle</p>
7		<p>A. Arm bones, ulna and ulna B. Femur, fibula and tibia</p>	<p>A. Bullet joints B. Hinge joints</p>	<p>Striated muscle</p>

No.	Motion Pictures	Bone Type	Joint Movement	Muscle Type
8		A. Neck bone B. Wrist bones C. Thigh, shin and fibula bones	A. Swivel joint B. Roll joint C. Hinge joints	Striated muscle
9		Neck bones	Swivel joint	Striated muscle
10		A. Neck bone B. Bones of the palm and wrist bones C. Bones of the upper arm, radius and ulna D. Thigh and calf bones	A. Swivel joint B. Sliding joints and roll joints C. Hinge joints D. Bullet joints	Striated muscle
11		A. Hip bones and spine	Sliding joint	Striated muscle
12		A and B Bones of the upper arm, ulna and ulna	A. Bullet joint (shoulder arm) B. Hinge joint (elbow)	Striated muscle

No.	Motion Pictures	Bone Type	Joint Movement	Muscle Type
13		<p>A. Wrist bones B. Bones of the upper arm, radius and ulna</p>	<p>A. Bullet joints B. Roll joint</p>	<p>Striated muscle</p>
14		<p>A. Bones of the upper arm, radius and ulna B. Pelvis</p>	<p>A. Ball joint (shoulder) B. Rotary joint (hip)</p>	<p>Striated muscle</p>
15		<p>A. Neck bone B. Bones of the upper arm, radius and ulna C. Wrist bones</p>	<p>A. Swivel joint B. Ball joints, hinge joints C. Roll joint</p>	<p>Striated muscle</p>
16		<p>A. Wrist bones, palm bones and knuckle bones B. Bones of the upper arm, radius and ulna C. Upper femur, fibula and shin bone</p>	<p>A. Shear joints and roll joints B. Ball joints and hinge joints C. Hinge joints and ball joints</p>	<p>Striated muscle</p>
17		<p>A. Neck bone B. Pelvis</p>	<p>A. Swivel joint B. Bullet joint</p>	<p>Striated muscle</p>

No.	Motion Pictures	Bone Type	Joint Movement	Muscle Type
18		A. Collarbone B. Knee, calf and shin bones	A. Swivel joint B. Hinge joints	Striated muscle
19		The upper arm, ulna and radius bones	Bullet joints	Striated muscle
20		The upper arm, ulna and radius bones	Ball joints and hinge joints	Striated muscle
21		The upper arm, ulna and radius bones	Ball joints and hinge joints	Striated muscle
22		Finger and palm bones	Saddle joints	Striated muscle

The results of the FGD in [Table 3](#) regarding the movements of the starling lawu dancers which have the potential as a source of learning in the motion system material were assessed for the feasibility of

learning resources by 3 junior high school science teachers. The results of the feasibility assessment of local potential as a learning resource are assessed based on 3 aspects, namely content feasibility, presentation feasibility and language feasibility. The results of the assessment by Teacher 1 got 3.5 while the average by teacher 2 was 3.9 and finally by Teacher 3 with an average of 3.9. From the three assessments carried out by the Science teacher, the average feasibility of learning resources was 3.7 as show in Table 4.

Table 4. Results of the Feasibility Assessment of Starling Lawu Dance as a Learning Resource

Assessor	Average assessment results
Teacher 1	3,5
Teacher 2	3,9
Teacher 3	3,9
Average	3,7

Based on these results as show in Table 4, the starling lawu dance as a learning resource for movement systems meets the eligibility criteria for learning resources. Regardless of the results obtained, the science teacher notes that the use of the starling lawu dance as a learning resource must provide clear signs to students and the teacher notes on several terms regarding the movement system with terms commonly used by students. The results of the analysis of the criteria for learning sources for the motion system material in the motions of the starling lawu dance are shown in Table 5.

Table 5. Results of Criteria Analysis of Starling Lawu Dance as a Learning Resource for Movement Systems

No.	Criteria	Indicator	Results of Analysis of Learning Resources
1	Potential clarity	Process potential	The results of research on the local culture of starlings lawu as a source of learning the motion system are that students are expected to be able to integrate the knowledge they have and the reality of the theory of motion systems which is integrated with the starlings lawu dance as an effort to preserve local culture.
		Product potential (having linkages between facts, concepts, and principles)	The facts obtained that the motion of the starling lawu dancers can be used as a means for students to study the movement system in humans. This principle can be revealed through the results of the researcher's analysis regarding the identification of each piece of motion of the starling lawu dancers which can be used as a means of learning the movement system. Research on the local culture of the starling lawu dance as a source of learning the movement system for junior high school students has never been carried out so that the results of this analysis can be used as a first step that the local culture of the starling lawu dance can be integrated into the movement system learning.
2	Conformity with learning objectives	Basic competency reference	The results of the analysis obtained through interviews and identification of the starling lawu dance are in accordance with the basic competencies of the Class VIII movement system in the 2013 curriculum used in schools. This suitability is in basic competencies 3.1 material for motion systems for junior high school students in semester 1.
3	Target clarity	Observation target	The motions of the starling lawu dancers in the Magetan Regency area
		Designation target	Grade VIII junior high school students in the Magetan Regency area in odd semesters
4	Clarity of disclosed information	Information obtained by students	The starling lawu dance can be used as a means for students to study the movement system in humans, through every movement by dancers.
5	Clarity of expected gain	Cognitive realm	Able to provide an understanding of motion in living things, the movement system in humans, and efforts to maintain the health of the movement system
		Affective realm	through the integration of local culture, the dance moves of the starling lawu.

No.	Criteria	Indicator	Results of Analysis of Learning Resources
		Psychomorphic realm	Able to foster attitudes (behavior) towards local culture in the surrounding environment, especially the local culture of the starling lawu dance in Magetan Regency.

Base on [Table 5](#) show the results of the analysis of the local potential of the starling lawu dance as a learning resource, students are expected to be able to integrate their knowledge and reality. Students can analyze every movement of the starling lawu dancers in relation to the types of bones, joints and muscles involved in this dance. It is hoped that from the results of this analysis, in addition to analyzing the movements of the starling lawu dancers on the movement system material, students are also more familiar with the local culture of the area. The integration of local culture with learning materials is expected that students obtain more accurate and accountable information. Besides that, presenting direct experience in learning biology that is integrated with local culture can be one of the efforts to encourage the realization of meaningful learning to find a concept related to life. This is in accordance with the 2013 curriculum which emphasizes learning on the utilization of local potential in the region.

Discussion

Biology learning can be developed by utilizing the uniqueness and abundant potential of an area, including local culture and traditional technology. This is in line with the results of research showing that the starling lawu dance can be integrated into learning the movement system ([Whiten et al., 2017](#)). The motion of the starling lawu dancers can be analyzed in every movement, which is part of the unity of the motion system. This can be used as material for the preparation of teaching materials for teachers based on local culture. The potential of local wisdom can be integrated into school education. Local wisdom can be developed in the form of learning models, teaching materials, curriculum development, and even assessments. The involvement of the surrounding local culture in learning can improve the teacher's pedagogical abilities so that it has a positive effect on students ([Asrial et al., 2021](#); [Ma Rhea, 2018](#)).

According to previous study biology learning as a field of study has considerable potential to utilize local culture as a learning resource ([Eny, 2013](#)). This is in line with the opinion Yuliana et al. (2017) that local culture is a local part of social life that can be used as a source of learning, especially in biology lessons ([Yuliana et al., 2017](#)). There must be a common thread that connects traditional knowledge with modern science and seeks ways to integrate it into the formal learning system in schools so that students understand and do not forget local cultural values ([Ardan, 2016](#)). The preparation of biology learning resources must be arranged according to user needs, namely needs based on geographical location, ethnography, and, regional wealth characteristics to create meaningful learning ([Ramdiah et al., 2020](#); [Saidin et al., 2015](#)).

The results showed that the curriculum used at Junior High School 1 Bendo Magetan was the 2013 curriculum on movement system material for class VIII basic competencies 3.1 namely 3.1 Analyzing motion in living things, movement systems in humans, and efforts to maintain healthy movement systems. In the implementation of learning the teacher uses teaching materials in the form of worksheets, textbooks, and material in the form of power point from subject teachers. Learning resources are an important part of the learning component that provides learning to students so that students can easily get the information, knowledge, experience, and skills needed to be utilized either directly or indirectly ([Gómez-García et al., 2020](#); [Miniawi & Brenjekjy, 2015](#); [Muhali, 2019](#)).

The Starling Lawu dance is one of the local dances in Magetan Regency. This dance movement was inspired by the starlings that are always in the Mount Lawu area of the Magetan regency. Every movement of the dancers of the starlings lawu illustrates the movements of the starlings on the slopes of Mount Lawu and is given beauty to the art of dance. In addition to presenting the beauty of the art of dance, the motion of the starling lawu dancers is a standard substance and the main element for dancers which is used as a tool for communication through expression and movement ([Jufrida et al., 2018](#); [Smith et al., 2022](#)).

In general, the variety of dance consists of elements of movement of the hands, body, head and, legs which are inseparable from the human the movement system ([Antariksawan & Soebijantoro, 2018](#); [Clements & Redding, 2020](#)). In line with opinion that every dance movement the dancers try to move flexibly and kindly so that the screams can be enjoyed in every movement of the body, hands, and feet ([Wulandari & Djukri, 2021](#)). This unity gives rise to various movements and mechanisms of movement in dance. This local culture can be used as a reference in developing learning resources for Junior High School students' movement systems based on the starling lawu dance. This is in line with previous study state that local wisdom deserves to be integrated with learning ([Toharudin & Kurniawan, 2017](#)). Local wisdom can be used as a basis for developing learning, which is able to increase student knowledge and be used as material for

developing teacher teaching materials. Efforts to integrate and develop a local culture in learning, including implementing multicultural education governance (Gloriani, 2013; Wijayanti & Indriyanti, 2017).

The results of the feasibility assessment of learning resources show that the starling lawu dance as a learning resource meets the eligibility criteria for learning resources. The starling lawu dance deserves to be used as a source of learning the movement system because each movement describes the unity of the motion system in humans. This is in line with an opinion that learning resources are all things that support and can be utilized either in the form of humans or non-humans and can also be designed or utilized (Lidi et al., 2021). The utilization of this dance movement makes it easier for students to understand the concept of motion systems in the human body. This is because students learn to learn in a way that increases the enthusiasm of students in participating in the biology learning process (Asria et al., 2021; Utama et al., 2014).

Regardless of the results of the analysis of the local culture of the starling lawu dance that has been submitted, the application of the starling lawu dance as a learning resource for this movement system still has potential that needs to be explored so that it becomes a learning resource that voices the local culture. This is in line with the research that learning based on local cultural potential has a high potential to facilitate students in mastering 21st-century skills (Jumriani et al., 2017). Thus, in future research, researchers can develop the results of this analysis into teaching materials that are linked to relevant 21st-century skills and develop this potential into complete teaching materials. The results of the analysis of the motion of the starlings lawu dancers can be used as a future basis for the development of further teaching materials in further research. Finally, further efforts are needed to package the starling dance as teaching material for human movement systems based on local culture that is tailored to the learning needs and characteristics of students, for example, packaged into modules, student worksheets, enrichment materials or teaching materials according to the needs of students in each education unit.

4. CONCLUSION

The results of the study found that the series of movements in the Starling Lawu dance can be transformed into 22 vector images and have the potential to become a source of learning on the subject of joint motion, types of bones, and types of muscles involved in dance movements. The vector illustration is equipped with the proper attributes of the starling Lawu dancers and is equipped with instructions regarding the types of bones, joints, and muscles involved in the movement. Furthermore, the results of the teacher's assessment showed that the starling lawu dance packaged into 22 vectors has the potential to be a source of learning and meets the criteria for a learning resource. Fulfill aspects such as clarity of potential, suitability of learning objectives, clarity of objectives, clarity of information disclosed, and clarity of expected gain.

5. REFERENCES

- Alimah, S. (2019). Kearifan Lokal Dalam Inovasi Pembelajaran Biologi: Strategi Membangun Anak Indonesia Yang Literate dan Berkarakter Untuk Konservasi Alam. *Jurnal Pendidikan Hayati*, 5(1), 1–9. <https://doi.org/10.33654/jph.v5i1.574>.
- Andini, Y. F., Fitri, R., & Rahmi, Y. L. (2020). Pengembangan Modul Pembelajaran Berbasis Etnosains pada Mata Pelajaran Biologi untuk Meningkatkan Kemampuan Literasi Sains Peserta Didik. *Literatur Review. Spizaetus: Jurnal Biologi Dan Pendidikan Biologi*, 1(October), 21–26. <http://spizaetus.nusanipa.ac.id/index.php/spizaetus/article/view/4/4>.
- Anjelia, B., Yolida, B., & Marpaung, R. R. T. (2018). Identifikasi kearifan lokal di Sungai Musi Provinsi Sumatera Selatan sebagai sumber belajar IPA SMP/MTs. *Jurnal Bioterdidik: Wahana Eksplorasi Ilmiah*, 6(4), 1–14. <http://digilib.unila.ac.id/id/eprint/32899>.
- Antariksawan, V., & Soebijantoro, S. (2018). Tari bandol kabupaten Magetan (sejarah, nilai filosofis dan potensinya sebagai sumber belajar sejarah lokal. *Agastya: Jurnal Sejarah Dan Pembelajarannya*, 8(2), 199. <https://doi.org/10.25273/ajsp.v8i2.2679>.
- Ardan, A. S. (2016). The development of biology teaching material based on the local wisdom of timorese to improve students knowledge and attitude of environment in caring the persevation of environment. *International Journal of Higher Education*, 5(3), 190–200. <https://doi.org/10.5430/ijhe.v5n3p190>.
- Ardan, A. S., Ardi, M., Hala, Y., Supu, A., & Dirawan, G. D. (2015). Needs assessment to development of biology textbook for high school class X-based the local wisdom of Timor. *International Education Studies*, 8(4), 52–59. <https://doi.org/10.5539/ies.v8n4p52>.
- Asria, L., Sari, D. R., Ngaini, S. A., Muyasaroh, U., & Rahmawati, F. (2021). Analisis Antusiasme Siswa Dalam Evaluasi Belajar Menggunakan Platform Quizizz. *Alifmatika: Jurnal Pendidikan Dan Pembelajaran Matematika*, 3(1), 1–17. <https://doi.org/10.35316/alifmatika.2021.v3i1.1-17>.

- Asrial, A., Syahrial, S., Maison, M., Kurniawan, D. A., & Putri, E. (2021). Fostering Students' Environmental Care Characters Through Local Wisdom-Based Teaching Materials. *JPI (Jurnal Pendidikan Indonesia)*, 10(1), 152. <https://doi.org/10.23887/jpi-undiksha.v10i1.27744>.
- Azahari, A. R. (2017). Pelestarian Olahraga Tradisional Menyipet Di Kota Palangkar. *Mediasosian*, 1(1), 83–101. <https://doi.org/10.30737/mediasosian.v1i1.185>.
- Budiarto, G. (2020). Dampak Cultural Invasion terhadap Kebudayaan Lokal: Studi Kasus Terhadap Bahasa Daerah. *Pamator Journal*, 13(2), 183–193. <https://doi.org/10.21107/pamator.v13i2.8259>.
- Caya, O., & Mosconi, E. (2022). Citizen behaviors, enterprise social media and firm performance. *Information Technology and People*, 1. <https://doi.org/10.1108/ITP-07-2020-0514>.
- Clements, L., & Redding, E. (2020). Creativity in Higher Education Contemporary Dance. *Journal of Dance Education*, 20(2), 88–98. <https://doi.org/10.1080/15290824.2019.1572155>.
- Eny, W. (2013). Analisis potensi lokal untuk mengembangkan bahan ajar biologi di SMA Negeri 2 Wonosari. *Pendidikan Sains Universitas Muhammadiyah Semarang*, 4(1), 16–25. <https://doi.org/10.26714/jps.4.1.2016.51-57>.
- Eurika, N., & Hapsari, A. I. (2017). Analisis Potensi Tembakau Na Oogst sebagai Sumber Belajar Biologi. *Jurnal Biologi Dan Pembelajaran Biologi*, 2(2), 11–22. <https://doi.org/10.32528/bioma.v2i2.824>.
- Fuad, M., Efendi, A., & Muhammad, U. A. (2020). The use of pepaccur local wisdom for Indonesian literary teaching materials. *JPI (Jurnal Pendidikan Indonesia)*, 9(2), 213–223. <https://doi.org/10.23887/jpi-undiksha.v9i2.22779>.
- Gloriani, Y. (2013). Kajian Nilai-Nilai Sosial Dan Budaya Pada Kakawihan Kaulinan Barudak Lembur Serta Implementasinya Dalam Pembelajaran Bahasa Dan Sastra Indonesia Berbasis Multikultural. *Lokabasa*, 4(2). <https://doi.org/10.17509/jlb.v4i2.3147>.
- Goldman, D., Baum, D., Ayalon, O., & Weiss, B. (2018). Influence of 'Green School Certification' on Students' Environmental Literacy and Adoption of Sustainable practice by Schools. *Journal of Cleaner Production*, 183, 1300–1313. <https://doi.org/10.1016/j.jclepro.2018.02.176>.
- Gómez-García, M., Hossein-Mohand, H., Trujillo-Torres, J. M., & Hossein-Mohand, H. (2020). The training and use of ICT in teaching perceptions of melilla's (spain) mathematics teachers. *Mathematics*, 8(10). <https://doi.org/10.3390/MATH8101641>.
- Hamdi, M. M. (2020). Evaluasi Kurikulum Pendidikan. *Intizam, Jurnal Manajemen Pendidikan Islam*, 4(1), 66–75. <http://ejournal.staida-krempyang.ac.id/index.php/intizam/article/view/248>.
- Hidayati, N. A., Waluyo, H. J., Winarni, R., & Suyitno. (2020). Exploring the implementation of local wisdom-based character education among indonesian higher education students. *International Journal of Instruction*, 13(2). <https://doi.org/10.29333/iji.2020.13213a>.
- Huberman, A., & Miles, M. (2012). Understanding and Validity in Qualitative Research. In *The Qualitative Researcher's Companion*. <https://doi.org/10.4135/9781412986274.n2>.
- Jayanti, N. A. D., Susilo, U., Suarsini, H., & Endang. (2017). Analisis Kebutuhan Bentuk Sumber Belajar dan Media Pembelajaran Biologi Berbasis Potensi Lokal untuk Kelas X SMA di Provinsi Lampung. *Prosiding Seminar Pendidikan IPA Pascasarjana UM*, 2, 591–599. <https://pasca.um.ac.id/conferences/index.php/ipa2017/article/viewFile/1122/788>.
- Jufrida, J., Basuki, F. R., & Rahma, S. (2018). Potensi Kearifan Lokal Geopark Merangin Sebagai Sumber Belajar Sains Di SMP. *EduFisika*, 3(01), 1–16. <https://doi.org/10.22437/edufisika.v3i01.5773>.
- Jumriani, J., Prasetyo, K., & Z. (2017). Important Roles of Local Potency Based Science Learning to Support the 21st Century Learning. *European Journal of Engineering and Formal Sciences*, 1(1), 6. <https://doi.org/10.26417/ejef.v1i1.p6-16>.
- Lidi, M. W., Daud, M. H., & Bolong, M. Y. M. (2021). Potensi Kearifan Lokal Tambi Uma Suku Ende Sebagai Sumber Belajar Biologi Dan Pendidikan Karakter. *Jurnal Pendidikan Biologi*, 12(1), 45. <https://doi.org/10.17977/um052v12i1p45-51>.
- Ma Rhea, Z. (2018). Buddhist pedagogy in teacher education: cultivating wisdom by skillful means. *Asia-Pacific Journal of Teacher Education*, 46(2), 199–216. <https://doi.org/10.1080/1359866X.2017.1399984>.
- Mansyur, K., Umrah, M., & Rifal, M. (2019). Budaya Pendidikan Anak Pesisir di Wilayah Kepulauan Spermonde. *Jurnal Pemikiran Dan Pengembangan Pembelajaran*, 1(2), 1–14. <http://ejournal-jp3.com/index.php/Pendidikan/article/view/44>.
- Marhayani, D. A. (2016). Development of Character Education Based on Local Wisdom in Indegenous People Tengahan Sedangagung. *JETL (Journal Of Education, Teaching and Learning)*, 1(2), 66. <https://doi.org/10.26737/jetl.v1i2.40>.
- Miniawi, H. El, & Brenjeky, A. (2015). Educational Technology, Potentials, Expectations and Challenges. *Procedia - Social and Behavioral Sciences*, 174, 1474–1480. <https://doi.org/10.1016/j.sbspro.2015.01.777>.

- Muhali, M. (2019). Pembelajaran Inovatif Abad Ke-21. *Jurnal Penelitian Dan Pengkajian Ilmu Pendidikan: E-Saintika*, 3(2), 25–50. <https://doi.org/10.36312/e-saintika.v3i2.126>.
- Mukaromah, H. (2021). Peningkatan Aktivitas dan Hasil Belajar Siswa Melalui Penggunaan Media Audio Visual Pada Materi Sistem Gerak. *Jurnal Penelitian Sains Dan Pendidikan (JPSP)*, 1(2), 136–142. <https://doi.org/10.23971/jpsp.v1i2.3314>.
- Munawar, M., Prasetyo, A., & Pusari, R. W. (2013). Pengembangan Model Pembelajaran Inovatif Melalui Pendekatan In House Training Berbasis Kearifan Budaya Lokal. *Jurnal Penelitian PAUDIA*, 2(1), 1–13. <https://doi.org/10.26877/paudia.v2i1%20mei.367>.
- Nisak, N. Z. (2021). Analisis Kebutuhan Bahan Ajar Biologi untuk Siswa SMA Ditinjau dari Tingkat Kesulitan Materi, Keterampilan Berpikir Tingkat Tinggi, dan Keaktifan Belajar Siswa. *EduBiologia: Biological Science and Education Journal*, 1(2), 128. <https://doi.org/10.30998/edubiologia.v1i2.9629>.
- Ramdiah, S., Abidinsyah, A., Royani, M., Husamah, H., & Fauzi, A. (2020). South Kalimantan local wisdom-based biology learning model. *European Journal of Educational Research*, 9(2), 639–653. <https://doi.org/10.12973/eu-jer.9.2.639>.
- Rohmah, C. N., & Setiani, R. (2022). Pengaruh Model Problem Based Learning (PBL) terhadap Hasil Belajar Materi Sistem Gerak pada Manusia Siswa Kelas VIII SMPN 4 Tulungagung. *Jurnal Pendidikan Dan Pembelajaran Sains Indonesia (JPPSI)*, 5(2), 99–106. <https://doi.org/10.23887/jppsi.v5i2.51669>.
- Rosala, D., Masunah, J., Narawati, T., Karyono, T., & Sunaryo, A. (2021). Internalisasi Nilai Tri-Silas melalui Pembelajaran Tari Anak Berbasis Budaya Lokal. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, 5(2), 1973–1986. <https://doi.org/10.31004/obsesi.v5i2.1087>.
- Saidin, N. F., Halim, N. D. A., & Yahaya, N. (2015). A review of research on augmented reality in education: Advantages and applications. *International Education Studies*, 13. <https://doi.org/10.5539/ies.v8n13p1>.
- Smith, L., Thomas, H., Chapman, S., Foley, J., Kelly, L., Kneen, J., & Watson, A. (2022). The dance and the tune: a storied exploration of the teaching of stories. *Changing English*, 29(1), 40–52. <https://doi.org/10.1080/1358684X.2021.1957669>.
- Suastra, I. W. (2010). Model Pembelajaran Sains Berbasis Budaya Lokal Untuk Mengembangkan Kompetensi Dasar Sains dan Nilai Kearifan Lokal di SMP. *Jurnal Pendidikan Dan Pembelajaran*, 43(2), 8–16. <https://www.academia.edu/download/56402629/1697-3083-1-SM.pdf>.
- Suryani, I., Mardiati, Y., & Herlanti, Y. (2016). Pengaruh penggunaan lembar kerja siswa (LKS) berbasis kontekstual terhadap hasil belajar siswa pada konsep sistem gerak manusia. *Edusains*, 5(3), 248–253. <https://doi.org/10.15408/es.v8i2.1823>.
- Susilo, M. J. (2018). Analisis Potensi Lingkungan Sekitar Sebagai Sumber Belajar Biologi yang Berdayaguna. *Proceeding Biology Education Conference*, 15(1), 541–546. <http://download.garuda.kemdikbud.go.id/article.php?article=2334385>.
- Toharudin, U., & Kurniawan, I. S. (2017). Sundanese Cultural Values of Local Wisdom: Integrated to Develop a Model of Learning Biology. *International Journal of Sciences: Basic and Applied Research (IJSBAR)*, 32(1), 29–49. <https://gssrr.org/index.php/index/index>.
- Utama, C., Kentjaningsih, S., & Rahayu, Y. S. (2014). Penerapan media pembelajaran biologi SMA dengan menggunakan model direct instruction untuk meningkatkan hasil belajar siswa. *Jurnal Pena Sains*, 1(1), 29–39. <https://doi.org/10.21107/jps.v1i1.1325>.
- Whiten, A., Ayala, F. J., Feldman, M. W., & Laland, K. N. (2017). The extension of biology through culture. *Proceedings of the National Academy of Sciences of the United States of America*, 114(30), 7775–7781. <https://doi.org/10.1073/pnas.1707630114>.
- Wijayanti, D., & Indriyanti, P. (2017). Pendidikan Multikultural Berbasis Seni Budaya Di Sd Taman Muda Ibu Pawiyatan Yogyakarta. *SOSIOHUMANIORA: Jurnal Ilmiah Ilmu Sosial Dan Humaniora*, 2(1). <https://doi.org/10.30738/sosio.v2i1.493>.
- Wulandari, E., & Djukri, D. (2021). Identification of Lampung local potential as source of Biology learning in senior high school. *Biosfer*, 14(2), 250–263. <https://doi.org/10.21009/biosferjpb.20178>.
- Yuliana, S., S., & Sanjaya, Y. (2017). Local wisdom of Ngata Toro community in utilizing forest resources as a learning source of biology. *AIP Conference Proceedings*, 1868(August 2017). <https://doi.org/10.1063/1.4995217>.
- Zulkarnain, H., K., N. E., & Nevrita. (2022). Analisis kebutuhan dalam modul pembelajaran biologi terintegrasi kearifan lokal masyarakat Tambelan. *Student Online Journal Universitas Maritim Raja Ahli Haji*, 3(1), 617–621. <https://doi.org/https://soj.umrah.ac.id/index.php/SOJFKIP/article/view/1618>.
- Zuriah, N., Sunaryo, H., & Yusuf, N. (2016). IbM Guru Dalam Pengembangan Bahan Ajar Kreatif Inovatif Berbasis Potensi Lokal. *Dedikasi*, Vol. 13, 39. <https://doi.org/https://doi.org/10.22219/dedikasi.v13i0.3136>.