

ETHNOPHYSICAL STUDIES ON SALAI JIN DANCE IN NORTH MALUKU AS A SOURCE OF LEARNING PHYSICS

Irnin Agustina Dwi Astuti*, Ria Asep Sumarni, Irawan Setiadi, Alvina Damayanti

Universitas Indraprasta PGRI Jakarta, Indonesia

e-mail: irnin.agustina@gmail.com, riaasepsumarni@gmail.com, irawan.setiadi91@gmail.com,
alvinadama821@gmail.com
irnin.agustina@gmail.com*

Abstract: Culture in Indonesia is very diverse, ranging from traditional musical instruments, traditional games, regional dance arts, and many others. As an effort to introduce Indonesian culture to students, one of them is by implementing it into the learning process. Therefore, this study connects physics material into local culture in Indonesia, one of which is the Salai Jin Dance in North Maluku. This study aims to examine the concept of physics in the Salai Jin dance. The research method used is descriptive qualitative with data collection techniques through observation, questionnaires and interviews. The data obtained is then analyzed, verified, and reduced then constructed into scientific knowledge and interpreted into physics concepts in physics learning. In this Salai Jin dance, there are various concepts of physics, one of which is the concept of motion, torque, and waves in the material for class X and XI SMA/MA. The results showed that the salai jin dance can be used as a source of learning physics on motion material in class X SMA/MA, and moments of inertia, as well as waves in class XI SMA/MA.

Key Words: Dance Culture, Ethnophysics, Physics Learning Resources, Salai Jin dance

Introduction

Education is an effort to empower human potential to inherit, develop and build a civilization in the future (Astuti, & Bhakti, 2021). Education is rooted in the nation's culture to build the present and future life. Students are creative heirs of the nation's culture, through the learning process students are directed to develop the potential learned from cultural heritage (Fuad, et al, 2018). As an effort to introduce the nation's culture to students, namely by implementing it into learning activities, one of which is it's in physics.

Physics is a branch of science that aims to study and analyze natural phenomena or processes and the properties of substances and their application (Rahayu, 2013). Physics is not only in the form of facts, laws, formulas, and calculations, but is also a lesson that examines the world and life (Wiradana, 2012). In physics subjects, it is necessary to understand the concepts between theory and the application of its applications both in everyday life and in physics equations. Physics will be more meaningful if there is a link between the material being taught and daily activities in the environment where students live as a means of learning students (Oktaviana, et al. 2017).

The use of local culture in learning makes students make direct observations and students are trained to be able to find various concepts that are studied thoroughly

(holistically), meaningfully, authentically, and actively (Dinissjahet al, 2017; Nursaadah, 2017). The integration of physics material with the identity or local wisdom around where students live, not only aims to make it easier for students to understand physics material but also so that students are more familiar with the surrounding culture which may begin to be replaced by foreign cultures (Oktaviana, et al. 2017).

This local wisdom can be used as a means as a source of learning physics called entophysics, through this local wisdom interactive learning can occur where there is active interaction between students, educators and the learning resources used. So that learning occurs from two directions. In this study, we examine the ethnophysics of the salai jin dance in North Maluku as a source of learning physics.

Method

This research is included in the qualitative research method in the form of literature study. Through this method, researchers can describe the problems discussed clearly and comprehensively. According to Sudjana (2018), with the literature study method, data is collected for analysis and then presented in the results and discussion so that conclusions can be drawn.

The research method used is descriptive qualitative with data collection techniques through observation, questionnaires and interviews. The data obtained were then analyzed, verified, and reduced then constructed into scientific knowledge and interpreted into physics concepts in class X and XI high school physics learning.

Results and Discussion

Learning resources are one of the important things in the learning process. In the current era, there are various types of learning resources to suit the needs of different students. These diverse learning resources will provide their respective functions according to the needs of students in increasing knowledge for the benefit of learning. Optimal use of learning resources by students will further have an impact on the achievement of the student's learning achievement (Andriyani, et al. 2015).

The Indonesian nation has a diverse culture. Every culture has noble values that are still maintained. These values are also called local wisdom (local knowledge, local wisdom) which can be taken and used as value education with a different approach (Ramdani, 2018). The existence of local wisdom triggers students to study and examine various phenomena that occur in the local wisdom scientifically, so that awareness to maintain and preserve culture will grow when local wisdom is used as a source of learning (Saputra, 2016). One of the learning resources that can be used is ethnophysics, because according to Astuti and Bhakti (2021), ethnophysics is related to knowledge that comes from culture which can act as the basis for building reality that prioritizes cultural relations with physical knowledge.

North Maluku Province is one of the regions in Indonesia that has cultural diversity from various ethnicities and has various traditions that follow ethnic pluralism, one of which is regional dances. One of the traditions in Ternate is the Salai Jin tradition, this tradition is very thick with dance elements. Salai Jin dance is an ethnic dance originating from Ternate, North

Maluku. This dance is a medium of communication with the jinn. (Local, Friends. 2019). The Salai Jin dance is actually a series of activities from traditional rituals that have a high tradition and philosophy for the Ternate indigenous people.


In the past, this dance was used by the ancestors of the Ternate people to communicate with the Jin people who were in the supernatural. The purpose of this communication is to ask for the help of the Jinn to solve various problems faced by humans. One of the problems that most often causes this dance to be held is an illness suffered by a family member (Lestari, 2022).

Local people believe that the number of dancers must be even in order to avoid disaster. In addition, the dancers are also not random people, but those who are considered to have more "strength". The reason is, the dancers of this dance will usually experience a trance, aka the possession of a spirit which is believed to be a genie. And it still happens until this modern era and becomes the value of this dance (Administrator, 2019).

This genie salai dance is accompanied by regional musical instruments such as; Tifa is a musical instrument shaped like a drum that is played by hitting it. Then Rababu is a musical instrument that is played by friction. The basic form of rababu has main parts, namely lou (small bamboo that functions as the neck of the rababu) and cafi (coconut shell that functions as the body of the body). While the musical instrument Saragi or what we usually know as Gong is a type of percussion instrument made of metal (bronze with copper) with a round surface. In the game, Saragi players will hit Saragi using his bat according to the predetermined tifa stroke ending (Salasa & Amin, 2019). This jinn salai dance is not only accompanied by the accompaniment of musical instruments but also accompanied by the speech of bobeto. Babeto is a matra that speaks the local area.

In the context of ethnophysics, this jinn salai dance can be used in physics learning which can be used as a source of learning physics. From the initial movement of the Salai Jin dance to the end, it can be studied with the concept of dynamics of motion and rotation in physics for class X and XII SMA/MA. Further explanation of the physics concept in the Salai Jin dance can be seen in table 1.

Table 1. Study of Jin's Salai Dance as Ethnophysics

NO	Dance Phase	Dance Movement	Physics Study
.1	Opening Dance	 <p>The male dancers enter the arena to the accompaniment of tifa, rababu, gongs, and bobeto speeches. Then the male dancers use incense sticks and a piece of bamboo as dance props.</p>	<p>On the sound of musical accompaniment; tifa, rababu, and gong use the concept of sound wave physics. In this case, the sound wave propagates through the air medium.</p> <p>This sound wave propagates at a certain speed. In air, the speed of sound depends on the temperature of the air and the types of particles that make up the air. The formula for the speed of sound waves in air (gas) can be written:</p>

$$V = \sqrt{\frac{\gamma RT}{M}}$$

Information:

V = speed of sound (m/s)

γ = adiabatic constant

R = general gas constant
(8,31 joule/mol K)

T = absolute temperature of gas (K)

M = relative mass of gas (kg/mol)

Then for the rababu musical instrument, it also has another physical concept, namely friction, this frictional force is generated from the friction between the rabu stick and the strings. In this event, kinetic friction occurs, this kinetic friction force acts when the contact surfaces slide against each other and acts on a moving object. The formula for friction can be written as follows:

$$f_k = \mu_k \times N$$

Information:

f_k : magnitude of kinetic friction (N)

μ_k : coefficient of kinetic friction (N)

N : normal force (N)

rababu sticks and strings function to produce sound, this is the same as the explanation in the opening of the dance which is included in the concept of sound wave physics.

2. Dance Core



After that, it was continued with female dancers who entered the dance arena. Female dancers hold a bunch of dry palm leaves (woka) and a fan as a dance prop. Female and male dancers perform Movement from standing to squatting slowly by turning their bodies 180°.

The movement from standing to squatting/up and down slowly is included in the physics concept of vertical downward motion.

The formula for downward vertical motion can be written:

$$h = V_0 t + \frac{1}{2} g t^2$$

$$V_t^2 = V_0 + 2gh$$

$$V_t = V_0 + gt$$

Information:

h : height (m)

V_0 : initial velocity of object (m/s)

V_t : object's current velocity t (sekon)(/s)

t : traveling time(s)

g : acceleration due to gravity (m / s²)

For a dance movement that displaces its body 180° it is included in the material concept of moment of inertia on a long

homogeneous rod, the axis through the center.

$$I = \frac{1}{12}ml^2$$

Information:

I: Moment of Inertia(Kg.m²)

l: Rod Length(m)

m: Rod Mass(Kg)

This movement contains the physics concept of Newton's second law.

$$\vec{a} = \frac{\vec{F}_R}{m}$$

Information:

\vec{a} : Acceleration ($\frac{m}{s^2}$)

\vec{F}_R : Resultant Force (N)

m : Object Mass (Kg)

3. Dance
Core



Then the next movement is the female dancer kneeling and followed by the movement of the hands up and down in front of one of the male dancers holding incense.

4. Dance
Core



Next, the female dancer performs a half-body circular motion with a rotation of 360°.



The next movement of female and male dancers back to their feet slowly by turning their bodies 180°. After Standing the dancers perform movements in the upper body with a rotation of 360°.



Same as number (2) for Movement, it contains the concept of physics in the matter of moment of inertia.

For dance movements that rotate the body 360° it is included in the material concept of moment of inertia on a long homogeneous rod, the axis through the center.

$$I = \frac{1}{12}ml^2$$

Information:

I: Moment of Inertia (Kg.m²)

l: Rod Length (m)

m: Rod Mass (Kg)



Next, the female dancers flap the dry leaves and the fan in their hand with their whole body doing a 360° rotation followed by a male dancer holding a bamboo stick.

5. Dance Core



The highlight of this dance is when the female dancer falls unconscious because she has been possessed by a genie and continues with other dancers.

The activity at the peak of this dance when the female dancer falls unconscious contains the concept of free fall motion physics (GJB).

The difference between free fall motion (GJB) and downward vertical motion that has been described previously is that GJB does not have an initial velocity when moving ($V_0 = 0$), while upward vertical motion has an initial velocity when moving ($V_0 \neq 0$).

$$h = \frac{1}{2} gt^2$$

$$V_t^2 = 2gh$$

$$V_t = gt$$

Information:

h : height (m)

V_t : object's current velocity t (sekon)(s)

t : traveling time (s)

g : acceleration due to gravity ($\frac{m}{s^2}$)

In the closing movement of this dance, the physics concept of straight motion changes regularly.

The following is the formula for Uniform Change in Straight Motion:

$$s = V_0t + \frac{1}{2} at^2$$

$$V_t^2 = V_0^2 + 2as$$

$$V_t = V_0 + at$$

Information:

V_0 : initial velocity of object (m/s)

V_t : object's current velocity t (sekon)(s)

t : traveling time (s)

6. Closing Dance



Then they dance uncontrollably until the incantations are recited and finally the dancers come to their senses and the dance performance ends.

Based on what has been explained in table 1, that the salai genie dance can be studied with various physical concepts, including the dynamics of motion and rotation along with sound waves. This Salai Jin dance can be used as a source of learning physics based on local

wisdom in North Maluku. A learning approach using local wisdom is very important so that students get contextual and meaningful learning (Fuad, 2018). In line with the increasingly globalized times, schools not only carry out cultural transformation of their students but also help in determining the way of life in the future, values and abilities and skills that must be possessed for their future lives. Cultural transformation means changing the form of culture to remain in accordance with an increasingly advanced and complex society by not abandoning the original cultural culture.

The existence of ethnophysics is able to combine culture with existing physics concepts, with this students are able to understand a physics formula through existing culture. According to Astuti & Bhakti (2021) the application of this kind of learning has the potential to develop a way of learning that is still generally teacher-centered into student-centered learning. So that the classroom atmosphere is more fun and not boring, and the enthusiasm for learning students will also increase. In addition to understanding the concept of physics, students can also learn to understand the culture in their respective regions so that the culture can still be preserved and not faded (Munandar et al, 2022). Learning by linking local cultures can also increase student learning activities and student learning motivation (Husin, Wiyanto, & Darsono, 2018; Subijanto, 2015). Students can explore the cultures in their respective regions so that they can explore their creative thinking skills as well.

Learning that is too far from the values of local wisdom according to Sudiana (2015) can trigger students' ignorance of local wisdom, which ultimately reduces students' love for their own nation. Therefore, the use of learning resources for the salai jin dance based on local wisdom in North Maluku is an effort to shape the character of students so that they love and be proud of the culture in Indonesia.

Conclusion

Based on the results and discussion above, it can be concluded that the Salai Jin dance is a local wisdom in the North Maluku area that can be used as a source of learning physics. Salai Jin dance can be studied physically with various physics concepts, namely the dynamics of motion and rotation that can be found in the material for class X and XII SMA/MA. By using this local wisdom-based learning resource, students can learn physics material while at the same time fostering a love for culture.

Acknowledgment

Thank you to the Ministry of Cultural Education, Research, and Technology and the Directorate General of Higher Education, Research, and Technology for providing funding for the Penelitian Terapan Unggulan Perguruan Tinggi (PTUPT) 2022. Thank you also to LLDIKTI Region III and LPPM Universitas Indraprasta PGRI for providing support for research activities.

References

Administrator. 2019. "Salai Jin, Tarian Memanggil Jin Yang Dilestarikan", <https://www.indonesia.go.id/ragam/budaya/kebudayaan/salai-jin-tarian-memanggil-jin-yang-dilestarikan> , di Akses 20 Juni 2022.

- Andriyani, A., Sunarno, W., & Rahardjo, D. T. (2015). *Kontribusi Motivasi Berprestasi dan Pemanfaatan Sumber Belajar Terhadap Kemampuan Kognitif Siswa Mata Pelajaran Fisika Kelas X SMA N 1 Karangayar*. In PROSIDING: Seminar Nasional Fisika dan Pendidikan Fisika (Vol. 6, No. 3).
- Astuti, I. A. D., & Bhakti, Y. B. (2021). *Kajian Etnofisika Pada Tari Piring Sebagai Media Pembelajaran Fisika*. SINASIS (Seminar Nasional Sains) (Vol. 2, No. 1).
- Fuad, Z., Misbah, M., Hartini, S., & Zainuddin, Z. (2018). *Identifikasi Kearifan Lokal Kalimantan Selatan Sebagai Sumber Belajar Fisika Kelas X*. In Prosiding Seminar Nasional Pendidikan Fisika "MOTOGPE".
- I.W.G.Wiradana, *Pengubahan Miskonsepsi Siswa SMP Melalui Penciptaan Lingkungan Belajar Konstruktivis Berbasis Masalah Nyata*. *Jurnal Pendidikan dan Pengajaran*. 2(2012), p.130-140
- J. Maknun, *Penerapan Pembelajaran Konstruktivisme untuk Meningkatkan Pemahaman Konsep Dasar Fisika Siswa Sekolah Menengah Kejuruan (SMK)*., Prosiding Seminar Internasional Pendidikan IPA. Fakultas Tarbiyah dan Keguruan. UIN Syarif Hidayatullah (2007), p. 26-39.
- Lestari, Dwi Elsa. "Tari Salai Jin yang Mistis dan Keberadaannya Kini". <https://indonesiakaya.com/pustaka-indonesia/tari-salai-jin-yang-mistis-dan-keberadaannya-kini/> , di Akses 21 Juni 2022
- Lokal, Sahabat. 2019. "Mengenal Tari Salai Jin yang Lekat Dengan Kesan Misterius Asli Ternate." , Mengenal Tari Salai Jin Yang Lekat Dengan Kesan Misterius Asli Ternate | Sahabat Lokal (adira.co.id) , di Akses 20 Juni 2022.
- Oktaviana, D., Hartini, S., dan Misbah, M. (2017) Pengembangan Modul Fisika Berintegrasi Kearifan Lokal Membuat Minyak Lala untuk Melatih Karakter Sanggam. *Berkala Ilmiah Pendidikan Fisika* 5(3), 272-285.
- Rahayu, A., Murniati, N. A. N., & Farikhah, I. (2013, September). *Kajian Pengembangan Media Pembelajaran IPA Menggunakan Fotonovela Berbasis Pendidikan Karakter*. In lpf2013.
- Ramdani, E. (2018). Model pembelajaran kontekstual berbasis kearifan lokal sebagai penguatan pendidikan karakter. *JUPIIS: Jurnal Pendidikan Ilmu-Ilmu Sosial*, 10(1), 1-10.
- Salasa, Siti Maryati. Amin, Safrudin. (2021). Perubahan Musik Tradisional Dan Resistensinya Pada Masyarakat Tidore. *Jurnal Ilmiah Kebudayaan dan Kesenjangan*. Vol. VIII, No. 1.
- Saputra, A., Wahyuni, S., & Handayani, R.D. (2016). Pengembangan Modul IPA Berbasis Kearifan Lokal Daerah Pesisir Puger pada Pokok Bahasan Sistem Transportasi di SMP. *Jurnal Pembelajaran Fisika*, 5(2), 182-189.
- Sudiana, I.M., & Sudirgayasa, I.G. (2015). Integrasi Kearifan Lokal Bali dalam Buku Ajar Sekolah Dasar. *Jurnal Kajian Bali*, 05(01), 181-200.