

The Role of Sekaten Tradition in Learning Physics to Conserve Culture in Yogyakarta

Novika Lestari

STKIP Melawi

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ABSTRACT

Yogyakarta is one of the provinces in Indonesia that has many cultures, among them is Sekaten tradition. Sekaten is a culture to commemorate the birth of prophet Muhammad SAW by Kesultanan Ngayogyakarta Hadiningrat. The activities include playing gamelan in Masjid Gede from 5 to 12 Rabiul Awal and closing by grebeg, parade of gunungan to be shared to society. Implementation of Sekaten in physics learning is a challenge for physics teachers in the globalization era. This article aims to integrate physics curriculum in Indonesia and Sekaten tradition. This research used a qualitative method. The impacts are physics teachers can improve skills to manage learning from local culture. Hence, this article discusses methods to analyze competence from physics curriculum in Indonesia which integrated Sekaten tradition. This result is expected to be guidelines for physics teachers to teach physics based on Sekaten tradition. Furthermore, it can improve student knowledge and attention about local culture.

Correspondent authors: : Novika Lestari

STKIP Melawi

E-Mail : novika.lestari02@gmail.com

INTRODUCTION

Yogyakarta is one province in Java Island, Indonesia. This province lies on the southern tip of Java Island exactly between 109° 40' - 111° 0' BT and latitude 8° 30' - 7° 20' LS [1]. Yogyakarta is known as a special area. The term special area is given by Ir. Soekarno because Kesultanan Ngayogyakarta gave full support to the independence of Indonesia, in form of 6000 gold pieces to Ir. Sukarno as initial funding after the independence of Indonesia. Other aid in the form of salaries to the first president and vice-president of Indonesia. The document evidence of transaction is saved in Keraton Ngayogyakarta.

The system of government in this province are government and kesultanan. The leader of Kesultanan Ngayogyakarta serves as the governor as well king or sultan of Yogyakarta. The authority of the king as governor is to run the administration and public services corresponding regulations in Indonesia. Meanwhile the king's authority as Sultan Ngayogyakarta is to rule the empire in order to preserve the values and traditions in Yogyakarta. Therefore, the culture in the city is still maintained continuity.

Cultural diversity can be one of the themes in the studying science including physics. As a result, cultural diversity and the environment is one of the issues that need to be considered in preparing the education curriculum [2]. Unfortunately, integration of culture in learning is only implemented in one subject. Whereas culture should be integrated implicitly in every subject [3]. The scope of culture that can be integrated in the learning of them comparative social system; cultural classification societies including human diversity, techniques and resources; and physical phenomena and historical thinking of the natural scientific explanation or ethics. [4].

Efforts to integrate learning and local potential implicitly in the learning often referred to locally based learning potential. Local potential derived from a particular community group is called by ethnoscience. Other terms of ethnoscience is local knowledge, indigenous knowledge, folk knowledge, people knowledge, traditional wisdom [5]. Local knowledge is knowledge that is passed on from generation to generation by word of mouth and through cultural rituals in the form of agricultural base, food, health, education, conservation and other community specific activity [5]. Mozzocchi suggests that local wisdom is the development of the concept of learning environment that emphasizes the character of symbiosis of human and nature [6]. It can facilitate the distinction between local and scientific knowledge systems. As stated by Aikenhead, culture is often a serious clash for local students to learn irrelevant scientific knowledge to their culture [7]. In fact, the proper integration of local knowledge can assist students to understand learning and retains their identity [8]. It also can improve the awareness of learners in the preservation of nature [9] and useful in combining basic and applied scientific research [10-11].

Pembelajaran sains khususnya fisika sebenarnya sangat dekat dengan kehidupan sehari-hari. Guru sebaiknya lebih peka untuk menghadirkan pembelajaran fisika berdasarkan contoh-contoh yang sederhana dari lingkungan sekitar. Namun di dalam proses pembelajaran guru seringkali menemukan bahwa siswa seringkali mengeluhkan bahwa fisika adalah pelajaran yang sulit dan abstrak. Hal ini sebagaimana yang ditemukan oleh Chekley dalam surveinya mengenai persepsi siswa terhadap fisika [12]. Hasil yang didapat bahwa sebagian besar siswa minat siswa terhadap sains khususnya fisika rendah dilihat dari banyaknya siswa yang tidak mengambil mata pelajaran fisika karena mereka menganggap fisika itu sulit, tidak relevan dan membosankan.

Students generally see science as boring lesson that requires them to accumulate facts without involving imagination and creativity [13]; science education does not provide a role in the preparation of community life science and technology [14]; students' interest towards the physics lessons [15]. Negative perceptions about the teaching of physics should be treated with appropriate learning approaches. The way the teacher presents a lesson greatly affect students' motivation. The results of another study that supports this is research conducted by Tuan et al (2005). From these studies it was found that the factors that most influence student motivation is environmental stimulation [16]. Stimulation conducive learning environment created from the perception of students if the learning presented teachers is comfortable and attractive.

Teachers should present science facts more in introducing the concepts of physics [17]. In physics learning, realistic approach is important to do because of two reasons: to help students to connect physics with the phenomena of everyday life and help students learn the structure of the knowledge of physics [18]. Assessing the values of local wisdom in learning can be done to present a contextual learning. Thus, students can more easily understand the concepts of physics in a different way and more memorable so that they are no longer considered physics as abstract and having minimal correlation with everyday life.

Integrating the value of local wisdom in learning began much done in the region, including Indonesia. Some of the research conducted by Martawijaya [19] who found that the integration of local knowledge in learning A'bulo Sibatang effectively improve students' scientific honesty. Baquete , Grayson and Mutimucuo (2016) found from their research that indigenous knowledge give benefit to participant in their daily life. Indigenous knowledge also help them to understand about some physics subjects such as thermal physics, static electricity and mechanic concept [20]. These results fit to empirical data by Li et al (2016) who suggest to integrate local knowledge with global knowledge such as physics curriculum because they can not stand separately and linked to one another [21].

From these studies concluded a positive impact of the integration of local knowledge in learning. Moreover, Yogyakarta is known as one of the special areas that still hold the cultural values from generation to generation firmly. This is evidenced by the high tourism potential Yogyakarta both from local and international tourist because of the uniqueness and distinctiveness of culture that is still preserved until this day, one of them is Sekaten tradition. Therefore integration Sekaten tradition in teaching physics becomes promising to do.

METHOD RESEARCH

This research method is qualitative research. Data collection is done through in-depth interviews with Abdi Dalem or the servants in Keraton. Abdi Dalem Keraton are the people who devote themselves to serving Keraton. Interviews were conducted to two Abdi Dalem and the a guard of Masjid Gede that were taken by purposive technique. The results of the interview are recorded by audio recorder. Triangulation of used data comes from the records and the collection of literature on the Kesultanan Ngayogyakarta and interviews of residents around Keraton.

The interview results were analyzed based on the basic competence of learning physics, physics learning objects learning and social values that exist in the tradition sekaten. Therefore, the study of literature on the basic competencies contained in the curriculum of learning physics in 2013 needs to be done [22]. The results of the analysis become a reference in teaching physics and integrate local knowledge in the area around Keraton Ngayogyakarta.

DISCUSS AND RESULT

Definisi dari Tradisi Sekaten di Yogyakarta

From interview, known that sekaten tradition is a tradition done by Sunan Kalijaga to introduced Islam. The purpose of Sekaten is to commemorate the birth of Prophet Muhammad. Sekaten is done by playing two sets of gamelan in the north and south of the mosque Gede interchangeably. The purpose of playing gamelan is to attract resident to come to the Masjid Gede. After playing gamelan, Sunan Kalijaga invited them to enter the mosque to hear his lecture about Islam or called by dakwah. This tradition has existed since 1988 which began a century the empire Pajang new Mataram was taken by Sunan Kalijaga. This sekaten stems from citizens around the palace Ngayogyakarta who were Hindu and Buddhist. Sunan Kalijaga would like to invite residents around the palace to know more about Islam. By this way, it was expected that Islam can be accepted by resident and many of them will convert to Islam or in other words pengislaman. Sunan Kalijaga used a unique way to invite people to Islam without any coercion or violence. This tradition is preserved by Kesultanan Pajang and now inherited the Kesultanan Ngayogyakarta in every month of maulud or the

birth of the prophet Muhammad, which is 12 Rabiul Awwal of Hijriyah Calendar.

The sequences of Sekaten begin with cleaning two gamelan then bringing them from Keraton Ngayogyakarta to Masjid Gede. Each gamelans were put on two pogungan or stage in courtyard of Masjid Gede. Gamelan playing process lasted for seven days, starting on 5th until 12th of Rabi al-Awwal. Gamelan were named by Kyai Guntur Madu and Kyai Nogo Wilogo. One set of gamelan is a legacy of the Majapahit kingdom. The sets was made of iron, different from the current set of gamelan which is made of bronze or brass. The gamelan are played by Abdi Dalem interchangeably for 24 hours. For the 6 days, in every afternoon and after prayer, held lectures or preaching Islam by inviting dai from all over Indonesia and for the last day, the preaching is delivered by Sultan.

Each set of gamelan consist kendang or gendang, demung, saron, peking, gong, kempul, bonang, slenthem, kethuk, kenong, gender, gambang, suling, rebab and siter.. The musical instrument consist of percussion, brass, string, percussion and stringed. Percussion instruments include demung, saron, pekung, gong, bonang, slenthem, kethuk, kenong, gender and gambang. Suling represent wind instruments, kendang represent percussion, siter representing stringed instrument and stringed instruments like rebab.



Figure 1. Gamelan Set

Tradition sekaten closed with grebeg gunung on the 12th of Rabi al-Awwal. Grebeg is parade of gunung from Keraton to Mesjid Gede. Gunung is a cone-shaped food mountain with a diameter of 1.5 meters and a height of 3 meters. Gunung contain of cooked food on top and raw food materials on the bottom. Cooked food is traditional cakes, meanwhile raw food materials such as rice, beans, peppers, vegetable, and other agricultural products. Grebeg mountain is done solely for alms or sharing sustenance from Keraton to the citizens. This activity held in front of the mosque Gede.

There are eight principles that need to be held by teachers to integrate learning with sekaten physics. Eight principles that include: knowing the history, methods, principles and development of sekaten and learning of physics determine the competence, principles and basic concepts of learning physics, has pedagogical abilities in teaching physics; have confidence that the knowledge he teaches is valid; account the diversity of human, material and technical and educational resources; avoid the dominant group; avoid dogmatic and moralistic elements and avoid making conclusions based on the entire culture cultural elements (direct and general)[23]. Once these principles are fulfilled, the next step is to design a physics concept that integrates the right local knowledge and links that cross the boundaries between local knowledge and western (Table 1).

Table 1. Integration of Sekaten and Physics Learning

No	Basic Competences	Local Knowledge	Character Value	Areas of physics
1.	Applying the concept of torque, moment of inertia, gravity and angular momentum on a rigid body (static and dynamic) in daily life such as in sports	Cone-shaped mountain to be easily lifted	Social awareness, religious,	Center of gravity
2.	Analyzing the nature of the elasticity of the material in daily lives	a. Siter use strings with different thicknesses in order to produce different sounds. b. Leather drums using cow or buffalo leather because it is thick and produce bass tones. c. Shoulders on the siter is used to adjust the tension strings.	Social awareness, curiosity, creative thinking	materials elasticity materials elasticity tension
3.	Analyzing the characteristics of mechanics wave	All the device vibrate when gamelan are played	Curiosity, creative thinking	Propagating media
4.	Analyzing the physical magnitudes of dynamic wave and static waves in various real cases	The wood in siter attached at an angle so that the strings produce different tones	Curiosity, creative thinking	amplitudes, stationary wave equation, and the propagation velocity
5.	Applying the concepts and principles of sound and light waves in technology	a. The material and tension of string affect the sound produced b. This type of leather used to make drums affects the sound produced c. Bronze gamelan produce higher noise than iron gamelan d. The column of air on the flute is made with different distances in order to produce different sounds.	Curiosity, creative thinking	The sound source, Frequency, wavelength and amplitude
6.	Analyzing correlation between force and vibration in everyday life	a. Percussion instruments must be braced at the side so that no sound reflections happen. b. The strings on a siter on must be braced so that no sound reflections.	Curiosity, creative thinking	Force and vibration

The results of the analysis of the sekaten tradition used to integrate learning material in physics and sekaten tradition. The theory used in physics teaching integrating with tradition sekaten is Theory of Birdcage. This theory apply local frameworks with the limits of ideology and social norms are obvious to design the curriculum so that education can have a local focus and develop global knowledge [24]. This theory is considered suitable for lifting sekaten social values and norms are quite as good as social awareness, curiosity, creative thinking. In addition to the values and norms, sekaten also contains local knowledge can be explained by western science. Local knowledge can be integrated in the learning in this type of contextual learning. Contextual learning and the learning approach must be developed as an alternative to finding a significant relationship between abstract thinking and practical application in the real world context [25] or the daily life of both the context of personal, social, and cultural [26]. The impact that can be obtained from this study that increased student engagement in learning as well maintained culture and identity of the nation.

This tradition is a part of the culture of a nation. Results of culture are two kinds of knowledge, namely emic and ethics [27]. Ethics is local knowledge that has western science explanation while emik explains about the local knowledge that do not have an explanation from the west. There is some knowledge of ethics in sekaten traditions such as gamelan playing to call people around the palace and the gunungan grebeg cone made more balanced and stable. It explains that the ancestors of History has knowledge to creating some sound source sources and the concept of sound. In fact, the orchestra consists of various musical instruments and materials by using different manufacture can produce a harmonic music. Another example is the concept of gravity that is from gunungan. The ancestors of ancient times did not understand that the concept of emphasis on gunungan is the third of the height of the cone is measured from the base of the cone. However, without understanding the ancestors used to make a mountain of a conical shape. Some other traditions that have ethical values contained in Table 1.

CONCLUSION

Sekaten is a tradition introducing Islam by playing two sets of gamelan in the north and south of the mosque Gede interchangeably. The concept of physics in the tradition sekaten include gravity, elasticity of the material, tension, frequency, wavelength, amplitude, wave equation, propagation velocity, force and vibration. So, there are three topics that could be discussed from this tradition that is elasticity, balance, and sound. Based on the analysis of basic competency for cognitive abilities in UU No. 24, 2016 is known to have six basic competencies that can be taught by lifting sekaten tradition in explaining the physics of matter. Another from cognitive addition, this learning can build the character of students. Students characters from this study include social awareness, curiosity and critical thinking. Therefore, sekaten tradition can be integrated in the curriculum of physics in Yogyakarta, Indonesia. This tradition can be used as contextual learning materials to build and maintain the culture of Indonesia.

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