The use of Banyumas traditional art as analog sources of elementary school science materials

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Abstract. All various traditional arts of Banyumas area support this area to be one famous region located in the periphery of West and Central Java with its unique cultural identity. In science learning, these traditional arts are very important aspect which can be implemented as a source of analog by students thinking a science concept analogically. This paper discusses a kind of Banyumas traditional art: the ebeg, and its cultural characteristics which can play a significant role in supporting elementary school students’ analogical thinking of a science material. The method used were literature and documentary studies. It is concluded that the ebeg provides many cultural characteristics which can be used as analog of elementary school science material, in terms of its music player’s motion, kinds of musical instruments played and its dancer motion.

1. Introduction

It is undeniable that students’ analogical thinking skill plays a significant role in supporting elementary school students’ understanding of particular science concepts. Using this skill, a student think about relational similarity between analog or base and target. In science learning, the analog or base refers to previous students’ experience and the target is the science concept itself [1]. As experience is a part of student’s culture, so the culture will affect the students’ choice of analog [2].

Regarding with the topic of analogical thinking skill, a research on culture-based student’s analogical thinking skill has been done. In this research, the culture refers to Central Java culture consisting of many forms, one of them is the arts [3]. This paper discusses the research finding of the traditional art of Banyumas, one specific area of Central Java having various unique cultural identities, which can support the students’ analogical thinking in terms of their use as analog source of a science material. A kind of traditional art work, namely the ebeg, was studied its cultural characteristics by using literature and documentary review methods in order to answer the raised problem, what are the ebeg cultural characteristics which can be used as an analog of elementary school science materials.

The use of analogy in science learning has been the focus attention of many authors. The skill of thinking regarding with analogy has been proven to be essential for helping students to understand the science concept better [4-6]. Children are able to think analogically in learning science through the support of models [7]. Students also showed better learning achievement of computer hardware through the use of analogy [8] and even, physicists and ecologists can be facilitated by analogical
reasoning to learn their fields together [9]. In general, the skill of thinking analogically is characterized by the existence of structural similarity [10] which refers to relational patterns in a form of either similarity or suitability between two different objects, known as analog or base and target. The analog, in this case, can be supported by the use of artworks [11], since the artworks are human made objects which belong to the end product of an artistic process and can be observed by students as external experience and involved in the cultural universals [12].

In 2017, the curriculum implemented in elementary schools in Banyumas area is 2013 curriculum, commonly called as thematic curriculum. There are several themes include in grade 5 science materials, one of them is Manusia dan Lingkungan in which a topic of motion of muscle is discussed. Within this topic, several motions of muscle are exemplified, such as motion of straightening, lowering, bending of elbow, finger joint and knee, and so forth. The examples provided are the motions done by an athlete.

There are many Banyumas traditional arts, ranging from music, dance and other performance arts, such as the calung, the lengger, the ebeg, the begalan, the angguk, the sintren and so forth [13]. All of these arts have specific features depicting Banyumas people characters which are humorous, more direct and egalitarian [14]. Banyumas music accompanying the other art performances, formally known as Banyumas gamelan, consists of several instruments such as gong, kempul, kenong, kethuk, saron, bonang, slenthem, gender, gambang, kendang and so on. This gamelan operates both pelog and slendro tuning systems [14]. In other form of the traditional arts, Banyumas dances are performed by dancers with general dancing motions, such as ngithing, nyempurit, ngruji, sembahan silo, jengkeng, and so forth.

2. Methods
There was a traditional art studied in the research: the ebeg. The ebeg was chosen as the representation of the traditional art of Banyumas because it is a very famous mixed folk consisting of dance and music performances. It also portrays a harmonic value among Banyumas people and has functions of entertainment and communication [15]. In order to gather data related to the characteristics of this art, the methods of literature review and documentary study were implemented in the research. Several literatures and documents associated with the ebeg were reviewed. In addition, there were also some interview about the performance of the art with a group of the ebeg, called Mega Laras, and several people surrounding area where the group exists. The data taken from the literature and documentary reviews and the interview were then analyzed using the descriptive method.

3. Result and Discussion
The results of data analysis provide three major concerns of cultural characteristics of the Banyumas traditional art, particularly the ebeg, those are dancer movement, kinds of musical instruments, and music player’s motion. These characteristics are shown in the following tables.

Information provided by the characteristics of the ebeg, in terms of its dance movements, music instrument and player’s motion to play the instrument give an idea of taking their benefits for elementary school science learning employing student’s analogical thinking. The characteristics fit need of using form and function analogy involved in the topic of muscle motion, since they include natural and designed world. In this analogy, form refers to object’s physical feature, e.g shape, configuration, pattern of motion, texture, and so on supporting any human’s body function, while function in this case relates to the of portion’s use, purpose or task [12]. The body movements of the ebeg dancer describe such natural world, in terms of pattern of motion of human body parts, as well as the way of playing music instruments used in the ebeg performed by the player (Table 1 and Table 2).
Table 1. Dance movements specification of the *ebeg*

| No | Dance Movement’s name | Body part | Notes |
|----|----------------------|-----------|-------|
| 1  | Sembahan             | Hand      | lifting two palms cupped flat in front of the face as a salutary statement |
| 2  | Jengkeng (p 202)     | Foot      | right knee is placed on the floor, left knee lifted. The body rests on the right foot. The back is perpendicular |
| 3  | Nogorangsang (modifikasi) | Hand | hands is bent backward to form a sharp angle on the wrist. Four fingers are straight, thumb is folded to the front of the palm |
| 4  | Menthang kanan       | Hand      | Arm is stretched to the side of the body, somewhat forward diagonally. The arm is raised at chest height and shoulders |
| 5  | Trap puser nyekithing modification | Hand | Fingers are bent in front of the navel |
| 6  | Tanjak (right and left) | Foot | the foot is moved slightly to the right, then the right foot is pulled toward the inside of the left leg |
| 7  | Tanjak               | Foot (kuda-kuda position) | Hold the *kuda kepang* |
| 8  | Gedheg (p 124)       | Hand      | Hold the *kuda kepang* |
| 9  | Ambeng               | Head      | Shake the head (left & right) when holding the *kuda kepang* |
| 10 | Lumaksana            | Hand      | Hold the *pecut* & elbow is bent in front of chest |
| 11 | Miwir sampur         | Foot, hand, and body | Walking with the upright body |

Table 2. Instruments used and music player’s motion of the *ebeg*

| No | Instrument’s name | Music player’s motion |
|----|-------------------|-----------------------|
| 1  | *Gong*            | Strike the central hub of the stand-mounted *gong* using a mallet (hummer) |
| 2  | *Jidur*           | Strike the middle part of the circle surface made of ox skin using a hummer |
| 3  | *Kethuk*          | Strikes the central knob (*pencu*) of the *kethuk* using a wooden stick beater padded with tightly wound cord |
| 4  | *Kenong*          | Strikes the central knob (*pencu*) of the *kenong* using a wooden stick beater padded with tightly wound cord |
| 5  | *Bonang Penerus*  | Strikes the central knob (*pencu*) of the *bonang penerus* using a wooden stick beater padded with tightly wound cord |
| 6  | *Bonang Barung*   | Strikes the central knob (*pencu*) of the *boning barung* using a wooden stick beater padded with tightly wound cord |
| 7  | *Kendang*         | Strike both heads using both hands (one for each head). Several primary and secondary strokes--some produced on one head, others on both heads |
| 8  | *Demung*          | Strike the midpoint of their top surface using hammer-like |
| 9  | *Saron*           | The right hand, which holds the mallet, strikes the key to be played, while the left hand damps the key that already sounds. Thus the left hand follows, the right hand. The damping is done by grasping the key by the edge |
The use of the characteristics can be exemplified as follows. One of the target will be reached in muscle motion topic is the form and function of the human’s hand. This target can be explored through the use of analog sourced from human’s hand functioning in the ebeg performance. For example, with the form of hand telling that fingers can bend around the edge of an object in the palm, the function of the hand to hold the pecut coming from the ebeg, called ambeng, can be used as the analog. In this case holding the pecut representing the function of keeping object from falling out of palm [12]. In addition, in terms of playing the music instruments, the way of striking the gong and other music mallets/hummer, can be used as the analog of form of hand has jointed fingers that bend and function of fingers curl around object to hold it.

4. Conclusion
Based on the discussion, it can be concluded that one kind of Banyumas traditional art: the ebeg, provides important means for elementary school science learning. Its cultural characteristics play a significant role in supporting students’ analogical thinking of the science material, in terms of its music player’s motion, kinds of musical instruments played and its dancer movement as sources of analog.

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