

VALIDITY OF ETHNOSCIENCE BOOKLET MEDIA IN THE REGION OF PONOROGO ON SOUND WAVE SUB MATERIAL

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Abstract

This research aims to develop innovative media in the learning of the students in form of ethnoscience booklet in the region of Ponorogo for junior high school students in sub material of sound wave. Ethnoscience media booklet is one of the learning support materials of students that associate the sound wave material with tone alignment technique on traditional music instruments of *gong*, *boning*, and *saron* in Ponorogo. Type of research used is R&D (Research and Development), namely potential analysis and problem stage, data collection, booklet design, media validation, and media revision. Instrument validation of media ethnoscience booklet uses material validation sheets and media validation sheets of ethnoscience booklet. The material validation sheets of ethnoscience booklet is assessed of content feasibility, linguistic, presentation technique, and ethnoscience orientation. For a while, the media validation is composed of cover design and content design. The validation result shows the cover design gets 95%, content design gets 96%, content feasibility aspect gets 98%, linguistic 91%, presentation technique 92%, and ethnoscience orientation gets 96%. In this study, it can be concluded that the ethnoscience booklet based on assessment of material expert and media expert with the tendency of criteria is very feasible to be used as learning media.

Keywords: booklet, ethnoscience, sound wave, tone alignment

INTRODUCTION

In the 21st century, development of science, technology, and information takes place very quickly and is full of competition. Sometimes, in other country have applied learning by daring, so it can Indonesians must prepare themselves by growing and developing many competencies. Therefore, education is very important so that students can act scientifically to solve problem encountered (Suardana et al., 2018). Education certainly relies on designed and enforced curriculum. Thus, the government seeked to design and improved several curriculum in Indonesia, one of which is to revise the curriculum's 2013. It can be proved by repealed of the Permendikbud with number 57-60 on year 2014 on curriculum 2013 and replaced by the Permendikbud with number 24 on year 2016 (Permendikbud, 2016). The curriculum's 2013 is designed to strengthen the competency of the students to always actively apply the knowledge that they get to everyday life.

Certainly, studying the environmental problems in everyday life can be a source of learning of students who are interesting in the control of their natural knowledge. Chiappetta and Coballa (2010:105) expressed the process of reviewing natural phenomena, the fact doesn't escape the ability to think, how to investigate a building of

science, and its relation to technology and society. Sya'ban (2014:83) stated that one of the learning by using the source of the environment thus has benefit of giving the students the opportunity to have the ability to know, manage, and maintain the environment wisely.

The management of environmental resources, each region certainly has the culture and customs of the society that contains local science or original science that has become a part of the culture of society acquired by hereditary scara (Balqis, 2018). It supported by the research of Sudarmin (2012), who stated that if the knowledge that lives in the community can be transformed into scientific knowledge, it will be used as a good source of the learning for students. Knowledge which lived in the community that can be attributed to scientific science is known as ethnoscience.

According to Sudarmin (2015), used the term ethnoscience comes from the Greek "Ethnos" which means nation and Latin is the word "scientia" which means knowledge, so that the meaning of ethnoscience related to the cognitive map of the world from a society or indigenous knowledge of society. Suastra (2005) suggested that ethnoscience is a study that contains cultural linkages and events related yo the universe in society. Similar research by Sudarmin and Zahro et al.,

(2019) argued that learning process by ethnoscience-based could be referred to as one of the solutions to overcome the problems of students who have low thinking skills because they often find the phenomenon of scientific science in their environment.

One of the efforts to help to spread scientific science with indigenos science that need for teaching media in the form of textbooks and visuals. The ethnoscience-based booklet can be one of the teaching media that supports school teaching materials dominated by images or original documentation in the local community environment. According to Mahendrani (2015), booklet was collection of several leaflets joined together to form a book that discusses a particular topic. Learning using ethnoscience integrated science materials can certainly improved student science literacy compared to use BSE book package, so it can to increase insight the local wisdom of students (Perwitasari, 2016).

Reviewed from the results of the national exam of junior high school years lesson on 2019 in the study of the Education Assessment Center by the Ministry of Education and Culture in Ponorogo district has a percentage in the material mastery “Wave, Electricity, and Magnet” of 47.64% with low category compared to the mastery of other science materials. The percentage rate actually decreased by 16.63% from years lesson on 2018 (Puspendik, 2018). The results of the national test that suffered the decline can be the first step of the author develop an idea of an innovative media booklet relating to the sub material.

The development of an innovative media booklet in the study selected a topic on tone alignment on traditional gamelan music instruments such as *Gong*, *Bonang*, and *Saron* in Ponorogo. The creation of gamelan instruments is one of the job's people in Paju area, Ponorogo city. Similar research that supported the development of ethnoscience-based media booklet by Adelina Balqis (2018) in the manufacture of red bricks in Mojosari related to the material properties of physics and chemical objects got percentage of the “very decent” criteria with average percentage values 95% by the validator. These criteria is effective when tested to the students of junior high school eight-grade as a science media supporting. The research of Snively (2000), titled *Discovering Indigenous Science Implications for Science Education*, suggests that science educators integrate Western science with native Science (Indigenous Science).

Other similar research by Atmojo (2012) that the learning process involved ethnoscience, students must be actively involved in learning so that later can have a better understanding conventionally. It is supported by Vygotsky's theory of contractivism, which emphasizes the interaction of social, cultural-historical, and individual interpersonal factors as the key human development (Schunk, 2012).

During this time, students are considering that the making of Reog's musical instruments, one of them gong, is obtained from hereditary means or from ancestors. Whereas in making the instrument traditionally can be used as a source of learning students. The gamelan instrument is still preserved until now as a companion to

the show Reog Ponorogo. In fact, Reog and *Karawitan* art was used as a local content lesson in most schools in Ponorogo. Some explanations of tone alignment in the gamelan can be associated with sound wave submaterial, such as determining the resonance chamber, strong influence of the sound in open, and closed space, etc.

Those study different from previous research of the focused ethnoscience area and associated material. The ethnoscience area is the city of Ponorogo with the science of community in the field of instrument makin Gong as accompaniment of Karawitan art or Reog Ponorogo. Based on the explanation above authors were encouraged to study further with the suitability of the title “Validity of The Ethnoscience Booklet Media in The Region of Ponorogo on Sound Wave Sub Material”.

METHOD

This development research uses validation methods and observation in data collection. This research is also research is also a research with the type of R&D (Research and Development) which was adopted from Sugiyono's research design (2017) consisting of :

Potential Analysis and Problem Stage

At this stage analysis of problems that arise to background development of the media. Analysis of the problem is taken from the pre-research data at Junior High School 2 Ponorogo and interviewed one of the teachers of Science.

Data Collection

This stage is the process of collecting pre-research data, such as observing the place that used as ethnoscience object and one of the shoos. Ten can be analyzed basic competencies to be used and indicators that will be discussed in booklet.

Booklet Design

The results of the material analysis that will be discussed are used as a basis for designing products by arranging the theme, title, book cover, and content booklet design.

Media Validation

The validation data of media experts, material experts, and one science teacher of science are analyzed in a quantitative descriptive based on the criteria specified. Each of the components such as cover design, content design, content feasibility, linguistic, presentation techniques, and ethnoscience orientation on media development assessment instruments will be calculated the total score gained. The score of validation assessments is as follows.

Table 1 Validation Rating Scale

No.	Rating	Score
1	Very Good	4
2	Good	3
3	Enough	2
4	Not Good	1

(Riduwan, 2013)

The next of the score is calculated percentage with formula:

$$\text{Percentage} = \frac{\text{Total score}}{\text{Total Score Maximum}} \times 100\%$$

Then categorize the results of the eligibility score obtained with the eligibility criteria based on the following provisions:

Table 2 Validator Rating Criteria

Percentage	Criteria
0% - 20%	Not Good
21% - 40%	Enough
41% - 60%	Good
61% - 80%	Very Good
81% - 100%	Excellent

(Riduwan, 2013)

Based on these criteria, ethnoscience-based media booklet is said to be worthy if the observer's assessment reaches the criteria of $\geq 61\%$.

Media Revision

This stage as a phase of fixing the flaws according to the direction and judgement of the validator to obtain the media criteria worthy of testing for learners.

RESULT AND DISCUSSION

This ethnoscience-based media booklet discusses the tone alignment of traditional Javanese gamelan instruments namely *Gong*, *Bonang*, and *Saron* which are associated with the sound wave materials. The results of this study in the form of eligibility media booklet that refers to validation result of media experts and material members of 3 validators. The results of the research and discussion will be described below.

Table 3 Results of Validation by Media Experts

Table 3: Results of Validation by Media Experts						
No	Rated Aspect	Validator			Total Score	
		I	II	III		
I. Cover Design						
1	Fit booklet size with media content material	4	4	4	12	
2	The appearance of layout elements on the front and back cover has a rhythm and unity as well as consistent	3	4	4	11	
3	Harmonious color display	4	4	4	12	
4	Fonts used are attractive and easy to read	4	3	4	11	
5	Media cover illustration	3	3	4	11	
Total Score					57	
Percentage = (Total Score/60) x 100%					95%	
Trend Criteria					Very Decent	
II. Content Design						
1	Lavout Consistency	4	4	4	12	

2	Harmonious layout elements	4	4	4	12
3	Image illustration and captions	3	4	4	11
4	Image layout	3	4	4	11
5	Typographical simple booklet contents	4	4	4	12
Total Score					58
Percentage = Total score/60) x 100%					96%
Trend Criteria					Very Decent

Then, below is the Experts Material Validation Results, as follows:

Table 4 Results of Validation Material Experts

No	Rated Aspect	Validator			Total Score
		I	II	III	
I. Content Feasibility					
1	Conformity with KI and KD	4	4	4	12
2	Compliance with students's needs	4	4	4	12
3	Accuracy of materials	3	4	4	11
4	The material suffix	4	4	4	12
5	Benefits for the addition of knowledge insight	4	4	4	12
Total Score					59
Percentage = (Total score/60) x 100%					98%
Trend Criteria					Very Decent
II. Linguistic					
1	Information clarity	3	4	4	11
2	Feasibility aspects of presentation	3	4	4	11
Total Score					22
Percentage = (Total score/24) x 100%					91%
Trend Criteria					Very Decent
III. Presentation Technique					
1	Supporting presentation (practice, summary, etc.)	3	3	4	10
2	Presentation of learning	4	4	4	12
Total Score					22
Percentage = (Total score/24) x 100%					92%
Trend Criteria					Very Decent
IV. Ethnoscience Orientation					
1	Ethnoscience principal	4	4	4	12
2	Ethnoscience component (include indigenous science and original science)	4	3	4	11
Total Score					23
Percentage = (Total score/24) x 100%					96%
Trend Criteria					Very Decent

Based on media validation results and material from the assessment from three person of validator is listed in Table 4 and Table 5. Ethnoscience-based media booklet get a tendency assessment of criteria with “very decent” criteria on each aspect of media validation and material validation. The materials can stated to be “feasible” when the components are developed with a percentage of $\geq 61\%$ (Riduwan, 2013). This media is categorized as “decent”, can be used as a learning medium by students and can be reproduced to use.

This media is different from the development of ethnoscience-based booklet before. The booklet media developed by author included an interesting cover design, gamelan origins, sound wave material and several sound concepts related to gamelan instruments, tone alignment techniques that are associated with scientific science study, interview guidelines, sheets of ethnoscience activity and student worksheets.



Image 1 Cover Design of Ethnoscience Booklet

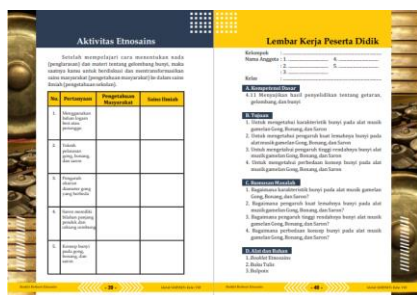


Image 2 Sheets of Ethnoscience Activity and Student Worksheets

The validation results from media experts on the cover design aspect get a percentage of 95%, while the content design get 96%. Then, the result of material validation aspect of content feasibility get a percentage of 98%, linguistic get 91%, the aspect of presentation technique get 92%, and ethnoscience orientation get 96%. The ethnoscience focus on the media is the creation of gamelan instruments in the technical alignment technique in Ponorogo. Students are introduced to the cultures that are around them, so they can learn to transform the original science (community knowledge) with scientific science.

Material validation results on the aspect of content eligibility, this ethnoscience-based media booklet in Ponorogo shows compliance with basic competency and indicators to be achieved. The selection of ethnoscience focus with the material is highly relevant. The concept is

presented in a contextual media booklet because it associated sound wave material with the technique of tone alignment in the traditional gamelan instruments.

The ethnoscience-based media booklet also contains a photographic documentation of traditional gamelan instrument alignment techniques as supporter of the media's appeal. Moreover, there is a barcode scan obtain a video interview of author with speaker.

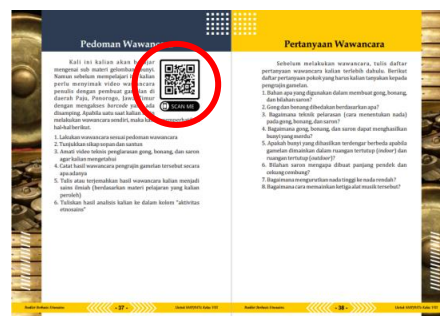


Image 3 Scan Barcode Feature for Accessing Video Interview

Surely, the media is also still equipped with the help of technology to be able to view video using barcode scans. According to Fitria (2018) books that contain the main book supporting materials can be enrich and enhance the mastery of knowledge, technology, skills, and shaping the personality of learners, educators, and other readers. The provision of interesting features such as images, photos of the original documentation, and some additional knowledge info can support learners to be more enthusiastic about reading booklet. It is based on Prastowo (2014), the images taken are pictures that have been recognized by the students so that they do not cause much view or perception.

The media of this ethnoscience booklet supported the hope of the research results of Sudarmin (2017) who expects educators or teachers to develop ethnoscience learning resources to enrich the science of junior high school. Other research from Snively (2000) titled “Discovering Utilization Science Implications for Science Education” also suggested to science educators to integrate western science with native science (Indigenous Science).

This is supported by the theory of constructivism according to Vygotsky which emphasizes students as active students so that in its application the constructivist theory is often referred to as a student-centered teaching strategy. So according to the explanation that the teacher not only provides knowledge to students, but students must also play an active role in building their own knowledge in their memory, including those related to their daily habits or about the culture of local customs they know.

CONCLUSION

Based on the results of the validation of ethnoscience-based media booklet that researchers have developed, it can be concluded that an innovative media booklet ethnoscience for junior high school students eight-

grade on sound wave sub material can be declared worthy and effectively used in supporting the learning process by integrating the scientific science and science of indigenous peoples in Ponorogo. This ethnoscience media booklet can certainly also be printed and published.

SUGGESTION

Based on research that has been developed, the suggestion that can be given by this ethnoscience-based media booklet can be tested for junior high school students and for other researchers, the author recommend that the study of ethnoscience in various regions, so that there will be a variety of ethnoscience-based learning media.

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