

Development of Ethnoscience Project-Based Worksheets "Jidor Art" for PGSD Students

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Abstract: Natural science and ethnoscience can help combine local knowledge with modern scientific knowledge to overcome problems in learning. The aim of this research is to determine the feasibility of a worksheet based on the "Jidor art" ethnoscience project for PGSD students, as well as to determine student responses in learning the Physics of sound concept course through a project assignment integrating the Jidor art ethnoscience approach. The subject used is the tanjidor musical instrument. The research method used is the development of the Borg and Gall R & D Model. From data collection to large group operational validation (Step 8). The feasibility results obtained an average score of 4.1 in the good category. Student responses stated that 69.75% agreed that it was acceptable. Thus, it can be concluded that the worksheet based on the ethnoscience project "Jidor Art" for PGSD students is declared suitable for use. Student responses stated that they agreed that it could provide insight, challenge, make things easier and fun, as well as foster the 4C.

Keywords: Ethnoscience; Jidor Art.; Project; Worksheet

Introduction

Science and Ethnoscience can help combine local knowledge with modern scientific knowledge to address environmental issues, biological conservation, alternative medicine, or sustainable technology development. Science and Ethnoscience play a role in complementing and expanding our understanding of the natural world and human knowledge as a whole. Ethnoscience is a transforming activity between original science which consists of all knowledge about the facts of society derived from hereditary beliefs and still containing myths. Ethnoscience is a form of natural knowledge in the form of customs and culture, morals, languages, and technology created with natural knowledge (Rahayu & Indriyanti, 2023). In its application, this ethnoscience method is very unique because it can explore students' declarative knowledge with constructive procedural knowledge simultaneously (Rahayu & Ismawati, 2022).

The ethnoscience linkup space includes the fields of science, agriculture, ecology, medicine, even including from flora and fauna (Rahayu & Sudarmin,

2015). The birth of ethnoscience is inseparable from the knowledge discovered by trial and error and the absence of the ability to translate the results of its findings into scientific knowledge. This is because the starting point of ethnoscience is at the local to regional level as a form of knowledge resulting from trial and error (Rist & Dahdouh-Guebas, 2006). Science subjects are one of the subjects that can be developed for the application of life skills learning. In accordance with the characteristics of science learning, namely studying the universe and the symptoms that occur in it. In its application to learning, bias is developed so that it is not only oriented to academic competence but also can be designed in such a way that students are able to understand nature and apply what has been learned in real life (Mujakir, 2012). The implementation of ethnoscience is not only in line with Curriculum Standards Indonesian society at this time, but also intended to foster a love of culture and tribe bangs and increase students' knowledge of the cultural potential of the region (Putri et al., 2023).

The PjBL learning model emphasizes students to work on a project (activity) as the core of learning

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(Almulla, 2020; de Oliveira Biazus & Mahtari, 2022; Diana et al., 2021). Activities that must be carried out by students consist of exploration, assessment, interpretation, and synthesis of information with the final result in the form of learning outcomes consisting of knowledge, skills, and attitudes. The characteristic of the project-based learning model is that it always begins with the preparation of basic questions related to existing findings, where this will be the basis for providing projects (activities) (Nurjanah et al., 2021). This learning model is a result of the development of a project-based learning model specifically designed to develop Process science skills (Farida, 2021).

Physics learning allows integration with ethnoscience (Idul et al., 2023; Sari et al., 2023; Wati et al., 2021). Jidor art is a community culture that develops in several cities on the island of Java with various distinctive characteristics. Basically, Jidor art has always been associated with music produced from several types of musical instruments, so that it can produce a variety of different sound variants. The concept of sound is part of the concept discussed in the Physics Concepts course at the PGSD study program of PGRI Adi Buana University Surabaya. Because of the similarity in aspects between the ethnoscience of Jidor art and the discussion of the concept of physics, namely "Sound", a scientific study was carried out to integrate the ethnoscience approach of Jidor art in learning the concept of sound. This research was conducted to determine the feasibility of worksheets based on the ethnoscience project "Jidor art" in PGSD students, as well as to determine student responses in learning the sound concept physics course through project assignments integrating the Jidor art ethnoscience approach.

Method

The research method in this study uses research and development methods. The subject of the study was a student of PGSD FPP PGRI Adi Buana University Surabaya. The development model used refers to the development model according to Borg and Gall. The Borg & Gall development model contains systematic guidelines for the steps taken by researchers so that what they design has feasibility standards. The Borg and Gall R&D model consists of ten implementation steps, in the research carried out this is limited to step 8 only (Walid et al., 2022), namely *Operational Field Testing*. The steps of the Borg & Gall model are stated in figure 1.

The steps in this study are in accordance with the Borg & Gall model, which are as follows: *Research and Information Collection*: at this stage, literacy studies,

needs analysis, and research frameworks are carried out; *Planning*: at this stage is the ability and expertise to formulate research problems, formulate the objectives of each stage, and design the research steps needed to determine a product feasibility; *Developing Preliminary Form of Product*: in this step, it is the introduction or initial step of an educational product called a trial product. This trial product was developed by preparing and evaluating supporting components; *Preliminary Field Testing*: at this stage, the initial product is tested on a limited scale through questionnaires or observations to obtain and analyze data for the next step or stage; *Revising Main Product*: the initial product is revised using the data obtained in the fourth step. Revisions are likely to be made more than once depending on the results of product trials. Once revised, it is ready to be tested in a large way; *Main Field Testing*: at this stage it is called the main trial, which is the testing of the revised education product so that it will be tested widely (5-15) people or even more. Data collected using qualitative methods; *Revising Operational Product*: the revised product, in this step is revised again based on the data obtained in the sixth step. The product is then developed as an operational model design to be validated; and *Operational Field Testing*: this operational validation is carried out on large groups (30-40) people through observation, questionnaires. The data becomes the basis for revising the product in the last step. This is intended to ascertain whether the product is really ready for use in the field of education. In this study, it was limited only to this stage due to time and cost constraints.

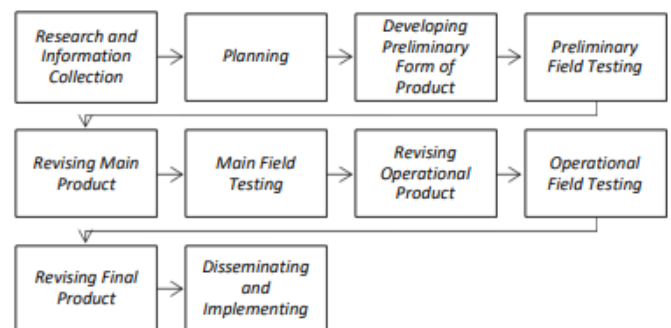


Figure 1. Borg & Gall Model Steps

Result and Discussion

The ethnoscience-based science learning process emphasizes local wisdom and problems that exist in the community (Suastra et al., 2021), so that students are able to solve problems faced in everyday life (Nuralita, 2020). This opinion is in line with the results of the study (Dinissjah et al., 2019; Nuralita et al., 2020; Utari et al., 2021), which states that ethnoscience is easier to develop in learning by integrating the culture and

habits of the community around students. Cultural knowledge such as folklore, fairy tales, traditional games, traditional rituals, local production, and the use of nature are forms of ethnosience learning (Alviya et al., 2023; Sukarma, 2023). The difference between this research and previous research is that this research uses an ethnoscientific approach in the form of traditional jidor musical instruments by incorporating into physics science, namely sound material in the form of project-based student worksheets. Based on some of these studies, it shows the usefulness of the ethnosience approach in learning the concept of science (physics) not only recognizes the culture of the community, but can construct a natural and real understanding of concepts.

The feasibility data of student worksheets based on the ethnosience project "Jidor art" was obtained from an assessment by experts in terms of several aspects in the form of appearance, content, and language. In the display aspect, a score of 4.1 was obtained in the good category. Meanwhile, in the content aspect, a score of 4.3 was obtained in the good category. And in the language aspect, a score of 4.1 was obtained in the good category.

Student worksheets that were declared feasible and revised in accordance with expert advice, then continued by conducting large trials for PGSD students of PGRI Adi Buana University Surabaya. This large trial was carried out on PGSD 2022 A students with a total of 37 students. This trial was conducted to determine the response of students to the ethnosience project-based student worksheet "Jidor art". Students are given a response questionnaire consisting of 15 questions with several aspects including; aspects of providing insight, giving challenges, facilitating experiences, fun, and useful building 4Cs.

The results of the student response questionnaire data to the ethnosience project-based student worksheet "Jidor art" on aspects provide insight with the percentage of "Strongly Agree" categories as much as 34% and "Agree" as much as 64%. In the aspect of giving challenges in the category of "Strongly Agree" as much as 34% and "Agree" as much as 65%. For aspects of facilitating understanding in the category "Strongly Agree" as much as 29% and "Agree" as much as 69%. The fun aspect in the "Strongly Agree" category was 25% and "Agree" was 74%. While the beneficial aspect of building 4C in the category of "Strongly Agree" as much as 27% and "Agree" as much as 72%

Project-based learning is able to expand the process of understanding or insight of students in a particular subject (Ngereja et al., 2020). The knowledge gained becomes more significant and learning activities become more interesting so as to help them understand

and solve problems faced every day (Fatmawati et al., 2000). In the aspect of providing insight, one statement is that the ethnosience-based project assignment of jidor art in learning sound concepts can make it easier for students to learn sound concept material, which is in accordance with this opinion. This opinion is also in line with the results of research on the aspect of facilitating understanding, that student worksheets based on the jidor art ethnosience project are able to help students understand the concept of material and are associated with their daily lives.

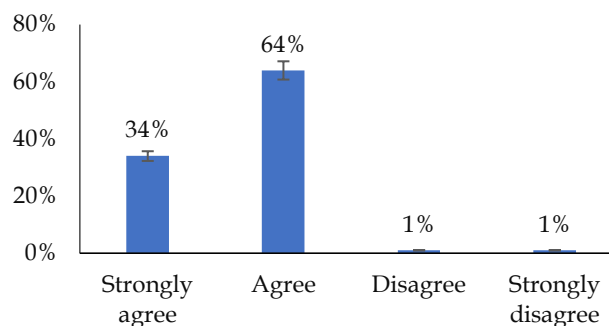


Figure 2. Graph of student response on aspects giving insight

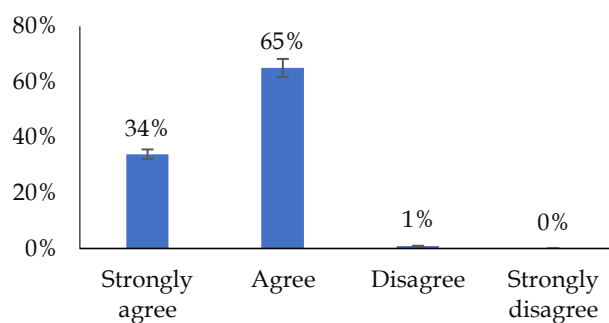


Figure 3. Graph of student responses on challenging aspects

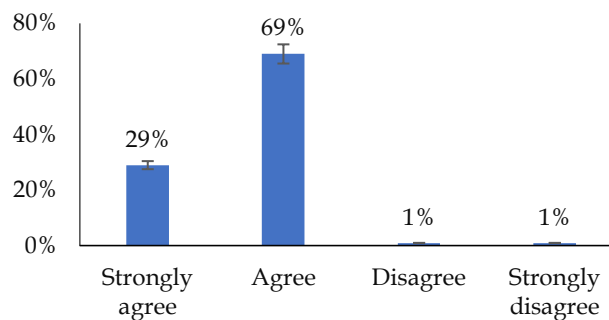


Figure 4. Graph of student responses on aspects of facilitating understanding

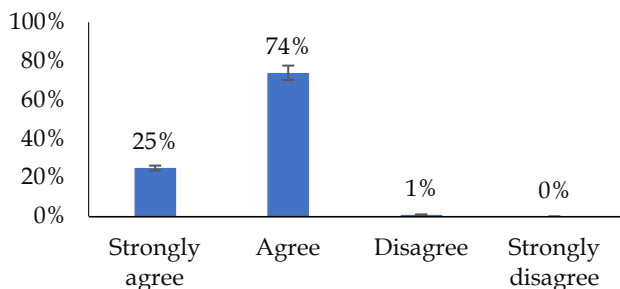


Figure 5. Graph of student response on fun aspects

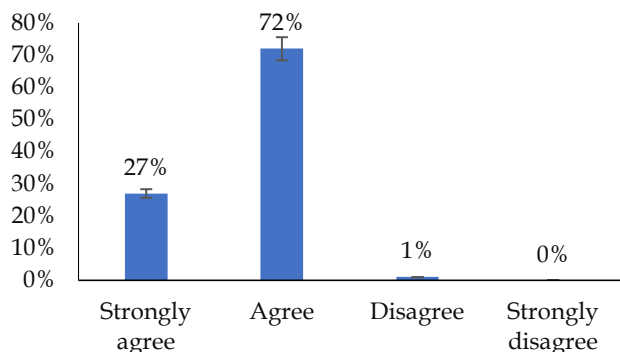


Figure 6. Graph of student response on beneficial aspects of building 4c

On the fun aspect, 74% of students agree and 25% strongly agree that using Jidor's art ethnoscience project-based worksheets can create attraction for reading and understanding and can attract students' enthusiasm and enthusiasm to use the worksheets. This is in accordance with the opinion of Sari et al. (2019) Student Worksheets can attract students to participate in learning. Project-based Student Worksheets make students more motivated to learn actively. This can help them understand the material better and improve their creative thinking.

In the aspect of giving challenges, 65% of students agree and 34% of students strongly agree with Jidor art ethnoscience project-based worksheets because it can provide challenges to develop the competence of professional teacher candidates. In line with the results of this research, (Nurmi et al., 2020) stated that there will be an encouragement for independent, interactive, challenging, and motivating learning for students when using project-based student worksheets. It is also able to increase the efficiency and effectiveness of learning. The results of research conducted by Nurmi et al. (2020) also stated that because the activities on the Student Worksheet involve students in solving or working on existing problems, the use of Student Worksheets can improve learning outcomes and improve student abilities during the learning process.

While on the beneficial aspect of building 4C, as many as 72% of students said they strongly agreed and

27% agreed with the student worksheets based on the Jidor art ethnoscience project. Jidor's art ethnoscience project-based worksheets provide a variety of challenges of lithation, communication, collaboration, critical thinking, and creative skills. This is in line with opinion (Alpindo & Dahnuss, 2019) that Student Worksheets can help students think critically, present problems, and draw conclusions. Project-based learning has the potential to improve the cognitive abilities and skills of learners in the learning process. It can also increase the enthusiasm and motivation of learners to follow the lesson, and can also help them develop creativity and skills (Nurmi et al., 2020). *Project Based Learning* requires students to think critically, analytically, use strong thinking skills, communicate, work together, solve problems, and learn independently (Aminullah, 2017).

Project-based learning can improve mathematical critical thinking skills and active student engagement (Anita, 2017). Students or students are involved in project-based learning by working together and conducting an ongoing information search. In its application, project-based learning can help students to become creative and actively involved in solving problems (Mustika et al., 2020). Projects made by students, good for solving problems faced by the community, so that it will benefit the community. Project assignments help students grow creatively, improve their communication skills as they can design the way they work on project assignments, and improve collaboration skills as they work on project assignments in groups (Vonnisye et al., 2022).

From the results of feasibility data, student responses to the research that has been carried out and the opinions that have been mentioned, the development of worksheets based on the ethnoscience project "Jidor art" for PGSD students is feasible and can be used in the learning process.

Conclusion

Based on the results of the research conducted, it can be concluded that 1) The feasibility results of the worksheet based on the ethnoscience project "Jidor art" in PGSD students were declared feasible with scores on the display aspect of 4.1 with a good category, and on the content aspect of 4.3 with a good category, and on the language aspect of 4.1 with good category. 2) The feasibility of the results of student responses to the ethnoscience project-based worksheet "Jidor art" in PGSD students with aspects of giving insight was 34% stated "Strongly Agree", 64% stated "Agree". While in the aspect of giving challenges, 34% stated "Strongly Agree". 65% said "Agree". And in the aspect of ease of

understanding by 29% stated "Strongly Agree", 69% stated "Agree". And on the fun aspect 25% said "strongly agree", 74% stated "agree". Then 27% said "Strongly Agree", 72% stated "Agree". Thus, from these results, it was stated that the ethnoscience project-based worksheet "Jidor art" for PGSD students was declared suitable for use.

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Author Contributions

Achmad Fanani; conceptualization, writing—review and editing manuscript; Rosmiati.; visualization, methodology; Feny Rita Fiantika; software, validation, submit journal and minor revise manuscript; Triman Juniarso; instrument, and analyse data.

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Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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