Ethnomatematics Based Learning For Students Of Elementary Teacher Education Faculty Of Teacher Training And Education Riau University Pekanbaru

Gustimal Witri, Zetra Hainul Putra, M. Alwi
gustimal.witri@lecturer.unri.ac.id zetra.hainul.putra@lecturer.unri.ac.id
Elementary School Teacher Education, Faculty Teacher Training and Education Riau University Pekanbaru

Abstract This research is aimed to develop a piece of valid, practical and effective learning equipment based on ethnomathematics for students at Elementary School Teacher Education to improve their mathematics communication skill on the basic concept of mathematics for elementary about the two-dimensional figure. Ethnomathematics is mathematics which is linked to society's culture outcomes such as either artifact or traditions. One of the traditions which grow in Malay Riau society is rhymed poem or pantun. To develop this learning equipment, the researchers used a 4D research development method. The stages of this method are: (1) Define, (2) Design (3) Develop and (4) Disseminate. According to the data analysis, it can be concluded that mathematics learning based on ethnomathematics can improve the mathematics communication skill of students at Elementary School Teacher Education, and generate the learning spirit.

Keyword: Ethnomathematics, *Pantun*, Mathematics communication skill

1. Introduction

Education and culture are something whole and thorough that applied in society, besides, education is a primary need for each individual in a society. Education is a value system and idea that is appreciated by a group of people in a particular environment in a certain period. Culture might change corresponding with the development of the society's mindset, so, culture is more dynamic following the era and society's needs.

Culture can be reviewed from 3 aspects: (1) universal culture, (2) national culture, and (3) local culture which exists in the society.

Sardjio and Pannen (2005: 83-97) stated that learning based on culture is a model of learning approach that prioritizes students activities with various cultural background, is integrated with a certain subject learning process.

Learning based on culture can be divided into three kinds, learning about the culture, learning with culture, and learning through culture. Culture-based learning is a strategy of creating an environment and designing learning experience which integrates culture as part of the learning process.

According to Supriadi (2010: 115), four things should be taken note in cultural-based learning, they are substance and competence of science and study area, usefulness and learning process, as well as learning outcomes assessment and the role of culture.

Concerning culture, here the researchers integrated between mathematics learning and Malay's rhymed poem or *pantun*. *Pantun* is one of Malay's cultures that still exist until the present time. An event,

either formal or informal will feel un-complete if there is no *pantun* performance. The activity of integrating mathematics with culture is what we call as ethnomathematics.

Ethnomathematics was introduced by D'Ambrosio, a Brazilian mathematics expert in 1977. As quoted from D'Ambrosio, ethnomathematics comes from the prefix Ethno is today accepted as a very broad term that refers to the social-cultural context and therefore includes language, jargon, and codes of behavior, myths, and symbols. The derivation of mathema is difficult but tends to mean to explain, to know, to understand, and to activities such as ciphering, and modeling. The suffix tics is derived from techne', and has the same root as technique (Astri, et al; 2013: 4).

Based on the term, ethnomathematics interpreted as*:* "The mathematics which is practiced among identifiable groups such as national tribe societies, labor groups children of certain age brackets and professional classes". Then, D'Ambrosio (in Astri et al; 2013: 4) completed it: "I have been using the word ethnomathematics as modes, style and techniques (tics) of explanation of understanding, and of coping with the natural and cultural systems (ethno),

According to D'Ambrosio's argument above, it can be concluded that "ethnomathematics is mathematics learning activity that is linked with the culture outcomes that exist in society, either in the form of artifact or traditions. Thus, researchers tried to develop mathematics learning through Malay culture – *pantun.*

The learning equipment based on ethnomathematics must meet several criteria that can be seen from Table 1 as follows:

Table 1. Learning Equipment Based on Ethnomathematics Criteria

No	The Elements	Criteria
1	Content	There is an integration of cultural value like (artifacts, traditions, clothes, etc)
2	Learning method	the learning activity tends to observation, direct learning, communication, even outdoor learning.
3	Approach	The lesson is designed based on a scientific approach or realistic mathematics or Brunner.
4	Learning center	Student-centered
5	Contribution to the cultures	As one of the ways to introduce and conserve the culture to the students

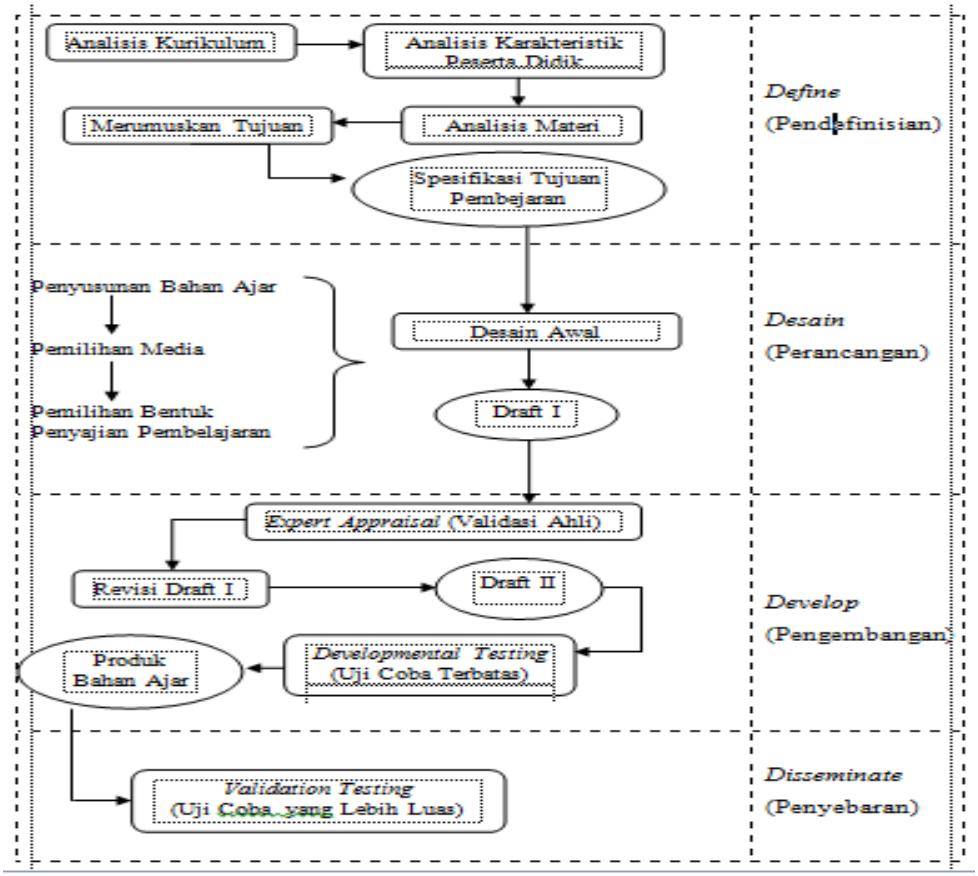
Ethnomathematics and Its Relationship with Riau Malay Culture. The relationship between mathematics and culture is a far developed idea, or it can be told that mathematics raised because of the needs and the development of a culture. At first, the combination of culture and mathematics is known as ethnomathematics. This idea is told by D'Ambrosio (1985)

Ethnomathematics [*is*] *the mathematics which is practiced among identifiable cultural groups, such as national-tribal societies, labor groups, children of a certain age bracket, professional classes, and so on.*

According to the arguments about the relationship between mathematics and Malay culture, and poured out as Malay ethnomathematics, the researchers have done research development of learning equipment based on Malay culture "*pantun*" ethnomathematics which is designed as a piece of learning equipment that integrates mathematics with Malay culture "*pantun".*

2. Research Method

This research is developmental. This developmental research can be interpreted as a series of process steps to develop a product effectively and as learning material, media, learning strategies to use in learning activities and not to test theories (Surya Dharma in Putra, 2015). In this research, the researchers developed learning equipment based on ethnomathematics Riau Malay. The development model that was used referred to the 4-D model, that according to Thiagarajan (in Mulyatiningsih, 2011) is consist of 4 stages, they are define, design, develop, and disseminate. The picture below explains the stages which was done in the development of learning equipment based on Malay Ethnomathematics to improve mathematics communication skills of students at Elementary School Teacher Education Faculty of Teacher Training and Education Riau University.



Picture 1: Research Framework of Thinking

The research framework of thinking above explains the research stages of the learning equipment development based on ethnomathematics :

1. Define

In the context of learning equipment development based on ethnomathematics, the definition was done by 1) curriculum analysis 2) students characteristic analysis, 3) material analysis, 4) goals formulation.

2. Design

In this stage, the design of learning equipment based on ethnomathematics to improve the mathematics communication skill of students at PGSD was done. Things that have been done in this stage were:

1) Arranging test criteria.
2) Arranging the equipment corresponding with the goal.
3) Choosing the lesson presentation form.

3. Develop

Two activities are done in this stage:

a. Expert appraisal

This is a technique to validate or to grade properness of product design or in this research to grade the properness of lesson plan which has been designed by the researchers. This research involved three validators who master the substance about the basic concept of mathematics for elementary which related to geometric, and Indonesian language about *pantun.* Validation in this research was for validating or grading the properness learning equipment on the geometric concept. The validators test the properness of learning materials from didactic requirements, constructions, and techniques, also suggest the deficiencies on learning materials to refine the learning equipment which was developed by the researchers more :

Table 2: Learning Equipment Validation Result by the Validators

NO	Validators	Scores	Percentages	categories
1	Validator 1	51	85,00	Very decent
2	Validator 2	54	90,00	Very decent
3	Validator 3	50	83,33	Very decent
	Average score	51,66	86,11	Very decent

Form the validation result of the three validators, it can be concluded that this learning equipment is very decent.

b. Developmental testing

Developmental testing is an experiment on the real subject. In this research limited experiment was done in one class which is PGSD third semester. Before the experiment of learning equipment based on ethnomathematics product was done, the students had been given the pre-test to find out their initial knowledge on the material that was about to be learned. After the test, the experiment was done with the students observed and discussed the activities on the learning materials, the students also filled out questionnaires which were given by the researchers as the assessment for learning materials. The experiment's result is to find out whether the developed equipment is proper to be used by students at PGSD. After the experiment on the product had done, the second test was done to find out about students knowledge on the concept that has been learned.

The result of students' responses to the questionnaire about the learning equipment based on ethnomathematics can be seen in table 3 below :

Table 3. Students' Responses on Learning Based on Ethnomathematics

Average Score	Percentage	Criteria
35	87,50	Very good

4. Disseminate

The equipment that has been revised on development stage then was implemented on the real target which is aimed to get responses on the developed learning based on ethnomathematics. The disseminate was done to students at Elementary School Teacher Education Faculty of Teacher Training and Education Riau University.

3. Discussion of Research Result

1. Learning Equipment Validation.

According to the validators' assessment, it shows that this learning equipment is valid and is decent to be used. This learning can improve the mathematics communication skill of students because this learning challenges the students to deliver their creative ideas through *pantun*, so, the learning process is centered on the students, not the lecturer.

2.The practicality of *Pantun* Ethnomathematics.

This learning can improve the mathematics communication skill of students because this learning challenges the students to deliver their creative ideas through *pantun*, so, the learning process is centered on the students, not the lecturer.

By taking note on students' responses and reaction, it can be concluded that a score of 87.50 (very good) was obtained from this learning equipment. One of *the pantun* examples that were delivered by the students in learning based on ethnomathematics is as follows :

Pohon keladi dipinggir kali
Tumbuh subur lebar daunnya
Wahai saudara yang baik budi
Bangun persegi apa cirinya?

Membuat tapai memekai ragi
Tapai dimakan si anak bujang
Salah satu ciri bangun persegi
Keempat sisinya sama panjang

4. Conclusion and Suggestion

According to the result of validators' assessment and the data analysis from the experiment, it can be concluded that this learning equipment is proper to be used, and can improve students' mathematics communication skill, this can be proved by the increase of students' ability on writing a *pantun* and delivering it which is related to characteristics of two-dimensional figure material.

To improve students' mathematics communication skill, it is recommended for the lecturers to habituate the *pantun* culture in lecturing processes.

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