

Ethnomathematics Learning With Sundanese Culture For Elementary School Students

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Abstract. Ethnomathematics learning is learning that connects cultural and mathematical concepts by looking at mathematics as a cultural product. Material reduction of natural numbers can be learned using Indonesian children's games, namely Sundanese culture. Mathematical learning activities that can be done is to understand the basic facts of addition to a collection and reduction that is presented with the technique of discarding. The subject of this study uses 82 teachers, 1 teacher guides 1 until 9 elementary school students with a total of elementary school students used 273. Students learn mathematics with ethnomathematics learning *endog-endogan* game. After the data are collected, the researcher processes the data using a qualitative descriptive method, which describes the documentation of the data with the students' responses. Benefits in this learning students will play together with other students so that fun, 163 happy, 49 student enthusiastic in learning mathematics, 49 students says learning mathematics is easy and 12 students eliminate misconceptions in reduction operations. Mathematical abstracts can be reduced and promote Indonesian cultural products in the development of mathematical learning innovations.

1. Introduction

Mathematics learning today is still less than optimal in connecting the concept of mathematics with the concept of culture. Teachers and the public in general do not generally say that mathematics and culture are connected [1]. Resulting in a conflict between student culture in everyday life with mathematics [2], whereas by connecting between mathematics and culture can help in the educational progress of a country [3]. A. new development in education which relies upon getting your strength back autochthonous practices of traditional cultures [4]. Mathematics with culture can be integrated into the concept of ethnomathematics. The word ethnomathematics is used to communicate the connection between culture and mathematics. The expression requires a active interpretation because it describes concepts that are themselves neither rigid nor singular-namely, ethno and mathematics[5].

Ethnomatematics learning has been done by Knijnik [6]. in introducing the Brazilian culture 'cubagem of wood'in.[7] with culture in Africa as well as [8]. with the culture of Ugandan society. Indonesian culture is well known by the world, this paper describes an Indonesian culture, namely modified Sundanese culture in mathematics learning, so that cultural acceptance is more contemporary and flexible understood by everyone. Sundanese are an ethnic group originating from the western part of the island of Java, Indonesia, with the term Tatar Pasundan which covers the administrative regions of the provinces of West Java, Banten, Jakarta, Lampung and the western region of Central Java (Banyumasan). Sundanese are spread in various parts of Indonesia, with the provinces of Banten and West Java as the main regions. The identity that unites Sundanese is its language and culture, one of the Sundanese culture that will be conveyed in this article is *endog-endogan* children's games.

2. Methods

The subject of this study uses 82 teachers, 1 teacher guides 1 until 9 students elementary school with a total of elementary school students used 273. Students learn mathematics with ethnomatematics learning *endog-endogan* game. Introduction, students is treated with *endog-endog* playing, then observed and interviewed about their responses to ethnomatematics learning. The material that is connected is the reduction of lower classes by means of each child clenching their hands into eggs, then playing with other students, after which the teacher asks regarding the concept of reduction that is connected. After the data are collected, the researcher processes the data using a qualitative descriptive method, which describes the documentation of the data with the students' responses.

3. Results and Discussion

3.1 Endog-endogan Game

The endog-endogan game is a traditional Sundanese game. This game is not difficult to practice, because it only uses the media of one member of our body that is the hand. So this game is very flexible to play anywhere and anytime. In this game we, the wisdom that can be taken is that we must cooperate with each other to build-up to a peak, and if there is a fall we always to help him to rise again and not despair.

Endog-endogan Song

Endog-endogan peupeus hiji prek
Endog-endogan peupeus hiji prek
Goleang-goleang mata sapi bolotot

Endog-endogan game in the concept of reduction



Figure 1.Endog-endogan Games

Steps to learning mathematics in a reduction operation: First, prepare questions in advance for the child, write the questions on the board, say $6-2 = \dots$, prepare 3 children by clenching their hands like forming eggs while singing modified endog-endogan songs:

- Endog-endogan endog genep peupeus two prek
(Six eggs split two, Prek)
(Students think counting the rest)
- Endog-endogan nu teu peupeus is an opat
There are four eggs that don't break
- Goleang bolotot cow eyes
Scoot the eyes of the cow

The following are presented photos of endog-endogan game learning with variations in expressions of elementary school students



Figure 2. Endog-endogan endog tilu peupeus hiji prek (three eggs split one, Prek). (Students think counting the rest)
Endog-endogan nu teu peupeus aya dua (there are two eggs that don't break).
Goleang bolotot cow eyes (Scoot the eyes of the cow)



Figure 3. Endog-endogan endog delapan peupeus tilu prek (eight eggs split three, Prek). (Students think counting the rest)
Endog-endogan nu teu peupeus aya lima (there are five eggs that don't break).
Goleang bolotot cow eyes (Scoot the eyes of the cow)

Table 1. The following are all summaries of students' responses to egg games.

No	Sum Student	Student response through interviewed
1	163	One Student Happy (T58) three students have increased motivation, carefree and happy (T1), Two children of first grade elementary school students feel happy with the typical laughter of elementary school age children (T4). two students are very happy, exciting and understand the endog-endogan game given (T8). three students were very happy with the endog-endogan game given (T9). Three students Happy (T10, T44, T51, T59). Two students Happy (T11, T45, T47, T54, T55, T56, T65, T66, T67, T68, T69, T70, T71, T72, T73, T75, T76, T77, T78, T79, T80, T81, T82). Four students happy (T41, T42, T43, T50, T52, T53,

		T16,17,18,26, T28,T30, T31,T32, T34,T35, T36, T37,T38, T40), Five student happy (62)Nine student happy (63)
2	49	Three students were enthusiastic in this eggs game, making children very happy because in learning they could also play (T2). When doing this game five students were very enthusiastic, happy and could add to their knowledge. Because basically math is not always a problem with numbers I(T3).Three students were more enthusiastic about counting with endog-endogan games compared to counting directly (T6). Seven students were enthusiastic in this eggs game (T49).Five students enthusiastic(T14). three students looked enthusiastic because they learned while playing (T17,T61). four students were enthusiastic (T19,T20,T48) eight students were enthusiastic and happy (T46)
3	49	two children in first grade elementary school said learning mathematics was easy(T5,T61), three students stated that mathematics was easy with endog-endogan. games (T7,T58). nine students says fun and math are easy (T15,T33). Two student says easy and happy (T45), Seven students says easy and happy (T57,T60).Five students says easy (T64)
6	12	Three Students did not experience misconceptions in reduction(T22,23,T24,T25)
Sum	273	

Based on table 1 student responses to endog-endogan games are 163 students happy, 49 students enthusiastic in learning mathematics, 49 students say learning mathematics is easy and 12 students eliminate misconceptions in reduction operations. The concept of reduction in learning of Sundanese ethnomathematics with game endog-endogan can be easily studied by students, because it is more contextual and directly interpreted by students in learning because there is interaction between students' thinking and student's visual. Abstract the number 8 for the student by exhibiting with 8 student fists, disposing technique in learning reduction operation can be connected, 4 fists thrown hand, then obtained by final result 4 fists. Lower grade elementary students will see the answers directly so that when teachers use the abstract stage it can be easily understood. [9]that contextual learning is a learning that prioritizes the activity of connecting between the material being studied and the actual situation (context) given, so that the learning of mathematics using endog-endogan fashion is more meaningful for the students, especially the low grade. The endog-endogan game will be constructed by students into the concept of subtraction, the mathematics can be constructed from a growing culture, so the result is a mathematical product that has a cultural essence. This is in line with the opinion of ethnomathematics researchers that mathematics is regarded as a cultural construction, hence the result of cultural development [10]. The mathematical abilities in learning reduction operations can be reduced, students can make some reduction activities by throwing techniques through cultural and mathematical concepts such as endog-endogan game activities, so that the abstract nature of mathematical learning will diminish with the learning of ethnomathematics [11].

4. Conclusion

Mathematics learning should be flexible in accepting change, including with cross-science with culture. The Sundanese ethnomathematics learning with the endog-endogan game is one of the innovations that can be used to improve students' understanding in the concept of reduction. Contextual mathematics makes it easier for students to learn math and comprehend concepts longer in students' memories. Benefits

in this learning students will play together with other students so that the interaction in learning mathematics, mathematical abilities can be reduced as well as to promote and maintain the Indonesian culture from annihilation, especially Sundanese culture.

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References

- [1] Rosa, M., & Orey, D. (2011). Ethnomathematics: the cultural aspects of mathematics. *Revista Latinoamericana de Etnomatemática: Perspectivas Socioculturales de La Educación Matemática*, 4(2), 32-54.
- [2] Prediger, S. (2004). Intercultural perspectives on mathematics learning—Developing a theoretical framework. *International Journal of Science and Mathematics Education*, 2(3), 377-406.
- [3] Uloko, E. S., & Imoko, B. I. (2007). Effects of ethno mathematics teaching approach and gender on students' achievement in Locus. *Journal National Association Social Humanity Education*, 5(1), 31-36.
- [4] D'ambrosio, U. (1995). Multiculturalism and mathematics education. *International Journal of Mathematical Education in Science and Technology*, 26(3), 337-346.
- [5] D'Ambrosio U (2001). *What Ethnomathematics and How it Can Help Kids in School? Teaching kids math*. In V.T. Beston (Ed), National Council of Teachers of Mathematics, NCTM.
- [6] Knijnik, G. (2002). Curriculum, culture and ethnomathematics: the practices of cubagem of wood in the Brazilian landless movement. *Journal of intercultural studies*, 23(2), 149-165.
- [7] Mosimege, M. (2012). Methodological challenges in doing ethnomathematical research. *International Journal of African Renaissance Studies-Multi-, Inter-and Transdisciplinarity*, 7(2), 59-78.
- [8] Kaahwa, J. (2011). The role of culture in rural Ugandan mathematics teaching and learning. *Diaspora, Indigenous, and Minority Education*, 5(1), 48-62.
- [9] Johnson, B. E (2006). *Contextual Teaching and Learning*. Bandung: PT.Mizan
- [10] Rios, D. P. (2000). *Primero Etnogeometría para Seguir con Etnomatemática [First ethnogeometry to Follow with Ethnomathematics]*. In M. C. Domite (Ed.). *Anais do Primeiro Congresso Brasileiro de Etnomatemática - CBEm-1* (pp. 367-375). São Paulo, SP, Brazil: FE-USP
- [11] Emmanuel, et.al (2009), *Effect of Ethnomathematics Teaching Approach on Senior Secondary Students' Achievement and Retention in Locus*. *Educational Research and Review* Vol. 4 (8), pp. 385-390.