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Ethnomathematic Of Sasaknese As A Mathematic Learning Source Sri Supiyati 1*, Muhammad 9

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: supiyatisambada@gmail.com Abstract: Keywords: Science and technology are increasingly developing with the times. This has made a significant contribution in developing educational technology. In the midst of the development of educational technology, the education curriculum also demands the involvement of culture in schools learning aiming at creating generation of characterized students and be able to maintain and preserve culture as the foundation of the nation's character. As the result, education plays a major role in supporting national development and fulfills the needs and aspirations of the community. The link between educations becomes a key in the national ability to develop and achieve sustainable development. While the purpose of education is to balance and integrate some of the tensions between global and local, tension between tradition and modernity, education should help young people value a history and cultural traditions by balancing these with ethical acumen and cooperative skills to honor where change and innovation are necessarily valuable. Thus, the presence of learning innovations such as ethno- mathematics is needed so that learning mathematics can become more fun. Mathematic Education,, Sasak Ethnomatematic Mathematic is one of the most crucial subjects and it contributes most in daily life application. As stated by mathematic has various practical advantages in everyday life "…to arrange furniture, pack luggage, and park cars. They also use…in art, architecture, design, graphics, animation, and dozens of other vocational and recreational settings" [1]. Nevertheless, some students have not fully realized the importance of mastering mathematics so that they show less participation in learning mathematics. The process of learning mathematics in general only emphasizes the achievement of curriculum targets and contextual delivery only, teachers rarely provide context to connect subject matter with real problems often faced by students so that students are not able to solve mathematical problems in everyday life. Meanwhile, in the learning process still often encountered the

phenomenon of lack of student involvement. The teacher dominates the learning process which causes students tend to wait more for the teacher's presentation than either to find or discover knowledge and skills they need. Hence, learning mathematics requires a more realistic approach related to daily life activities in order to create more contextual mathematics learning, activate students in learning and bring students to the importance of mastering mathematics to increase students' appreciation in participating In order to bridge mathematics with existing local culture and to examine further link between them, researchers has chosen the domain called ethnomathematic. Etnhomathematics is a resrach discipline that explores the relationship between mathematics and cultur [2], with some fundamental reason. Firstly, through processes of social negotiations in society shows that new knowledge about mathematics can be in the social sphere or in the sphere of individuals. New mathematical knowledge in the social sphere is objective and new knowledge in the individual sphere is subjective. Mathematics as human activity [3], this means Mathematics needs to be endeavored and linked close to students' daily life, and if possible it should be real for students. Besides in general, learning mathematics from primary to high levels is not easy, therefore the abstractness of objects in mathematics should be close to students' life to support students comprehension [4]. We contend that the teaching and learning of mathematics should reflect and embrace the cultural diversity found in our mathematics classrooms and in our increasingly interconnected world. [5]. Classroom learning activities should provide opportunities for students to explore more the uses and benefits of mathematics, especially material taught by teachers in daily life so students can immediately feel the benefits of learning mathematics. Also based on the results of research, some of the arguments against inclusion of ethnomathematics into the curricula, as well as some ways in which these arguments can be successfully countered. Ultimately, we hope to demonstrate that ethnomathematics, which has the potential to show our students' multicultural views of mathematics, may help students develop a greater interest in mathematics [6]. 1 So, expressing culture as a source in mathematics learning is important as the result of the process of social interaction in society. Second, learning mathematics by respecting culture is one way to appreciate the differences that exist in class, students are personally accustomed to participating in mathematics learning by looking directly at their own culture from what they have practiced and what they think about mathematics. Therefore this study found a form of utilization of Sasak community cultural activities as a source of learning mathematics in primary education. Method The research method used in this study is qualitative approach with ethnographic models [7] aimed at exploring the cultural products of the Sasak community from a mathematical point of view called ethnomatematics, then these cultural products are used as learning resources in learning mathematics in primary education. Informants in this study are cultural practitioner, community and mathematics teachers. Results and Discussion Ethnomatematics is a bridge between culture and education, especially mathematics education. [8] argues that currently

the field of	ethnomatematics,	**namely mathematics that**	grows	**and develops in society and in accordance with local culture**	7

, can be used as a center of the learning process and teaching methods, although it is still relatively new in the world of education. In the field of mathematics education, ethnomatematics is still a new study and has a very good potential to be developed into contextual learning innovations as well as introducing culture to students so that the field of ethnomatatics can be used as a center of learning processes and teaching methods, although it is still relatively new in the world of education. [9] Ethnomathematics is

a research program that focuses on the	ationships	**between mathematics and culture**	10

. ([10] Below are the utilizations of Sasak ethnomatematics in Mathematics education: a. Ethnomathematics based in Mathematics education in modeling Mesjid Songaq (Masjid Kuno Songaq) Figure. 1. Songaq Mosque Mosque (Mesjid) architecture is one component of traditional architecture that has a long history in Lombok. In every group of people who are still strong in maintaining their customs and culture, there is almost certainly a site in the form of a traditional mosque or an ancient mosque that functions as a center of civilization. The size of the mosque floor is generally 7m × 7m, the height of the base is 1.5 meters and the doorway uses steps or stairs. Even though the floor area is small but the mosque inside feels roomy because of the application of high roof structure patterns and the four sides are trapezoidal, so the volume of the roof becomes a base. The ancient mosque of Songaq has several plane figures such as: rectangular walls, rectangular and semi-circular doors and windows, four sides of a trapezoid-shaped roof, triangular domes. Besides, it was also built in the form of space: dome-shaped quadrilateral prisms, rooms and pillars in the mosque in the form of cuboids, mosque stairs in the form of combined cuboids. Shape of Planes figure in Songaq Mosque building The walls of Songaq mosque were built using clay clusters and the walls of the mosque are rectangular. Figure. 2 Geometry Model on Mosque's walls a From the shape of the mosque wall, there is a rectangular concept in which there is a combination of rectangular and semicircular window. The mosque wall area can be calculated by the formula: L = Area of mosque wall minus the area of window. a) The area of rectangle on the wall = ? ? ? b) The area of rectangle on the window= ? ? ? c) The area of semicircular on the window = ? ? ? ? ?? ??? d) The area of the window = ? ? ? ? ? ? ? ? ?? ??? ? ? ? ? e) So the area of mosque's wall = The area of rectangle on the wall – area of window L=????????????????? ? ? The

rectangular pyramid on the dome of the Songaq mosque has a square shaped base. The properties of a rectangular pyramid whose base is square are as follows a) It has a square shaped base. b) It has five vertices consisting of one vertex at the top and 4 vertices at the base. c) It has 8 laterals, with four same straight size. d) It has 5 sides, those are 1 rectangular side and 4 other sides are plane in triangle shape. kaki. Volume and area of surface rectangular pyramid as follows: a) Volume pyramid = ? base area ? height ? ? b) Area of surface pyramid = base area + 4 ? area of straight sides The Geometry of model from Mosque room, pillar and base are : Formula for volume and area of surface of rectangular prisms on rooms, pillars and base are the same as area of surface of rectangular prisms on building bale: Volume rectangular prisms = ? ? ? ? ? Area of surface rectangular prisms = ?? ? ? ? 2? ? ?? ? ? ? 2? ? ?? ? ? ? 2? b. Ethnomathemathic based in Mathematic education by modelling Gendang Beleq. Figure 3. Modelling Gendang Beleq There is no standard or exact number for size of the drum, but the average height is more than 90 cm, the diameter of the small ramp is 34 cm and the big one is 41 cm. At both ends of the drum are given ornaments in the form of decorative flowers and leaves. While in the middle are given black and white checkered with red edges. These colors have a certain meaning; red symbolizes spirit, white symbolizes honesty, and black symbolizes the spirit of a burning soul. This is in accordance with the function of Gendang beleq is to encourage soldier to have passion and honesty, as the character of a warrior. Gendang Beleq shape is a cylinder. The characteristic of a cylinder refers to the figure above are: 1. Base and upper part has a circular shape with the same size. 2. It has 3 sides those are base, roof and blanket. 3. No angles and it have 2 laterals which circle the base and upper part. To find out the volume of a Gendang Beleq , we can use the similar formula on Volume of Cylinder, : Volume

Cylinder = area of base ? height As **the Base of** gendang beleq **is a** 11

circle, so the base of gendang beleq can be found by using the formula of circle = ? ? ??, So, volume gendang beleq= ? ? ?? ? ? Gendang Beleq body made of wood and covered with cloth, geometrically called a cylinder blanket which when stretched will be rectangular with a length corresponding to the circumference of the base circle and the height of the cylinder. As the result, the cloth need to make gendang beleq can be found by using the formula od cylinder blanket that is : ? = ? ? 2? ? ? The area of surface gendang beleq is a addition of base area, roof area and cylinder blanket area, or surface of cylinder 2 ? ? ? ?? ? ? ? 2? ? ? = 2???? ? ?? c. Ethnomathemathic based Mathematic Education by modelling Sesekan Sasak Subahnale (Sasak woven cloth) Figure 4. the translation model of Kain Sesekan Subahnale Through the picture of woven fabric (sesekan subahnale) above, students will be able to learn the characteristic of plane geometry, calculate the area and circumference of different planes shapes, rhombus, hexagons, triangles, and circles 1) Rhombus: Characteristics: have 4 sides and 4 angles, all four sides are the same length, have 2 pairs of angles facing equal, diagonally intersect perpendicular, have 2 folding symmetries, have rotational symmetry of level 2. ????? Formula area of Rhombus, ? = Circumference of Rhombus= side1 + side 2 + side 3 + side 4. ? 2) Hexagon General Characteristics: have 6 sides, 6 angles, number of all interior 7200, and 9 diagonal lines. If the hexagon is a regular hexagon (all sides are the same length and all angles are equal) then it has 6 folding symmetries, 6 rotary symmetries. Regular hexagon is a combination of 6 equilateral triangles, as in the image below So area of hexagon is the addition of 6 area of triangle The formula for triangle which has sides of a, b, c is: ? = ???? ? ???? ? ???? ? ?? where s= ? ?? ? ? ? ?? The area of triangle which has side of a : ? ??√3 ? = So, the area of regular hexagon which has the side a is: 4 ??√3 ? = 4 ? 6 = 3√3 ? ?? The synergy of local cultural values in mathematics education with learning materials must be 2 designed, developed and implemented in a complementary way [11]. The development of local cultural values in mathematics education and mathematics learning material is understood as the integration of messages and tools, namely as a tool for civilizing and empowering individuals Thus the results of several studies. The results of his research show that the shape and architecture of Mesjid Jamiq (Jamiq Mosque) in the City of Bengkulu

has ethnomatematics related to mathematical concepts including triangles, rectangles, circles, cubes , cuboids, **pyramid and** Cylinders. **Mathematical concepts found in the Jamik Mosque can be used to introduce and understand** Geometry **concepts** 4

through local culture [12]. Ethnomatematics found in barongan art is in the patterns of carving masks, motifs and forms of costumes, as well as the forms and patterns of motifs in barongan art tools. The concept of geometry found there in is two-dimensional geometry (plane figure) including trapezoid, equilateral triangle, triangle, right triangle, random triangle, square, rectangle, parallelogram, kite and circle, three dimensional geometry (solid figure) including triangular prism, triangular pyramid, ball, cylinder and cone, transformation geometry including rotation (rotation), reflection (reflection), and translation (shift), dilatation enlarged / reduced [13]. Based on the results of the analysis that Solok weaving motif of Banyuwangi were found the elements of plane geometry and transformation geometry. Plane geometry consists of points, lines, and polygons, geometrical symmetry properties of plane figure, concordance and congruence [14].

The architecture products of "sasak" **society also describe that** "sasak" **society is more focus on the process than the final** 3

[15]. The development of local cultural values in mathematics education can be done through various models and learning methods chosen by the teacher contextually, for example to develop students' critical thinking skills, teachers can choose realistic problem solving approaches in learning. The development of collaborative, skilled and disciplined intelligence can be carried out in practical activities at cultural sites which mean that all expected aspects are designed and assessed as a form of results of contextual education in mathematics learning. Conclusion Ethnomatematics are

of culture. Mathematical activities that are owned and practiced in Sasak community are considered important as a special study of mathematics owned and practiced by the Sasak community for generations, which is expected to be a reference for contextual mathematics education. This learning is one of the ways that can be perceived to make mathematics learning more meaningful and contextual which is believed to stimulate students to use their thinking skills which perform rich and reflective learning. The cultural context is used to stimulate the adventures of students because it is easy to remember, pupils are directly involved in it and are directly related to their daily lives. References [1] S. Tipps, A. Johnson, and L. M. Kennedy, Guiding children's learning of mathematics. Cengage Learning, 2011. [2] M. Rosa and D. C. Orey, "Humanizing mathematics through ethnomodelling," J. Humanist. Math., vol. 6, no. 2, pp. 3–22, 2016. [3] J. Oliver,済無No Title No Title, vol. 53, no. 9. 2013. [4] G. Octizasari and S. Haji, "Penerapan Model Pembelajaran Rme Berbasis Ethnomatematika untuk Meningkatkan Kemampuan Pemecahan Masalah Mahasiswa Calon Guru Pendidikan Matematika Fkip Universitas Bengkulu," JUPITEK J. Pendidik. Mat., vol. 1, no. 1, pp. 1–7, 2018. [5] A. Brandt and E. J. Chernoff, "The importance of ethnomathematics in the math class," 2015. [6] R. A. Ogunkunle and N. R. George, "Integrating ethnomathematics into secondary school mathematics Curriculum for effective artisan creative skill development," Eur. Sci. J., vol. 11, no. 3, 2015. [7] J. P. Spradley, "Metode Etnografi, terj," Misbah Zulfa Elizab. Tiara Wacana, Yogyakarta. Cet I, 1997. [8] J. Shirley, W. Gifford, and A. Dyce, The dramatic works and poems of James Shirley, vol. 2. Murray, 1833. [9] U. d'Ambrosio, "Ethnomathematics and its place in the history and pedagogy of mathematics," Learn. Math., vol. 5, no. 1, pp. 44–48, 1985. [10] V. Albanese and F. J. Perales Palacios, "Enculturation with ethnomathematical microprojects: From culture to mathematics," 2015. [11] Marsigit, R. Condromukti, D. S. Setiana, and S. Hardiarti, "Pengembangan Pembelajaran Matematika Berbasis Etnomatematika," Pros. Semin. Nas. Etnomatnesia, pp. 20–38, 2015. [12] S. Rohayati, K. Karno, and W. I. Chomariyah, "Identifikasi Etnomatematika Pada Masjid Agung Di Yogyakarta," 2017. [13] D. U. Rahayu, A. Shodiqin, and M. Muhtarom, "Eksplorasi Etnomatematika dalam Kesenian Barongan di Kabupaten Blora," Imajiner J. Mat. dan Pendidik. Mat., vol. 1, no. 4, pp. 1–7, 2019. [14] S. WAHYUTINI KHOIRIYAH, "Etnomatematika pada Motif Tenun Solok Banyuwangi Sebagai Bahan Ajar Geometri Siswa." [15] S. Supiyati, F. Hanum, and Jailani, "Ethnomathematics in sasaknese architecture," J. Math. Educ., vol. 10, no. 1, pp. 47–57, 2019, doi: 10.22342/jme.10.1.5383.47-58.

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