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# Learning Mathematics with Western Sumatera-Based Learning Video to Improve The Numerical Literacy Skill of Students

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**Abstract.** Indonesia's Demographic Bonus refers to the number of productive age population which is higher than the elderly population. Improving the quality of human resources must continue to be carried out to make human resources knowledgeable, cultured in attitude or character, and competitive. Adat Basandi Syara', Syara' Basandi Kitabullah (ABS-SBK) refers to the guidelines for social life in Minangkabau. West Sumatra has a diversity of cultures and customs. Mathematics is one of the sciences that is taught at all levels of education, from basic education to tertiary institutions as mandated by the curriculum. Therefore, mastering mathematics is important. The OECD from PISA makes mathematics a focused subject. In this program, students must apply and practice their physical skills to real-life math literacy skills. The results of the international assessment and ranking of mathematics show that Indonesia still has a lower ranking than other countries. To improve students' numeracy literacy skills, interesting learning is needed and can add insight into the culture that surrounds students. For this reason, this research is a descriptive study that reveals culture in West Sumatra which was studied with West Sumatran humanists and explores supporting theories to improve numerical mathematical literacy skills in learning mathematics. The results are useful for starting Research & Development in the form of instruments or media for learning mathematics to improve students' numerical literacy.

**Key words:** mathematics numerical literacy skill; mathematics learning; Western Sumatera-based cultural video

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## INTRODUCTION

Qualified human resources are a requirement for demographic bonuses in this digital era. This bonus refers to people of productive age who are ready in terms of attitude, character and skills to develop their potential. The Human Development Index as a performance measurement unit measures success by developing the quality of human life. In this measurement process, the approach applied is a dimension consisting of age, health, knowledge, and quality of life (Masjaya, 2018). The 2021 Human Development Index shows a score of 72.29, ranking 107 out of 187 participating countries. Indonesia is also ranked fifth among ASEAN countries, in the moderate category. Formal education in schools develops the potential of students properly. Most students at school consider mathematics a difficult subject even though mathematics has become a part of human life. Mathematics allows humans to face problems in social life. Based on the 2018 PISA results by the OECD (2019), the average learning achievement of Indonesian mathematics students is 379. This average indicates the low ability of students' numerical literacy. In mathematics lessons, numerical literacy skills are important, requiring critical thinking patterns to solve the problems at hand. So, mathematics is not always a problem with mathematical formulas. Numerical literacy skills facilitate students to understand the role and purpose of mathematics in dealing with everyday life problems.

The facts show that numerical literacy skills must be improved because skills correlate with efforts to improve the quality of human resources. Mathematical literacy is a person's ability to efficiently formulate, apply, and change all concepts, procedures, facts and mathematical tools both in terms of calculations, numbers and space in the context of daily life (Fathani, 2016).

Education makes people cultured, which means that education and culture exist together and promote each other. The knowledge obtained in the learning process should be useful in students' lives, therefore students are expected to be able to make connections between events in life and the knowledge obtained in learning.

This paper defines a theoretical solution to the problem. Therefore, this paper explores supporting theories to improve numerical mathematical literacy skills in learning mathematics. One of them is learning

mathematics assisted by cultural videos based on West Sumatra. The next stage of the research results includes the promotion of Research & Development to produce mathematics learning tools to improve students' numerical literacy skills.

## RESULTS AND DISCUSSION

### Mathematics Numerical Literacy

Numerical literacy skill is important for the current generation. The skill includes the knowledge of science and symbols to understand numbers and analyze quantitative information, such as graphs, charts, etc (Kemendikbud, 2021). Excellent numerical literacy skill facilitates learners to reach competence, apply their knowledge, and practice their mathematics skills in daily life. The Ministry of Culture and Education, Kemendikbud, determines numerical literacy to be the assessment parameter for learners in Indonesia.

Mahmud and Pratiwi (2019) explain three primary aspects of numerical literacy context. They are 1) the calculation aspect (including operating, subtracting, multiplying, and dividing), 2) the numbering aspect, and 3) the arithmetic operation. The efforts to measure the skills require indicators as the guideline (OECD). The indicators are a) mathematics skills, b) communication skills, c) reasoning and arguing skills, d) representing skills, e) applying appropriate strategy to solve problems, f) linguistic skills, symbolic operation, and formal and technical skills, and g) the ability to use a mathematics-assisted tool (Aggrieni, 2018). Table 1 shows the numerical literacy components in the 2013 curriculum.

**Table 1.** The Numerical Literacy Components and the Mathematics Scope within the 2013 Curriculum

| Numerical Literacy Components | The Mathematics Scope within the 2013 Curriculum |
|---|---|
| Estimating and calculating the whole numbers | The numbers |
| Using fraction, decimal, percentage, and ratio | |
| Recognizing and using patterns and relation | The numbers and algebra |
| Using spatial reasoning pattern | Geometry and measurement |
| Using measurement | |
| Interpreting the statistical information | Processing the data |

Han et al (2017)

Table 2 shows the indicators to measure the numerical literacy skills of learners.

**Table 2.** Numerical Literacy Skill Indicators

| Number | Numerical Literacy Skill Indicators |
|---|---|
| 1 | Using various numbers and symbols related to basic mathematics to solve problems within various contexts of daily life |
| 2 | Analyzing the displayed information in various forms, such as graphics, tables, charts, diagrams, etc |
| 3 | Interpreting the analysis results to predict and make decisions |

Han et al (2017)

### Mathematics Learning

Human has many activities. One of them is learning. Learning and the learning process are two different events because the learning process involves a teaching action. Learning and teaching are integrated into an interactive activity to realize feedback between teacher and student during a learning process. Hamalik (2010) explains that learning refers to behavioral empowerment by practicing. Learning is an effort to improve a situation that allows learners to learn and combine various influential elements of learning objectives. The elements include the participating individuals, the facilities, and the learning procedures.

The learning process refers to the communication process between teachers and learners to realize better behaviors. The results of the educational implementation are inseparable from the quality and capability of a teacher. A teacher must manage the class and select appropriate models, strategies, and learning methods to improve the intention of the learners to study mathematics. Thus, they could lose their boredom and experience an effective learning

environment. The learning outcomes of learners go in line with the learning interaction to construct their knowledge. Thus, teachers cannot only transfer the knowledge to the learners but also involve the learning elements.

Nikson, cited by Nasir (2017), explains that mathematics learning is an effort to construct mathematics concepts and principles with the personal efforts of the learners. This effort involves the internalization process of the concepts and principles to be reconstructed. The obtained information transformation becomes the new concepts and principles. The transformations may easily occur when the constructed understanding occurs due to constructed schemes inside of the learners' brains. Darsono (2004) explains the observable learning features. They are a) planned learning systematically and consciously, b) learning to motivate and pay attention to the learners' learning, c) learning by providing interesting and challenging material, e) learning to create a secure and joyful environment for learners, and f) learning to make students accept the learning physically and psychologically.

Cobb, cited in Suherman et al (2003), explains that mathematics learning is an active constructing process for learners to create their mathematics knowledge. Learning mathematics requires should be active and not only focus on numbers and formulas. Hudojo (2003) explains that learning is an active process to obtain new experiences and knowledge that lead to behavioral changes. The mathematics learning principles should not only learn to know but also learn to be and learn to live together. Thus, mathematics learning should refer to the notion that learners learn comprehensively and in an integrated manner (Suherman et al., 2003).

Thus, mathematics learning is a process or an activity of a mathematics teacher to teach the learners, create a learning climate, facilitate the learners' skills, potential, interests, and talents; and provide the necessities of the learning so that an optimal interaction occurs among teachers and learners.

**The Western Sumatera Culture**

Minangkabau citizens live based on the custom philosophy of Minangkabau. The philosophy is "*Adat Basandi Syara', Syara' Basandi Kitabullah* (ABS-SBK)" and the natural philosophy of Minangkabau, *"Alam takambang menjadi guru.*" The habit and experiences of Minangkabau ancestors become the teachers of the community live. For the Minangkabau community, nature is everything and not only the places of birth, living, death, and growing (Navis, 2015). Minangkabau custom teaches the term of *raso jo pareso*, a Minang proverb about the connection and interaction of life and human. The term *raso jo pareso* refers to a devotion feeling toward God. Humans with this feeling will behave politely, carefully, and respectfully. The custom helps an individual to respect any differences.

The art of Minangkabau, the traditional art, becomes a cultural element with distinctive functions and roles from other cultural elements. Traditional art refers to historically shifted arts. Traditional art is born and grows along with the community interests, such as music, *randai* or traditional folk theater, and many more. The traditional arts have undergone some historical shifts. The traditional arts appear and develop along with the community interests. *Talempong* is a preserved traditional art of Minang citizens. *Talempoing* refers to Minangkabau percussions. The other reference of *Talempong* is the played music or the sounds (Yunus, cited by Syeilendra, 2009).

**Mathematics Learning with Western Sumatera-based Cultural Videos to Improve Numerical Literacy Skills of Learners**

Mathematics is a science that concerns the learners' skills to reach the learning objective. The mathematics learning process has some principles to teach and select during mathematics learning. Learning media also has an important role to improve learning quality. Learning media can deliver abstract mathematics concepts to learners. Mathematics learning media should have an interesting presentation to improve the learners' interest in learning mathematics. The learning media implementation is important to make learners interested in studying mathematics. Learning video refers to a learning media with visually-recorded video with some motion and sound elements. A video has the capabilities to take the benefits of time and space and to make learners interested in the given stories.

Western Sumatra-based cultural videos consisted of some stages. They were 1) the pre-production stage - by collecting the cultural concepts and notions as the materials for the learning discussion, 2) the production stage - all prepared elements before the pre-production process, and 3) the post-production process - a completing process of a complete movie to

deliver stories or suggestions. In this process, the editor processed all figures in a production process.

These Western Sumatra-based cultural videos had interesting packages by adjusting the given day's material. The video contained the cultures and customs, including the discussed materials for daily life matters. For example

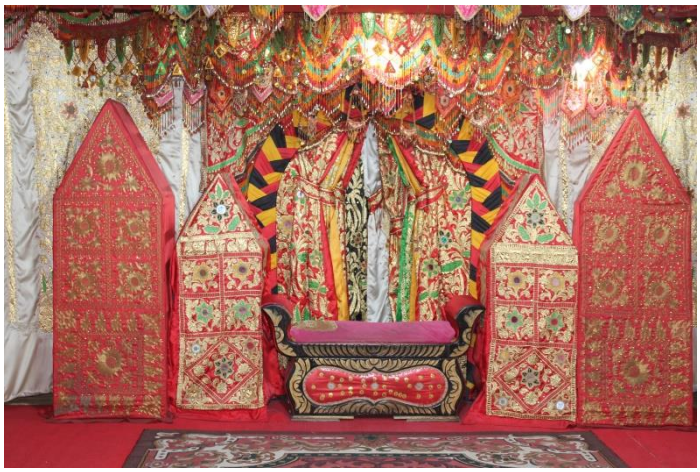

**Figure 1.** The Signature Aisle of Minangkabau

Figure 1 shows the part of a video as a learning medium about a two-dimensional figure and geometrical concept. The videos contained interactive discussion stages for the learners to find the types of two-dimensional figures in the videos, explain the parts of the given geometrics, to calculate the areas, circumference, and the areas of the sides. In this research, the researchers asked about the required areas of a garment for making the aisle, the needed costs, and many more. The researchers also provided some cultural philosophy to enrich the information and knowledge of histories, the function, and the colors of the aisle delivered with the traditional music of Minangkabau. The other examples are the following figures.

**Figure 2.** The Gadang and Rangkiang Houses of Minangkabau

The Gadang house is the traditional house of Western Sumatra. The front part has some *rangkiang* with similar appearance to *sibayau-bayau* circuits, *sitenggang lapa*, *silihat lauik*, and many more. *Rangkiang* is a rice barn with philosophy and function based on the names and the numbers of the foundations. For example, the *sitenggang lapa rangkiang* stores rice during the dry season. For mathematics learning, the learners could take and connect some matters, such as the shape of the building based on the geometric materials, the two-dimensional figure, the geometrical object, the volume of the object, and many more. The other applications in daily life include social arithmetic and many more.

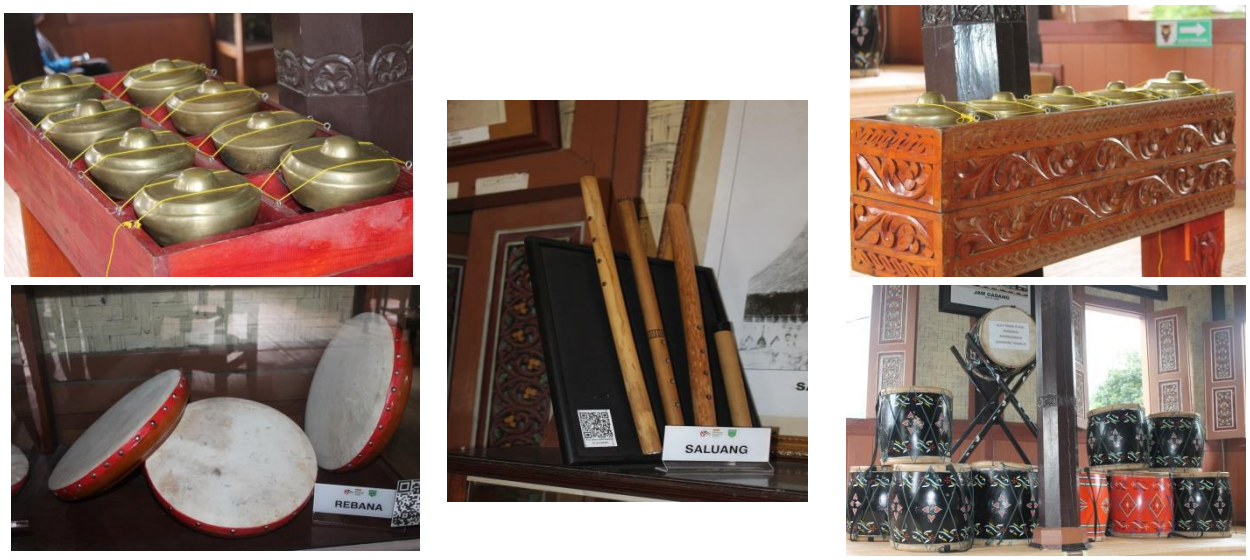


**Figure 3.** The Traditional Music Instruments of Minangkabau

The traditional musical instruments of Minangkabau could be the learning media for mathematics learning, such as the frequencies of the beats and the period of the beats along with other instruments. The researchers also combined social arithmetics, algebra, and geometry with the cultural arts of traditional music instruments of Minangkabau.

## CONCLUSION

Numerical literacy skill is important for the current generation. The skill includes the knowledge of science and symbols to understand numbers and analyze quantitative information, such as graphs, etc Mathematics learning is an effort to construct the mathematics concepts and principles with the personal efforts of the learners. This effort involves the internalization process of the concepts and principles to be reconstructed. Minangkabau citizens live based on the custom philosophy of Minangkabau. The philosophy is "*Adat Basandi Syara', Syara' Basandi Kitabullah* (ABS-SBK)" and the natural philosophy of Minangkabau, *"Alam takambang menjadi guru.*" The habit and experiences of Minangkabau ancestors become the teachers of the community life. Mathematics learning media should have an interesting presentation to improve the learners' interest in learning mathematics. The learning media implementation is important to make learners interested in studying mathematics. Learning videos are visual-audio media with some elements, starting from motion and sounds combined into a learning media. These Western Sumatera-based cultural videos had interesting packages by adjusting the given day's material. The video contained the cultures and customs, including the discussed materials for daily life matters. Mathematics learning with Western Sumatra cultural-based video assistance could improve the learners' mathematics literacy skills.

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