

# How does Ethnomathematics Work within an Online Platform

*by* Nofi Peni

---

**Submission date:** 07-Oct-2022 11:38PM (UTC-0500)

**Submission ID:** 1919826678

**File name:** Paper\_Submission\_2.docx.pdf (609.17K)

**Word count:** 1986

**Character count:** 11535

## **How does Ethnomathematics Work within an Online Platform?**

**Nur Robiah Nofikusumawati Peni** <sup>1(\*)</sup>

<sup>1</sup>Master of Mathematics Education Department, Faculty of Teacher Training and Education, Universitas Ahmad Dahlan, Yogyakarta, Indonesia

(\*)✉ [nofipeni@gmail.com](mailto:nofipeni@gmail.com)

### **Abstract**

Recently, ethnomathematics has emerged as one of the promising approaches for assisting teachers in promoting culture in the lives of their students. However, ethnomathematics left a strong impression that it was primarily concerned with cultural issues and was difficult to integrate with technology. Because the image of traditional ethnomathematics has become in contrast with the new era nowadays, where the online platform is used during the teaching-learning process during this pandemic situation, the usage of ethnomathematics has decreased. The essence of ethnomathematics, which requires face-to-face learning, posed a new challenge to applying this approach in the digital age. This study aims to investigate the characteristics of ethnomathematics and how they interact with online platforms. This literature review gathers information from previous studies in which several online platforms work with students with or without culture as a context in the teaching-learning process. The findings show that the characteristics of ethnomathematics and those online platforms are intertwined and that this could be a new approach to promoting culture within the mathematics learning process.

**Keywords:** ethnomathematics, online platforms, mathematics learning process.

### **Introduction**

During the COVID-19 pandemic, online learning is required from various levels of education. For more than two years, students need to be more independent in knowledge, resulting in lost learning for students without extra help from teachers compared to learning before the pandemic. Even though it is done online, the teachers have also tried their best to use various platforms to create interesting education for students. Teaching using PowerPoint slides taught

Corresponding Author: Nur Robiah Nofikusumawati Peni  
Master of Mathematics Education Department, Universitas Ahmad Dahlan,  
Yogyakarta, Indonesia  
Email: [nofipeni@gmail.com](mailto:nofipeni@gmail.com)

through Google Meet or Google Classroom is still not helpful enough to help students explore some of the mathematics problems.

The teacher's new challenge could be seen in introducing mathematics using culture in ethnomathematics during this pandemic. Ethnomathematics needs a place where the students must interact with each other, see the cultural artifact with naked eyes, or feel the cultural activities during the teaching-learning process. How to design an online mathematics class by using the ethnomathematics approach must be considered by the educator. Besides using PowerPoint, the choice of online platforms is another challenge for teachers to reduce difficulties in online learning, especially when the material being taught in mathematics is integrated with culture. Various kinds of online platforms can be accessed for free to assist teachers in delivering material in class, such as Canva, Desmos, Shodor, Kahoot, Mentimeter, etc. This literature review research would like to investigate whether those platforms could help introduce culture using the ethnomathematics approach and how it works.

On the other hand, ethnomathematics gave the image of being predominantly concerned with cultural issues and difficult to incorporate with technology. The use of ethnomathematics has declined as the image of traditional ethnomathematics has become incompatible with the new period of today, where the online platform is used during the teaching-learning process during this pandemic condition. In the digital age, the essence of ethnomathematics, which involves face-to-face learning, faced a new difficulty. Based on the issue mentioned, **this study aims to investigate the characteristics of ethnomathematics and how they interact with online platforms.**

### **Method**

This literature review gathers information from previous studies in which several online platforms work with students with or without culture as a context in the teaching-learning process. The

characteristics of some of the online platforms here are Canva, Desmos, and Shodor being used to introduce mathematics and ethnomathematics characteristics to see the possibility of developing the teaching-learning method based on the ethnomathematics approach during virtual meetings.

### *Result and Discussion*

Canva is an online app with templates and features that help teachers and students promote technology-driven learning, skills, creativity, and achievable benefits. Inspiring attention and interest in learning by presenting interesting material are one of Canva's strengths (Pelangi, 2020). The variety of templates provided by Canva is fascinating, where the provision of colors, images, letters, and so on makes it easy for teachers to attract students' attention to learning. Teachers can also innovate in making presentation slides by using various other features such as millions of images provided, photo filters, icons, shapes and elements that can help create math problems, and hundreds of fonts that can attract students' attention. Previous researchers also support that the Canva platform can help teachers hone their professionalism (Bakri, 2021) in developing themselves and innovating to provide interesting learning materials (Andrianie, 2021).

In addition, as an app with several advantages over other apps, Desmos includes the fact that it does not require a considerable internet allowance and can be used through platforms, websites, and cellphones. Desmos can be used in various ways, including a free graphing calculator, and has several languages (Paul & Thulasi, 2018). Teachers can use it to create high-quality graphics for evaluations and presentations, as well as by students to connect mathematical concepts to realistic, real-world forms and images. Erasmus+ program starts to develop some tools for students to teach functions, and the graphical representations from those shapes are easily represented by using Desmos, as shown in Figure 1. The figure shows that varied functions

result in different shapes (see what kind of functions are seen to form the triangle as a roof of the house, steps 3,4,5).

Therefore, understanding the values of a function and the slopes and curves that result is required to describe images using graphs. Graphic art can be portrayed on a Cartesian coordinate system in various ways, from simple to complicated graphical representations, by managing the length of such forms and curves well enough.

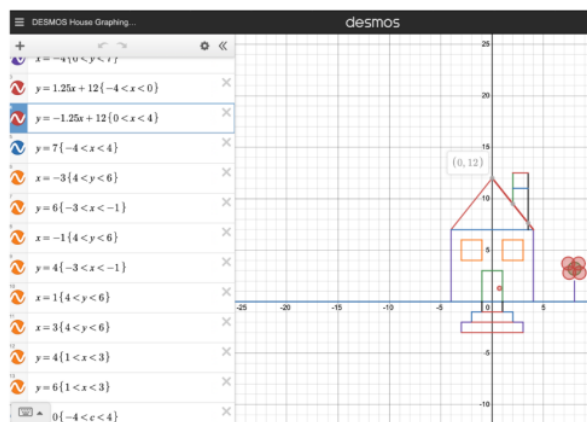


Figure 1. House and function in Desmos

(source: <https://www.desmos.com/calculator/9fahdexfkl>)

Using Desmos could be the first step to introducing several models of traditional houses with this sketch to show the students that those traditional houses could be formed by function. This tool will focus on simple forms, such as circles and straight horizontal, vertical, and oblique lines, which it takes to generate graphic art as simple as Figure 1.

Some activities in the class that should be done face-to-face now can be done by using Desmos during this online system. The various topics are already prepared on this platform, which helps the teacher develop their lesson plan and gives some insight into how to create an online mathematics classroom. As shown in Figure 2 below, some of

the playing activities that could be regarded as six universal mathematics by Bishop (1990) could be designed.

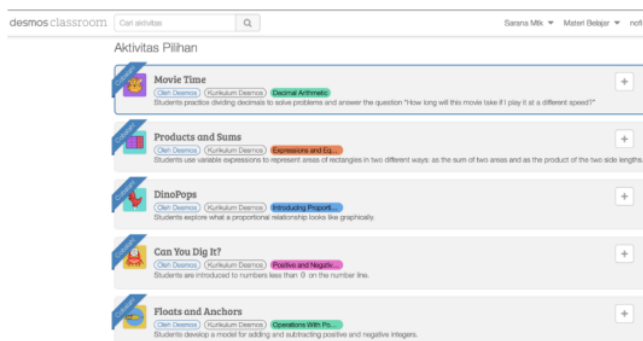


Figure 2. Desmos Classroom for Teacher  
(source: <https://teacher.desmos.com/?lang=id>)

The last one is Shodor, an online platform as a national resource for computational science education. However, mathematics education could be applied as well. Shodor also provides various types of mathematics activities, which are similar to Desmos; however, there is an interesting thing in this platform: the math dictionary. Within this math dictionary, students are able to find the definition of complicated term mathematics that students used to face. There are 187 lessons provided by Shodor consisting of algebra, calculus, discrete, geometry, modeling, number and operations, probability, statistics, trigonometry, and elapsed time. The materials start from grade 3 elementary school until undergraduate.

1 An example of activity in figure 3 below shows Students learning about probability by predicting the outcome of planned experiments and playing racing games. This game could be applied for Grades 3-5 and Grades 6-8 and connected to data, events, experimental probability, fair, fractions, outcomes, percent, probability, probability simulation, theoretical probability, and trials.

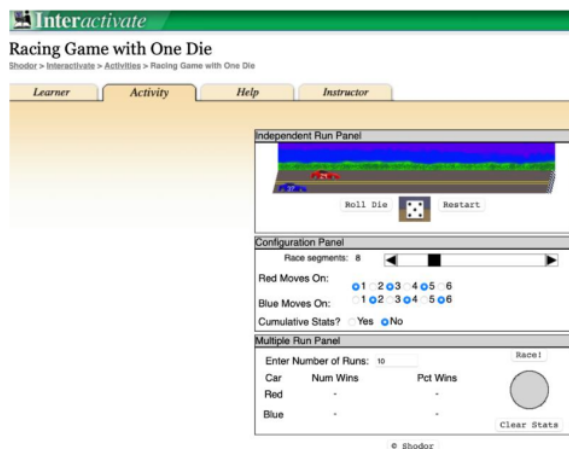


Figure 3. Racing Game in Shodor (source:

<http://www.shodor.org/interactivate/activities/RacingGameWithOneDie/#printing>

Besides preparing the activity as an online system, this online platform also provides the lesson plan and worksheet related to the activities that can be downloaded. The lesson plan is prepared to show the lesson's objectives. The activity steps start from the opening until the closing of the class. The types of the lesson plan also could be changed into five standards addressed differently depending on where you live or what kind of format of lesson plan do you use: Alaska performance standards, Common Core State Standards, NCTM, South Carolina Academic Standards for Mathematics, and the last one is Virginia Standards of Learning.

By integrating those online platforms into ethnomathematics, where the culture needs to be emphasized to promote mathematical thinking, the teacher needs to be more innovative and creative. There is nothing possible in this case because, based on the characteristics mentioned above, several activities could be designed using the Canva to have an interesting template for representing culture in the classroom. For interactive classes, students could start using Desmos, which can be developed by the teacher, or using the lesson provided

by a platform such as Shodor; then, the students will be able to try and error during the teaching-learning process even the teaching-learning process was held by online.

Based on the previous studies, ethnomathematics has several characteristics (D'Ambrosio, 1985; Suarjana et al., 2014; Hutauruk, 2020; Peni, 2021), which need to be considered during the design of the lesson using these online platforms. They are:

- a. Mathematics design needs to be practiced among cultural groups such as children, workers, and tribes—the chosen cultural content material also aligns with the mathematical content.
- b. From cultural products that are used as ethnomathematical materials, we can see the mathematics concepts contained in them, both to be used as a teaching reference and to mathematically model the cultural idea of the cultural product. Here shows that the mathematics found here is not the formal ones used by the engineer but also the traditional activities of informal mathematics.
- c. Appreciation of the culture could increase students' character to love their country without any doubts and be proud of their real identity as an Indonesian.

### **Conclusions**

The similar characteristics among those online platforms that could increase students' participation during online classes with each benefit of it, ethnomathematics could play a role as context here to enrich students' knowledge not only for understanding the mathematical content but also their own culture. When the students can make connections between what they learn at school, even online or offline, with their real environment at home, then the students are able to reach meaningful learning.



### References

- Andrianie, S., et. al. (2021). Pelatihan pembuatan media pembelajaran berbasis karakter religius menggunakan Canva di SDN Tanon 2. *Dedikasi Nusantara: Jurnal Pengabdian Masyarakat Pendidikan Dasar*, 1(2), 65-75.
- Author at Desmos.com. (2021). Part I: Visual arts & mathematics, Tool 9: Art imaging through the use of functions. *The Art of Maths*. Erasmus+ Programme of the European Union.
- Bakri, et. al. (2021). Pelatihan pembuatan materi presentasi dan video pembelajaran menggunakan aplikasi Canva kepada guru di kota Medan dan Jayapura secara online. *Jurnal Ilmiah Pro Guru*, 7(1), 1-10.
- Bishop, A. J. (1991). *Mathematical enculturation. A cultural perspective on mathematics education*. Dordrecht: Kluwer Academic Publishers. <http://dx.doi.org/10.1007/978-94-009-2657-8>
- D'Ambrosio, U. (1985). Ethnomathematics and its place in the history and pedagogy of mathematics. *For the Learning of Mathematics* 5 (2), 44-48
- Hutauruk, A.JB., (2020). Karakteristik etnomatematika dalam pembelajaran sekolah. *Prosiding Webinar Ethnomathematics Magister Pendidikan Matematika Pascasarjana Universitas HKBP Nommensen*.
- Paul, P. C., & Thulasi, G. (2018). A study on graph with Desmos through ICT in diploma in elementary education of tamil Nadu state board. *International Journal of Engineering & Technology*, 7(1.5), 249-252.
- Pelangi, G. (2020). Pemanfaatan aplikasi Canva sebagai media pembelajaran Bahasa dan Sastra Indonesia jenjang SMA/MA. *Jurnal Sasindo Unpam*, 8(2), 79-96.
- Peni, N. R. N. (2021). Development of an ethnomathematics curriculum through emergent modeling in an Indonesian primary school. *Doctoral Dissertation*. Hiroshima University, Japan.
- Surjuana, I. M., Suharta, I.G.P., & Japa, I.G.N. (2014). *Etnomatematika system kalender Bali*. Seminar Nasional Riset Inovatif II.

# How does Ethnomathematics Work within an Online Platform

## ORIGINALITY REPORT

6%

SIMILARITY INDEX

6%

INTERNET SOURCES

0%

PUBLICATIONS

2%

STUDENT PAPERS

## PRIMARY SOURCES

1

[www.shodor.org](http://www.shodor.org)

Internet Source

2%

2

[dergipark.org.tr](http://dergipark.org.tr)

Internet Source

1%

3

[shodor.org](http://shodor.org)

Internet Source

1%

4

Submitted to Liberty University

Student Paper

1%

5

[www.gplra.org](http://www.gplra.org)

Internet Source

<1%

6

[www.ijstr.org](http://www.ijstr.org)

Internet Source

<1%

7

[www.mathematik.uni-dortmund.de](http://www.mathematik.uni-dortmund.de)

Internet Source

<1%

Exclude quotes On

Exclude matches Off

Exclude bibliography On