TSG Agenda

TSG 52: ETHNOMATHEMATICS

Class: B

Session 1

1. Time: 19:30─20:10

   Welcome Intro and Tribute to Ubiratan D'Ambrosio

   TSG Team Members

2. Time: 20:10─20:40

   Revisiting ethnomathematics: another social turn?

   Arindam Bose

   Tata Institute of Social Sciences (TISS), Mumbai, IN

   It is now well acknowledged that school is not the only site of mathematics learning. Coming from developing world context, large conglomerations of immigrants with diverse hand skills and strong social networks contain rich funds of knowledge often containing mathematical ideas in them. Opportunities and affordances available within work-contexts and everyday settings are potentially resource-rich with elements of mathematics embedded in them. Such understudied fields call for broadening the epistemological underpinnings of subject ethnomathematics to examine issues at the intersection between mathematics, culture and work-contexts with diverse affordances and opportunities for mathematics learning. Invoking critcal engagement with ethnomathematical ideas, this paper calls for yet another social turn for learning from the productive force of knowledge creation and respond to politics of math education.

3. Time: 20:40─21:00

   General Discussion

Session 2

1. Time: 21:30─21:40

   Welcome and Plan for the Day

   TSG Team Members

2. Time: 21:41─21:46

   A framework for examining the quality of mathematics teaching for mathematical understanding in ethnic minority cultural contexts

   Aihui Peng

   Faculty of Education, Southwest University, China, CN

   The paper reviewed the current existing frameworks on examining the quality of mathematics teaching and addressed the gap of them. By drawing upon theoretical perspectives from culturally responsive mathematics education and the process of students' mathematical cognition of contextualizing, complementizing, and complexifying, the paper proposed an extended framework on examining the quality of teaching for mathematical understanding in ethnic minority cultural context. The paper advances new understanding of the quality of mathematics teaching in ethnic minority cultural context by echoing Ubiratan DAmbrosios call for restore cultural dignity and taking students mathematical cognition into consideration. The paper ends with a short description of the use of this framework in assessing a math lesson on symmetrical geometrical figures in grade two from a primary school in an ethnic minority area and a reflection on its effectiveness.

3. Time: 21:47-21:52

   Ethnomathematics and ethnomodelling research: glocalizing educational systems from exclusion to inclusion at local and global levels

   Daniel Clark Orey, Milton Rosa

   Universidade Federal de Ouro Preto, Ouro Preto, BR

   The acquisition of both local (emic) and global (etic) knowledge forms an important goal for the implementation of ethnomathematics research. Local knowledge (emic) is essential for an intuitive and empathic understanding of mathematical ideas, procedures, and practices developed throughout history. Global knowledge (etic) is essential for the achievement of cross-cultural comparisons that demand standard analytical units and categories to enable communication. Glocalization (dialogical) uses both local and global knowledge through dialogue, and interaction through translation. In this context, we define ethnomathematics as the study of mathematical phenomena within a culture because it is a

culturally bound social construct while ethnomodelling brings cultural aspects of mathematics into the modelling process. The main objective of this paper is to share recent reflections in regards to feedback received from our ongoing work in ethnomodelling in Nepal, Costa Rica, Brazil, and the United States. In this paper, we discuss the local, global, and glocal approaches necessary for the development of ethnomathematics research in educatinal systems

4. Time: 21:52-22:02

   Discussion

5. Time: 22:02─22:07

   Ethomathematics as pedagogical and political tool in an indigenous school curriculum

   Vanessa SenaTomaz, and Ozirlei Teresa Marcilino

   Universidade Federal de Minas Gerais, Belo Horizonte, BR

   The article discusses how a teaching and research experience sheds light on socio-political issues of mathematics education and ethnomathematics to pursue the creation of an Indigenous school-mathematics in a way that respects self-determination and sovereignty. We rely on ethnomathematics perspective, which articulates Ludwig Wittgensteins and Michel Foucaults theoretical notions, to analyze how an Indigenous undergraduate group explores connections between mathematics and ethnomathematics, involving them in a political and epistemological level when ensuring their own traditional practices in the specific curriculum to their schools.

6. Time: 22:08─22:13

   Fany Salazar, Marta Civil

   University Of Arizona, Tucson, US

   In this paper, we present on the work with a group of Mexican-American women who participated in a larger project aimed at developing a two-way dialogue about mathematics between parents and teachers. We focus on a task that required the participants (mothers) to create a story based on a given graph. We first describe a collaborative group discussion around a topic they all had expertise in (cooking rice). We then turn to some of their individual stories based on their personal experiences developed together with their peers' support. All the mothers personalized their stories by relating it to their day to day life. Thus, their stories gave us a window into their everyday life experiences or, building on prior work, what we have termed their funds of knowledge.

7. Time: 22:13─22:23

Discussion

8. Time: 22:23─22:28

   Regaining cultural signs through ethnomathematical descriptors: artifacts, sociofacts and mentifacts

   Ma. Elena Gavarrete, Milton Rosa, and Daniel Clark Orey

   Universidad Nacional, Heredia, CR

   This proposal offers an alternative way to study contextual elements considered as cultural signs through the involvement of three ethnomathematical descriptors: artifacts, sociofacts, and mentifacts. This proposal empowers investigators to develop ethnographic studies with the possibility of incorporating inventories of cultural signs, which are understood to be the representative elements of the members of distinct cultural groups with potential of development of ethnomathematical studies. These descriptors - artifacts, sociofacts, and mentifacts - enable researchers and practitioners to distinguish cultural elements that are authentic cultural signs from the ones that are not.

9. Time: 22:29─22:32

   Perspectives of mathematics by traditional purhpecha artists

   Thomas E Gilsdorf

   Central Michigan University, Mt. Pleasant, US

   This paper represents an ethnomathematical analysis of eighteen interviews with traditional Purhpecha artists. The goals of the study were to obtain the artists perspectives regarding how they learned their craft and use those perspectives to observe mathematical activity that might be involved in the learning and maintaining of their skills, and to determine whether they perceived that mathematics they might have learned through formal schooling was of use to them as traditional artists. Conclusions include that all eighteen artists utilize mathematical activity in their work. Some artists indicated that school mathematics was helpful to them with respect to their profession, but a significant number indicated that school mathematics was not helpful to them. These conclusions have implications for how traditional artists learn mathematics and point to a need for educational systems to be more culturally inclusive.

10. Time: 22:33─22:36

    A study of the quechua weaving elaboration process and mathematics teaching in basic education

    Maria del Carmen Bonilla

International Study Group on Ethnomathematics, Lima, PE

The goal of the research is the study, recognition and revaluation of the ancestral mathematical knowledge of the Quechua-collao culture, which underlie the elaboration process of weaving of four stakes loom (WFSL) in order to incorporate them into the mathematics learning process in Intercultural Bilingual Education in Puno, Peru. From the political, anthropological and historical dimensions contributed by the Ethnomathematics, and, considering the epistemological dimension approached from the Anthropological Theory of the Didactic (ATD), the Personal Praxeological Organization (PPO) of the elaboration process of WFSL made by a weaver of Puno is determined, with the purpose of making known elements of his mathematical dimension, so it is a case study. The methodology is qualitative, ethnographic method, field work, participant observation and semi-structured interviews are applied to key informants. Subsequently, the audiovisual records are analyzed from the ATD and, finally, mathematical notions and properties related to the rectangles that are used by the weavers in the process are identified.

11. Time: 22:36─22:46

Discussion

12. Time: 22:46─22:49

Math trail activity on machchhindranath chariot: cultural perspective on mathematics education in Nepal

Toyanath Sharma

Center for Activity Based instruction, nepal, Lalitpur, NP

This article explores about how I have used the Cultural Project-Based Learning (CPBL) to both challenge and opportunity in the field of school mathematics teaching learning activity in the process of transforming Nepalese schooling views and teachers perception towards instruction activities. This research is about the ethnographic case study of one of the schools that is transforming itself from book based teaching learning approach to the curriculum specific child friendly learning process. This paper also explores how CPBL contributed to empower learners by involving them in socially and culturally authentic problems. Thus, I have raised issues of current practices of Nepalese school mathematics. Likewise, I have shared here one fieldwork example of how to empower teachers for teaching learning process in authentic context. However, it is not possible unless teachers are empowered to understand the notion of education as a political act. In this paper I have investigated some practices to achieve the higher objectives of ethnomathematics which are pivotal for establishing harmony, peace, and social justice in Nepal.

13. Time: 22:50─22:53

Ethnomathematical study on cultural artefacts: anethnographic field to classroom practice

Jaya Bishnu Pradhan

Tribhuvan University, Mahendra Ratna Campus, Kathmandu, NP

The implicit mathematical ideas practices and experiences in everyday life of children outside the classroom could be the powerful and interesting pedagogical tool to communicate formal mathematical concepts. The main objective of this study is to explore the ethnomathematical ideas embedded in the cultural artefacts and assess its contribution in the process of teaching and learning of school mathematics. The methodological procedures include in-depth interviews and observation of students and teachers regarding mathematical ideas comprised in cultural artefacts at different moments. The mathematical knowledge hidden in the various cultural artefacts have been analyzed on the basis of written documents, photographs, and video graphs. The findings indicated that the cultural artefacts provide an ample opportunity to understand different mathematical concepts. In addition, students have wonderful learning experience beyond the four walls in the classroom and connect the ethnomathematical ideas to conceptualize formal mathematics.

14. Time: 22:53─22:58

    Discussion

15. Time: 22:58─23:00

    Wrap-Up

Session 3

1. Time: 14:30─14:35

   Welcome and Plan for the Day

   TSG Team Members

2. Time: 14:35─14:55

   Coming together, research and desire in the field of ethnomathematics

   Wilfredo Alangui

   University of the Philippines Baguio, Baguio City, PH

Ethnomathematics is approached from various perspectives and ethnomathematicians have various motivations that define their research activities. This paper applies the notion of a slogan system to ethnomathematics in order to understand and explain how it is.

3. Time: 14:55─15:05

   Discussion

4. Time: 15:05─15:10

   Waka migrations: reclaiming cultural traditions and identity
   Anthony Benjamin Trinick, and Tamsin Meaney
   The University of Auckland, Auckland, NZ
   Ethnomathematics has always had an aim of supporting marginalised groups through colonisation, however, it has not always been easy to know how this could be achieved. In this paper, we use the cultural symmetry model to analyse preservice teachers responses to a task in their mathematics education course about traditional canoe migrations. From this discussion, it was possible to see how the preservice teachers became reflective and question knowledge about mathematics and their own traditions that had been distorted through the colonisation process. The cultural symmetry model seems to have the potential to support Indigenous teachers and students to decolonise how they view mathematics connected to traditional activities.

5. Time: 15:11─15:16

   Exploring mathematics in the eskaya tribe: an ethnolearning theory

   Fe Reston Janiola

   Holy Name University, Tagbilaran City, PH
   This research sought to generate an ethno-learning theory in mathematics by exploring the sociocultural and ethnomathematical practices of the Eskaya tribe of Duero, Bohol, Philippines. Using the ethnographic mixed methods design, this paper explored the mathematics practiced by the Eskaya tribe developed and validate instructional materials that can be used in teaching the Eskaya ethnomathematics, and generated a theory grounded on the data. Through purposive sampling, selected teachers, parents and students from the tribe served as key informants of the study. Data collection took almost a year of observation, lived experiences, documentation, interviews, and quasi-experimentation of instructional materials. The findings were synthesized to constitute the elements of Janiola's Theory and the instructional materials may be used for teaching mathematics among tribal and non-tribal students.

6. Time: 15:16─15:26

   Discussion

7. Time: 15:26─15:31

Ethno-mathematics of banyuwangi culture: bamboo woven

Mega Teguh Budiarto, Rini Setianingsih, Rudianto Artiono

Universitas Negeri Surabaya, Surabaya, ID

Ethno-mathematics refers to various forms of mathematics as consequences that are embedded in cultural activities. Culture-based Mathematics Learning is one of the ways that can be perceived to make mathematics learning meaningful and contextual that is closely related to the cultural community, where the mathematics learned will be applied to the cultural community, as well as interesting and fun mathematics learning. The purpose of this study is to explore ethno-mathematics in living equipment and livelihood systems that are used to review mathematical thought patterns in Banyuwangi culture. This research is a qualitative research with ethnographic approach. Qualitative research is used because researchers intensively participate in the field, note carefully what happened, conduct reflective analyzes of various documents found in the field, and make detailed research reports. The ethnographic approach is used to describe, explain and analyze mathematical concepts on the cultural reality of Banyuwangi. The results of this study are in the form of descriptions of observations and interviews about Banyuwangi woven bamboo.

8. Time: 15:37─15:42

   Towards mathematics curriculum recontextualisation: developing a rhizocurrere with Roma students

   Georgios Kyriakopoulos

   University of Thessaly, Athens, GR

   Students out of mainstream like Roma students often face problems following the mathematics curriculum which is designed without taking into consideration them and this fact contributes to the reproduction of inequalities. This paper suggests indicatively due to the limited layout an activity in the direction of reconceptualization of the Mathematics curriculum through rhizomatic thinking. The aim of the rhizomatic inquiry is to avoid representationalism often inherent in qualitative research and to challenge the dichotomies apparent in Mathematics education. Roma students ideas on parallel and intersecting straight line sections become a smooth space for both knowledge consolidation and application of mathematical knowledge in contexts that allow the restoration of social justice and honor movements against marginalization softening, thus, power relations

9. Time: 15:42─15:52

   Discussion

10. Time: 15:52─15:57

Mathematics as venture for learning and apprenticeship in a collective for the commons

Eirini Lazaridou, Anna Chronaki

University of Thessaly, Volos, GR

The purpose of this paper is to discuss mathematics as a venture for learning and to revisit the pedagogic and didactic relational tensions of apprenticeship in the utopian context of a collective for the commons that evolves in the rural scape of a Greek village during the last decade. Whilst, a turn to commons aims to challenge the neoliberal and capitalist politics of economic austerity in the area, at the same time, it challenges the ways we could open up mathematics education as a venture for learning as has been argued by ethno-mathema-tics and, perhaps, move it further recognizing its embodied, relational and nature-culture entity.

11. Time: 15:58─16:01

An international class in Germany: the need for ethnomathematical considerations

Marc Sauerwein

University of Bonn, Germany

Teaching mathematics in an International Class in Germany differs in many ways from teaching in regular German classes. The (hidden) potentials are often overseen while focusing on the obvious challenges. After a short sketch of selected but crucial characteristics of such a class, this article wants to present aspects from the teaching practice and relates them partly to the ethnomathematics and critical mathematics education framework.

12. Time: 16:01─16:11

Discussion

13. Time: 16:11─16:14

Ethnomathematics in Ethiopia using glocal approach: the case of Gebeta playing

Solomon Abedom Tesfamicael, Anne H. Nakken, Tirillo, Peter Grey

Teacher Education Department, NTNU, Kattem, NO

This article presents how a locally available and accessible activity, a game called Gebeta, can be used to foster understanding of school mathematics via culturally responsive curriculum and instruction in Ethiopia. This is done through the glocal (mix of local and global) knowledge framework. Building culturally responsive learning and

teaching mathematics demands educators to be engaged in searching such activities/tasks/games in the culture (locally) and connect them to the universal aspects of mathematical knowledge(globally) and vice versa.

14. Time: 16:15─16:18

    Ethnomathematics constructs of ibo society in Chinua Achebes "things fall apart".

    Epsi Deme

    University of port harcourt, Port Harcourt, NG

    The study is based on the content analysis of Chinua Achebes book, Things Fall Apart, the book captures the cultural elements of the and the general view of the Ibo in eastern Nigeria. The content analysis of the text shows several constructs that lays credence to the relationship between mathematics and culture. The analysis also showed that an integration of the extracts of novels like things fall apart can be incorporated into the teaching learning setting, as this will help students get a well-rounded view of their culture, society and how mathematical principles are prevalent in virtually all. In the end, it will aid comprehension of these mathematical concepts.

15. Time: 16:18─16:28

    Discussion

16. Time: 16:28─16:30

    Wrap-Up