

## Topic Study Group 52

### Ethnomathematics

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#### 1. Theme(s) and Description

The ‘TSG-52: Ethnomathematics’ examined issues that consider intersections between the areas of mathematics and culture, but also went beyond to create synergies between them. We used “culture” in a dynamic, emergent, living sense to focus attention on both common traditions and understandings practiced by a group as well as how these understandings and practices shift, vary, and change over time. Our goal was to invite provocative critical engagement in the ideas of Ethnomathematics research and pedagogical practices. We explored connections between mathematics, culture, community, politics, and social as well as ecological justice using reciprocal relations while going beyond non-essentialized understandings.

As written in the TSG-52 Invitation, we organized our discussions around the following themes and questions (Rosa et al, 2016):

*Cultural self-confidence and reclamation:* How can ethnomathematics (or ethnomathematical practices and ethnomathematics research) support transformation of educational systems (from exclusion to inclusion) at local and at global levels (toward regaining “cultural self-confidence”)?

*Decolonizing and Indigenizing:* To what extent can ethnomathematics support (or challenge) practices of decoloniality (i.e., challenge how knowledge is constructed across time and place)? How can ethnomathematics be engaged in a political/epistemological level with other systems of knowledge, and in a way that respects self-determination and sovereignty?

*Indigenous education and teacher education:* What role does ethnomathematics play for Indigenous education and what are the social and cultural impacts of these uses for their own communities? What kind of ethnomathematics experiences are needed for indigenous teacher education? What research exists in this area and what have we learned from these experiences?

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*Critical mathematics education:* In what ways does ethnomathematics support a critical mathematics education (as conceptualized by Skovsmose) and the problematizing of mathematics epistemologies and mathematics education?

*Heterogeneous cultural groups:* What can ethnomathematics offer in working with heterogeneous cultural groups (with varied linguistic, ethnic, caste/race diversity) but with access to rich funds of knowledge?

## **2. Program Overview (format, participants, presentations, posters, main outputs, etc.)**

When the submission process of ICME-14 TSGs ended, 37 papers were submitted to TSG-52 ETHNOMATHEMATICS. The rigorous review process was conducted from an inclusive perspective. As a result, 38 papers were approved: 21 long presentations, 13 short presentations and 4 posters. Due to the global pandemic and the move of ICME Topic Study Groups to a virtual environment our final program included 12 long presentations and 6 short presentations.

TSG-52 met over three sessions. Our initial session was divided in two parts. The first part was held by the TSG-52 organizing team, composed by Gelsa Knijnik (chair), Arindam Bose, Cynthia Nicol and Aihui Peng. Unfortunately, our colleague Marcos Cherinda (co-chair) could not attend the meeting. The TSG team welcomed everyone and participant introductions included everyone locating themselves on a world map to emphasize the varied places/lands/ and political spaces of our shared work. Following introductions, Gelsa Knijnik opened the session with a tribute to and acknowledgement of the vast and deep contributions of ethnomathematician Ubiratan D'Ambrosio. Participants were invited to offer memories and experiences with the Brazilian educator on the TSG-52 Padlet (a virtual visual bulletin board that formed the virtual hub of our group). In the second part of our first session Arindam Bose, Tata Institute of Social Sciences (TISS), Mumbai, IN, presented a paper "Revisiting ethnomathematics: another social turn?" to start the TSG-52 discussion.

Each Session began with an Ethnomathematical Riddle posted on our group Padlet where participants could post their responses and strategies such as this Riddle posted on Day 3.

*nau maun guru, nau maun guruayeen, nau maun ke dunno chela, nau maun bhaar naiya sahela, bari-bari paar karela.*

A teacher's weight is nine *maun* (1 *maun* = 40 kg approx.), teacher's wife weighs the same, two students together weigh nine *maun*, one boat can bear nine *maun* at a time, how do they cross the river.

Discussion during our first session included comments and questions focused on how students' school math learning elucidates students' everyday math knowledge; on how drawing upon funds of knowledge as a theoretical framework could overcome the mechanism of scaffolding that can rework local knowledges to be replaced by prescribed curriculum knowledge; and on whether too much school math can erase our practical mathematics?

During our second session ten papers were presented followed by discussion that included questions around the need for clarity in language and terms used, the need to reduce academic jargon, the role and relationships of language, land and mathematics, and the search for ethnomathematical studies of Indigenous North and Central South America.

Session 3 involved the presentation of seven papers followed by discussion questions such as: the future direction of ethnomathematics; the diversity of ethnomathematics indicating the varied ways of being and doing ethnomathematics; the possible reconsidering of ethnomathematics as research programs (plural rather than singular), and the implications for teaching with an ethnomathematical curriculum to counter colonial understandings of school math curriculum.

Below are the titles of the papers, with the name of their respective authors, in the order they were presented during Session 2 and 3 of the TSG (Tab. 1).

Tab. 1. The list of papers presented in session 2 and session 3

<b>Paper and author(s)</b>	
[1]	A framework for examining the quality of mathematics teaching for mathematical understanding in ethnic minority cultural contexts. <b>Aihui Peng</b> (China).
[2]	Ethnomathematics and ethnomodelling research: glocalizing educational systems from exclusion to inclusion at local and global levels. <b>Daniel Clark Orey and Milton Rosa</b> (Brazil).
[3]	The ethnomodelling as a math learning strategy in the Ecuadorian educational system. <b>Juan Ramon Cadena Villota</b> (Ecuador)
[4]	Ethnomathematics as pedagogical and political tool in an Indigenous school curriculum. <b>Vanessa SenaTomaz and Ozirlei Teresa Marcilino</b> (Brazil).
[5]	Mexican American Women talking about Graphs: A focus on their lived experiences. <b>Fany Salazar and Marta Civil</b> (USA).
[6]	Regaining cultural signs through ethnomathematical descriptors: artifacts, sociofacts and mentifacts. <b>Ma. Elena Gavarrete, Milton Rosa, and Daniel Clark Orey</b> (Costa Rica).
[7]	Perspectives of mathematics by traditional P'urhpécha artists. <b>Thomas E Gilsdorf</b> (USA).
[8]	A study of the Quechua weaving elaboration process and mathematics teaching in basic education. <b>Maria del Carmen Bonilla</b> (Peru).
[9]	Math trail activity on Machchhindranath Chariot: cultural perspective on mathematics education in Nepal. <b>Toyanath Sharma</b> (Nepal).
[10]	Ethnomathematical study on cultural artefacts: anethnographic field to classroom practice. <b>Jaya Bishnu Pradhan</b> (Nepal).
[11]	Coming together, research and desire in the field of ethnomathematics. <b>Wilfredo Alanguí</b> (Philippines).
[12]	Waka migrations: reclaiming cultural traditions and identity. <b>Anthony Benjamin Trinick and Tamsin Meaney</b> (Newzeland).
[13]	Exploring mathematics in the Eskaya tribe: an ethnolearning theory. <b>Fe Reston Janiola</b> (Philippines).
[14]	Ethno-mathematics of Banyuwangi culture: bamboo woven. <b>Mega Teguh Budiarto, Rini Setianingsih, and Rudianto Artiono</b> (Indonesia).
[15]	Towards mathematics curriculum recontextualisation: developing a rhizocurrere with Roma students. <b>Georgios Kyriakopoulos</b> (Greece).
[16]	An international class in Germany: the need for ethnomathematical considerations. <b>Marc Sauerwein</b> (Germany).
[17]	Ethnomathematics in Ethiopia using glocal approach: the case of Gebeta playing. <b>Solomon Abedom Tesfamicael, Anne H. Nakken, Tirillo, and Peter Grey</b> (Norway).
[18]	Ethnomathematics constructs of Ibo society in Chinua Achebes "things fall apart". <b>Epsi Deme</b> (Nigeria).

### 3. Future Directions and Suggestions

At the end of the work, the participants showed their satisfaction with what we had accomplished. The variety of topics and the depth of coverage were highlighted. The importance of bringing the papers together in a publication was discussed. In fact, the TSG Team has invited all colleagues who had their papers accepted to contribute to an edited book. This volume work is currently underway with an intended publication date before ICME-15 conference so that copies are available during the conference.

### Reference

- M. Rosa, U. D'Ambrosio, D. C. Orey, L. Shirley, W. V. Alangui, P. Palhares, and M. E. Gavarrete, (2016). *Current and Future Perspectives of Ethnomathematics as a Program*. ICME-13 Topical Surveys. Springer.