

## **Editorial – Special Issue: IndigMEC, Indigenous Mathematics Education Conference**

**Tromsø, Norway, September 4–7, 2017**

The idea of Indigenous Mathematics Education Conference, *IndigMEC*, was to create a meeting place for people around the world who aim at culturally responsive mathematics education. At IndigMEC 2017 in Tromsø, Norway, teachers and researchers from three continents presented their work. In addition we shared ideas in round table discussions. The conference was supported by the Norwegian Research Council's program for Sámi research. One aim of the conference was to contribute to building research networks in the field of Indigenous mathematics education. Another aim was to compare research in the field of culturally responsive mathematics teaching in Sámi schools with similar research among other Indigenous people. The keynote speakers focused on mathematics education among the Māori people of New Zealand, Canada's Mi'kmaq people and the Sámi people of Scandinavia. By highlighting similarities and differences between Indigenous peoples in Canada, New Zealand and Scandinavia, the conference aimed at contributing to enlighten challenges and possibilities for Sámi teachers.

The idea of bringing teachers and researchers together in this conference was born during two workshops for Sámi teachers in 2015, supported by the Norwegian Research Council's program for Research and Innovation in the Educational Sector. At workshop one, the teachers at each school agreed upon a theme they would focus on and at workshop two they presented their work from the intermediate period. After workshop one, Tamsin Meaney suggested that the next workshop could include a Skype meeting with Uenuku Fairhall and Tony Trinick in New Zealand. Due to different time zones, we knew this Skype meeting would be a challenge to the teachers; they had to start the day one hour earlier than usual. All teachers showed up and they experienced this Skype meeting as a success (Fyhn, Meaney,

Nystad & Jannok Nutti, in press). Then the idea of arranging an international conference for teachers and researchers, was born.

One group of workshop teachers presented their work in *Tangenten* (The Tangent), Norway's national journal for mathematics teachers (Fyhn et al., 2016) and they were invited to give a keynote lecture at IndigMEC. The successful Skype meeting with Uenuku Fairhall and Tony Trinick caused an invitation to give a keynote lecture. On Tamsin's suggestion we invited Lisa Lunney Borden to give a keynote lecture about Mi'kmaq mathematics education in Canada, while Ylva Jannok Nutti was a natural choice of a Sámi keynote.

The scientific papers and posters that were presented at the conference underwent a two-step review process. Extended abstracts were reviewed by two other authors and summed up by the guest editor. The second step was a submission of papers followed by a similar review process. The authors then had to submit reviewed papers before the conference and some minor review comments were added. We are very grateful to Journal of Mathematics and Culture's editor Tod Shockey, who offered us the possibility to publish the proceedings in this special issue.

It is a great honor to introduce eight scientific articles and three posters that are outcome of the IndigMEC 2017. Despite the great variety in focus areas and approaches, culturally responsive mathematics education is a common issue. The authors represent three different continents; Australia and Aotearoa/New Zealand, North America and Europe.

The three articles from Australia and Aotearoa/New Zealand focus on different aspects of language related to culturally mathematics education. Piata Allen and Bruce Taplin presents an empiric study from a Māori-medium schooling context, where most students and teachers are second language learners of te reo Māori. Their study shows how the use of ICT software can support language revitalization by providing insight into students understanding and thus discern between mathematical misconceptions and language difficulties.

Cris Edmonds-Wathen provides a critically oriented textual analysis of a mathematics resource for teachers of Australian students whose first language is not English. Her study shows that a discourse of developmental imperatives and incompletely articulated expectations leads to a focus on teaching English language and concepts, rather than on how students' prior knowledge might be used as a resource in a culturally responsive approach. She also give some recommendations for how to improve the resource for Indigenous language speaking students and develop more culturally responsive mathematics teaching. Tamsin Meaney, Tony Trinick and Uenuku Fairhall use Nancy Fraser's (2000) model of social justice in framing a literature review of the use of ethnomathematics and Indigenous languages in the teaching of mathematics in Polynesian language regions. The literature review concerned published research papers and other documents, such as reports and newspaper articles that considered mathematics, ethnomathematics, language policy, vernacular language and bilingualism in these areas. The authors suggest that if education is to be transformed in these Polynesian language regions, more needs to be done to provide opportunities for people to make decisions about education and to have a range of possible examples, not just revamped versions of Western school mathematics found in Western countries, to choose from.

The North American articles deal with analyses of official documents, demonstration of an alternate mathematical practice and an autoethnographical study of a researcher/teacher's professional work. Annica Andersson and David Wagner analyze how numbers are used and not used in two documents from the Canadian Truth and Reconciliation Commission, (TRC). Indigenous children were taken from their families and placed in residential schools since the 1870s and until 1996 in Canada with the aim to "kill the Indian in the child." The TRC was formed in 2008 to provide victims of these schools the opportunity to recount their experiences in a safe and culturally appropriate manner. Andersson and Wagner's analysis is

an example of a culturally situated use of number for rhetorical purposes. The authors aim to identify questions and ways to analyse the documents that may allow university and school teachers to use the documents as a base for teaching mathematics and political mathematical analysis.

Ciarra Greene and Swapna Mukhopadhyay demonstrate an alternate mathematical practice; they provide a thorough description of the construction of North American tipi. Incorporation of the Nehiyawak (Cree) cultural process of mîkiwâhp/tipi construction in mathematics curriculum provides an example of decolonizing mathematics. The paper provides insight into an example of a culturally responsive approach to mathematics. Tod Shockey presents the story of his professional journey in North America; the twenty-five years story of a mathematics educator privileged to work with Native friends. He has chosen an autoethnographical approach. In 1991 Shockey accepted his first opportunity to work as a mathematics educator in a Tribal school in the United States. That experience immediately revealed that he was not prepared for working in a community of which he was not a member. Today he works in higher education with a focus on preparing secondary mathematics teachers, who too are not prepared to work in communities of which they are not a member.

The two Scandinavian papers questions what mathematics to teach in school. Torgeir Onstad' s paper is reflecting on the term ethnomathematics while Jan Henry Keskitalo, Anne Birgitte Fyhn and Kristine Nystad are reflecting on Sámi mathematics. Onstad combines his years of experiences from Africa with the ethnomathematics literature. He discusses the role of language, communication, concepts and culture and enters the debate on ethnomathematics. He consider it vital to study more closely how context may support and may impede the learning of mathematics. Keskitalo, Fyhn and Nystad contribute to the discussion of a need for a Sámi mathematics curriculum by analysing founding documents and the logo of two Sámi institutions for education and research. Jan Henry Keskitalo was the

first and founding rector of Sámi University of Applied Sciences and his access to and knowledge about old documents is crucial for this study to be done. The authors identify cultural properties of the numbers three and four; cultural properties of numbers are not included in the national mathematics curriculum.

The three posters present the development of a new course for elementary teachers in Canada and two Ph. d studies. Kathy Nolan and Shana Graham present a culturally responsive mathematics course at the University of Regina in Canada. Graham and Nolan used the poster session to launch the data collection phase of Graham's research through engaging conference participants in complex conversations about what decolonization of mathematics education could mean. Siv Ingrid Nordkild presents an overview of her Ph. d study of teachers and students' interdisciplinary work with *lávvu*, Sámi tent, and mathematics.

Finally, I would like to thank the editorial board of this special issue for their cooperation and their effort. Tamsin Meaney, Kristine Nystad, Tod Shockey, Tony Trinick and Ylva Jannok Nutti – thanks a lot. And thanks to the authors. I look forward to the next IndigMEC conference.

Tromsø, November 17<sup>th</sup> 2017 Anne Birgitte Fyhn (Guest Editor)

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