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Special Issue on Circumpolar Indigenous Issues, Knowledge, Relations to Education, Science
and Mathematics

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Guest Editorial

Circumpolar Indigenous Issues, Knowledge, Relations to Education, Science and Mathematics

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The idea of compiling and editing a special issue of *Interchange* focused on Circumpolar indigenous issues and knowledge in relation to education, science and mathematics was the result of several visits to The University of Tromsø by the first guest editor (Sriraman) in the period 2008-2010, and participation in the 2009 Symposium *Lessons from Continuity and Change in the Fourth International Polar Year Symposium* at The University of Alaska, Fairbanks. The first editor's exposure to indigenous issues in Alaska began as an undergraduate student and subsequent travels in the American and Canadian Arctic led to a greater awareness of the cultural and political significance of this region of the world. It represented a region of the world with a long present indigenous population that had for over a thousand year more or less sustained its traditional ways of life in spite of interactions with outsiders. However with the advent of colonization, then globalization, and now climate change, the region was increasingly on a collision course with forces from the outside that would determine its future. The second guest editor (Fyhn) had been engaged with the Sámi community in Norway, particularly the mathematics inherent in Sámi weavings and ornamentation. It dawned on us we had a shared interest in Arctic education, particularly issues revolving around math and science in the need to create culturally congruent materials for the indigenous communities present in the circumpolar regions.

Educational and social institutions play a non-trivial role in how the future of the polar regions gets shaped, and we thought it would be of interest to the educational community to learn more about the issues from this region. We proposed the idea of a special issue to Ian Winchester (the editor of *Interchange*) who was supportive of such an initiative. After a year and a half of work on this issue, we are pleased to present five articles that capture an essence of educational initiatives in region in question and bring Inuit, Yup'ik, Athabaskan, and Sámi voices into the fray. The sixth article is a synthesis that tackles the notions of "indigenous" as stipulated by the U.N versus the reality inherent in how the term is interpreted in a world carved by nation-states and vested interests. The journal issue as whole covers topics that include indigenous knowledge, autonomy, educational policy, cultural preservation and developmental issues. The only voices absent in this issue are from arctic Greenland and Russia.

The opening article by Duffy and colleagues tackles the notion of "place based education", i.e., the local context determining what is taught in reform based science, particularly chemistry. This work brings into focus the value of including indigenous perspectives in a non-majors general

chemistry course which covers topics in ice and water resources, genetic engineering, etc, as well as issues at the intersection of land stewardship and chemistry (e.g., uranium mining) in Alaska.

Rasmussen's article entitled "Forty years of struggle and still no right to Inuit education in Nunavut" is provocative because it discusses the erosion of minority rights in an "autonomous" region of Canada, namely Nunavut. Inuit language (Inuktitut) and culture are given value in the legislation in place with rights to language preservation and education, however the reality of the situation is that 10,000 Inuit students do not have the same rights to be educated in their native language as their 40 or so Francophone schoolmates. The data presented in the form of teachers that populate the schools of Nunavut suggests that "settlement" or cultural colonization is still very much a reality for the Inuits in Arctic Canada.

Yup'ik cosmology and epistemology is brought into the light via the ethnographic study of everyday Yup'ik practice. Lipka and colleagues from Alaska demonstrate that notions from proportionality, measurement and symmetry play an important role in the solution strategies used by Yup'ik elders in solving everyday problems, and argue that this provides an alternative pathway to the teaching of geometry and rational number reasoning. We build on the Mathematics in a Cultural Context (MCC) work of Lipka et al., in the fourth article authored jointly with a school principal (Eira) and mathematics teacher at a Sámi school in Kautokeino (Norway). Like the Inuits and Yup'ik, the Sámi are an indigenous people of the Arctic, scattered in Norway, Sweden, Finland and Russia. Through a U.N., resolution, Norway is bound to take care of the Sámi culture and language, and although the Sámi have a curriculum in place, there is no mathematics syllabus! We build on the importance of indigenous measurement concepts in mathematics and explain the unique way in which Sámi treat ratios with three illustrative examples. This particular paper took a substantial time to develop since it required the ability of putting into writing, concepts that are orally described and thought.

The fifth article by Barbaran is more of a technical report that described a developmental cultural preservation project conducted with Athabaskan elders, with the goal of implementation in the Athabaskan villages of Central Alaska. The concluding article (Sriraman) is a synthesis of some themes arising in the five articles discussed in the larger scheme of indigenous issues confronting the world today. The political aspects of the label "indigenous" are discussed as well as topics related to two articles of the 2007 U.N Resolution of Indigenous rights, with implications for the future.

We hope the journal issue stimulates the interest of Interchange readers in circumpolar issues and initiates a larger dialogue on the value and role of indigenous knowledge within education and society.