TSG 44
MATHEMATICS AND INTERDISCIPLINARY EDUCATION

The Organizing Team

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As an outcome of the Topic Study Group "Interdisciplinary Mathematics Education" at ICME-13 in Hamburg, Williams et al. (2016) produced a short "state of the art" of research in this area, including

- a conceptual classification of the general notion of "discipline" as well as the terms used to indicate various degrees of interaction between disciplines, and
- a review of some of the English language research interdisciplinary educational settings which include mathematics in some form (with some cases being presented in higher detail).

We retain in particular that the notions of "discipline" and "interdisciplinarity" are in general quite elusive, and that a great part of the mathematics education literature on "mathematics in interaction with other disciplines" is dominated by case studies which, due to a lack of common measures of the outcomes, are hard to synthesize.

The present group will, as the slight change in title suggests, take a more specific point of departure in mathematics in its current educational and societal shapes, viewed as social realities: namely, mathematics as taught from preschool to higher education, and mathematics as a more widely established set of social practices (such as in academic research) viewed broadly to include also statistics and what is sometimes referred to as "applied mathematics". Our main goal will be to share studies and in-depth cases of the ways in which mathematics currently interacts – or is supposed to interact – with other educational practices, in part reflecting the role of mathematical practices in society at large. For instance, what are current or potential contributions of mathematical theory and techniques to elucidate the "big" questions which are sometimes, perhaps even increasingly, focused on in general education, such as sustainable development, or the roles and forms of digital technologies in modern society? How does mathematics function as preparation for general citizenship, or for more specific professional specializations? To what extension is mathematics taught in a "paradigm of questioning the world", or in a "paradigm of visiting monuments" (Chevallard, 2015)?

It goes without saying that the international scope of the congress should thoroughly permeate the workings of the group, so that we will welcome both case studies from different parts of the world (some of which are insufficiently represented in the main-stream, English language research literature) as well as genuinely "international" studies which try to undertake, for instance, comparisons between practices in parts of the world which differ, for instance, in educational culture, institutional landscape and socio-economical conditions.

To emphasize our focus on "the ways in which mathematics interacts", we have deemed it appropriate to organize the investigation according to fields of knowledge which are largely found in every school system across the world, to situate and study concrete forms of interaction which take into account specific questions and contents (while each subtheme will likely contain studies involving a wide span of educational levels:

Subtheme 1: *Mathematics and the study of nature*: here we consider the ways in which mathematics interacts with teaching and learning of subjects such as physics, biology, chemistry etc.

Subtheme 2: *Mathematics and technology*: interactions with the study and use of technology in a broad sense, comprising digital technologies, technological innovation and engineering

Subtheme 3: *Mathematics and the study of human activity and society*, including business and enterprises, economy, creative fields such as art and music, philosophy, history etc.

We are particularly interested in systematic studies of current practices which involve more than one setting, e.g. several institutions in one society, or similar institutions in several societies. Succinct case studies with clear references to relevant literature are also welcomed. We will strive to create an atmosphere of inclusive, serious scholarship both within the three subthemes and across them, so that there will be separate as well as plenary sessions in the final programme.

References.

Chevallard, Y. (2015). Teaching Mathematics in Tomorrow's Society: A Case for an Oncoming Counter Paradigm. In S.J. Cho (ed.), *The Proceedings of the 12th International Congress on Mathematical Education* (pp. 173-187). Dordrecht: Springer.

Williams, J., Roth, W.-M., Swanson, D., Doig, B., Groves, S., Omuvwie, M., Borromeo Ferri, R. and Mousoulides, N. (2016). Interdisciplinary Mathematics Education: A State of the Art. ICME-13 Topical Surveys book series. Cham: Springer.