National and International Investment Strategies for Mathematics Education

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Mathematics education is an essential pathway for economic security and technological advancement at the national, community, and individual levels. In developed and developing countries, there is an impetus for innovation and improvement of mathematics curriculum and pedagogical practices that meet local and practical needs. Partnership and input from practitioners is essential for policy makers and research funding organizations to navigate the path forward. This ICME13 Discussion Group explored the following global issue: What is the appropriate role of funding agencies, ministries, and related institutions in influencing and advancing improvements in mathematics education research and policy, as well as in facilitating international research in mathematics learning?

The discussion addressed a number of key issues where there are differences internationally, highlighting how much we can learn from examples and organizational structures in various countries. It became clear that different types of organizations—a federal funding agency to “promote the progress of science” (Ferrini-Mundy, U.S. National Science Foundation), a non-profit institute directed toward specific goals that are of economic importance to a country [Zomahoun, African Institute for Mathematical Sciences (AIMS)], a council designed to provide advice to federal and state governments (Prenzel, German Council of Science and Humanities), and a government agency concerned with developing evidence to help guide policy (Ginshima, Japan’s National Institute for Educational Policy Research)—have significant roles in the ecosystem for mathematics education.

Examples were provided of ways that government policy affecting mathematics education is informed, shaped, and furthered through that interconnected system. AIMS is focused on increasing the pipeline of women in mathematics on the basis

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of data and needs for job creation in Africa to counter high unemployment rates. Germany's "Excellence Initiative", which is promoting young researchers, top-level research, and capacity-building in institutions, provides an example of how mathematics education can benefit from being situated within wider government initiatives that have been recommended by distinguished leaders. We learned how assessments undertaken within the Ministry of Education in Japan are helping to shape curricular emphases in schools in mathematics.

By sharing information about this range of intuitions and organizations, arranged differently within different countries, it became clear that several features seem critical in ensuring coordinated impact on mathematics education policy and resources. Those may include: capacity for analyzing and sharing data and evidence in forms that are useful to practitioners, can inform policy makers, and help funders set priorities. It is also clear that when mechanisms for convening respected experts in education and research in structures charged with advising government exist, focus and strategic direction are possible.

Several issues emerged that would clearly benefit from continued international discussion. Those included the role of "big data" in mathematics education research, with concerns expressed about implications for the nature and amount of time devoted to assessments in schools; the need for active attention to translational research that can bring findings to practitioners and policy makers, in meaningful ways; the potential of making progress on shared challenges world-wide through new means of research collaboration, including infrastructures for data sharing; and the importance of making excellent mathematics education available to diverse groups of students, supported by arguments about economic benefits to a country.

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