



## TSG 37 Mathematics curriculum development

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Curriculum concerns what we want some or all students to learn, and when we want them to learn what we want them to learn; it is the heart of mathematics education. *Curriculum development* involves the design of curriculum materials, planning and overseeing their implementation, and testing their efficacy.

Curriculum development may be managed by countries, by school districts, by research and development projects, by commercial publishers, or by enterprising individuals interested in broad distribution, or by individual teachers in their classrooms. It can include the development of coordinated sets of problems, lessons, units, or courses.

In this TSG, we desire to share and discuss (1) policy, (2) design and practice, and (3) research on curriculum development throughout the world. We ask participants who are interested in contributing to the sessions to send brief (1-2 pages) or extended papers researching, reporting, or commenting on recent or current curriculum development efforts in their part of the world or in which they have been involved or interested. Papers may address any of the following topics and questions or other questions participants deem to be relevant to curriculum development. These papers will serve as stepping-

off points for discussion in the four 90-minute sessions devoted to this TSG, and some authors may be asked to prepare an oral presentation.

### **Topic 1: The Status of Curriculum Development**

1. Who is developing mathematics curriculum now, where, and for whom?
2. What are the major reasons for this effort?
3. Is the curriculum being developed according to a national plan, or is its source more local? What curriculum or curricula is this effort designed to improve or replace?
4. What are the roles of various groups in the curriculum development: parents, mathematicians, mathematics educators, learning theorists, politicians, the general public?
5. For what grade level(s) is the curriculum being created? If not for all students, then for which students?
6. Have intra-country evaluations and/or international tests influenced mathematics curriculum development and is there debate about that?

### **Topic 2: The Governing Principles**

The design of curricula may follow research or beliefs about mathematics, about the purposes of schooling, about learning and the learner, and about the nature of good teaching/learning materials within the socio-cultural realities of communities, schools, teachers, and learners.

1. How has this or other curriculum development in your area of the world been influenced by particular beliefs about learners or about the nature of good teaching/learning materials?
2. What socio-cultural or other realities that affect curriculum development are perceived as special or unique about your region?
3. Has curriculum development in your area addressed issues of equity, social justice, and individual differences addressed and, if so, how?
4. Listed are some areas in which there have recently been significant movements in mathematics content. In which of these areas (if any) has there been major mathematics curriculum development in your area, and how might these changes be described?
  - (a) statistics
  - (b) computational mathematics
  - (c) early (before grade 5 or age 10) algebra
  - (d) connecting traditionally unrelated branches of school mathematics, "connected mathematics"
  - (e) replacement of traditional arithmetic and algebra paper-and-pencil algorithms by calculator and/or computer
  - (f) mathematical modeling, "realistic mathematics"

- (g) other areas of significance in the curriculum development in your region
5. Have the answers to the above questions changed in recent times and, if so, why and how?

### **Topic 3: The Development Process**

Ideas are only as good as the quality of the learning environment in which they are implemented. Curricular materials are a key variable in that quality.

1. Who is (was) doing the work of developing the actual curricular materials?
2. How much freedom are (were) these people given in carrying out their work?
3. How much time is (was) given for the development?
4. What mechanisms, if any, are (were) there to ensure the validity of the mathematics and the quality of the materials created?
5. Are there aspects of the development process that might be unique to your country or region?
6. What aspects of the materials created do you consider to be the most interesting and could be described and shown in this session?

### **Topic 4: Implementation and Testing**

1. How are new curricular ideas tried out before being considered for wider implementation?
2. How is the efficacy of curricula assessed?
3. Does research on classroom transactions influence curricular policy or design?
4. How have curricula fared with differentiated aims for children from different socio-cultural backgrounds or those assumed to have different 'abilities'?
5. What process is in place to improve the materials on the basis of the testing?

### **Topic 5: The Future of Curriculum Development**

In the digital age, curriculum resources are widely available. Technology also has given us new platforms for developing materials and new ways of interacting with any materials that are developed. If time permits, we wish participants to discuss how curriculum development may evolve in the near future.