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CONFERENCES

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The Commission for the Study and Improvement of Mathematics Teaching – CIEAEM 64

CIEAEM 64 conference took place in Rhodes, Greece on 23-27 July 2012. It was organized by the Department of Sciences of Preschool Education and of Educational Design, Faculty of Humanities of University of the Aegean.

Topic of the conference

The theme of the conference was "Mathematics Education and Democracy: Learning and teaching practices". In the discussion paper of the conference the notion of democracy was defined and how that notion can be transferred into mathematics education:

> (...) globalization determines in a new way the notion of democracy in society, raising questions about the complexity of national political systems and their relationship with global, economic forces, challenging local assumptions about culture, identity, and the importance of specific mathematical skills for a given curriculum, and even requiring any study of democracy to include a self-critique of the cultural assumptions and traditions that inform our working hypotheses about the potential and limitations of democracy as an ideal form of social organization (Kafoussi, Skoumpourdi, Kalavassis, 2012, p. 9).

The conference theme was further expressed by the following topics:

1. Democracy in mathematics curriculum: How does school mathematics contribute to critical thinking and decision-making in the society?
   - What are the values of a democratic mathematics curriculum?
   - What are the goals and the contents of a democratic mathematics curriculum?
   - What is the nature of the relationship between mathematical knowledge of the workplace settings and in life contexts in general and school mathematics?
   - How can the new technologies help the design of a democratic mathematics curriculum?
2. Democracy in mathematics classroom practices: What kind of mathematics classroom practices would enact a particular set of humanitarian values (e.g. social justice, respect and dignity)?
   - What kinds of learning environments are needed to promote a democratic access to mathematical ideas for all students?
   - What is the nature of the critical process into which learners must be initiated?
   - What are the forms of a democratic discourse in the mathematics classroom?
   - What values are students expected to learn?
   - What are the criteria for assessment?
3. Democracy in mathematics teacher education:
   - What understandings, values and strategies do teachers need in order to promote democracy in mathematics classroom?
   - What are the characteristics of a (pre-service or in-service) teacher education program for democracy in mathematics classroom?
   - How does collaboration among policy-makers, mathematics educators, researchers and teachers support this goal?
4. Democracy in research on mathematics education:
   - How can mathematics educators more effectively act as "public Intellectuals" within democracy, enabling a democratic public education about and with mathematics education in the public sphere?

- What are the criteria for a critical assessment of research theories and methodologies?
- How does a "local" theory affect the researchers' theory building?
- How can democracy enact a democratic discussion about mathematics education issues that is informed by research and practice?

Conference activities

CIEAEM 64 conference consisted of various forms of presentations, including plenaries, working groups, workshops, forum of ideas and a special session. The plenaries were the following:

1. Ole Skovsmose: *Mathematics Education and Democracy: An on-going challenge*;
2. Koeno Gravemeijer: *Aiming for 21st Century Skills*;
3. Corneille Kazadi: *La démocratie en éducation les mathématiques: Terreau propice pour la démocratie*;
4. Anna Chronaki: *Women, mathematics, technology and other dangerous things: A gendered reading of development as the quality/equity discourse.*

The working groups were organized according to the four topics mentioned before; there were six workshops, four fora of ideas and a special session by Theodore Chadjipadelis entitled: "Misconceptions and misunderstandings. Can statistics education improve democracy?". In this session, the role of statistics was examined in relation to the elections, which are at the heart of democracy. Chadjipadelis mentioned examples on polls that take place prior to elections, exit polls, sampling (choice of sample) and questionnaires. The main idea was that all these tools can be used or misused (intentionally or not), eventually because the statisticians rely more on some pre-determined models than their own interpretive ability. These are some of the conclusions drawn by Chadjipadelis (2012, pp. 98-99):

- Learn as much as you reasonably can about the general subject matter field and the specific environment in which the data were collected;
- As part of this effort, statisticians need to probe, be curious, and ask good "non-statistical" questions;
- Correlation measured from an observational study does not imply causation.

Confusing correlation and causation is particularly troublesome in the social sciences;

- The real problem is often different from the one initially posed;
- An empirical approach is sometimes better than a theoretical one;
- Scientific logic is our business. Statisticians can often be most helpful by getting perspective on all aspects of a particular problem and then contributing ideas related to scientific method;
- Try to understand what is really going on;
- Valuable data are sometimes non-numerical;
- Scientific inference is broader than statistical inference.

Issues raised

The five days of CIEAEM 64 contained a wide variety of approaches in all the aforementioned themes. It was stressed that there is a significant gap between what and how students learn at school and what modern society demands, which is flexibility, creativity, problem solving, life-long learning and complex communication skills (Gravemeijer, 2012). The rapidly-changing information society affects also our roles as learners and citizens, creating new boundaries and offering us numerous possibilities. In such a world, mathematics education plays – or is expected to play – a highly significant role in educating a reflective, responsible and democratic citizen. Mathematics, either in the form of "techno-mathematics" (i.e. mathematics applied in the workplace) (Hoyles and Noss, 2003) or as a tool to model our reality (aided by powerful dynamic computerized tools) plays a major role in modern society. Concerning the relationship between mathematics education and democracy, it was noticed that it is hard to see it in the school mathematics tradition (Skovmose and Penteado, 2012), where:

(a) most (if not all) activities are defined by the authorized textbook;

(b) the information contained in these activities should not be questioned;

(c) learning mathematics is considered equivalent to eliminating errors;

(d) students' performance is evaluated solely by the teacher.

Thus, in order to establish connections between mathematics education and democratic ideals one has to consider approaches related to critical mathematics education, where the notions of equity, inclusion and culture (through ethnomathematics) come to the fore. An important feature of (mathematics)

education has to do with creating opportunities in life, thus adding new elements to the students' foregrounds (Skovmose and Penteado, 2012). In other words, the educators should not focus merely on the students' backgrounds to decide what is meaningful (thus interesting) for them, but look ahead, in their foregrounds and in all possibilities that students' intentions could be directed towards:

> Working for a mathematics education in such perspective means facing a range of challenges. All of them almost too difficult. Naturally, it need not be presuppose that democracy is well established in society, in the educational system in general, nor in the school environment in particular. In fact it is relevant to work for democratic ideals in contexts where there is no democracy in sight. Mathematics education concerned about democracy is a challenge, and one can face this challenge in all situations and in all contexts. Certainly there is no guarantee for any success. But there are concrete things to work for in order that "this could also be for me" is experienced through mathematics education by more and more people.
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> A mathematics education for democracy is an on-going challenge, and also an on-going challenge for itself. What such an education could mean is an open question without any specific answers in sight. Thus, we always have to keep in mind that "democracy" is an explosive concept (Skovmose and Penteado, 2012, pp. 26-27).

Polish participation

In the conference over one hundred participants took part, among them two representatives of Poland: Bożena Maj-Tatsis and Marta Pytlak from University of Rzeszow. They presented the following talks:

- Marta Pytlak, Bożena Maj-Tatsis, Konstantinos Tatsis: *Analysing students' definitions of geometrical concepts*;
- Konstantinos Tatsis, Bożena Maj-Tatsis: *Assessing pre-service teachers' works in realistic Mathematics*.

Conference proceedings

The conference proceedings are included in a special issue of the International Journal for Mathematics in Education, Volume 4, 2012.

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