Professional Development of Mathematics Teachers - Research and Practice from an International Perspective

Organised by
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Abstract. The Oberwolfach Workshop on “Teachers Professional Development” gathered a wide spectrum of topics of international research and practice in the field of mathematics education. Well-known researchers from all over the world explored the theme from various angles and with different emphasis ranging from theoretical and conceptual perspectives to empirical interventions.

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Introduction by the Organisers

The workshop Professional Development of Mathematics Teachers - Research and Practice from an International Perspective, organized by Kristina Reiss (Ludwig-Maximilians-Universität München), Alan Schoenfeld (University of California, Berkeley) and Günter Törner (Universität Duisburg-Essen) was held November 11th–November 17th, 2007. The meeting was attended by more than 40 participants with broad geographic representation from all continents. The researchers were mostly mathematics educators, some research mathematicians as well as colleagues working in the field of psychology and education. Due to the different backgrounds, the talks presented a variety of views on professional development and provided broad conceptual and theoretical information. The presentations were scheduled for half an hour and led to intensive discussion afterwards. Further, the workshop was organized around the following subtopics: aspects of professional development in general, examples for “best practice”, perspectives on teaching and learning, various themes in the field of professional development, teaching and teacher education. It consisted of thirty-seven talks encompassing the aforementioned areas.
Our meeting started with talks regarding aspects of professional development in general. One of the organizers gave an overview on theoretical and practical issues of teachers’ professional development (Alan Schoenfeld). The following talks were concerned with conceptual aspects (Martin Simon) and issues of effectiveness (John Mason). The next session was dedicated to examples of “best practice”. First, some basic mathematical assumptions in teacher education were outlined (Rina Zazkis), second “best examples” from various countries were presented. That is, two professional development initiatives in Germany were pointed out (Peter Baptist, Bettina Rösken), one from Canada (Sharon Friesen), followed by information about the tradition of mathematics teaching in Hungary (Ódön Vansco).

The next subtopic was perspectives on teaching and learning. Since the focus of the first day was on qualitative studies, these talks were primarily concerned with quantitative approaches. The presentation of a quasi-experimental design regarding the effect of an in-service teacher training on students’ achievement (Kristina Reiss) was followed by information about the COACTIV project, a study elaborating on the professional knowledge of German mathematics teachers (Werner Blum). In the afternoon, the use of different media as a tool to investigate in the field of teacher education was introduced (Miraim Sherin, Aiso Heinze, Jürgen Richter-Gebert and Hans Georg Weigand) as well as some general thoughts about teaching mathematics in the classroom (Abraham Arcavi and Klaus Hoechsmann). The talks on Wednesday discussed several approaches to initiate professional development of teachers. First, a model to describe professional growth was presented and applied to the use of video within teacher development programs (David Clarke). The next contributions described how institutional changes inspired and catalyzed practical changes and theoretical progress in the French system of teacher education (Michele Artigue) and how teachers and didacticians can work together as practitioners and researchers in a co-learning inquiry model. One of two parallel talks called attention to awareness of teachers for their decisions in complex situations and the (possibly less aware) basic assumptions that guide them (Chris Breen). The other one introduced a case study describing the journey of a Taiwanese teacher towards the teaching of mathematical modeling (Kai-Lin Yang).

On the fourth day of the workshop the first talk gave an overview of mathematics teacher education as a field with two aspects, practice and research, that gained contact in the recent years, (Konrad Krainer), followed by a report on a large teacher education project that incorporated and combined both aspects consistently (Malcolm Swan). The next talk on professional knowledge of mathematics teachers and the related TEDS-M study presented current quantitative research in the field (Gabriele Kaiser). The end of the morning formed a case study with two elementary teachers and their approaches to mathematical modeling and problem solving (Lieven Verschaffel). In the afternoon, a three-hour workshop challenged the participants to deal with professional knowledge, particularly with those aspects of mathematics teachers’ knowledge that is distinctive for their profession.
(Dina Tirosh, Tommy Dreyfuss). In a parallel session, a special aspect of professionalism, the identity as a mathematics teacher, was focused, presenting the results from a study with ten experienced teachers (Fulvia Furinghetti). A second parallel talk introduced the approach of "lesson study" as a means to assure and improve quality in Japanese mathematics classrooms (Makoto Yoshida). The last contribution of the day dealt with the mathematical part of teacher knowledge, described by the model of "mathematical knowledge for teaching" (Hyman Bass).

A final discussion formed the official end of the workshop. The last day, Friday, was reserved - and widely used - for informal discussions based on the large number of ideas and concepts presented during the week.

Additionally, three working groups were offered in the evenings: Alan Bishop invited the participants to work on values in education and a group around Barbara Jaworski focused on the roles of teachers and teacher educators, both as professionals and learners within the context of teacher education. The third group, organized by Aiso Heinze on Wednesday and Thursday, dealt with the notion of pedagogical concept knowledge of teachers and discussed possible item formats to measure this construct. During the week, there were also several informal sessions and lively group discussion. On Monday evening, we celebrated a birthday reception in honor of the 60th birthdays of two of the organizers. Wednesday afternoon, the excursion gave us an opportunity to experience the first snow of the year during a walk to Oberwolfach-Walke. Of course we did not miss the opportunity to taste some of the famous local cake.

The workshop provided a good overview on professional development and substantial information where the field is currently located. The different strands that were presented gave an impression of the diversity of the field. This research area is characterized by multiple perspectives leading to partial conceptual diffuseness, and sometimes seems to lack an overarching research-based theory. Due to cultural diversity, it is usually almost impossible to agree on the different notions and, what became obvious, we need cultural awareness to deal with this problem. One prerequisite for this awareness is the possibility to discuss concepts and notions in a stimulating and constructive atmosphere. The meeting was one attempt to provide an appropriate opportunity. It was fruitful and informative, brought people together although we could have ended in more concrete collaborations for ongoing research. Unfortunately, the railway strike had an effect on our meeting. We felt impelled to bring forward the talks announced for Friday in order to give all participants the opportunity to present their results. Though this was possible, it resulted in a tight schedule and there was less time for informal discussions than we could have filled - which is of course a regular experience for workshops like this one.

The contributions to this report are extended abstracts of most talks. In cases where the extended abstracts could not be submitted in time, we included the original (shorter) abstracts provided in advance of the meeting.
We would like to thank the Oberwolfach Institute, its director and the staff for a perfectly organized week that enabled an intensive and inspiring meeting concerned with mathematics teachers’ professional development.