Educating the Educators II

Conference on international approaches to scaling-up professional development in maths and science education

7–8 November 2016 in Freiburg, Germany

(including an Early Career Researchers' Day on 9 November 2016)

Call for proposals

Dear Colleagues,

We are pleased to send you this call for proposals for our upcoming, unique conference: 'Educating the Educators – international approaches to scaling-up professional development in maths and science education II'. This conference follows on the great success of the first one we hosted on this topic in December 2014 in Essen, Germany. Almost 200 researchers, policy makers and practitioners participated in the first conference where together, we identified the need to continue working on the scale-up of professional development (PD) for educators in mathematics and science.

The conference board welcomes contributions (in English) to this event and invites you to submit proposals for research or practice-oriented contributions (paper presentations, discussion groups, posters) to be given during the conference.

The European project mascil (mathematics and science for life!, www.mascil-project.eu) and the DZLM (German Centre for Mathematics Teacher Education, www.dzlm.de) are pleased to host the conference. The DZLM is an initiative of, and funded by, the Deutsche Telekom Stiftung (a leading corporate foundation in Germany – www.telekom-stiftung.de/en). Project mascil has received funding from the European Union's 7th Framework Programme. Event supporters are the University of Education Freiburg and the Technical University of Dortmund.

Date: 7–8 November 2016 (including an Early Career Researchers' Day on 9 November)

Location: University of Education Freiburg, Freiburg, Germany

The **deadline** for submission of proposals (paper presentations, interactive sessions, posters) is **Friday, 16 April 2016.**

To submit your proposal and for regularly updated information about the conference please visit http://educating-the-educators.ph-freiburg.de. For details on the conference dimensions and proposal guidelines, please read the information on the following pages.

We are looking forward to receiving your contributions and to seeing you at the conference.

With kind regards, the conference board:

Prof. Dr Katja Maaß — mascil | University of Education Freiburg, Germany
Prof. Dr Susanne Prediger — DZLM | TU Dortmund University, Germany
Mag. Diana Wernisch — mascil | University of Education Freiburg, Germany

Pädagogische Hochschule Freiburg
Université des Sciences de l'Education · University of Education

Freiburg Advanced Center of Education

Conference overview

Aims and dimensions

This is the second international conference specifically devoted to the topic of educating the educators in mathematics and science education, such as teachers, teacher educators, the educators of teacher educators, as well as multipliers and institutions engaged in teacher professional development. The topic is treated in particular in relation to disseminating innovative teaching approaches like inquiry-based learning. Scaling-up professional development is a specific challenge for disseminating on large scale which involves qualifying the multipliers.

Building on the results of the first conference on this topic, Educating the Educators II will serve as a lever and platform for international exchange about concepts and experiences. The aim is to present and discuss different approaches which ensure a high quality of the education of educators:

- **Personal dimension**: Which roles, contents and activities have to be considered in the PD for facilitators (in professional learning communities and in the multiplier concept)?
- **Material dimension**: Which role can materials play in professional development for math and science teachers (classroom materials, face-to-face PD materials and e-learning PD materials)?
- **Structural dimension:** How to establish adequate systemic project designs for scaling up and their evaluation (like e.g. in mascil or other professionalisation projects)?

Innovative formats

The conference will use innovative and interactive formats to help bring out the specific benefit of gathering a circle of participants from research, practice and policy. Vivid exchange will be ensured by:

- discussion groups and innovative research – practice interactive sessions with different stakeholder groups
- a materials market allowing participants to exhibit interesting professional development materials (including classroom materials) and learn about other materials.
- keynote lectures held by Alan Schoenfeld (Berkeley, US), Malcolm Swan (Nottingham, UK), and Olaf Köller (Kiel, Germany)
- poster sessions and oral presentations in the three dimensions to report on projects, approaches and research

Particular conference features will be:

- contributions on scaling-up PD from teacher educators, teacher education researchers, teachers and multipliers
- a special, half-day policy seminar on overcoming challenges in scaling-up teacher PD – researchers and practitioners engage in mutual exchange with policy makers
- involvement of the evolving STEM Professional Development Centre practice network
- Early Career Researchers' Day (9 November 2016)

Target groups

Teacher educators and researchers, multipliers and relevant networks, educators of multipliers and teacher educators, policy makers, teacher professional development centres, maths and science education support centres, presidents and representatives of PD institutions, teacher associations and relevant networks, as well as policy makers in the field of math and science education.

Organisational structure of the conference

Conference chairs

Katja Maaß (mascil | University of Education, Freiburg, Germany)
Susanne Prediger (DZLM | TU Dortmund University, Germany)
Diana Wernisch (mascil | University of Education, Freiburg, Germany)

Organisation committee

Elena Schäfer (mascil | University of Education, Freiburg, Germany)
Thomas Lange (DZLM | Humboldt University Berlin, Germany)
N.N.,TU Dortmund University, Germany

Programme committee

The programme committee will support the conference chairs with scientific and conceptual advice when selecting proposals to assure a high relevance and scientific quality of the conference and possible subsequent publication(s). Members of the programme committee are:

Bärbel Barzel (DZLM | University of Duisburg-Essen, Germany)
Karen Reitz-Koncebovski (mascil | University of Education Freiburg, Germany)
Bettina Rösken-Winter (DZLM | Humboldt University Berlin, Germany)
Marta Romero Ariza (University of Jaén, Spain)
Ragnhild Lyngved Staberg (University of Science and Technology, Norway)
Vincent Jonker (Utrecht University, Netherlands)

Venue and accommodation

The conference will be held at the University of Education Freiburg, Germany. If travelling to the conference by plane, nearby airports are in *Frankfurt* (direct train connection from the airport, about 2 h to Freiburg), *Basel* (1 h bus transfer to Freiburg) and Stuttgart (about 2 h, changing trains at least twice). Freiburg is also situated on major motorway and rail routes.

The conference board is arranging for a contingent of reserved rooms at hotels in Freiburg for participants. We will provide a list of hotels with such contingents at the time of the registration deadline on the conference website http://educating-the-educators.ph-freiburg.de/. Please note: participants are responsible for making and paying for their own travel and accommodation arrangements.

Registration & fees

You must register to attend the conference. The registration form will be available from 1 June 2016 until 21 October 2016 on the conference website http://educating-the-educators.ph-freiburg.de/

The fee to attend the conference will amount to approximately €100.

Important dates

Submission of papers, posters and contributions for the materials market: 16 April 2016
Author notification: 20 June 2016
Conference registration begins: 01 June 2016

Conference topics

Keynote speakers

Three prominent and excellent keynote speakers will provide high-quality contributions on different approaches to scaling-up professional development in math and science education.

Alan Schoenfeld (University of Berkeley, US) on *What counts in professional development, and can we conduct PD at scale?*

Malcolm Swan (University of Nottingham, UK), on *Problem solving, professional development and systemic change*

Olaf Köller (Leibniz Institute for Science Education, Germany) on *Teachers professional development: Lessons learnt from a large-scale German PD programme*

We kindly invite you to submit your proposal(s) addressing one of the following conference topics:

Topic 1: Personal dimension of educating facilitators: Roles, content and activities

This topic will address two models of face-to-face professional development courses that are used to reach a large number of teachers with innovative approaches, such as inquiry-based learning, or deal with heterogeneity. In the *pyramid model,* engaged teachers or researchers are qualified to become facilitators, who then go on to support other teachers in PD courses. In the second model, teachers themselves organise *professional learning communities* in which one teacher takes the role of a facilitator. This topic examines both models and aims to – amongst others – draw links between them.

The pyramid model and learning communities have proven efficiency and effectiveness within various contexts and projects. However, educating multipliers poses considerable challenges inherent to the specific requirements of the multipliers' dual role. Multipliers act as experts in some subject-related content, and at the same time, as professionals in adult education. Therefore, qualifying multipliers has to cover both of these requirements. A consideration with learning communities is that these often lack external input.

The topic focuses on key questions, such as (examples):

- What are the differences between multipliers and facilitators? Can we consider both ways of providing PD as two opposing ends of a large variety of professional development courses? How can we combine the two approaches?
- What are the features of successful concepts for educating multipliers? Which pitfalls have to be avoided?
- How can we address and handle cultural factors, such as national specifics in how teachers cooperate at school – or not, or common classroom culture?
- What are the needs and experiences of the different target groups: Educators of teacher educators, teacher educators themselves, facilitators of learning communities and teachers in their everyday classroom practice?
- What are the pre-conditions for setting up self-sustaining learning communities? How can we ensure sustainability?
- What are the requirements for learning community facilitators? How can teachers be educated and prepared to take on the role of learning community facilitators in their schools?
- Can such support be a means of providing learning communities with needed external input?

Topic 2: Material dimension of educating teachers and facilitators: The role of classroom and PD materials and tasks

Carefully designed classroom tasks and materials can be powerful tools for enhancing the quality of maths and science teaching, influencing the classroom culture and fostering students' learning. In the process of developing a task culture and implementing good material in classrooms, a *spiral model* of professional development has proven to be efficient and effective within various projects (e.g. EU projects LEMA, COMPASS, PRIMAS or the German DZLM project PIKAS). In the spiral model, teachers actively experience the innovative approaches in continuing cycles of analysis – implementation – reflection. After gaining some experience, professional learning communities are able to develop their own tasks. This process ensures shared ownership of tasks, and thereby facilitates their use.

Furthermore, PD in the *spiral model* requires appropriate materials designed for a learning community's facilitator or multiplier to use with their work with teachers. These PD materials can also be realised in the form of e-learning materials, as innovative technologies enable new approaches and powerful possibilities for collaborative, learner-centred and research-oriented learning with flexible access. Materials for blended learning need to be a combination of those used in face-to-face learning and in e-learning.

Proposals of paper, poster or materials presentations within the scope of this topic will address some of the following questions (examples):

- What are the quality criteria for the design of materials for classrooms and/or PD? What are the features of materials for classroom and/or PD that are suitable for promoting IBL and/or more closely connect science and mathematics learning to the world of work?
- How can the design of materials meet the affordances out of education systems and policy context? How can constraints for the flexible design of materials be overcome?
- Which factors promote or impede the implementation of innovative materials in practice?
- How can self-explanatory materials be designed that have large potential for scaling-up?
- Which features do excellent e-learning materials have? How can existing PD materials be modified and adapted for use in an e-learning environment?
- How can e-learning support be tailored to the needs of the target groups? What do suitable tools for self-assessment, monitoring teachers' success or evaluation of users' experience with the e-learning environment look like?
- How can engagement and sustainability in virtual learning communities be ensured? Can a virtual learning community be as effective as one that meets in the same physical space?
- What are the needs and experiences of the different target groups: Teacher educators, facilitators/instructors of e-learning forums and/or virtual meetings and teachers using e-learning support?
- How can we successfully combine face-to-face learning with e-learning?

Topic 3: Structural dimension – Systemic project designs for scaling-up and their evaluation

When aiming at improving STEM education and large-scale teacher professional development, different project architectures are possible. This topic will focus on the specific design of projects and initiatives that aim at scaling-up the implementation of innovative, research-based approaches to mathematics education (e.g. also nationwide centres, such as the DZLM in Germany) and will take into account their contextual framing (such as curriculum, assessment, relation between policy and professional development, school context).

For example, we can educate facilitators who in turn carry out professional development courses on a large scale. One can either ask individual teachers for participation or only whole schools. The materials for these courses can be provided either centrally or by the individual facilitator. Another possibility for supporting professional development is to involve teachers in small, action research projects. Other projects work with regional and national centres that have the responsibility of supporting innovation in their region.

In any case, these initiatives must provide both scaled-up professional development activities and sustainable structures for supporting cooperation between different stakeholders, while also taking contextual factors into account.

Proposals of papers or posters in this topic will address some of the following questions (examples):

- What can a design of an initiative aiming at a widespread implementation of innovative teaching and for scaling up professional development look like?
- Which structures prove to be effective in which cultural context? Which do not?
- What challenges remain to be overcome even if such initiatives gain traction?
- What adaptations need to be made for PD approaches when implementing them in different project designs?
- What adaptations need to be made for project designs when implementing them in different countries with their different institutional and cultural contexts?
- How can we investigate empirically the impact of different project designs?

Proposal submission information

Overview on formats with call for submissions

Proposals for active participation to the conference can be submitted for the following formats:

- oral presentation sessions in the three dimensions to report on projects, approaches and research,
- poster sessions and
- materials market, allowing participants to exhibit interesting professional development materials (including classroom materials) and learn about other materials.

Please carefully read the submission guidelines to ensure meeting the requirements for each of the formats.

Submissions for oral presentations

The conference aim is to provide a platform for exchange among research *and* practice on the successful implementation of innovative teaching concepts and experiences on and with 'educating the educators' and the scaling up of professional development.

Accordingly, we welcome a range of different formats and high-quality contributions addressing issues of approaches to scaling-up professional development in maths and science education from different countries. We welcome 20 minute oral presentations (plus 10 minutes discussion time) of research-based papers, as well as practical reports or demonstrations (e.g. a simulation of a professional development situation, demonstration of materials, demonstration of e-learning support platforms).

It is essential that your proposal clearly refers to one of the main topics of the conference:

- **Topic 1: Personal dimension** of educating facilitators:
  Roles, content, and activities
- **Topic 2: Material dimension** of educating teachers and facilitators:
  The role of classroom- and PD-materials and tasks
- **Topic 3: Structural dimension** – Systemic project designs for scaling-up and their evaluation

Your proposal should outline:

(1) How it relates to the overall conference theme;

(2) From which perspective (e.g. country-specific, target group-specific) it will address the topic;

(3) How it relates to one of the conference topics (brief outline of the content and subject matter of your planned presentation/input); and

(4) Which of the questions (exemplarily) raised in the topic descriptions you will address.

In addition, you are requested to (5) clearly provide a description of the format you intend to use.

Proposals should be precise, and include sufficient details and references for a critical review. Please keep in mind when planning/writing your proposal that it should also address the underlying purpose of promoting more meaningful and motivating science and mathematics learning.

The length of the proposal must be **two pages**, including some references, excluding a cover page. A template is provided at the website (http://educating-the-educators.ph-freiburg.de/). Eventual submission will be through an online form that will be provided from 21 March 2016 onwards.

Strict deadline for submission will be **16 April 2016**.

The programme committee will review all submissions.

Authors will be notified by 20 June 2016 at the latest.

Submissions for posters

All guidelines for oral presentation submissions apply for poster submissions as well, with one addition: Poster contributions for the exhibition and poster session during the conference may relate to one of the three conference topics *or* present the work of professional development and support centres, networks, institutions or projects with relevance to the overall conference theme.

Relevant professional development and support centres are particularly invited to present their work using posters (the conference will ensure that a platform for exchange among such institutions is provided).

A poster proposal should thus outline:

(1) How the poster relates to the overall conference theme;

(2) The work to be presented on the poster (who, what, etc.);

(3) From which perspective (e.g. country-specific, target group-specific, stakeholders, supporting institutions) it will address the topic; and if relevant,

(4) How the poster relates to one of the three conference dimensions (topics) (if not presenting work of a professional development institution)

You should prepare your poster for presentation at the conference in portrait format – and we strongly suggest using at minimum 23" x 33" (59cm x 84cm).

The text of your proposal for poster should be **a maximum of two pages**. You may use one additional page for such items as diagrams, figures and references etc. You must submit your proposals using the mandatory template provided on the conference website at: http://educating-the-educators.ph-freiburg.de/ via the website tool (from 21 March 2016).

Strict deadline for submission will be **16 April 2016**.

The programme committee will review all submissions.

Authors will be notified at the latest by 20 June 2015.

Submissions for the Materials Market

A Scientix workshop will present the Scientix platform, opportunities and its database of materials (30–45 min). Participants will learn about the services and opportunities offered by Scientix (workshops, conferences, translation on demand) and get an overview of the Scientix database that contains a large number of STEM materials (classroom materials, PD materials, reports and guides) that were developed in the course of international projects. We particularly invite teachers, teacher educators, teacher associations, PD Centres and European projects in the area of STEM from across Europe to this session since they are important actors in ensuring that teachers in local settings get to know internationally developed materials.

A materials market (60 min) will follow this presentation and allow attendees to look into a broad range of PD materials and classroom materials supporting PD in the area of STEM (primary,

secondary and vocational education) exhibited by European projects, educators and PD course participants in maths and science education.

The materials market will continue as an open exhibition and forum for all conference participants. An accompanying poster exhibition will display current developments in scaling-up teacher professional development in STEM education.

If you want to participate in this market as an exhibitor, please send in the following information:

- What kind of materials (PD materials and classroom materials supporting PD) you will present (focus, subjects, background, specific features or aims, designer/owner, languages available, etc.) (materials must be primarily in English).

Please also let us know:

- Whether your materials are available online, e.g. through the Scientix database? The amount of materials (would you need one or two tables of 100 cm x 60 cm)?

You must prepare a poster (using at minimum 23" x 33"= 59cm x 84cm and at maximum 33" x 47"= 84cm x 119cm) to accompany your exhibit that includes an abstract of the materials (max. of 500 words) and possibly some relevant visuals.

A template is available on the conference website: http://educating-the-educators.ph-freiburg.de

Your contribution (first draft of abstract and above questions answered) should be sent to: educating-the-educators@ph-freiburg.de by 16 April. Please refer to materials market in this e-mail.

Please forward this call to teachers, teacher educators, teacher associations, Professional Development Centres and European projects in the area of STEM.

Conference hosts

mascil – mathematics and science for life!

Project mascil (www.mascil-project.eu) has received funding from the European Union's Seventh Framework Programme. During the four-year mascil lifetime (2013 – 2016), 18 partners from 13 countries are working together to achieve project goals.

Our aim is to promote a widespread use of inquiry-based teaching and learning in primary and secondary school science and mathematics classrooms. In addition, a key mascil focus is connecting mathematics and science education to the world of work. When doing inquiry-based tasks, students work like scientists and in the process, acquire competencies they need for their future professional and personal lives as active citizens.

In order to implement inquiry-based teaching and connect mathematics and science education to the world of work, mascil follows a holistic approach by carrying out a variety of activities, including the development of materials and running professional development courses. Vocational educational teachers and industry representatives support the professional development courses for pre- and in-service teachers. Within the mascil concept, IBL-trained teachers become mascil multipliers who in turn, offer courses to other teachers. Depending on the national context, we accomplish this aspect through use of e-learning. The national and European advisory panels are comprised of stakeholders charged with providing expert advice to the partners throughout project lifetime. Mascil uses workshops and policy papers to reach and inform policy makers.

mascil is represented by partner universities and institutes in thirteen countries:

University of Education Freiburg (Germany), Foundation for Research and Technology Hellas (Greece), Utrecht University (The Netherlands), University of Nottingham (Great Britain), University of Jaén (Spain), University of Nicosia (Cyprus), National and Kapodistrian University of Athens (Greece), Norwegian University of Science and Technology (Norway), Leibniz Institute for Science and Mathematics Education Kiel (Germany), Babes-Bolyai University (Romania), University of Hradec Králové (Czech Republic), Divulgación Dinámica SL (Spain), Hacettepe University (Turkey), Vilnius University (Lithuania), University of Innsbruck (Austria), Goethe University Frankfurt (Germany), Bulgarian Academy of Science (Bulgaria)

mascil is coordinated at the University of Education Freiburg. The University of Education is a specialized university focusing on research, teaching and training the next generation of education researchers and teaching and learning professionals. In-service training for education professionals is also an important pillar in the university's work. Through the Freiburg Advanced Center of Education the University of Freiburg and the University of Education Freiburg join forces in delivering teacher education of the highest quality. Ten years of successful international collaboration in European projects have also established the University of Education Freiburg as a significant research centre and disseminator of innovative practices in STEM (science, technology, engineering and mathematics) education: www.ph-freiburg.de/international/international-research-and-projects

DZLM – German Centre for Mathematics Teacher Education

The German Centre for Mathematics Teacher Education (DZLM, www.dzlm.de) is Germany's first nationwide centre providing teacher training in mathematics and is funded by the Deutsche Telekom Stiftung (www.telekom-stiftung.de). The DZLM focuses on developing long-lasting, continuing professional development programmes for multipliers that are research-based and practically relevant. These multipliers are teachers themselves (from pre-, primary and secondary schools) who in turn, offer PD courses, advice and support to other teachers, e.g. by supervising professional learning communities. The DZLM also provides professional development courses and materials that target specific types of teachers and their educators, e.g. educators who teach mathematics out-of-field, i.e. outside their specialty area, as well as pre-school teachers. All courses are continuously improved based on empirical evidence and disseminated at a large scale.

Seven universities are involved in the consortium: The Humboldt-University Berlin, Free University Berlin, University of Bochum, TU Dortmund University, the University of Duisburg-Essen, the University of Education Freiburg and Paderborn University. In addition, the DZLM cooperates with further partners in the fields of mathematics, mathematics education and educational research, as well as the educational institutes of the different federal states.