

Educating the Educators III: International Conference on approaches to scaling-up professional development in maths and science education

7th – 8th October 2019 in Freiburg, Germany

Call for proposals



Dear Colleagues,

We are pleased to send you this call for proposals for our upcoming international conference: 'Educating the Educators III – approaches to scaling-up professional development (PD) in maths and science education'. This conference follows on the great success of the first and second conference that we hosted on this topic in December 2014 in Essen, Germany and in November 2016 in Freiburg, Germany. Almost 200 researchers, policy makers and practitioners participated in these first two conferences, where together we identified the need to continue working on the scaling-up of professional development (PD) for educators in mathematics and science.

The conference board welcomes contributions (in English) to this event in 2019. We invite you to submit proposals for research, practice or policy-oriented paper presentations, posters and workshops to be given during the conference as well as stands for the material market.

The conference is hosted by the International Centre for STEM education (icse.eu), the International Consortium for STEM education and the project MaSDiV (masdiv-project.eu). The project MaSDiV has received funding from the Erasmus+ program of the European Union (Project number 582943-EPP-1-2016-2-DE-EPPKA3-PI-Policy). The conference is also supported by the DZLM (German Centre for Mathematics Teacher Education, initiated and funded by Deutsche Telekom Stiftung, www.dzlm.de).

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

- **Kara Jackson** (University of Washington, US)
- **Susanne Prediger** (TU Dortmund University, Germany)
- **Jim Ryder** (University of Leeds, UK)

Location: University of Education Freiburg, Freiburg, Germany

The **deadline** for submission of proposals (paper presentations, interactive sessions, posters) is **16th March 2019**.

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, ICSE, University of Education, Freiburg, Germany

Associate Professor Dr. Michiel Doorman, ICSE Consortium & Utrecht University, Netherlands

Elena Schäfer, ICSE, University of Education, Freiburg, Germany

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1. Conference overview

1.1 Aims and dimensions

This is the third 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 course leaders and institutions engaged in teacher professional development. The topic is treated in particular in relation to disseminating innovative teaching approaches like inquiry-based learning, intercultural learning and connections between STEM learning and fundamental values of our democratic societies. Scaling-up professional development is a specific challenge for dissemination on a large scale which involves qualifying the course leaders.

Building on the results of the first and second conference on this topic, 'Educating the Educators III' 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 professional development courses for PD course leaders and facilitators in professional learning?
- **Material dimension:** Which role can materials play in professional development for maths and science teachers (classroom materials, face-to-face PD materials and e-learning PD materials)?
- **Structural dimension:** How can projects or initiatives for scaling up professional development look like and how can they be evaluated?

1.2 Target groups

Teacher educators and researchers, course leaders and relevant networks, educators of course leaders 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 maths and science education.

1.3 Conference formats

The conference will use both traditional and innovative 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** with different stakeholder groups
- **workshops** actively involving participants
- a **materials market** allowing participants to exhibit interesting professional development materials (including classroom materials) and learn about other materials.
- **keynote lectures** held by Kara Jackson (University of Washington), Susanne Prediger (TU Dortmund University) and Jim Ryder (University of Leeds)
- **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 course leaders, and policy makers
- a 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

2. Organisational structure of the conference

2.1 Conference chairs

Katja Maaß, ICSE, University of Education, Freiburg, Germany

Michiel Doorman, ICSE Consortium & Utrecht University, Netherlands

Elena Schäfer, ICSE, University of Education, Freiburg, Germany

2.2 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:

Digna Cousa, Autonomous University of Barcelona, Paul Drijvers, Michiel Doorman, Vincent Jonker & Monica Wijers (Utrecht University, Netherlands), Josette Farrugia, University of Malta, Konrad Krainer (Alpen-Adria University Klagenfurth, Austria), Antonio Quesada & Marta Romero Ariza (University of Jaén, Spain) and Ragnhild Lyngved Staberg (Norwegian University of Science and Technology, Norway).

2.3 Organisation committee

Christiane Fischer, ICSE, University of Education, Freiburg, Germany

2.4 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.

2.5 Registration & fees

You must register to attend the conference. The registration form will be available on 4 June 2019 on the conference website <http://educating-the-educators.ph-freiburg.de/>

The fee to attend the conference will amount to approximately €120.

2.6 Important dates

Submission of papers, posters and contributions for the materials market: 16 March 2019

Author notification: 20th May 2019

Conference registration begins: 4th June 2019

3. Conference topics in details

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

Topic 1: Personal dimension of educating course leaders: 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 **course leaders**, 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 course leaders poses considerable challenges inherent to the specific requirements of the course leaders' dual role. Course leaders act as experts in some subject-related content, and at the same time, as professionals in adult education. Therefore, qualifying course leaders has to cover both of these requirements. A concern with learning communities is that these often lack external input.

The topic focuses on key questions, including, but not limited to:

- What are the differences between course leaders 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 programs for educating course leaders? Which pitfalls have to be avoided? How can essential contents be identified and which activities are suitable to learn the contents?
- How can we address and handle cultural factors, such as differences in how teachers cooperate at school – or not, different school contexts or 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?
- How can courses for course leaders look like that address cultural or achievement related diversity in class?
- How can course leaders be prepared to support teachers in connecting mathematics and science education with fundamental values of our democratic societies?
- Can support given to learning community facilitators be a means of providing learning communities with lacking external input?

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

Carefully designed classroom tasks and materials are 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, MASCIL or the German DZLM projects PIKAS, MSK, PriMakom). 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 course leader 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-centered 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?
- 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? What has to be explained in particular in PD Materials and how do course leaders adapt materials?
- How can materials look like that address cultural or achievement related diversity in class?
- How can materials support teachers in connecting mathematics and science education with fundamental values of our democratic societies?
- Which features do excellent e-learning materials have? How can existing PD materials be modified and adapted for use in an e-learning environment? What has to be considered for open educational resources?
- 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 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 – Designs for projects or initiatives for scaling-up innovative STEM education approaches

When aiming at improving STEM education, different procedures for reaching large numbers of teachers and through them their students, are possible. This topic will focus on the specific large-scale projects (e.g. nation and region wide projects) and initiatives that aim at scaling-up the implementation of innovative, research-based approaches to STEM education (e.g. nation- or region wide curriculum implementation projects, special structures such as the STEM PD centre network, cooperation initiatives between policy and research) and will take into account their contextual framing (such as curriculum, assessment, relation between policy and professional development, school context). What are the best practices of project designs for scaling-up (e.g. description of successful cooperation)?

For example, we can educate course leaders 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 course leader. 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. Cooperation between the policy, practice and research level can be initiated by including stakeholders from each level into projects (e.g. in the European project MaSDiV Ministry-University tandems from each partner country ensure cooperation between the policy and research level).

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):

- How can a design of an initiative or project aiming at a widespread implementation of innovative teaching and for scaling up professional development look like? (e.g. nation- or region-wide implementation projects)
- Which structures prove to be effective in which cultural context? Which do not? Research results, best practice experiences and lessons learnt?
- 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?
- How can we investigate empirically the impact of different project designs?

4. Proposal submission information

4.1 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,
- **workshop sessions** actively involving all participants
- **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.

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.

4.2 Submissions for oral presentations

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 course leaders: Roles, content, and activities
- **Topic 2: Material dimension** of educating teachers, course leaders and facilitators: The role of classroom- and PD-materials and tasks
- **Topic 3: Structural dimension** – Project designs for scaling-up innovative STEM education

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 will be provided at the website (<http://educating-the-educators.ph-freiburg.de/>). Submission will be through an online form that will be provided from 21 February 2019 onwards.

Strict deadline for submission will be **16 March 2019**.

The programme committee will review all submissions.

Authors will be notified by **20 May 2019** at the latest.

4.3 Submissions for discussion groups

We welcome proposals for discussion groups which actively involve participants. The aim of a discussion group is an exchange of experiences in relation to questions to which little is known so far and to which little research exist. The discussion group will last 60 minutes and should consist of a brief introduction (of max. 10 minutes), 40 minutes of discussion time and a brief summary (of max. 10 min).

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

- **Topic 1: Personal dimension** of educating course leaders: Roles, content, and activities
- **Topic 2: Material dimension** of educating teachers, course leaders and facilitators: The role of classroom- and PD-materials and tasks
- **Topic 3: Structural dimension** – Project designs for scaling-up innovative STEM education

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);
- (4) What the aim and relevance / importance of your discussion group is.

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 will be 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 February 2019 onwards.

Strict deadline for submission will be **16th March 2019**.

The programme committee will review all submissions.

Authors will be notified by **20th May 2019** at the latest.

4.4 Submissions for workshops

We welcome proposals for workshops which actively involve participants. The aim of the workshop should be to make participants experience materials or PD courses or PD for facilitators or course leaders. The workshops will be 60 minutes and should consist of a brief introduction (no more than 10 minutes, 45 minutes of working time / active participation of participants and a summary of about 5 min).

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

- **Topic 1: Personal dimension** of educating course leaders: Roles, content, and activities
- **Topic 2: Material dimension** of educating teachers, course leaders and facilitators: The role of classroom- and PD-materials and tasks
- **Topic 3: Structural dimension** – Project designs for scaling-up innovative STEM education

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);
- (4) What the aim and relevance of your workshop is and
- (5) in which kind of activities you want to involve participants.

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 will be 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 February 2019 onwards.

Strict deadline for submission will be **16th March 2019**.

The programme committee will review all submissions.

Authors will be notified by **20th May 2019** at the latest.

4.5 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 that will be provided on the conference website (<http://educating-the-educators.ph-freiburg.de/>) via the website tool (from 21 February 2019).

Strict deadline for submission will be **16th March 2019**.

The programme committee will review all submissions.

Authors will be notified by **20th May 2019** at the latest.

4.6 Submissions for the Materials Market

A materials market will 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 will be available on the conference website (<http://educating-the-educators.ph-freiburg.de/>) from 21 February 2019.

Your contribution (first draft of abstract and above questions answered) should be sent to educating-the-educators@ph-freiburg.de by **16th March 2019**. 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.

A committee will review all submissions.

Authors will be notified by **20th May 2019** at the latest.

5. Conference hosts

5.1 MaSDiV

MaSDiV (2017-2020) is a EU funded project that aims to support maths and science teachers in accommodating cultural, socioeconomic and performance related diversity in their classrooms. Central to this project is the inclusion of a social and intercultural dimension in maths and science classes. Teachers shall be equipped to foster students' understanding of fundamental values of our society through their maths and science lessons.

Innovative teaching approaches, such as inquiry based learning and intercultural learning, create inclusive class environments that help to enhance the achievement levels of all students. By applying these approaches, teachers can actively support their students in the process of becoming well-informed and critically-reflected citizens.

The concrete measures of MaSDiV are the development, the evaluation and the dissemination of an innovative professional development course for teachers, who are teaching secondary school. Research facilities and ministries from six different European countries are working closely together in this project. The evaluation process will be conducted by the renowned IPN at the Universität Kiel in Germany.

5.2 ICSE & ICSE Consortium

The International Centre for STEM Education (ICSE) is located at the University of Education in Freiburg, Germany and focuses on practice-related research and its transfer into practice. ICSE sustainably links stakeholders from research, practice, policy and industry, nationally as well as internationally through the ICSE consortium.

The ultimate aim of ICSE is to help improve STEM education across Europe. That is, to give students insights into authentic features of STEM subjects and their connection to real-life contexts, to raise achievement levels in STEM subjects and to make science literacy accessible to all students, regardless of gender and cultural or socioeconomic backgrounds. Thereby, ICSE intends to promote the interest of young people in STEM careers.

The ICSE Consortium was founded in 2017 and endeavours to lead the field of transfer-oriented research and development in STEM education. It wants to set standards for a high-impact international collaboration of higher education and research institutes. The consortium is comprised of the following 14 research institutes:

- Austria, University of Innsbruck
- Bulgaria, Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences
- Cyprus, University of Nicosia
- Czech Republic, Charles University
- Germany, International STEM Centre, University of Education Freiburg
- Greece, National and Kapodistrian University of Athens
- Lithuania, Vilnius University
- Malta, University of Malta
- Netherlands, Utrecht University
- Norway, Norwegian University of Science and Technology

- Slovak Republic, Constantine the Philosopher University in Nitra
- Spain, University of Jaén
- Sweden, Jönköping University
- Turkey, Hacettepe University

6. Conference supporters

6.1 DZLM – German Centre for Mathematics and 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 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.

Eight 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 Potsdam, Paderborn University and the University of Education Freiburg. 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.