CALL FOR PROPOSALS
Call no. IEA 02/02-2015

Thematic report using IEA TIMSS data: The roles of teachers and teaching in education and their relationship to student outcomes

1. Introduction

1.1 The International Association for the Evaluation of Educational Achievement (IEA) invites proposals for creating a report based on secondary analysis of IEA’s Trends in International Mathematics and Science Study (TIMSS) database. The general theme for this report is the influence of teacher characteristics and instructional practices on student learning outcomes. The deliverable for this project will be an 80- to 150-page report that includes, in addition to the main text, an executive summary, tables, graphs, and cited references.

2. TIMSS

2.1 IEA has conducted TIMSS, an international assessment of mathematics and science at Grades 4 and 8, every four years since 1995. In 2011, nationally representative samples of students in 63 countries and 14 benchmarking entities (regional jurisdictions of countries, such as states) participated in the study. In total, more than 600,000 students took part in TIMSS 2011. The various international reports on TIMSS 2011 give a very detailed overview of the study’s results.1

2.2 TIMSS measures different content areas and cognitive processes on scales that also enable trend comparisons across TIMSS cycles. In addition, students, their mathematics and science teachers, and their school principals complete background questionnaires about the contexts in which teaching and learning take place.2 The TIMSS encyclopedias provide further information on the contexts (e.g., teacher training) of all participating education systems.3

---


2 In some countries, the fourth-graders’ parents fill in a background questionnaire. Consult the TIMSS 2011 international database user guide for details.

3. Study background and objectives

3.1 The role of teachers and teaching is increasingly understood as one of the most important school-related factors determining students’ educational outcomes (ACT, 2012). Structural factors such as teacher preparation and resources and teachers’ working conditions have been found crucial for successful learning at school, while classroom practices such as management, time on task, and the learning activities provided have likewise been identified as important for student outcomes (Hattie, 2009; Kyriakides, Creemers, Antoniou, & Demetriou, 2010).

3.2 What we know already from TIMSS 2011 and other relevant studies:

**Teacher preparation**

(1) Analysis presented in the TIMSS 2011 international report (Mullis et al., 2012) reveals that students with higher achievement in both mathematics and science were more likely than students with lower achievement to have teachers who had more teaching experience, expressed confidence in their subject-related teaching, and said they were satisfied with their careers.

(2) The report also stated that the majority of fourth-grade students had (mathematics and science) teachers with a Bachelor’s degree. An even higher proportion of eighth-grade students had teachers with Bachelor’s and postgraduate degrees.

(3) At both grades, most students had (mathematics and science) teachers who reported having at least 10 years of teaching experience, considered themselves very well prepared to teach the TIMSS mathematics and science topics, and said they felt very confident in their teaching.

**Learning environment and classroom instruction**

(1) Various research studies show that the learning environment and classroom instruction are at the core of student learning (e.g., Creemers & Kyriakides, 2010; Scheerens, 2004).

(2) As stated in the TIMSS 2011 international report, the study found that “engaging instruction” was related to higher achievement in both science and mathematics at Grade 4 and Grade 8.

(3) The report also stated the finding that students with positive attitudes toward learning the subject had higher achievement than less positive students in both science and mathematics at Grade 4 and Grade 8.

**Teacher working conditions**

(1) As stated in the international report, TIMSS 2011 found that successful schools (i.e., those with higher student achievement) were more likely than less successful schools to have better working conditions and facilities as well as more instructional materials, such as books, computers, technological support, and supplies.
3.3 Research questions

The thematic report for which you are tendering should deepen our knowledge about the association between teachers’ characteristics and practices and student achievement. You will therefore need to explore the role of teachers and teaching in the education process from different perspectives, taking into account the respective national educational policy contexts.

Structural and process characteristics also need to be part of the analysis. Structural components include “time-stable” personal and psychological characteristics of teachers, such as teacher education level or experience. Process components encompass the learning processes that take place at school through, for example, teaching activities and the materials teachers use when teaching.

Although the cross-sectional, large-scale design of TIMSS does not permit observation of processes, the teacher and student questionnaires do include items pertaining to variables on teaching processes. These can be used as indicators of the teaching and learning processes that take place within classrooms. In order to provide helpful policy recommendations, please try to identify in your proposal not only the factors positively related to student learning outcomes but also the factors detrimental to learning processes. Remember, though, that correlations are not enough to warrant policy recommendations.

3.4 Methodology

Learning is a complex process that takes place within a particular environmental context. Successful teaching depends on structural factors solely related to the role of teacher, several factors related to teachers and students as individuals (such as motivation and ability to learn), and several factors related to classroom and school contexts. It is therefore important when submitting your proposal that you make explicit how you intend to address this complexity when conducting your analysis. You will also need to explain in the proposal how you will deal with trends and the multilevel structure in the TIMSS data.

We furthermore encourage you to use methods of analyzing cross-sectional data that go beyond ordinary least squares (OLS) regression, such as discontinuity design, difference in differences, and instrumental variables, as these lessen the problems associated with simple correlational analysis. You should also describe the limitations of your selected methods.

4. General guidelines for proposal submission

4.1 Your proposal must be submitted in English.

4.2 The research literature on teacher and teaching influence on student achievement is relatively extensive. Please make sure that you demonstrate your familiarity with this research by including a sound literature review in your proposal. You must also make clear in it the contribution you think your analyses of the TIMSS data will make to this literature, especially in terms of its potential to expand the current state of research and knowledge.

4.3 When preparing your proposals, please clearly specify the research relevance and the policy relevance of the research questions and methods you intend to use. This specification needs to expand on and add to the ideas set out in this call for proposals.
4.4 Your proposal must furthermore describe the general analytical framework that will guide not only your analyses of the TIMSS data but also your interpretation of the results of those analyses. The description of the framework must be such that it clearly shows how the proposed analysis will address the policy-relevant research questions. The description should therefore identify (i) which data within TIMSS (questionnaire items, indices, or constructs from the TIMSS questionnaires) you intend to use in your analysis, (ii) the non-TIMSS data sources that you propose to use, and (iii) any additional data collection that you consider necessary (e.g., system-level characteristics). Please make sure that you also briefly describe the types of statistical analyses you will use.

4.5 In addition, your proposal must provide a detailed timeline for all analyses and report-writing activities as well as the budget you think is needed to complete the proposed work.

4.6 When developing your timelines, assume a start date of 1 July 2015 and an end date of 31 March 2016, which is when you will need to submit the final manuscript of your report to IEA for print production. That said, there may be a certain degree of flexibility in the timeline. Nonetheless, the timeline must make provision not only for submission of a complete draft report on 21 December 2015 for review by IEA but also related revisions to and language editing of the report. This process will take place from January to March 2016. In addition, you will be asked to be available for consultation with Springer Publishers during the print production period of April to May 2016.

4.7 Your budget must include the expected number of work days needed to complete each activity related to the project and a total budget in euros or US dollars. The total budget should not exceed 25,000 euros.

4.8 The proposal should be no more than 10 pages in length. You will also need to include a short (500-word maximum) biographical note on each person in your team tendering for this project. Please highlight each person’s experience relevant to the proposed activities.

4.9 IEA will review all proposals according to their methodological quality, research and policy relevance, and budget. All tenderers will be informed of the outcome of these deliberations by 5 June 2015.

4.10 Tenderers may submit proposals by post or by courier. However, proposals must be received no later than 1:00 p.m., 20 April 2015, at the following address:

International Association for the Evaluation of Educational Achievement
IEA Secretariat
Herengracht 487
1017 BT Amsterdam
The Netherlands

Alternatively, you can submit your proposal by email to department@iea.nl, but again please ensure that it reaches us by the deadline of 1:00 p.m. (CET), 20 April 2015.

---

4 You are requested to use Times New Roman 12 point type double spaced.