

## CALL FOR PROPOSALS

Call no. IEA 14/03-2022

### Thematic report using IEA TIMSS data: Northern Lights on TIMSS

#### 1. Introduction

The International Association for the Evaluation of Educational Achievement (IEA) invites proposals for creating a report based on secondary analysis of IEA data. The report should aim at using the data on science and mathematics from the IEA Trends in International Mathematics and Science Study (TIMSS) and possibly the OECD Program for International Student Assessment (PISA) with an emphasis on the results from the Northern European countries, Denmark, Finland, Norway, Iceland and Sweden.

This report is a cooperation between IEA and the Nordic countries through the Nordic Council of Ministers and will be a follow up of the Northern Lights report series based on Nordic cooperation in large scale international studies.<sup>1</sup>

The deliverable for this project will be an 80- to 150-page book, to be published by Springer as part of IEA's Research for Education Series (see <https://link.springer.com/bookseries/14293>). In addition to the main text, the book will include, tables, graphs, cited references, and relevant appendix materials. Additionally, the authors will work with the IEA editors to develop a short overview of key findings from the book for the IEA Compass Briefs in education series: <https://www.iea.nl/publications/series-journals/iea-compass-briefs-education-series>.

#### 2. Study background and objectives

The Nordic Countries work closely together in the Nordic council of ministers (see <https://www.norden.org/en/nordic-council-ministers>). As part of their work, the Nordic council of ministers publishes results from international education studies to inform policy and practice in the member countries. This call for proposals is supported by the Nordic council of ministers.

The aim of this report is to get an in-depth understanding of Nordic TIMSS results. Proposals should focus on development over time in the school subjects of mathematics and science. The most recent TIMSS data was gathered in 2019 but the proposal should engage with developments across multiple rounds, preferably looking at long as well as short term trends.

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<sup>1</sup> The two most recent Northern Lights publications can be read here <https://www.norden.org/no/node/44790> and here <https://www.iea.nl/index.php/news-events/news/northern-lights-civic-and-citizenship-education>

The thematic scope of proposals is open to the interest and expertise of research teams; however, we offer some suggested themes. The report, for instance, could focus on pedagogical practice for the two subjects, the overall goal of teaching and how schools and teachers are evaluated. It could, for instance, be investigated whether curricula and evaluation/assessment procedures are coherent. Are different forms of evaluation/assessment and learning related and does content curriculum match how students are evaluated and assessed? Digitalization is another interesting area, both the digitalization of school life and the effect that integration of digital technologies in the everyday lives of students might have upon schooling and learning.

However, within the overall framework of developments within the school subjects of mathematics and science, different proposals are welcomed. The above-mentioned focus points of curriculum, evaluation/assessment and digitalization should thus be seen as suggestions rather than mandatory themes. The report should, however, be a coherent exploration of a theme rather than a collection of separate chapters.

## 2.1 Research questions

As mentioned in the previous section, this thematic report should use IEA TIMSS data to examine the development in mathematics and science in the Nordic Countries. Aspects and specific questions that could be explored in the report may include, but are not limited to:

- How have teaching methods and the use of curricula and evaluation procedures in science and mathematics developed over time in the Nordic countries? Is development across time characterized by common trends or national pathways? Which similarities do the Nordic countries share in comparison with other participants in international assessments?
- How does content in the specific curricula match with the way pupils are being evaluated and assessed?
- What is the correlation between evaluation and learning development/improvement?
- How has the use of digitalization, as a tool for teaching, evolved and does enhanced digitalization in and outside of school improve learning, interest and motivation amongst pupils?
- Does the picture regarding the above questions vary according to groups of students (socioeconomic background, gender etc.), in the sense that the developments affect different students in different ways?

## 3. Data

Since the theme of the report will be the development within the subjects of *mathematics and science*, the report should primarily be based on data from the TIMSS assessment

of mathematics and science. TIMSS has been conducted since 1995, focusing on measuring educational achievement in mathematics and science at the fourth and eighth grades. The study is designed to capture the breadth and richness of these subjects as they are taught in the participating countries. TIMSS collects detailed information about curriculum and curriculum implementation in addition to empirical information about the contexts for schooling.<sup>2</sup> Not all Nordic countries have participated in every round of TIMSS, but since TIMSS 2011 Norway, Sweden, Finland, and Denmark has participated in the 4<sup>th</sup> grade study. When deciding how many rounds the analysis should cover, priority should be on making the analysis relevant in the majority of Nordic countries.

Even though TIMSS assesses students in both fourth and eighth grade, the *Northern Lights* publication should focus on pupils in the fourth grade since, e.g., Denmark only participated on this level. Data from the eighth-grade assessment can be included when relevant.

Though TIMSS should be the primary data source, the analysis can also draw on other international assessments such as PISA and TALIS. This is particularly relevant since Iceland does not participate in TIMSS.

PISA (*The Programme for International Student Assessment*) is a worldwide study conducted by the OECD. PISA measures 15-year-olds' ability to use their reading, mathematics and science knowledge and competences to meet real-life challenges.<sup>3</sup> PISA has been conducted every third year since 2000 with the latest assessment taking place in 2018. Since TIMSS assesses the competences of students in 4<sup>th</sup> grade and PISA assesses 15-years old, the two studies in combination contains information on students at both the middle and near the end of mandatory schooling. However, data from the two studies cannot be combined directly, so analyses based on PISA would serve only as a potential supplement, perhaps giving preliminary indication on whether results identified in the 4<sup>th</sup> grade seems to hold for older students as well.

TALIS (*Teaching and Learning International Survey*)<sup>4</sup> is conducted by the OECD in order to measure how teachers and leaders experience the teaching- and learning environment in schools. TALIS can thus provide the perspective of teaching professionals. The latest TALIS round was conducted in 2018. TALIS results could therefore contextualize the Nordic results of TIMSS by including further teacher perspectives beyond those already covered in TIMSS. However, the majority of Nordic countries have only conducted TALIS at the lower secondary level and not the primary level, which would have been most relevant for 4<sup>th</sup> grade TIMSS.

Finally, the TIMSS encyclopedia can serve as a source for contextual information on mathematics and science education in the Nordic Countries. As part of TIMSS participating countries complete a curriculum questionnaire and prepare a chapter describing mathematics and science education. Together, the curriculum questionnaire data and

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<sup>2</sup> <https://www.iea.nl/studies/iea/timss>

<sup>3</sup> <https://www.oecd.org/pisa/>

<sup>4</sup> <https://www.oecd.org/education/talis/>

country chapters in the encyclopedia present a portrait of mathematics and science. In addition to these suggested sources, other data can be included when relevant, as long as the report maintains its comparative focus.

## 4. General guidelines for proposal submission

4.1. Proposals must be submitted in English.

4.2. The research literature regarding development in mathematics and science is extensive. Please ensure that the proposal demonstrates familiarity with all relevant research by including a sound literature review. Ensure that the contribution of the proposed thematic report to this literature is explicit, especially in terms of its potential to expand the current state of research and knowledge.

4.3. When preparing a proposal, please clearly specify the research relevance and the policy relevance of the research questions and methods selected. This specification needs to expand on and add to the ideas set out in this call for proposals.

4.4. The proposal must furthermore describe the general analytical framework that will guide not only analyses of the IEA data, as well as that of other data sources, but also 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: (a) which IEA data (study, questionnaire items, indices, or constructs from questionnaires) you intend to use; (b) any non-IEA data sources that will be included; and (c) any additional data collection that is deemed necessary (e.g., system-level characteristics). Please make sure that a brief description of the types of statistical analyses to be used is included.

4.5 The proposal should demonstrate how the various chapters of the volume work together to answer a common question.

4.6. The proposal must include a detailed timeline for all analyses and report-writing activities, as well as a well-considered budget proposal to complete the project.

4.7. When developing timelines, assume a start date of March 2022 and an end date of 31 December 2023; the final manuscript of the report must be supplied to IEA for print production by 1 September 2023. Although there may be a certain degree of flexibility in the timeline, it must make provision for (i) submission of a complete draft report on 15 February 2023 for review by IEA and the Nordic council of ministers, and (ii) subsequent revision and later language editing of the report. This process will take place March 2023–September 2023. The corresponding author must be available for consultation with Springer Publishers during the print production period of October–December 2023.

4.8. Budgets must include the expected number of workdays 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.

4.9. The call is open to all researchers. Preference will be given to research teams comprising researchers from more than one Nordic country.

4.10. The proposal should be no more than 10 pages in length. Please also provide a short (500-word maximum) biographical note on each person in the team tendering for the project. Please highlight the relevance of each person's experience to the proposed activities.

4.11. 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 15 May 2022.

4.12 Researchers with an accepted proposal understand that their work is subject to a rigorous review process and that eventual publication relies on a willingness and ability to undertake necessary revisions as negotiated with the series editors.

**Proposals may be submitted by email.**

**The deadline for proposals is 1:00 pm, 9 April 2022.**

Email address: [secretariat@iea.nl](mailto:secretariat@iea.nl).