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Publication of new report on maths and science teaching in Second Year

The Educational Research Centre (ERC) today launched a report describing how mathematics and science are taught in post-primary classrooms. ***Inside the post-primary classroom: Mathematics and science teaching in Second Year*** is written by Aidan Clerkin, Rachel Perkins, and Emma Chubb, and is the third in the ERC's Research Series.

The report draws on data from TIMSS 2015 (*Trends in International Mathematics and Science Study*) to examine aspects of the teaching of mathematics and science in Ireland, with international comparisons. The achievement results from TIMSS 2015 (which were published in December 2016) indicated that the performance of students in Ireland in mathematics and science is relatively high by international standards. At Second Year, only six of 39 countries obtained significantly higher mean scores than Ireland in mathematics, while seven countries significantly outperformed Ireland in science.

One finding from ***Inside the post-primary classroom: Mathematics and science teaching in Second Year*** relates to instructional time. In Ireland, Second Year students received 109 hours of mathematics teaching per annum compared to an average of 138 hours across TIMSS countries. Instructional time was lower for science in Ireland, and the lowest of all TIMSS countries, with students receiving 90 hours of teaching over the course of the year, compared to an average of 144 hours internationally. However, there does not appear to be a direct relationship between instructional time and student achievement. While many of the highest-performing countries devoted more instructional time to mathematics than in Ireland, not all did. Aidan Clerkin, one of the report's authors, noted that "for example, in Japan less time is spent on maths instruction than in Ireland but average maths performance is significantly higher. On the other hand, the United States has similar mean mathematics performance to Ireland but American students receive many more hours of maths instruction per year."

He also cautioned that "these figures for classroom instructional time don't take account of extra lessons or tutoring that isn't provided by the school, which students in Ireland have been found to engage in less frequently." He noted that the relatively low amount of time devoted to science teaching at Second Year follows the limited exposure that students receive at primary level, where instructional time for science was lower in Ireland than in any other TIMSS country.

Another finding that is highlighted is that over 30% of students in Ireland are taught mathematics and science by teachers with a Master's-level qualification or higher, compared to about 25% on average across TIMSS countries. However, about 20% of students in Ireland were taught mathematics by a teacher whose main area of study was something *other* than mathematics or mathematics education, compared to an average of 13% internationally. Rachel Perkins, another of the report's authors, noted that "while these

teachers will have met the Teaching Council’s requirement for recognition, it is likely that those who had not studied mathematics or mathematics education as a major part of their third level education would not meet the Council’s requirements for teaching mathematics.” She also noted that “it is not clear the extent to which teachers considered the Professional Diploma in Mathematics for Teaching when answering questions about their qualifications.” The report also highlights that many more students in Ireland had science teachers who studied biology or chemistry as a main area than the average across TIMSS countries, but only one-quarter of Irish students had a teacher whose main area of study was physics.

Other aspects of mathematics and science teaching covered include:

- **Characteristics of mathematics and science teachers** (gender, age, teaching experience and qualifications).
- **Characteristics of the mathematics and science classrooms** (class size and students with language difficulties).
- **Teaching practices in mathematics and science lessons** (instructional time, teaching in maths lessons, teaching in science lessons, assessment of maths and science, coverage of curriculum, and availability and use of ICT in the classroom).
- **Teacher confidence and professional development** (confidence in using different teaching methods in mathematics and science lessons, confidence in teaching mathematics and science content, participation in Continuing Professional Development and collaboration with colleagues).
- **Teachers’ views of the working environment** (challenges of teaching, safe and orderly school environment, emphasis on academic success, career satisfaction).

Notes:

About TIMSS

Trends in International Mathematics and Science Study (TIMSS) is among the world’s largest studies of educational achievement. TIMSS assesses the maths and science skills of students in Fourth grade (Fourth Class in Ireland) and Eighth grade (Second Year) in participating countries. In so doing, it provides national and cross-national comparative information for policy-makers and educators. Fifty-six countries participated in 2015.

TIMSS is organised by the International Association for the Evaluation of Educational Achievement (IEA), a non-profit consortium of research institutes. The ERC managed Ireland’s participation in TIMSS 2015 on behalf of the Department of Education and Skills (DES).

The current report is based on data arising from the most recent cycle of TIMSS, in 2015. TIMSS is repeated every four years, with the next administration due to take place in 2019.

Related reports

The current report, ***Inside the post-primary classroom: Mathematics and science teaching in Second Year***, is the third volume in the ERC’s new Research Series. This themed report, along with the first two volumes in the ERC research series, builds on the initial national report that described the mathematics and science achievement of Irish students (at both

Fourth Class and Second Year) in the TIMSS 2015 assessment. These reports (listed below) can be found at www.erc.ie:

- *Inside the primary classroom: What happens in Fourth Class?* (by Aidan Clerkin, Rachel Perkins, and Emma Chubb; December 2017).
- *Shaping Schools: What TIMSS tells us about education systems* (by Eemer Eivers and Emma Chubb; December 2017).
- *TIMSS 2015 in Ireland: Mathematics and science in primary and post-primary schools* (by Aidan Clerkin, Rachel Perkins, and Rachel Cunningham; December 2016).

More information

The report is available for free download from www.erc.ie. More information about TIMSS, including previous reports, is available from www.erc.ie/TIMSS.

- **Aidan Clerkin, Rachel Perkins & Emma Chubb. (2018). *Inside the post-primary classroom: Mathematics and science teaching in Second Year*. Dublin: Educational Research Centre.**

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