

Traditional teaching methods still dominant in maths classrooms

September 7 2012

Twenty-first century maths lessons in English secondary schools are generally much like those of decades ago, with the teacher standing at the front of the class asking questions and opportunities for pupils to relate the subject to their real lives relatively sparse, according to University of Manchester research.

And the [GCSE exams](#) system seems to underscore this position, with lessons becoming increasingly routine and less interactive as pupils get older and approach the end of their compulsory schooling careers.

This may be a factor in maths ranking as the subject secondary pupils are most likely to say they dislike, although it also has among the highest number of pupils naming it as their preferred choice.

These are the major emerging findings of one of the largest investigations ever into the type of [teaching](#) going on in maths lessons in English schools, based on an inquiry into the school experiences of more than 13,000 11- to 16-year-olds at 40 secondaries across the country. The prevalence or not of traditional or "transmission" modes of maths teaching was a key element.

The Economics and Social Research Council-funded study, was being presented to the British Educational Research Association's annual conference today.

In October to December last year, researchers asked 13,516 pupils, and

128 teachers, to complete questionnaires detailing the kind of activities they experienced in maths lessons. Some 26 activities were listed, and the [respondents](#) asked to say whether each happened always, sometimes, rarely or never. As part of a measurement exercise, the teaching was grouped into three categories: high, medium and low "transmissionism", based on the tendency towards a more conventional, teacher-centred mode of teaching, with knowledge meant to be transmitted from teacher to pupil. "Low –transmissionist" teaching included more interactive activities, which were pupil-led, or sought to draw connections with the world outside the maths classroom.

The researchers found that those listed most frequently were weighted towards "transmission" activities. Top was "the teacher asks us questions", followed by "the teacher tells us which questions/activities to do". Also among the top 10 were "we listen to the teacher talk about the topic" and that bugbear of many pupils past and present "we copy the teacher's notes from the board".

Least frequently cited were: "we do projects that include other subjects" – which 28 per cent of pupils said never happened – "we learn how maths has changed over time" – 33 per cent – and "we use other things like newspapers, magazines or video [in lessons]" – 50 per cent.

Also less often mentioned were "what we learn is related to our out-of-school life", "we get assignments to research topics on our own", "the teacher starts new topics with problems about the world" and, perhaps surprisingly to those who imagine technology becoming more prevalent in teaching, "we use computers".

The trend of traditional activities being more frequently used in classrooms and less traditional less so was not completely uniform, however. For example, 84 per cent of pupils said their teachers always or sometimes gave them problems to investigate, which made it the seventh

most frequent activity. And the more traditional "we work through exercises in textbooks" was only the 12th most frequently-occurring activity, with 23 per cent of pupils saying it rarely or never happened.

But the general picture of more time being given to "transmission" activities was backed up by the views of the surveyed teachers, some of whom, said the researchers, expressed regret that time and exam preparation pressures meant they could not go in for more investigative work.

The researchers also came up with a measure which showed that, based on the pupils' answers, the frequency of "transmission" maths activities increased steadily from the start of secondary in year seven until years 10 and 11: the GCSE years.

And they found there was a significant negative correlation between pupils who agreed with the statement "I look forward to studying more maths in the future" and the degree to which "transmission" activities were present in their lessons. This, however, was just a provisional finding from the research, with the data to be analysed further.

Pupils were also asked which was their favourite subject; and which their least favourite. The core academic subjects of maths and English were actually high up in both lists.

More than one in five pupils (22 per cent) said maths was their least favourite, followed by English on 14 per cent. But maths was also the fourth most frequently listed favourite subject, cited by 7.8 per cent of pupils, behind PE (33 per cent); art (20 per cent) and English (8 per cent).

The academics found that those saying maths was their favourite subject reported considerably lower levels of "transmission" teaching in their lessons compared to those saying it was their least favourite, or those

who were indifferent about it (not saying it was their most or least favourite).

The Manchester team said this gave rise to the tentative finding that "students engage more with maths in less transmissionist learning environments." This builds on findings from previous research, finding that "transmission" teaching can turn pupils off maths.

However, pupils reporting high levels of "transmission" teaching were also more likely to say they planned to go to university. So the researchers said the picture was not simple, and they did not want to make claims as yet about the efficiency of any type of teaching.

The research findings as a whole are still tentative, as the project is only part-way through its three-year investigation, full data analysis has yet to be completed and interviews with teachers and pupils, also underway as part of the study, were not detailed in the findings.

Dr Maria Pampaka, who was presenting the paper today, said the aim was to inform better practice, and not to criticise teaching, especially as many teachers were working within quite tight constraints.

She said: "Teachers we spoke to acknowledge what we are finding. Most of them say 'we would prefer to do more of the non-transmission activities, but because of the pressure of preparing [pupils](#) for exams, because of the pressure of time, we cannot'.

"As you go up the year groups towards GCSE, there does seem to be more transmission-type teaching. But it's not just to do with the exams, it also seems to be about time constraints: teachers have to get through the content of the curriculum and even if there are a lot of things they would like to do in lessons, often they do not have the time.

"It's disappointing in a sense: it does mean that [maths](#) lessons perhaps haven't changed that much."

"Teaching and learning practices in secondary mathematics: measuring teaching from teachers' and students perspectives" is being presented to BERA on Thursday, September 6th by Maria Pampaka, Lawrence Wo, Afroditi Kalambouka, Sophina Qasim and David Swanson, all of the University of Manchester.

Provided by University of Manchester

Citation: Traditional teaching methods still dominant in maths classrooms (2012, September 7) retrieved 19 April 2024 from

<https://phys.org/news/2012-09-traditional-methods-dominant-maths-classrooms.html>

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