

MEI

House of Lords Reception

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Charlie Stripp, MEI Chief Executive

Stella Dudzic, MEI Programme Leader for Curriculum and Resources

- Good evening, my name is Charlie Stripp and I'm MEI's Chief Executive.
- MEI is an independent charity that exists to improve maths education through innovative work in curriculum development and teacher support.
- We are keen to work with schools, colleges, multi-academy trusts, Maths Hubs, universities, employers and other organisations that seek to improve maths education.
- MEI developed and manages the Further Mathematics Support Programme and works in a consortium with Tribal Education to lead the National Centre for Excellence in the Teaching of Mathematics, the NCETM, which coordinates the work of the Maths Hubs.

- We had anticipated that Professor Sir Adrian Smith's review of post-16 maths education would have been published by now.
- From what I have heard about it, I am confident that it will highlight many of the issues MEI will raise today, and that helping to implement its recommendations will be a key focus of MEI's work over the coming year.

- The DfE and government, with all party support, have promoted and supported maths education increasingly over the last decade.
- Some of this work has been very successful – you’ll know about the government support for the NCETM-led maths teaching for mastery programme in primary schools, for example.
- But our focus today is post-16 maths, and I want to begin by concentrating on AS and A level Maths and Further Maths in particular.
- Again there have been some real success stories. The DfE has funded the Further Maths Support Programme, which MEI developed and has managed for 12 years, and the numbers taking AS and A levels in Maths and in Further Maths have grown dramatically.

- In 2010, 77 000 students took A level Maths. By 2016 that number had risen to over 92 000, an increase of 20%.
- Over the same period, A level Further Maths numbers increased from a little below 12 000 to over 15 000, an increase of over 30%.
- These increases are stronger than for any other mainstream A level subject.

- Mathematics is now the most popular A level, in terms of numbers of entries, and Further Mathematics is 16th on the list. In 2005 they were, 4th and 27th. Clearly maths education is on the up. Furthermore, Further Maths is now offered by 2/3 of those state funded schools and colleges that offer A levels. These figures are extremely good news. Universities can no longer say that they cannot ask for Further Maths because state educated students cannot access tuition.
- However, there is still much room for improvement. In the independent sector, 24% of students that take A level Maths also take A level Further Maths. In the state sector the proportion is 16%. If all schools had 24% of A level Maths students also taking Further Maths, the current Further Maths figure would be over 22 000, rather than 15 000.

- MEI, through its management of the Further Mathematics Support Programme has made a major contribution to these increases.
- The government's recently published Industrial Strategy Green Paper celebrates the fact that the proportion of people studying mathematics is now at its highest ever level, and it is the most popular A-level.
- **BUT** – and it's a big **BUT**, the move to linear A levels from this September, changes to the status of AS qualifications and the current squeeze on school and college funding mean these numbers are fragile and could easily fall.
- This would be a tragedy. Maths opens doors to students, whatever other subjects they are taking, and it is vital for careers and higher education in STEM disciplines and finance that are key to the country's industrial strategy.

- The funding squeeze, the move to linear A levels and the reduced status of AS qualifications mean increasing numbers of schools and colleges are allowing students to take only three subjects from the beginning of year 12 and are stopping offering AS qualifications altogether.
- This is very bad news for maths.
- In the past, students typically took four AS qualifications in year 12 and many included maths, because they recognised it as useful, even though they expected to drop it after taking an AS at the end of the year.
- Actually, many of these students discovered they really liked maths, so they dropped something else instead and continued maths to full A level - VERY SENSIBLE!

- Other students started AS Further Maths in year 12, just to try it out, and ended up doing the full A level, and others, realising they wanted to take a STEM degree, took up AS Further Maths in year 13.
- The new school and college policies of offering only 3 subjects, and not offering AS levels, will prevent many students from choosing Maths and Further Maths in year 12 and are very likely to reduce the numbers of students taking Maths and Further Maths at both AS and A level – the very opposite of what is intended by government policies.

- To ensure current numbers taking A level Maths and A level Further Maths do not fall 3 things need to happen:
 1. The Further Maths Support Programme's work must continue – schools, colleges and students need its continuing support.
 2. AS Maths and AS Further Maths must be strongly recommended and recognised as valuable qualifications as part of A level programmes, even for programmes that include three other A levels. Four subjects should be an option in year 12 for any student wishing to take an A level programme that includes Maths or Further Maths. Policies are needed to ensure all schools and colleges can offer this.
 3. Universities should be clear about the value they place on Maths and Further Maths qualifications at both AS and A level by actively encouraging uptake in their prospectuses and offers to students.

- We also need to address some equality issues in mathematics A level uptake. Girls are under-represented, making up 40% of A level Maths and 30% of A level Further Maths entries – girls' uptake has increased proportionally with boys, but the inequality remains – and regional variation means where you are educated affects your chances of taking A level Maths. Evidence suggests that studying maths to at least A level has a strong impact on earning potential, so these inequalities matter.
- If we are to continue to expand participation in AS and A level Maths and Further Maths, building on the sustained increases over the past 12 years, addressing these issues will be crucial. If they are not addressed, the unintended consequences of the recent qualification reforms and funding squeeze could undermine years of good work.

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I'd now like to introduce my MEI colleague, Stella Dudzic, who will talk about some other aspects of post-16 maths education.

- We have new GCSE qualifications (examined for the first time this summer) and new Core Maths qualifications (examined for the first time last summer).
- What kinds of things do students learn in Core Maths?
- If you were running this event, how many bottles of wine would you need to have?
- Being able to make estimates is just one of the skills students learn in Core Maths courses – it is an important skill for future employment for life as well as something they might use in future study.
- MEI is proud of its development work in the Critical Maths project which influenced the content of all Core Maths qualifications.

- The 2015 British Academy report Count Us In said the following:
- *There is a need to transform the UK's quantitative skills: our ability to reason using numbers. Our evidence shows that a new, concerted national effort will be needed.*
- The report went on to say:
- *There are many benefits to building quantitative skills in the UK population, including helping citizens to participate more fully in the democratic process; enhancing research in universities and in the workplace; and supporting the economy, taking advantage in particular of the advent of "big data".*
- Universities are incorporating quantitative skills into their courses – both in the UK and internationally.

- In England we have incorporated quantitative skills into the Core Maths qualifications.
- 3000 students for the first sitting in June 2016 was a good start, but the potential numbers are much greater than this.
- Increasing the participation to the potential quarter of a million a year within the next 10 years requires planned funding.
- It also needs professional development for teachers, and for the Core Maths qualifications to be esteemed by employers and universities.

- The emphasis on problem solving and reasoning in the new Mathematics GCSEs is excellent and we hope this will improve students' ability to use mathematics in their future lives, but what should we do with the students who do not achieve a level 2 pass by age 16?
- During the past academic year we have been working with three colleges in the Stoke area to improve learning outcomes for students retaking GCSE Mathematics.
- The focus of this work is on deepening student understanding and confidence in using mathematics through supporting teachers and providing suitable resources.

- It is encouraging to find that teachers are becoming more confident about trying new approaches with their students, and that students are reporting greater enjoyment of lessons and confidence in their mathematics. This means that they are now attempting problems which they would have previously avoided and are succeeding better.
- Reflecting on our work in Stoke has reinforced our belief that a new GCSE Mathematics qualification is needed, designed for post-16 students and relevant to work and life.
- What has led us to that conclusion?
- The current GCSE resit policy is not working. Last year over 70% of 17 year olds resitting GCSE Mathematics failed to get a level 2 pass.
- This is damaging attitudes to Mathematics and wasting time and resources.

- The GCSE brand is well respected and recognised by employers but GCSE is a general qualification – it is intended to prepare students for further study in mathematics as well as giving them the skills that they will need in future life and work.
- For those who are not going on to higher level study in mathematics, perhaps we should concentrate on giving them the skills they need for future life, incorporating working with spreadsheets and understanding data at an appropriate level rather than students studying abstract algebra which they do not see the point of.
- We need a different kind of qualification for the post-16 resit students.
- It is encouraging that new functional skills qualifications are being developed but they will only succeed if they are properly understood by employers and recognised as a valuable qualification.

- We have found that, even in the small sample of colleges we have worked with in Stoke, there is a wide variety in prior attainment and time given to teaching GCSE resit.
- Our experience suggests that FE colleges are often working with students with a greater variety of prior attainment but that they have less resources available than other providers of post-16 education. The work of FE colleges and other providers in post-16 mathematics education must be properly recognised and resourced.

- Increasing Core Maths numbers. GCSE resit. They need teachers.
- There is a continuing and serious shortage of well-qualified teachers of mathematics at all levels.
- People with strong mathematical skills are highly sought after and have many employment opportunities available to them.
- We need to recruit, develop and retain more specialist mathematics teachers and we need to make mathematics teaching an attractive long term career choice.
- MEI is committed to doing all we can to give mathematics teachers the training and resources they need to enable their students to succeed

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I'll now pass back to Charlie

- Before concluding, I want to highlight an area of MEI's work that we believe can have a strong impact across post-16 maths: the use of technology to support maths teaching.
- The UK lags behind its international competitors in terms of participation in maths education post-16. To address this we need to greatly increase teaching capacity.
- Technology could be a key to addressing this and serious work is needed to understand properly how technology can be used to improve maths education and help to alleviate the problem of teacher shortage.

- MEI has done pioneering work in online teaching and learning resources, online tuition, and online teacher professional development to support mathematics at A level.
- Over the past year we have undertaken significant development work on our 'Integral' online teaching and learning platform, producing a fantastic interactive resources ready to support the new maths A levels from this September.
- We intend to investigate how this work could be developed to support all levels of maths education post-16. This could be key to expanding Core Maths uptake.

I'll conclude by emphasising four points as a call for action:

1. The sustained growth in AS and A level Maths and Further Maths entries has been a great success and we must ensure policies continue to support this, so that schools and colleges can access the resources they need to maintain and continue that growth.
2. Greatly expanding Core Maths numbers must be a priority and long term plans and funding must be put in place to ensure this happens.
3. The current policy for GCSE Maths re-sit is not working and we must ensure better alternatives are available that meet the needs of students.
4. Teachers of maths are a vital resource. They must be nurtured, and they must have an entitlement to professional development, so that they can provide the maths education our young people need and deserve.

Please support our call to address these points. At MEI we will continue do all we can to support maths education, and we are keen to collaborate with others to do so.

Something to leave you with: In these times of change, what should the maths curriculum look like in 10 years time? At MEI, we intend to be doing curriculum development work to help to influence this.