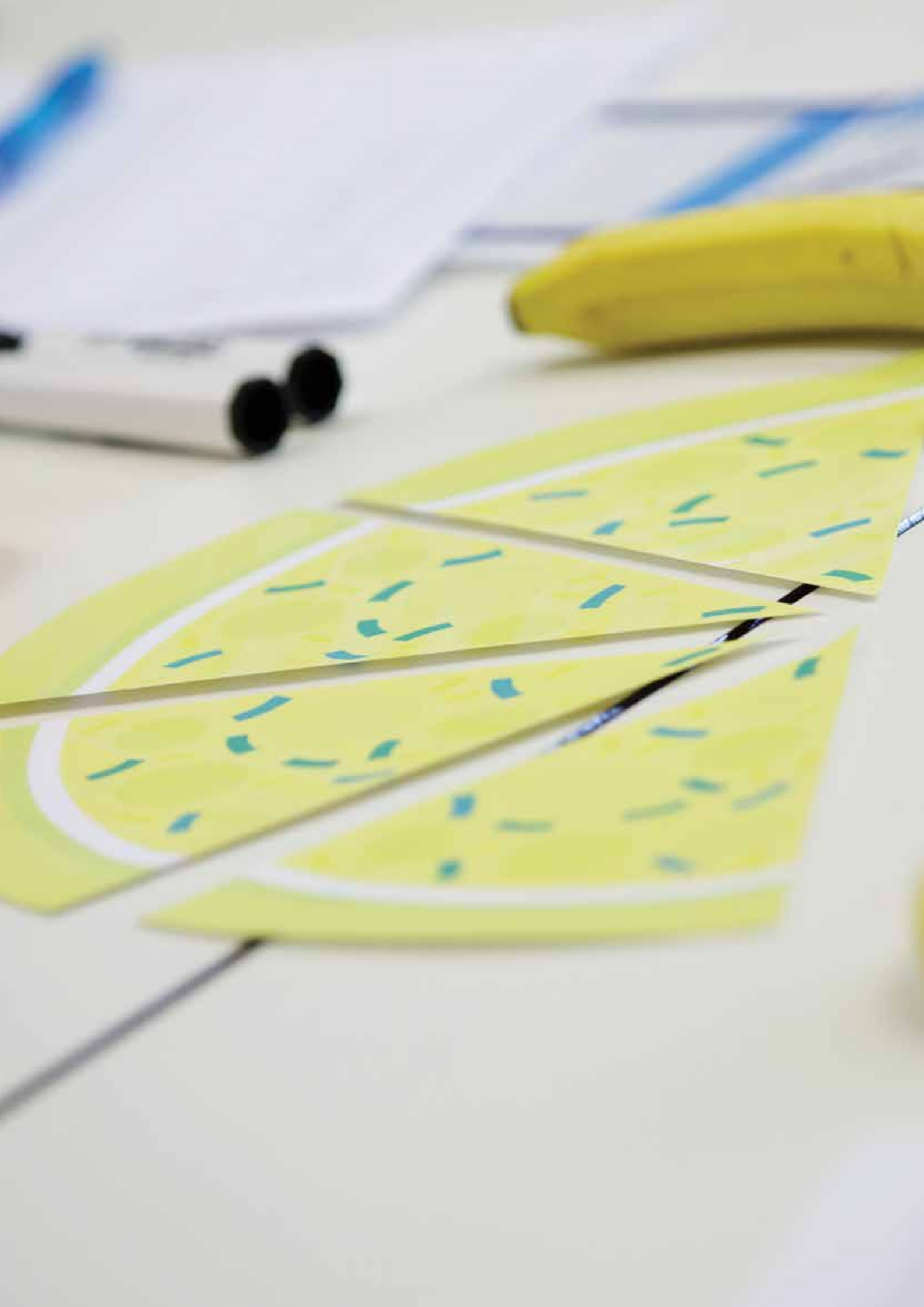




Mathematics in Education and Industry

Annual Review and Accounts

2015-2016



Executive Statement

Academic year 2015-16 continued the theme of rapid reform in maths education, with major changes being implemented at primary, secondary and post-16 level.

For the first time:

- » Primary school pupils sat national tests for the new maths National Curriculum at Key Stage 1 and Key Stage 2.
- » Secondary schools taught the new, more demanding GCSE Mathematics, working towards students taking new exams in summer 2017.
- » Students sat exams in Core Maths, a new programme designed for those who achieved a grade C or above in GCSE Mathematics, but for whom AS and A level Mathematics is not suitable.
- » Post-16 students with a grade D in GCSE Mathematics were required to re-take it.
- » Awarding organisations published draft specifications for AS and A level Mathematics and Further Mathematics for first teaching from September 2017.

All of these changes place extra demands on schools and colleges, and on maths teachers. Mathematics in Education and Industry (MEI) is working to help teachers adapt to the changes, so that they can improve maths education for all our young people.

This review outlines our work across all of these areas. Particular highlights from the last year are:

- » An extensive upgrade of *Integral*®, MEI's online teaching and learning platform for AS and A level Mathematics and Further Mathematics.
- » Our development of nationally available professional development programmes to help teachers prepare for the new maths AS and A levels, across all specifications.
- » The publication of the drafts of the new OCR (MEI) maths AS and A level specifications, which we feel reflect the spirit of the intended reforms, preparing students to be able to use the maths they

have learned when they progress to higher education and employment.

It is very pleasing that, despite a reduction in the overall number of A levels taken across all subjects, A level Mathematics entries have remained steady and A level Further Mathematics entries continue to grow. The MEI-managed Further Mathematics Support Programme (FMSP) continues to play a vital role in ensuring such high levels of uptake.

However, changes to the structure of AS and A levels, and to post-16 funding, have resulted in a fall in AS entries in Mathematics and Further Mathematics, and many schools and colleges are restricting AS/A level students to three subjects. This could have a particularly severe impact on Further Mathematics, which is usually taken as a fourth subject. MEI has raised these concerns with the Department for Education (DfE) and with Professor Sir Adrian Smith's review of post-16 mathematics education, which will report later in 2016.

At GCSE level, it is a cause for serious concern that 70% of post-16 students resitting GCSE Mathematics did not achieve a level 2 pass. The needs of many of these young people, over 120,000 of them this year, have not been met by our current system. MEI will continue to work to try to improve the mathematical learning experience of such students, helping them become confident users of maths.

The supply of well-qualified maths teachers is also an increasingly important issue. Meeting the growing demands for maths education, particularly post-16, requires that the country both recruits new maths teachers and retains and develops our current maths teachers. MEI's growing range of professional development and our support for students can play a key role in ameliorating the situation.

It has been another challenging year for maths education and the challenges are set to persist. We will continue to do all we can to support schools and colleges, to enrich the professional lives of maths teachers, and to improve students' experience of learning maths.



Charlie Stripp

Charlie Stripp MBE, FIMA
Chief Executive, MEI

Who we are

Mathematics in Education and Industry is an independent national charity committed to improving maths education.

We support the teaching, learning and assessment of maths. We work to achieve this directly, through partnerships, and by influencing and advising on national policy relating to maths education.

We aim to develop understanding, confidence and enjoyment in using maths, by encouraging the engagement and participation of students, and by supporting and inspiring teachers.

Our people

MEI employs a highly committed team of staff who work hard to achieve its aims. Our academic staff are experts in maths education and are based throughout England. They are supported by a dedicated team of finance and administrative staff at our offices in Trowbridge, Wiltshire.

We have eleven trustees, all volunteers, who are directors of the charity. Their career paths include senior positions in school and university education, business management and engineering, and they bring a wealth of experience to MEI. They are committed to ensuring MEI's corporate governance is strong and true to its values.

In addition, we have an Advisory Panel of external independent experts who provide MEI with strategic advice.

Our members

MEI's work is supported by its members, and by schools and colleges which have registered with us, free of charge, as MEI Educational Associates.

Our members and Educational Associates make valuable contributions to our work, particularly our AS and A level curriculum development programme, and to our responses to government consultations.



Our work

MEI's work to support maths education includes developing curriculum specifications and schemes of assessment; providing professional development opportunities for teachers; and publishing teaching and learning resources, including *Integral* our online teaching and learning platform for AS and A level Mathematics and Further Mathematics.

We provide direct support to students through the highly successful FMSP, which is funded by the DfE. This programme was developed by MEI and has been managed by us since its inception in 2005.

We focus on the maths education of 11-18 year-olds, addressing both academic and vocational pathways. We also support adult and higher education and the teaching and learning of maths in other subjects. Through our involvement in the leadership and management of the National Centre for Excellence in the Teaching of Mathematics (NCETM) we help



Top: Mohammed Basharat (right), an MEI TAM Deputy Coordinator, engages with teachers at the MEI conference

Above: Jo Sibley, an FMSP Central Coordinator, manages the FMSP's Live Online Professional Development programme



Left: Phil Chaffé, an FMSP Central Coordinator, provides problem solving support for teachers and students



Right: Kevin Lord, FMSP Programme Leader, demonstrates the projectile behaviour of a rigid body

coordinate the Maths Hubs programme and support maths teaching in primary schools.

Most of our work is in England, but we also contribute to improving maths education across the UK and internationally.

Who we work with

We have a rich network of relationships with beneficiaries, partners and other stakeholders, and we often collaborate with other organisations and with the Government to extend the reach and impact of our work. There are several examples of such relationships throughout this review.

We have strong connections with the national maths education community through our membership of the Joint Mathematics Council, and with other Science, Technology, Engineering and Mathematics (STEM) organisations, including STEM Learning.

We have a rich network of relationships with beneficiaries, partners and other stakeholders, and we often collaborate with other organisations and with the Government to extend the reach and impact of our work.

The number of academies managed by multi-academy trusts (MATs) has continued to rise and around 15% of all state-funded schools are now managed by them. Over the last year MEI has started to work with MATs and we aim to further develop this aspect of our work.

The maths education environment

The implementation of the Government's educational reforms continued as planned throughout academic year 2015-16.

MEI's work over this period was dominated by these reforms, with the changes to AS and A level Mathematics and Further Mathematics forming a particular focus.

The Government continues to view improving maths education as a high priority and aims to greatly increase post-16 participation. We were delighted to hear in March 2016 that the Government had asked Professor Sir Adrian Smith, Chair of the Council for the Mathematical Sciences, to review the feasibility of all students continuing to study maths to 18. We have contributed to the review and look forward to the publication of his report later in 2016.

GCSE Mathematics curriculum change

In September 2015 schools began to teach the new GCSE Mathematics specifications. These are designed to be more demanding, with a greater emphasis on mathematical reasoning and problem solving, and it had been anticipated that schools would allocate more timetable time to them, to ensure they were taught effectively. MEI continued to provide related professional development throughout this first year of teaching, targeting the teaching of reasoning and problem solving. The increased demand of the new GCSE Mathematics means more students should be well-prepared to progress to Core Maths and the maths AS and A levels.

Post-16 Mathematics curriculum change

Working towards GCSE Mathematics

Students who do not achieve a grade C or above in GCSE Mathematics at the end of Key Stage 4 are required to continue to study

maths post-16, working towards achieving at least that level of mathematical knowledge.

In academic year 2015-16, students who had achieved a grade D in GCSE Mathematics at the end of Key Stage 4 were required to resit it. As a result, the number of students resitting GCSE Mathematics increased from around 131,000 to nearly 174,000, while the level 2 pass rate for those resitting fell from 35.8% to 29.5%.¹

Recent experience of teaching GCSE resits helped inform an MEI position paper² on GCSE Mathematics, published in June 2016, a key recommendation of which is that a different, 'mature' GCSE Mathematics is required to meet the needs of many of those students who do not achieve a level 2 pass in GCSE Mathematics at the end of Key Stage 4.

Functional Skills Mathematics qualifications are often taken by students who achieved lower than a grade D at GCSE at the end of Key Stage 4. These qualifications are currently being reviewed and MEI has taken part in the process to reform them.

Core Maths

Core Maths qualifications were introduced for first teaching from September 2014 and exams were taken for the first time in 2016. These level 3 qualifications are intended for students who have achieved grade C, or better, in GCSE Mathematics, but who are not taking AS or A level Mathematics. They are designed to develop the skills students need to apply mathematical understanding to the problems they will encounter in their other courses, further study, and future life and employment.

AS and A levels

Reformed AS and A levels in Mathematics and Further Mathematics are to be introduced



Above: Creating opportunities for teachers to share experiences

// MEI is to be congratulated for being able to move with the times and the opportunities it has had to encourage effective and good mathematics teaching and assessment.

//

¹ Ofqual (2016). *Detailed analysis of summer 2016 GCSE results*

² MEI (2016). *MEI position paper on the 2015 reform of GCSE Mathematics*

Throughout 2015-16 MEI developed information, resources and professional development to help teachers prepare for the A level changes.



in England for first teaching from September 2017. The changes are significant and will have a major impact.

AS qualifications will be decoupled from A levels, and all assessment will take place at the end of the course. There will be more emphasis on problem solving, reasoning and modelling, and a requirement for the use of technology to permeate teaching and learning. The content of AS and A level Mathematics has been fully defined at national level and includes pure maths, mechanics and statistics. For AS and A level Further Mathematics, some of the content has been fixed at national level; however, there will also be some choice of content in these qualifications, with different options available.

MEI has worked in partnership with the OCR awarding organisation to develop new OCR (MEI) AS and A level qualifications in Mathematics and Further Mathematics. Draft versions of the specifications and assessment materials were submitted to Ofqual for approval in June 2016.

Throughout 2015-16 MEI developed information, resources and professional



development to help teachers prepare for the A level changes.

Government-funded support

The Government provides support for maths education in England through a number of DfE contracts, which include:

- » The National Centre for Excellence in the Teaching of Mathematics (NCETM)
- » The Maths Hubs programme, coordinated by the NCETM
- » The Core Maths Support Programme (CMSP)
- » The Further Mathematics Support Programme (FMSP)

The NCETM aims to ensure that all teachers of maths have easy access to high quality continuing professional development. MEI is a partner in the consortium that manages the NCETM. Charlie Stripp, MEI's Chief Executive, is also the Director of the NCETM, seconded from MEI on a half-time basis.

The Maths Hubs programme is a collaborative national network of 35 Hubs, each locally led

Left: Mick Blaylock, Head of the Core Maths Support Programme, talks to delegates at the MEI Conference

Right: A level Mathematics students work on one of *Integral's* Tarsia puzzles

// The course gave me far more useful ideas for using in the classroom than I ever imagined! //

by an outstanding school or college. It aims to develop and spread excellent practice and is coordinated at a national level by the NCETM. The Maths Hubs were established two years ago. Over this period MEI has increased its engagement with the Hubs, and has close working relationships with many of them. We have helped them respond to the needs of local teachers by delivering workshops and professional development courses. In addition, several Hubs have hosted a number of MEI's own professional development courses.

The CMSP, managed by the Education Development Trust, aims to support schools and colleges to promote and implement Core Maths. MEI has provided extensive resources to support Core Maths qualifications, several of which are available from the CMSP website. MEI developed two of the six available Core Maths specifications; these are administered by OCR. During 2015-16 we delivered a

programme of free professional development for Core Maths, which was funded by OCR.

The FMSP aims to support schools and colleges in promoting the study of AS and A level Mathematics and Further Mathematics. It also arranges Further Mathematics tuition for students when their schools and colleges cannot provide it themselves. The FMSP is managed by MEI, working in partnership with Tribal Education and the University of London Institute of Education (UCL IOE).

During the last year these programmes worked together at national and regional levels, to ensure effective coordination of support for level 3 maths. The FMSP organised a national meeting in London in March 2016 at which representatives of all four programmes met to discuss shared goals. This was followed by local meetings across England in the summer term.

//
Your passion
is infectious.
//

Below: Teachers explore new ideas together



More students are now studying maths post-16, whether this involves working towards Functional Skills Mathematics, GCSE Mathematics, Core Maths, AS or A level qualifications.

Maths teaching for mastery

As part of MEI's work in the leadership of the NCETM, a 'maths teaching for mastery' approach is being widely taken up by primary schools and is also starting to influence secondary school maths teaching. The approach is based on the way maths is currently taught in the Far East, particularly in Shanghai. It is centred on whole-class teaching, with an emphasis on developing deep learning and connecting mathematical ideas, employing careful questioning and discussion. This strongly reflects MEI's philosophy of how maths should be taught. A pupil may be said to have 'mastered' a mathematical technique when they can use it as part of the basis for further mathematical learning. The approach is underpinned by the belief that by engaging positively with maths, all children can develop their understanding.

Teacher shortages

The national shortage of teachers of maths at all levels was widely reported throughout the year. Unfortunately, this shortage comes at a time when the need for maths teachers is increasing, with more maths being studied post-16 at all levels and a need to increase teaching time for GCSE Mathematics in Key Stage 4. The Government has implemented new schemes to attract more people to teach maths, including the *Mathematics Teacher Training Scholarship*, *Future Teaching Scholars* and *Return to Teaching* programmes. MEI continues to promote these and other recruitment initiatives. We strongly believe that regular engagement with high quality professional development is essential for sustaining an effective and motivated teaching workforce.

Post-16 participation in maths

More students are now studying maths post-16, whether this involves working towards Functional Skills Mathematics, GCSE Mathematics, Core Maths,



Left and above: Teachers engage in MEI's extensive programme of professional development



AS or A level qualifications. MEI has strongly encouraged this trend, and we are delighted to see it advancing.

The first candidates to take Core Maths qualifications, almost 3000 students, received their results in the summer of 2016; of these, over 20% took the qualifications developed by MEI and administered by OCR. The overall pass rate was 82%. It is hoped that the number of students studying Core Maths will rise rapidly in future years if the Government's commitment to encourage all 16-18 year olds to study maths is to be fulfilled. The potential annual cohort for Core Maths is over 250,000 students. The introduction of Core Maths presents a staffing challenge at a time when there is a serious shortage of maths teachers. MEI is working to address this issue by providing professional development courses and teaching and learning materials designed to equip more



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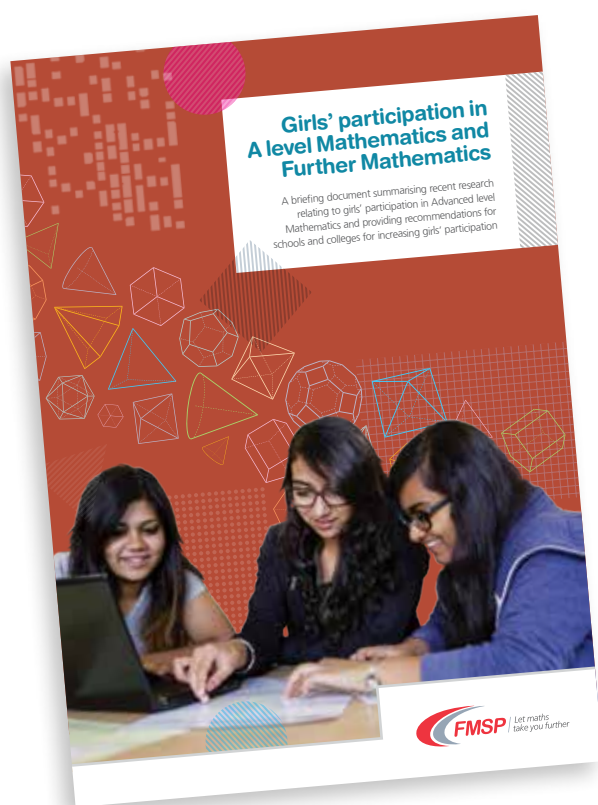
teachers, including non-maths specialists, to start teaching Core Maths.

The UK's 2016 A level entry numbers for Mathematics were also very encouraging. Despite an overall reduction of 1.65% in entries for all A levels, A level Mathematics entries held up well. Over 92,000 students took A level Mathematics which, once again, had the highest entry of any A level subject. A level Further Mathematics entries continued to increase, this year by 1.76%, resulting in a total entry of more than 15,000, the highest ever.

Above left: More students are now studying maths post-16

Above right: A student at an FMSP sixth form problem solving day tackles a problem with the help of a university postgraduate

A level Further Mathematics entries continued to increase, this year by 1.76%, resulting in a total entry of more than 15,000, the highest ever.



Girls' entries to AS and A level Mathematics and Further Mathematics have grown strongly, in line with the overall increase in entries. MEI continues to research ways to improve the gender balance in entries to the maths AS and A levels. During the year the FMSP produced a briefing document summarising the findings and recommendations resulting from research by UCL IOE into girls' participation in AS and A level Mathematics and Further Mathematics. This booklet was distributed widely and has been well-received.

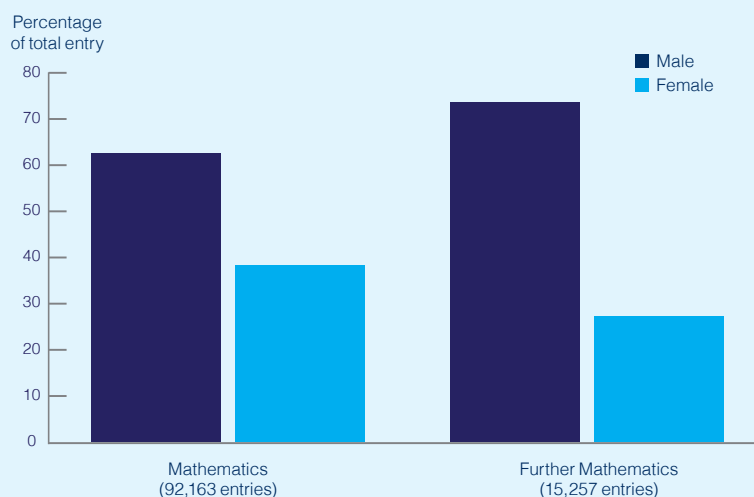
The FMSP also engaged UCL IOE to conduct research into the benefits of a school or college introducing A level Further Mathematics. The findings suggest there are wider, whole school benefits.



I was really scared to start Further Mathematics as I thought that everyone would already know more than me and I wouldn't be able to understand the work. However, when you get to know everyone in the class and your teacher, it feels like you've never known any different.



2016 A level Mathematics and Further Mathematics entries by gender





“Claims of increase in aspiration among other students, and in participation and attainment in A Level Mathematics, appear to be supported by evidence. So too are enhanced teacher knowledge, commitment and refreshment.”

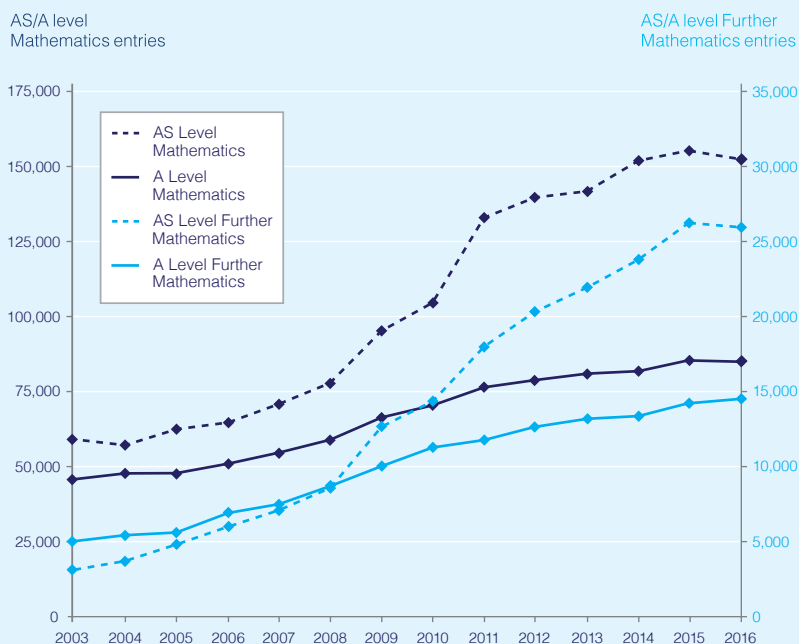
Wider school effects of engaging with the Further Mathematics Support Programme to introduce Further Mathematics: Summary report, March 2016

Whilst the number of 16-18 year olds studying maths beyond GCSE level is increasing, there is a danger that this trend could easily be reversed. Participation in maths AS and A levels is particularly vulnerable in the current education environment.

Changes implemented over recent years in government funding for post-16 education mean that state schools and sixth-form colleges are finding it difficult to maintain the full curriculum previously offered. Since these new arrangements were introduced, some schools and sixth-form colleges have restricted the number of A levels a student may take to three and have stopped entering students for AS levels.

Whilst the number of 16-18 year olds studying maths beyond GCSE level is increasing, there is a danger that this trend could easily be reversed.

AS/A level Mathematics and Further Mathematics entries in England



Source: JCQ

The maths AS levels are valuable qualifications in their own right, recognised by higher education and employers, but this summer AS entry numbers in both Mathematics and Further Mathematics fell for the first time in more than a decade.

MEI is concerned that the changes in funding, combined with the decoupling of AS and A levels, may have a particularly negative impact on the numbers of students taking AS and A level Further Mathematics. Further Mathematics is especially at risk as it is usually taken as a fourth A level subject. We have raised our concerns through our input to Professor Sir Adrian Smith's review, and we will continue to monitor the situation closely.

Above left: Students work together at an FMSP problem solving event

Highlights of the year

2015-16 was another busy year for MEI with the changes to maths A levels affecting many areas of our work.

House of Lords reception

In November 2015 MEI held its first parliamentary reception at the House of Lords, hosted by Lord Broers³. We were delighted that so many policy makers and leaders from maths education and business joined us to discuss the importance of maths education, the reforms taking place, and what might encourage increased participation post-16.

In his keynote speech, Charlie Stripp asked for support in three areas:

- » Encouraging students to choose the most challenging maths qualifications, as this will ensure they are well-equipped for a successful future.
- » Supporting MEI's call for greater investment in the recruitment and development of maths teachers.
- » Supporting MEI's call to ensure funding changes do not have a negative effect on the uptake of AS and A level Further Mathematics.

MEI's Chair of trustees, Gerald Goodall, urged those present to work with MEI to help meet the challenges faced by maths education.

New MEI AS and A level specifications

MEI's work on the development of new specifications for AS and A level Mathematics and Further Mathematics spanned the whole of the year, from initial design discussions starting in September through to the submission of draft specifications in June. The changes to the requirements are the most

radical for over 20 years, and we have seen this as an opportunity to design an engaging, innovative qualification that will provide students with the best possible foundation for work and further study. Once accredited, these new qualifications will be administered by OCR, and we will be working closely with OCR to provide tailored professional development and resources to support schools and colleges to teach them effectively.

Support for the new maths AS and A levels

MEI wants to help all teachers of all specifications through the changes to the maths A levels and we have developed an extensive programme of support with this aim in mind.

An essential aspect of this programme has been our campaign to raise awareness of the changes, communicated through social media, email and events. This encourages teachers to visit the MEI and FMSP websites to access comprehensive information and advice. Information has also been disseminated through the FMSP's teacher networks, which provide opportunities for teachers to discuss the issues.

With generous sponsorship from Casio, MEI has been able to offer a major national programme of professional development courses to support the transition. The delivery of this programme started in the summer of 2016 with courses designed to support those leading maths departments. It will progress during 2016-17 with a suite of courses for all teachers of the new AS and A levels, which will cover the changes in more detail. These courses will be complemented by over 40 one-day events delivered by the FMSP during autumn 2016.

As well as developing courses to support the transition to the new A levels, we have

//
Congratulations on your development of the MEI A level Mathematics and Further Mathematics specifications – an enormous task, which you have completed with great professionalism.
//

A levels 2017



ARE YOU READY?

Above: Image from MEI's 2017 maths A levels campaign

³ Former Chair of the House of Lords Science and Technology Select Committee

MEI continues to offer a rich and varied programme of professional development courses designed to meet the diverse needs of all 11-18 maths teachers.

reviewed and developed our existing A level professional development courses in line with the new specifications.

Teachers and students will also need high-quality teaching and learning resources for the new A levels. To meet this need we have:

- » Undertaken a major review of *Integral*, MEI's teaching and learning platform for AS and A level Mathematics and Further Mathematics. The review includes the development of exciting new resources, including interactive Walkthroughs and Skill Packs, and a new look and feel for the website.
- » Worked in partnership with Hodder Education to develop a series of textbooks to support the new qualifications; these will be available in printed and digital format. Digital editions will be linked to *Integral*, providing a valuable new facility for subscribers.
- » Commenced the development of a flexible and editable 'Scheme of Work' designed to be a useful planning tool for teachers preparing for September 2017.

MEI's work to support maths teachers through the A level changes is well advanced, and will continue to be a major priority for 2016-17.

Teacher support

An essential aspect of MEI's work is support for maths teachers. This involves professional development, information and guidance, and creating opportunities for teachers to engage professionally with one another.

MEI continues to offer a rich and varied programme of professional development courses designed to meet the diverse needs of all 11-18 maths teachers. The range of mathematical content spans post-16 Functional Skills Mathematics through to the advanced problem solving skills required for entry to some of the most prestigious STEM degrees. Courses are designed



Above: Teachers engage in inspirational professional development

to meet the needs of all maths teachers, covering matters such as curriculum change, subject knowledge, pedagogical practice, departmental leadership and curriculum enrichment. We want teachers to have easy access to our professional development and, where suitable, we offer short live-online sessions at convenient times of the day, as well as face-to-face events across the country, and extended courses, which often involve a blend of these approaches.

Our extended courses are designed to help teachers move into teaching maths at levels they have not previously taught. They include *Teaching GCSE Mathematics* (TGM), *Teaching Advanced Mathematics* (TAM), and *Teaching Further Mathematics* (TFM). In 2015-16 we developed two new extended courses: *Teaching Mechanics* and *Teaching Statistics*, which can attract Masters credits leading to a Postgraduate Certificate in Post-16 Mathematics Education from the University of Plymouth.

“
Excellent practical support and pedagogy – the course leader was superb.
”

“
The best CPD course I have been on.
”

We want teachers to have easy access to our professional development.



MEI has been offering TAM for many years and interest in the course remains high, with over 200 places offered each year. We are, however, continually looking for ways to adapt and improve our offer to meet the changing needs of teachers. As a result, teachers on the course can now choose to work towards Masters level accreditation, to focus purely on pedagogy and subject knowledge, or to do the course as preparation for teaching A level Mathematics in the following year.

In 2013-14 MEI began a major new project with the University of Cambridge delivering free courses to introduce teachers to the Underground Mathematics⁴ resources. These resources had been developed by the University to enhance the teaching and learning of A level Mathematics. MEI continued this dissemination during 2015-16, with the

⁴ Previously known as the Cambridge Mathematics Education Project

// You re-inspired my love of learning challenging mathematical concepts. //

Above: Teachers engage in inspirational professional development

addition of several courses to cohorts of trainee teachers. The project will continue for a further year, by which time we aim to have delivered over 100 courses.

At the end of 2015 MEI successfully completed seven professional development projects with the London School Excellence Fund. MEI worked with over 300 maths teachers on projects which benefited more than 10,000 students from 200 London schools.

2015-16 saw the start of the Stoke-on-Trent Mathematics Excellence Partnership. This is a three-year programme focused on improving the teaching and learning of maths

An important aspect of the FMSP's work is to improve Key Stage 4 students' experience and confidence in maths, so that more continue to study it post-16.

across the city, and particularly at GCSE. MEI is closely involved and will work on several initiatives, including a development course for heads of maths departments and a major project working with local colleges to support improvements in the teaching of GCSE Mathematics resit.

The FMSP helps schools and colleges to develop their capacity to teach AS and A level Further Mathematics and to raise participation in maths A levels. To support these aims, as well as providing extensive professional development for teachers of the maths AS and A levels, in 2015-16 the FMSP:

- » Offered *Key Stage 4 Extension and Enrichment* courses attended by 600 teachers.
- » Successfully piloted courses to help teachers with the new Higher Tier content of the new GCSE Mathematics. These will be offered nationally in autumn 2016.
- » Provided *Advanced Mathematics for Teachers in Early Career* courses on teaching A level Mathematics, attended by 152 trainee teachers. This course was developed by UCL IOE as part of an FMSP project.
- » Building on the previous year's successful pilot, worked with the NCETM to train and accredit 53 new A level Maths Professional Development Leads.

These are some of our large scale activities; however, other aspects of our teacher support work also continue to make a big difference to teachers, year-on-year.

MEI's annual conference

In 2016 we returned to the University of Bath for MEI's annual three-day conference. We were joined by 265 delegates, an increase of over 30% on 2015, in a wide range of activities including 100 stimulating sessions and plenaries, an extensive exhibition, social



Above and left: Delegates at MEI's 2016 annual conference

//
The MEI
conference has
revolutionised
my teaching.
//

events, and many other opportunities to share ideas and be inspired.

Student support

The majority of MEI's direct work with students takes place through the FMSP, which provides tuition for students of AS and A level Further Mathematics, much of it delivered online.

In 2015-16 the FMSP changed its model for online tutoring, with students attending online lectures in larger groups and tutorials in smaller groups on alternate weeks. This was well received, and provided support for 260 students.

The FMSP's programme of Live Interactive Lectures, which supports schools and colleges with their teaching of AS and A level Further Mathematics, expanded to include 237 sixth form students.

An important aspect of the FMSP's work is to improve Key Stage 4 students' experience and confidence in maths, so that more continue to study it post-16. The FMSP provides enrichment and extension activities, together with information and advice about further study and careers. In 2015-16, this included a range of enrichment events attended by over 12,000 students, and the FMSP's Year 10 Maths Feast team competition with more than 3000 participants.

The FMSP also provides enrichment activities for maths A level students. These include the Senior Team Maths Challenge competition, organised in collaboration with the United Kingdom Mathematics Trust. Entries have been rising steadily in recent years and the 2015-16 competition held 63 heats, with entries from 1237 schools.

Demand for tuition and support for the STEP, AEA and MAT⁵ exams, now required by



We are very grateful to MEI for the valuable problem solving skills that prepared our daughter for the STEP exams. She received today a confirmation from the University of Cambridge to read Mathematics. We are very, very happy.



several leading universities, soared over the last year. MEI continued to work with the University of Cambridge, University College London and the University of Warwick to help their applicants prepare for these exams. In addition, we developed an exciting new *Problem Solving MATters* programme for students preparing to take the MAT. This programme is delivered through three study days, which focus on the specific problem solving skills students need to develop. Additional support is provided by mentors from

Above: Students engaged in solving problems

⁵ The STEP (Sixth Term Examination Paper) and the MAT (Mathematics Admissions Test) are admission tests; the AEA (Advanced Extension Award) in Mathematics is a qualification

Irrespective of their roles or engagement with the programme, teachers were overwhelmingly positive about the FMSP.

the University of Oxford and Imperial College London. The programme was made possible through the generous support of Dr Tony Hill, an alumnus of the University of Oxford. The FMSP also continued to provide regular local STEP, AEA and MAT classes across England. In addition, the FMSP organised 41 one-day events to support students with higher level mathematical problem solving. These courses help ensure that all students can access the expert tuition they need to gain places on the most prestigious STEM degree programmes.

Independent evaluation of the FMSP

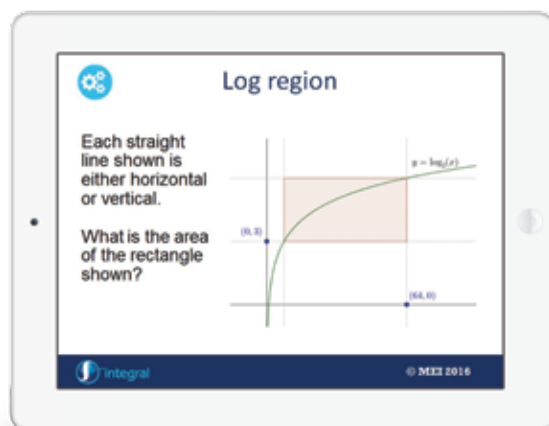
In May 2016 Sheffield Hallam University reported the results of its independent evaluation of the FMSP. The findings confirmed that the FMSP programme continued to be held in high regard by teachers. Irrespective of their roles or engagement with the programme, teachers were overwhelmingly positive about the FMSP. We were delighted to receive this affirmation of the quality of this aspect of MEI's work, which is essential to providing equality of opportunity in pre-university maths education.

"The FMSP has been invaluable... Without the FMSP there would be no uptake of Further Mathematics at all at this school. The quality of support and training is very high. The FMSP is a label for guarantee of quality."

Teacher interview from the FMSP independent evaluation

Resources

Although the main focus of our resources development has been our review of *Integral*, we also took the opportunity to develop a new maths app. *Sumaze! 2* is the sequel to our popular *Sumaze!* app. It presents puzzles of increasing difficulty, involving fractions, decimals, percentages, prime numbers and digits. Both apps were funded by the Sigma Network of university maths and statistics support centres. They have proved incredibly popular, with the total number of downloads exceeding 37,000. We believe the application of typical elements of game playing to basic maths skills can help engage more people of all ages in building deeper mathematical understanding, whilst also honing their speed and accuracy.



// Sumaze! is a brilliant app. I'm as addicted as my eight year old. **//**

Far left: Sumaze! 2

Left: An example from *Integral*'s new problem solving resources

Communication

MEI's engagement with teachers and other stakeholders expanded during 2015-16. We met more people by exhibiting at more conferences, including BETT 2015, STEMTech 2016 and several Maths Hub events. Our social media presence grew significantly; the number of MEI Twitter followers increased by almost 40%, FMSP Twitter followers were up by over 75%, and MEI Facebook Likes up 65%. We had more than 2,200 subscribers to the FMSP Revision Videos YouTube channel with more than 400,000 views, and over 600 subscribers to the MEI YouTube Channel with more than 120,000 views.

Since September 2015 we have been publishing a series of *Focus of the Month* articles on the MEI and FMSP websites. These shine a spotlight on particular aspects of our support for teachers. They have covered a wide range of topics, with titles including *Sixth Form Open Evenings*, *Returning to teaching*, and *Girls' participation in Advanced Mathematics*. In addition, we have expanded the content of our free *M4* resources magazine, which complements MEI's regular newsletter.

Over the last year we have made several contributions to academic conferences and associated publications, including the four-yearly International Congress on Mathematical Education, which took place in Hamburg. Regular contributions have been made to various professional organisations' membership publications, such as the Mathematical Association's *Mathematics in School*, and the Institute of Mathematics and its Applications' *Mathematics Today*. Articles have been on various topics, including: improving access to Further Mathematics for state-school students; the growth of Further Mathematics in relation to transition to STEM degrees; and on the numerous types of professional development MEI provides. In addition, MEI was commissioned by the Sigma Network to produce an updated guide for academics,



entitled *Understanding the UK Mathematics Curriculum Pre-Higher Education*.

International

MEI has often been invited to support maths education in other parts of the world. 2015-16 was no exception, and saw MEI delivering professional development in China and Switzerland. In addition, a number of international teachers engaged in our live-online professional development courses.

MEI also contributed to the *Connecting Classrooms* project, a joint initiative between the British Council and the Department for International Development, which aims to connect UK classrooms to over 30 countries around the world. The course is intended for teachers, in the UK and other countries, specialising in a range of subjects. MEI's input involved adapting the *Teaching critical thinking and problem solving* module to suit an audience of maths specialist teachers, mentoring the trainers, and supporting the teachers in their course project work.

FOCUS ON SIXTH FORM OPEN EVENINGS



Top: Kevin Lord listens to a group of students during a visit to Shanghai

Above: Image from an FMSP Focus of the Month article

Financial review

MEI Statement of Financial Activities for the Year Ended 31 March 2016 (Incorporating an Income and Expenditure Account)

Extract from audited accounts

	Unrestricted funds £	Restricted funds £	2016 Total funds £	2015 Total funds £
INCOME				
Donations and legacies	67,914	–	67,914	71,334
Other trading activities	284,596	–	284,596	285,937
Investments	1,655	–	1,655	1,441
Charitable activities				
Curriculum and Resources	74,069	13,000	87,069	131,751
Teacher Support	463,763	180,256	644,019	685,592
Business Development and Communications	75,076	3,660	78,736	90,540
Further Mathematics Support Programme	–	5,363,460	5,363,460	5,311,500
Total income	967,073	5,560,376	6,527,449	6,578,095
EXPENDITURE				
Raising funds	75,321	–	75,321	81,471
Charitable activities				
Curriculum and Resources	513,409	13,000	526,409	490,819
Teacher Support	231,646	345,921	577,567	468,518
Business Development and Communications	132,617	3,660	136,277	74,292
Further Mathematics Support Programme	–	5,318,673	5,318,673	5,283,369
Total resources expended	952,993	5,681,254	6,634,247	6,398,469
NET INCOME/(EXPENDITURE)	14,080	(120,878)	(106,798)	179,626
Gross transfers between funds	7,824	(7,824)	–	–
Net movement in funds	21,904	(128,702)	(106,798)	179,626
RECONCILIATION OF FUNDS				
Total funds brought forward	929,234	466,284	1,395,518	1,215,892
TOTAL FUNDS CARRIED FORWARD	951,138	337,582	1,288,720	1,395,518

MEI implemented a deficit budget in 2015-16 in preparation for the introduction of the new maths AS and A levels in 2017.

This investment was in three key areas:

- » Support for and development of the new maths AS and A level specifications.
- » New content and improved functionality for *Integral*, our online teaching and learning platform for the maths AS and A levels, in preparation for the introduction of the new specifications in September 2017.
- » Additional resources to develop and implement MEI's new marketing and communications strategy, to help maximise the impact of our work.

MEI's income in 2015-16 fell slightly from £6,578,095 to £6,527,449.

Over the same period our programme of investment meant that our expenditure increased from £6,398,469 to £6,634,247.

The net effect was a deficit of £106,798 compared with a surplus of £179,626 in the previous year.

Our financial position remains strong, with prudent reserves and well controlled cash flow.

The summary financial statement is only a summary of the information in the charity's full financial statements (on which the auditors gave an unqualified report).

The full statutory financial statements, including the trustees' report and the unqualified auditors' report, can be obtained from:

MEI

Monckton House
Epsom Centre
White Horse Business Park
Trowbridge
Wiltshire BA14 0XG

The full financial statements were approved by the Board of Trustees on 1 July 2016 and have been submitted to the Charity Commission.

Richard Browne

R Browne

Company Secretary, MEI



Looking ahead

The significant and rapid changes to the maths education environment experienced in 2015-16 are set to continue into 2016-17.

Our work over the coming year will focus on supporting schools, colleges and teachers to implement these changes, in particular the transition to the new maths AS and A levels.

We will also continue to develop our work to provide equal opportunities to students, aiming to ensure all can access the maths support they need to enable them to maximise their potential.



Get involved

We welcome your involvement with MEI. There are several ways in which you can keep in touch with us and support our work.

Education providers can register with us free of charge as Educational Associates, and receive regular communications, including topical teaching and learning resources.

If you are interested in contributing to our work to improve maths education, please consider becoming an individual member of MEI. Benefits include voting rights, regular communications, and discounted fees for our annual conference and several of our professional development courses.

If you are an employer, you can support our work as an MEI Corporate Associate. There are also many ways in which you can be more directly involved, from showing us how you use maths in your workplace to sponsoring our activities. We can also help you develop your employees' maths skills.

You can follow MEI on Facebook, Twitter and LinkedIn, and subscribe to our YouTube channels.

To find out more, please visit: mei.org.uk





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Charity number: 1058911