sigma Σ network for excellence in mathematics and statistics support

NEWSLETTER

Issue 14: Autumn 2017

sigma Network Annual General Meeting

Our AGM was held on 11th July 2017 at the University of Birmingham. The meeting was attended by 37 people, representing 23 institutions.

The Chair's Report. David Bowers outlined the achievements of the **sigma** Network during the past year, which was our first year as a non-funded, constituted professional association.

- The network organized nine CPD and networking meetings around the country, which allowed maths and statistics support practitioners to meet together and share ideas and experiences. In addition, four training events were run for new maths support staff. These events are popular and much appreciated by those who attend, and we thank those institutions who generously hosted them.
- The three **sigma** Special Interest Groups (focusing on particular issues relating to: accessibility of maths support and resources; employability and numerical reasoning; and the specific role of statistics support) continued to operate over the past year and have reported on their progress through the website, newsletter and conference presentations. In addition, a new working group was set up to help maths support staff gain professional recognition through HEA Fellowship.
- Our mailing list has grown to well over 300, including some overseas members. The **sigma** Network has established and developed links with a number of sector bodies and associations.
- None of this would have been possible without the commitment of our Steering Group members, and the support of their institutions. Thanks and appreciation!

The Secretary's Report. Eugenie Hunsicker explained that, during this first year as a constituted professional association, there had been no formal membership scheme. The maths support "community of practitioners" has been strong and supportive enough to carry the work of the **sigma** Network on a self-sustaining basis. A formal membership arrangement might be considered in the future, but nothing would be decided without full consultation.

The Treasurer's Report. Chetna Patel confirmed that there had been no income and no expenditure over the past year, and the bank balance remained at zero. Thanks were expressed to those institutions that supported the **sigma** Network in a variety of ways. Opportunities for income generation would be explored in the future.

The main business of the AGM was to ratify members of the Steering Group. The following people have agreed to serve on the **sigma** Network Steering Group for 2017/18, and all have an appropriate level of management support within their institutions to carry out this role:

David Bowers	University of Essex
Hansa Bissoondeeal	University of Essex
Emma Cliffe	University of Bath
Ruth Fairclough	University of Wolverhampton
Mark Hodds	Coventry University
Eugenie Hunsicker	Loughborough University
Tony Mann	University of Greenwich
Ellen Marshall	Sheffield Hallam University

Mohamed Mehbali	London South Bank University
Alun Owen	University of Worcester
Chetna Patel	De Montfort University
Rob Wilson	Cardiff University
Noel-Ann Bradshaw	Representative of the IMA

The meeting ratified the Steering Group membership by show of hands.

The Chair thanked Cheryl Voake-Jones, who is standing down from the Steering Group due to maternity leave, for her excellent work on the **sigma** Network newsletter and Twitter account. Hansa Bissoondeeal was welcomed to the Steering Group as a new member.

Fuller details of the AGM are available at
http://www.sigma-network.ac.uk/sigma-network-annual-general-meeting-2017/

– David Bowers, Chair, **sigma** Network

Editor's Note

The roads are busier and Christmas cards are on sale, it must be September. Welcome to the Autumn 2017 edition of the **sigma** newsletter! (It is acknowledged that it is not *officially* autumn quite yet, but it sure feels like it – I write this wrapped in a large scarf in early September and so calling this a summer newsletter does not seem quite right, even for our rainy little island.)

Thanks very much to everyone who gave such nice comments about the 'new look' newsletter, it is really appreciated. I hope you enjoy reading this edition as much as I enjoyed pulling it together.

However, two editions in and already my time as Editor has come to an end, for now at least. At the end of September I will be taking some time out of work to embark on a new adventure, parenthood – yikes! I will be leaving you in the very capable hands of Hansa Bissoondeeal from the University of Essex, who will take over responsibility of newsletter Editor and will also be joining the **sigma** Steering Group. For MASH/Bath related matters, my cover will be Charles Cox, who many of you will no doubt meet over the coming months.

Thank you, of course, to all authors for their contributions to this edition. The deadline for contributions for the next edition (Spring 2018) is **28th February 2018**. We welcome contributions on any topic that may be of interest to practitioners and academics supporting higher education students in their learning of mathematics and statistics. To submit an item, see http://www.sigma-network.ac.uk/sigma-newsletters/.

Finally, the boring bit as usual: the views expressed do not necessarily constitute recommendations from the **sigma** Steering Group or any associated parties.

Enjoy, and au revoir for now!

– Cheryl Voake-Jones

The Chair's piece: You Say, We Listen

David Bowers
Chair | sigma Network
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It was good to meet so many maths support friends at the recent IMA conference "Mathematics Education beyond 16: Pathways and Transitions" held at the University of Birmingham in July. The need for a confident and responsive provision of mathematics and statistics support for students at all levels in higher education remains as strong as ever, and the opportunity to meet with like-minded colleagues at a national (in fact international) conference always results in new contacts and new ideas – although unfortunately not additional hours in the day to devote to them as much as one would like!

Various **sigma** Network "activists" presented their work, and the conference also accommodated our Annual General Meeting (see report elsewhere in this Newsletter). Before people left the AGM, I asked them to note down suggestions for things they would like to see the **sigma** Network address in the coming year. We appreciate – indeed, we critically need – the engagement of the wider maths support community if we are to thrive as a professional association for the sector as a whole.

Here are some of the suggestions received:

- Can you help with advice on how to promote our maths support service and raise awareness [of the importance of maths support]?
- We would like a workshop in the north of England on using social media for maths support.
- Can you provide more statistics training so that maths support tutors who are not stats specialists can better support students in stats too?
- Can you provide guidelines on effective learning spaces for maths support?
- Please consider becoming a membership association with different levels of membership.

I will bring these suggestions to our next Steering Group meeting, but I am certain the response to the first four points will be: yes! These are exactly the kind of ideas we want in order to put together a programme of CPD events and networking meetings for the coming year. If anyone reading this would be willing to contribute to this programme by hosting an event or by being a keynote speaker, please get in touch and we will get you involved.

Regarding the fifth point, I am sure this was motivated by the Secretary's Report at our AGM that touched on membership issues. We already intend to consult more widely on this in the future, so please watch out for (and respond to) relevant messages via our mailing list.

So onwards now into the new academic year! Keep the suggestions and ideas coming, and we promise to keep listening.

IMA Gold Medals awarded to Tony Croft and Duncan Lawson

Tony Croft
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Duncan Lawson
PVC Formative Education | Newman University
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On 29th June 2017 Tony Croft and Duncan Lawson were awarded the IMA Gold Medals 2016 for outstanding contribution to the improvement of the teaching of mathematics, and in particular for their collaboration over many years in the development of mathematics and statistics support. The medals were presented at The Royal Society by the President of the IMA, Professor Chris Linton. A full citation can be found here: https://ima.org.uk/3144/citation-two-ima-gold-medals-2016/.

Following the presentation Tony and Duncan gave the IMA Gold Medal Lecture. An article based on the lecture will be published in a future edition of the IMA publication *Mathematics Today*.

Tony and Duncan commented: "We are deeply honoured and delighted to receive the IMA Gold Medals 2016. For the first time, the IMA has awarded Gold Medals to individuals working in the field of mathematics education. We believe this is timely recognition of the challenges facing those charged with inspiring the next generation of mathematicians and the many more non-mathematicians who will need to use mathematics and statistics in an increasingly wide range of occupations."

"We would like to feel that we are accepting the Medals on behalf of numerous academic and support staff, students, agencies and professional bodies with whom we have worked. Through their enthusiasm, expertise and dedication, hundreds of thousands of students have been supported. Through their hard work and commitment mathematics support has gathered significant momentum and is yielding the positive benefits we see today."

Tony and Duncan receiving the Gold Medals from IMA President, Professor Chris Linton

CETL-MSOR 2017 and beyond

Michael Grove
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On 10 - 12 July 2017, the annual CETL-MSOR Conference took place at the University of Birmingham. This year it was held as part of the Mathematics Education beyond 16: Pathways and Transitions Conference organised by the Institute of Mathematics and its Applications.

The activities of the conference were delivered through a series of working groups, including a group dedicated to mathematics and statistics support within higher education. One of the overarching keynote sessions for the conference was delivered by Tony Croft, one of the founders of **sigma** and Professor of Mathematics Education at Loughborough University.

In addition to presentation sessions and discussions based around the working groups, the conference also served as an important reminder of the real benefits that come from being able to talk, and network, with like-minded individuals from across the sector. This is a feature of the **sigma** Network from which many of us have benefitted over the years. The question therefore arises, what next for CETL-MSOR which has been running since the inaugural meeting at Loughborough University in 2006?

Discussions held with many individuals throughout the conference indicated how highly valued this meeting is as a chance to find out about what others are doing, to share ideas and resources, and develop collaborations, not just in mathematics and statistics support, but also in teaching and learning within the higher education mathematical science more broadly. While we have been fortunate this year to continue CETL-MSOR in conjunction with the IMA, we as a community must ensure we maintain our conference. In this vein, a small working group has been established with a view to running CETL-MSOR 2018 at its traditional time on the 5/6 September 2018. Over the coming months Shazia Ahmed (University of Glasgow), Michael Grove (University of Birmingham), Ciarán Mac an Bhaird (Maynooth University) and Rob Wilson (Cardiff University) will be developing plans to ensure the future of the CETL-MSOR conference series. If you have any ideas or suggestions, please do get in touch with one of us, but if not, we look forward to seeing you in September 2018!

Tony's keynote session at this event was one of his very last professional commitments before retiring. From the whole **sigma** Network, we wish you a very happy and enjoyable retirement.

Many of us would not be where we are without the invaluable efforts you made into establishing mathematics support.

The Provision of Mathematics and Statistics Support in Scottish HEIs (2016)

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The Scottish Maths Support Network (SMSN) was inaugurated in July 2008. The aim of the Network is to create a community of support for those interested in Maths and/or Stats support in Scotland. Until last year, there had been a number of Irish and UK-wide surveys on the provision of Maths and Stats support, but none looking at the Scottish picture. With Maths and Stats support becoming more prevalent, it seemed timely to assess the state of the provision in Scotland.

The SMSN Committee 2016 (Calum Macdonald, Kate Durkacz, Shazia Ahmed, Peter Davidson and Morgiane Richard) were tasked to conduct the research. We designed a questionnaire with 8 questions, covering:

- Existence/non-existence of support within institution
- Staffing of provision
- Type of support offered
- Attendance recording
- Audience to which support is offered

Scotland
(https://commons.wikimedia.org/w/index.php?curid=1503858)

We contacted the 17 Scottish HE Institutions, all of which responded to our questionnaire. Analysis of the responses shows that Maths and Stats support is offered in 87% of Scottish Institutions, which compares well with the UK (85% in 2012) and Ireland (83% in 2015). The majority of Maths support structures employ a dedicated member of staff (69%, vs 86% in the UK and 72% in Ireland), 38% employ Postgraduate Teaching Assistants and 15% employ Undergraduate Teaching Assistants.

Most institutions offer more than one mode of support delivery (77%), with one-to-one bookable appointments and drop-ins being equally popular (77%). This is very different from the UK and Ireland where drop-ins are much more common than bookable appointments (drop-ins used in 84% and 88% of UK and Irish institutions respectively, vs 6% and 44% respectively for bookable appointments).

All institutions provide support to Undergraduates, 77% of institutions offer support to Postgraduates, 38% to PhD students and 31% to staff. We have created a Google interactive map capturing some of these results, available here.

We are currently drafting a report of the study with further details on the results and analysis, along with recommendations, which will be published soon.

Eyes on the prize

Mateja Presern
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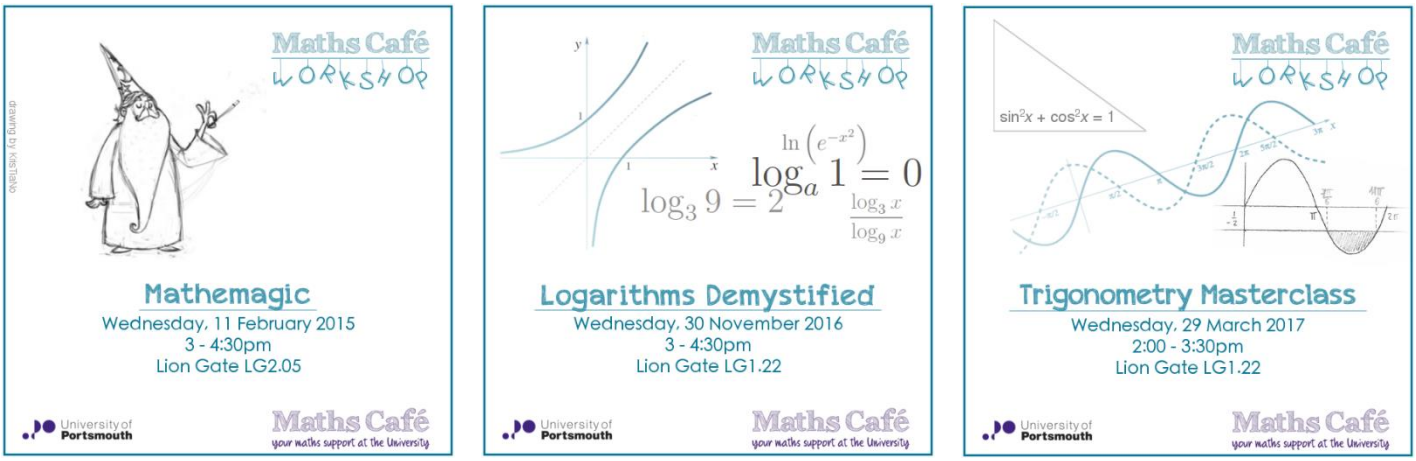
Since 2014, Maths Café at the University of Portsmouth has been running workshops on selected topics; these are open to any student at the University. Students book in advance so that a sufficient number of tutors can be arranged and ample support given with practice questions. Usually, a few of those who signed up do not attend, while a few that didn't sign up come along.

It is a challenge to deliver a teaching session which can be attended by foundation year students, first year pharmacy, engineering or mathematics students, and third year business students. But it can be done and having more than one member of staff involved, and offering exercises at different levels allows for all students to benefit from the workshop.

We strive to make Maths Café workshops fun and add elements that students are not likely to see in their lectures. They are always received extremely well by the attendees. But the interesting and surprising discovery was that the more fun we try to make the workshop title sound, the fewer students sign up for it. Our first workshop in 2014, *Dealing with mathematical expressions (and what does it all have to do with cake)*, was a great success, but many attendees expected actual cake. There was a sparkling beverage used for demonstration in *The art of differentiation (mathematics in a champagne glass)*, but not many students attended. *Mathematical software tools for dummies* (also lovingly referred to as *Maths STDs*) attracted far fewer students than it would be of benefit to, and carefully prepared *Mathemagic*, which aimed to develop and stretch mathematical and logical thinking skills while teaching a party trick or two, was attended by only three students.

It appears that most students decide on attending if they can see a direct link between the workshop and any assessment they will have. So *Graph-sketching masterclass*, *Logarithms demystified* and *Integration Essentials* have been well-attended, as well as *Shall we T-test? Let's have fun with Stats*. In 2017/18, we will rethink our workshops' titles and plan their timings even more carefully!

You are welcome to email me if you'd like to find out more about our experience with running the workshops.



Advertisements for Maths Café workshops

Collaboration with colleagues from different disciplines to increase students' employability

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Adam Wattam
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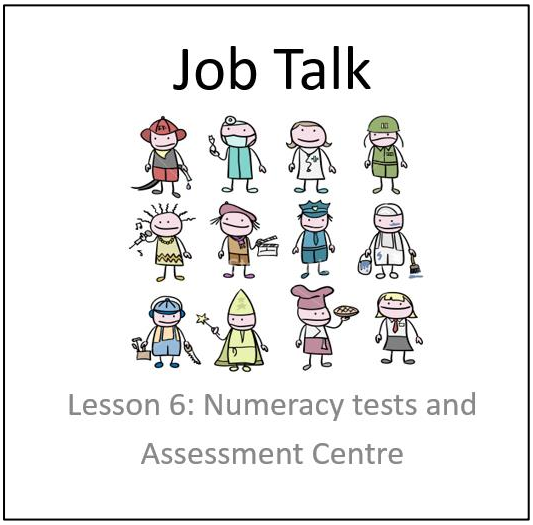
As a new Mathematics and Statistics tutor with the Talent Development Centre at the University of Essex, I benefitted from a range of tutor training sessions organised by **sigma** network, including 'Preparing Students for Numerical Psychometric Tests' held at the University of Greenwich in January 2016. This led to my collaboration with our Employability and Careers Centre to run workshops to prepare our students for this step of the graduate selection process. Following feedback from some non-native English speakers participating in these workshops, it became clear that for many, the language used in numeracy tests could be a major hurdle.



'Job Talk' is helping to increase the employability of students through the collaboration of colleagues working in maths/academic skills support and the employability and careers centre

This led to collaboration with Adam Wattam, a TDC Academic Skills tutor to include numerical test preparation in 'Job Talk', a module he runs specifically for non-native speakers to enhance their employability.

The lessons were designed to be in line with the University of Essex Employability sub-strategy to encourage 'reflection on their degree studies and extra-curricular experiences'. These highlighted the importance of drawing on experience and knowledge in evidence-based applications and interviews. In the last session, Adam uses activities that focus on the common key words and concepts that appear in numeracy tests. I then ran timed tests and gave tips on how to use a calculator effectively to avoid making mistakes and speed up the calculations required. Students are also guided to other resources such as the free 'Numeracy Skills for Employability and the Workplace' online course on FutureLearn and short numeracy refresher leaflets available on mathcentre.ac.uk.

We feel we were able to create meaningful and engaging activities that brought many of the issues around job applications into sharper focus for the students. It also led to co-operation with colleagues who do not normally have the chance to work closely together.

Adam and I gave a joint presentation ('Job Talk – designing a module to help international students respond effectively to the demands of current recruitment methods') at the British Association of Lecturers in English for Academic Purposes (BALEAP) conference in April 2017.

Numeracy support for Healthcare students

David Maynard
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My name is David Maynard and I co-ordinate numeracy support in the Faculty of Health, Education, and Life Sciences at Birmingham City University. I work with a wide range of students from Nursing, Paramedic Science, Operation Department Practice, Foundation Degree, and prospective students preparing to take the Professional Skills Test. Originally I was employed to support Healthcare students back in September 2004, when we were the Faculty of Health. In 2007 the Faculty of Health implemented a Numeracy Strategy to help meet the numeracy demands of clinical practice. The strategy had three main operational aims as follows:

1. To assess numeracy skills in each year of the programme
2. To embed numeracy teaching within programmes
3. To provide ongoing numeracy learning support for students while on programme

The model of numeracy support that we have adopted is what I call a layered-filter model delivered by three members of staff. In layer 1 each student in a nursing cohort attends numeracy workshops to ensure that they are prepared for the summative assessment. Students who struggle with numeracy then filter down to layer 2 where they can attend Lunch Time Drop-ins (which is a mixed group) or bespoke small group tutorials. In layer 3 students can attend bespoke one to one tutorials. To complement this support we provide video and paper-based resources that are hosted on Moodle (the university's virtual learning environment). The videos are created in-house using Camtasia Studio. There is a degree of flexibility within the model, so students who find mathematics very challenging and for whom the Drop-ins are not appropriate, can receive one to one support at an earlier stage.

I am currently studying for my Professional Doctorate in Education. I plan to focus on the one to one tutorial layer of the support model. Students benefit greatly from features of the one to one tutorial; however, a recent pilot enquiry generated interesting themes revolving around retention of knowledge and the delivery/reception of conceptually difficult knowledge.

If you wish to find out more about my research my email address is included above.

I can also be found on Twitter @DMMathtutor.

An e-learning package for mental health

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This is a review of the e-learning package developed by the Charlie Waller Memorial Trust, designed to give non-specialist university staff the skills, knowledge and confidence to offer a first line of support to students who may have mental health issues.

I have worked through this package and found it to contain a lot of straightforward common-sense advice. It is not too wordy, but presents the information within the context of examples. One of the most useful parts was the incentive it gave me to find out more about the support offered by the various university services and how this support can be accessed. The package was also good on how to listen, and what to say and not say. It was quite quick to work through (the 20 minutes for each section was a generous estimate for the time needed) and by being split into these short sections it was easy to find time to do it. Although I think that Maths support tutors are unlikely to be faced with some of the more serious cases presented here, it was a useful reminder of how to offer support.

The e-learning package can be accessed here: http://learning.cwmt.org.uk/.

Fractals, photos, Facebook and funnies – promotional resources for all

Cheryl Voake-Jones
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Promoting a mathematics and statistics resources centre can be difficult. In an increasingly competitive environment, it can be hard to get noticed among other services and activities. Indeed, The Chair's piece in this newsletter highlighted two particular issues raised at the AGM; how to promote a maths support centre and a request for a social media workshop.

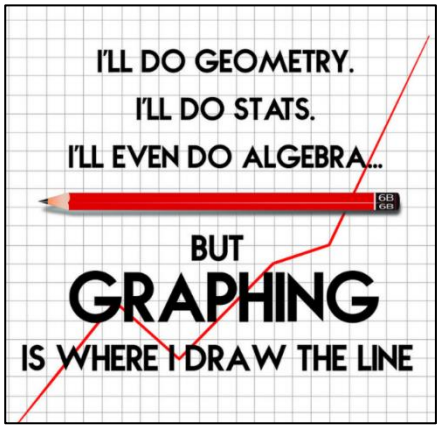
Through **sigma**-funded internships, the Mathematics Resources Centre (/MASH: Mathematics & Statistic Help) at the University of Bath has created a number of resources to assist other support centres with their promotional activities. The majority of the resources were created by students, for students. These resources are now freely available for other support centres to use. These can be used on posters, leaflets, social media, and beyond! You can resize, crop, add your own text and logos, or simply change the colours once inserted into a Microsoft Office document. The resources include:

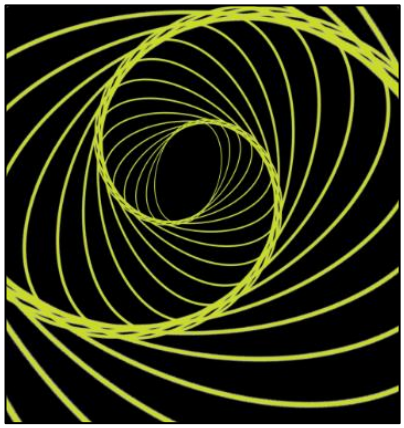
- Promotional photos (100+) and mathematical designs (30+)
- Mathematical jokes and puns (50+)

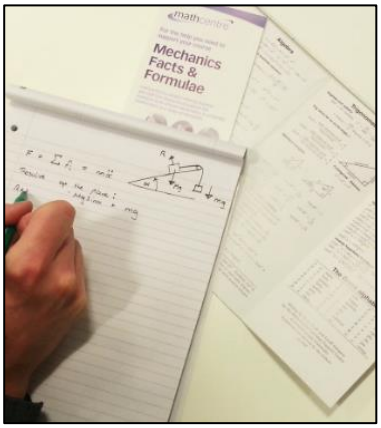
All available at: https://www.flickr.com/photos/152165451@N04/collections/72157686473705863/

- Quotations from famous mathematicians (300+)

Available in one PowerPoint document here.







We have had great success in MASH with social media, and post at least daily during term time on Facebook and Twitter. We have also successfully experimented with Periscope, a live-streaming app. We have produced two social media guides:

- **Social Media Guide** – includes detailed information on how to set up and use Facebook and Twitter, information on tools and tips to help you make the most of social media, a comprehensive list of ideas for content, and a glossary of commonly-used acronyms.
- **Guide to Live Streaming via Periscope** – includes an overview of what Periscope is and how it is used in Higher Education, how it can be used in maths support, and step-by-step instructions on using the app, including some top tips.

They are available here: http://www.sigma-network.ac.uk/resources/teaching-and-learning-resources/

Book review – Flipped Learning: A Guide for Higher Education Faculty

Damien Raftery
Lecturer / eLearning Development Officer | Institute of Technology Carlow, Ireland
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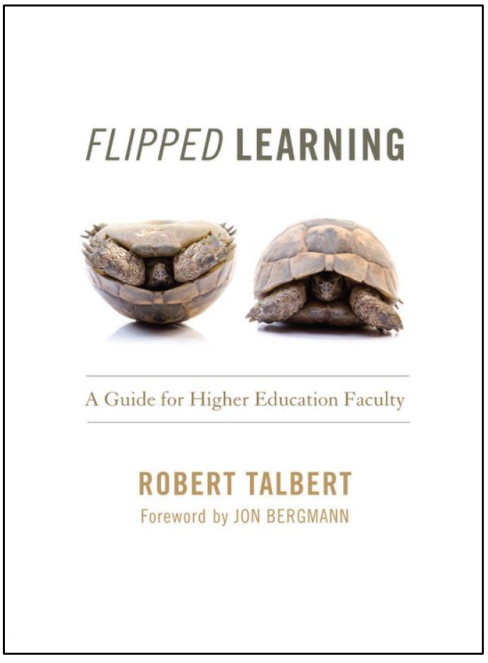
Talbert, R. (2017) Flipped Learning: A Guide for Higher Education Faculty, Virginia: Stylus.

Robert Talbert, an associate professor in mathematics at Grand Valley State University, has written a clear introduction to flipped learning. Although the book is for everyone who teaches in higher education, many of the examples are drawn from his own teaching of mathematics. Robert is refreshingly honest about both his failures and successes with flipped learning. He documents how to start with flipped learning, drawing both on the literature and his experiences.

After an accessible and comprehensive introduction to flipped learning, he explains a practical step-by-step framework for implementing a flipped learning approach for teaching both a module and an individual lesson. He distinguishes between basic learning objectives to be accomplished by students in the individual space (the initial guided exploration of new content) and advanced learning objectives to be collectively achieved in the group space (for active engagement with peers to extend and deepen understanding). Flipped learning thus enables more individual lecturer and peer support when working with more difficult concepts and content.

This new book is a valuable addition to the growing literature on flipped learning and provides a practical basis for anyone interested in using this approach.

It is available on Amazon here.



View of the Kindle edition
(https://www.amazon.co.uk/Flipped-Learning-Teaching-Face-Face-x/dp/1620364328)

FUTURE EVENTS

Tutor training events

Will your maths support centre be employing new tutors this year? For example, postgraduate students or academic staff who are new to the practice of maths support in HE?

The **sigma** Network offers FREE one-day training workshops for new maths support tutors. There is an upcoming workshop hosted by Cardiff University, details below.

Date: Friday 6 October, 10:30am – 3:30pm

Location: Cardiff University, School of Mathematics

Contact: Rob Wilson, wilsonrh@cardiff.ac.uk

Link: http://www.sigma-network.ac.uk/new-tutor-training-at-cardiff-6th-october-2017/

Can't make the training?

There are plenty of resources online to assist with the setting up and running of a mathematics and statistics support centre. These are complemented by evaluation pieces, case studies and a whole host of other reports relating to the field. Time to get reading!

Some examples include:

- Tutoring in a mathematics support centre – a guide for postgraduate students

  http://www.sigma-network.ac.uk/wp-content/uploads/2012/11/46836-Tutoring-in-MSC-Web.pdf

- A zip file containing the materials used in tutor training workshops

  http://www.sigma-network.ac.uk/resources/tutor-training-resources/

Want to host a training event?

Get in touch! Drop an email to chair@sigma-network.ac.uk

Scottish Maths Support Network: from Workshop to Symposium

Morgiane Richard
Academic Skills Adviser (Maths) | University of Aberdeen

Shazia Ahmed
Maths & Statistics Co-ordinator | University of Glasgow

Peter Davidson
Teaching Associate / MSSC Manager | University of Strathclyde

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The Scottish Maths Support Network (SMSN) have run a number of interesting and well-attended events so far this year.

Our first event in January was an "Introduction to Latex" workshop at the University of Glasgow led by Morgiane Richard from the University of Aberdeen, alongside Kate Durkacz (from Edinburgh Napier University) and Peter Davidson (from University of Strathclyde). It was an all-day intensive session, attended by a mixture of academic staff and PhD students. Due to its success, the Network will be running this workshop at a different Scottish institution on a more regular basis.

Next, our Annual Meeting took place on 2 June at Edinburgh Napier University. Our keynote speaker, Jonathan Cole from Queens University, Belfast, spoke about the recent Maths Learning Support Support Survey in Ireland.

The other talks included:

- The current status of Maths Support in Scotland by Peter Davidson from University of Strathclyde and Morgiane Richard from University of Aberdeen;
- A blended and online project aimed at providing maths support to Science students at the University of Glasgow by Shazia Ahmed;
- Colin Lowrie from the National Forum for the Enhancement of Teaching & Learning in Higher Education, Dublin, spoke about Digital Badging;
- Ewan Russell from the University of Keele gave a presentation on Promoting Active Learning in Pure Maths;
- "The Engineering Peer Tutors in their own words" by students at Edinburgh Napier University.

The annual meeting provided a great opportunity for networking, sharing ideas and consolidating links between Maths Support staff, academics and the Maths Support Networks.

(continued…)

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Lastly, SMSN, together with ADSHE Scotland (Association for Dyslexia in Higher Education), co-organised the 1st Scottish Symposium on Maths and Specific Learning Differences (SpLDs) at the University of Aberdeen on the 9th of June. A total of 26 Maths Support Practitioners, Learning Differences Specialists and Disability Advisers from Scotland and England attended the event. The keynote speaker was Emma Cliffe, who talked about her experience of working with students with SpLDs in Maths and STEM subjects.

The afternoon was a hands-on session where participants had to work in groups of mixed specialties to design strategies for 2 fictitious students with SpLDs with a particular Maths problem.

L-R: Julie Ross, Emma Cliffe, Morgiane Richard

Maths & SpLDs Symposium, June 2017

Mathematics and Statistics in the Age of 'Big Data' – 13 March 2017

Hansa Bissoondeeal
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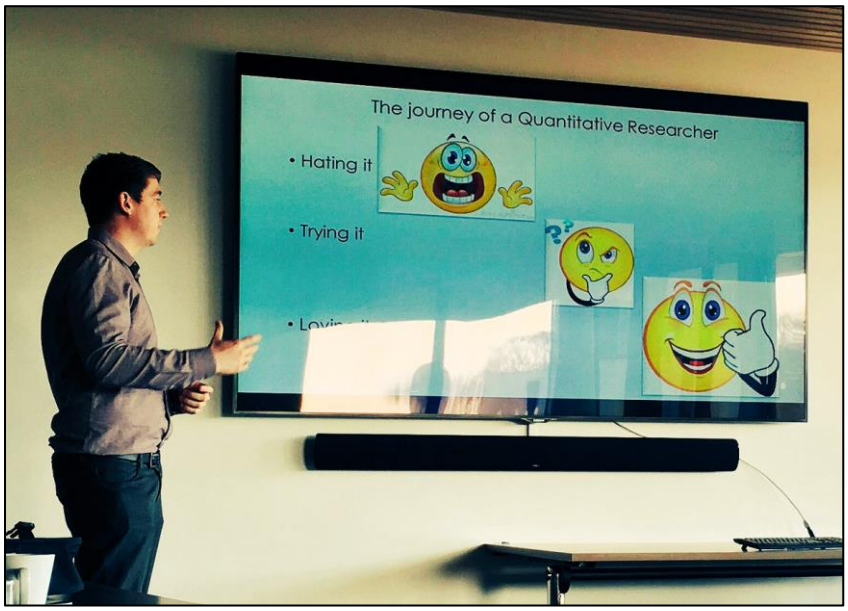
The University of Essex hosted a **sigma** event to discuss the impact of increased quantification of disciplines in Social Sciences and Humanities and advances in big data on Mathematics and Statistics support in Higher Education.

The event was attended not only by mathematics support practitioners, but also by students and staff from departments of Mathematical Sciences, Government, Language and Linguistics and the Business School. The event started with a presentation by Richard Skeggs (ESRC Business and Local Government Data Research Centre) to demystify 'Big Data' and exploring its scope and challenges for its use by undergraduate students. Simon Gallacher (Nuffield Foundation) highlighted the need to bridge the data skills gap and the role of Q-step centres in equipping Social Sciences students with the analytical skills to use quantitative data in their studies and research. The presentations were broadcast live via Periscope and Twitter and are available at https://youtu.be/4w8Pyw1hp4E.



Participants from various maths support centres also did short presentations on how they are responding to the changing demands for support students as students increasingly use 'Big Data' in their studies. The prevalence of Maths anxiety the need to address this issue from the outset was a recurrent theme in discussions.

Left: Simon Massey from Manchester Metropolitan University talking about cross-disciplinary numeracy support scheme through Data Buddies and pop-up data literacy support

Make sure you let us know if you run or attend an event that would be of interest to the mathematics and statistics support community! It does not have to be a **sigma** event, but anything that would pique the interest of our members.

See http://www.sigma-network.ac.uk/sigma-newsletters/ for full details on how to submit an item.

Where next for mathematics education in higher education? A one-day meeting in honour of Professor John Blake – 13 July 2017

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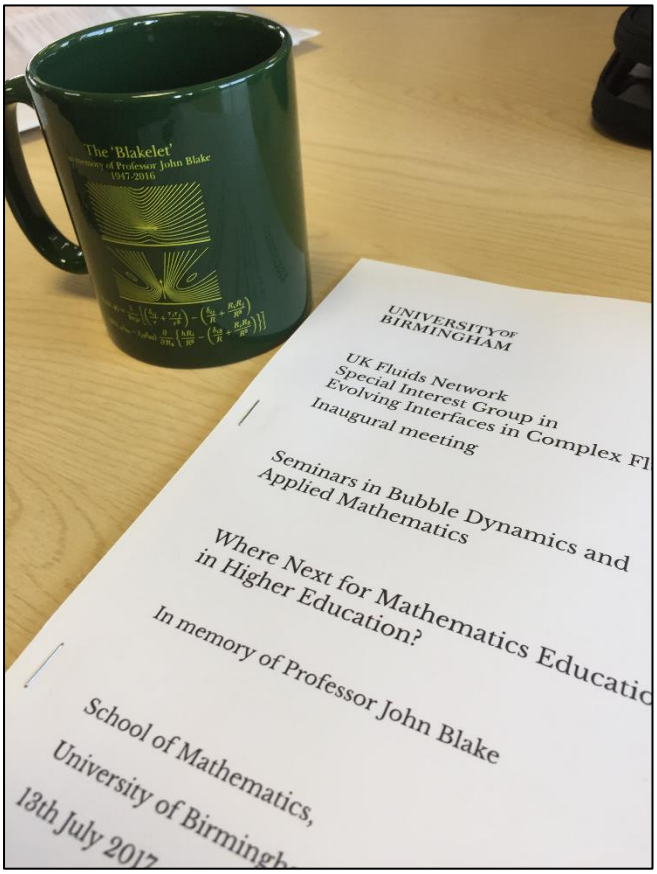
On the 10 of June 2016 Professor John Blake passed away peacefully following a short illness. He was 69.

For over twenty years, and until his retirement in 2013, John was Professor of Applied Mathematics at the University of Birmingham, where he held the Headship of the School of Mathematics on two occasions; he was also Dean of the Faculty of Science. In addition to his world-leading profile in mathematical research, John was amongst the first true champions of teaching and learning within higher education. He was also a passionate and vocal supporter of **sigma** and, up until his illness, chaired its Advisory Committee.

In July 2017, a programme of meetings and workshops were held at the University of Birmingham in his honour. As part of this programme, a one-day workshop was held to build upon John's extensive legacy and to explore the current educational needs and priorities of the higher education mathematical sciences community.



Mug featuring the 'Blakelet' and meeting programme

An article is currently being prepared for submission to *MSOR Connections* summarising the meeting and its emerging ideas, but we are grateful for the excellent and thought provoking contributions of Professor Chris Linton (Loughborough University and President of the IMA), Professor Tony Croft (Loughborough University), Dr Stephen Hibberd (University of Nottingham), Professor Jeremy Levesley (University of Leicester), Dr Gary Brown (Office for National Statistics) and Dr Joe Kyle (University of Birmingham) which allowed us to honour John in a fitting and appropriate way.

We are also grateful to Professor David Smith (University of Birmingham) for his expert organisation of the overall programme and for securing the financial support that allowed this meeting to take place.

Beyond Engineering Mathematics: Teaching Mathematics and Statistics to Engineers in the 21st Century – 13 July 2017

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Thirty-six delegates from 16 different institutes attended a one-day event hosted by Loughborough University on 13th July 2017. "Beyond Engineering Mathematics" was for people involved in teaching mathematics and statistics to engineers, focussing on some of the challenges faced by those teaching engineering maths, the role of statistics in engineering and some approaches being used to engage engineering students and enhance their learning.

Tim Davis (Warwick University & Chief Analytics Officer at We Predict Ltd.) started the proceedings with a thought-provoking keynote talk on "Creative Convergence", which produced a lively discussion on statistics in engineering.

Three short talks on innovations in engineering teaching followed:

- "A Multi-faceted approach to student engagement with engineering mathematics", Donald Balance, Glasgow University;
- "Teaching Maths to Engineers", Paul Hernandez-Martinez, Loughborough University;
- "Technology-enhanced learning in Engineering and Maths", Catherine Hobbs, UWE, Bristol.

These struck a chord with the participants who were keen to relate the ideas raised in the talks to their own experience and practice of teaching maths to engineers, and fed into the discussion where a panel of engineers fielded a wide range of questions, the main emphasis being on what mathematics students need to know and what the balance should be between manual calculations and the use of software.

The final breakout session produced a broad agreement on the fundamentals required, with an emphasis on applying maths to problems in engineering situations and for encouraging understanding of the maths rather than manipulation and manual calculation.

Beyond Engineering Mathematics workshop, July 2017

Bridges 2017: Mathematics | Art | Music | Architecture | Education | Culture

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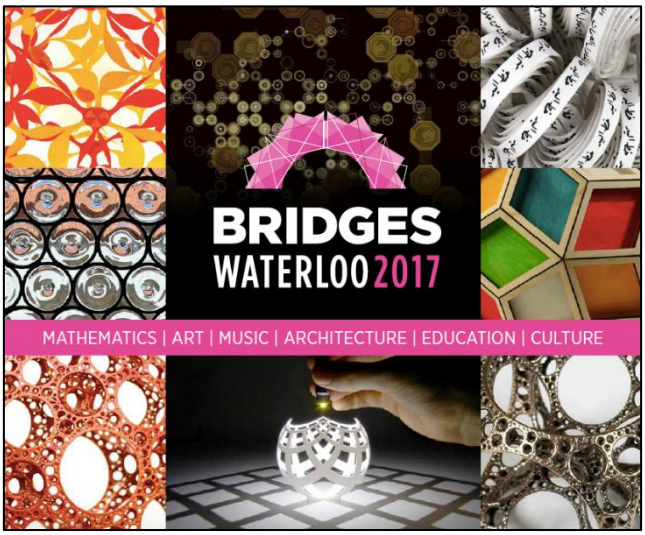
With the goal of fostering research, practice, and new interest in mathematical connections to art, music, architecture, education and culture, the Bridges Organisation (http://bridgesmathart.org) has convened an annual meeting since 1998. The Conference was held this year at the University of Waterloo, Canada from 27–31 July.

Peer reviewed papers and workshops were presented on a range of mathematical topics by both artists, educators and mathematicians. The curated exhibitions showed work in a range of media (print, wood, 3D printing, ceramics, textiles etc.) illustrating the aesthetics of mathematics. Activities included music, poetry and performance. The family day enabled the local community (children and adults) to interact with mathematical concepts through a wide range of resources and activities.

Many of the delegates were educators who generously make their teaching and learning resources available. And excellent example is George Hart and Elisabeth Heathfield who through their online site (MakingMathVisible.com), offer details for workshops with templates and resources that are free to use for educational purposes.

With my interest in textiles, I was delighted with the wide range of papers demonstrating links between mathematics and textile processes e.g. hyperbolic patchwork, radially-developing fractal curves using ceramics and crochet, a cloth torus, symmetry samplers, temari, weaving, symmetry in bobbin lace and knitting, cellular automation for the Houndstooth pattern or braids and cables in knitting, a quilted fabric model of the Klein quartic, braids, triaxial weaving and our paper illustrating the use of diagramming and tiling notation for textile knotting. There was even a workshop where participants made braids through dance!

The work presented in this and previous conferences makes fascinating and inspiring reading. An archive of paper contributions is available online (http://archive.bridgesmathart.org) together with a gallery of exhibition submissions (http://gallery.bridgesmathart.org/exhibitions).



Introduction to Numbas – 31 August 2017

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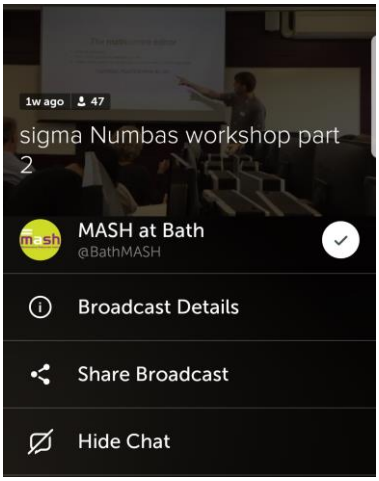
A **sigma** workshop providing an Introduction to Numbas was held on 31st August, hosted by the Mathematics Resources Centre (/MASH: Mathematics & Statistics Help) at the University of Bath. Christian Lawson-Perfect, E-Learning Officer in the School of Mathematics and Statistics at Newcastle University led the day.

Christian gave an overview of the e-assessment system Numbas including design goals and integration with virtual learning environments such as Blackboard and Moodle. He demonstrated a wide range of example questions including input of algebraic expressions, adaptive marking, dynamic and interactive diagrams, inclusion of videos and integration with GeoGebra.



Periscope broadcast

The overview of Numbas was live streamed on MASH's Periscope account (with a slight technical hitch – apologies!). Videos are available online at http://bit.ly/2vJbqwY and http://bit.ly/2xRkktF. Attendees then explored the extensive question bank and learnt to build an exam before Christian gave a step-by-step guide to making a first question including pitfalls and good practice.

The morning ended with attendees sharing resources in a swap shop:

- Cheryl Voake-Jones (Bath) shared **sigma** & MASH language resources – take a look and get involved!
- Emma Cliffe (Bath) shared the **sigma** & MASH getting started with Word and LaTeX resources.
- Mohamed Mehbali (London South Bank) shared the game-based learning platform Kahoot and the Desmos calculator family.
- Charles Cox (Bath) shared a useful GeoGebra resource and Dan Meyer's Three-Act Math Tasks.

In the afternoon, attendees created their own first Numbas question and grappled with suggested exercises. Christian provided expert help and answered individual questions. Finally, the need to update the 160 Flash-based tests on mathcentre was noted. A Numbas project will be set up to facilitate the work – if you are interested in helping please contact Emma Cliffe, email address above.

The 15 attendees gave very positive feedback and the following were highlighted as particularly helpful: *'demos on the screen by someone who really knows the system'*; *'the opportunity to ask detailed questions and get immediate detailed answers and discussion'* and *'an expert to help get going in Numbas – both technically and pedagogically'*.

Resources used by Christian included:

- Slides: https://www.numbas.org.uk/talks/bath-workshop-august-2017/slides/
- Numbas editor at mathcentre: https://numbas.mathcentre.ac.uk/
- Numbas tutorials and documentation: http://bit.ly/numbasdocs