



network for excellence in
mathematics and statistics support

Issue 4: September 2014

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Maths Support – higher, wider, deeper

David Bowers – Chair, sigma Network

Do not fear, gentle reader, I am not about to launch into song. But the title of Citipointe's ballad serves as a good metaphor for the current development of mathematics and statistics support in universities today.

Higher. Maths support is no longer just about helping new students with “remedial” skills when they enter university. (Actually it never has been just about that, despite the high profile media assertions of the weak skills base of new undergraduates.)



Support in maths and statistics is often needed at all levels, including final year dissertation and postgraduate students. In my day-to-day work as a maths support tutor, I see as many students seeking help with their research statistics as I do with their first year numeracy and algebra. Expectations of mathematical skills increasingly permeate higher level study, and this in turn places demands on the maths support tutors themselves

Wider. Quantitative reasoning is being increasingly built into disciplines such as humanities and the social sciences which “in my day” would have had nothing at all to do with maths. Earlier this year the Nuffield Foundation launched the [Q-Step initiative](#), pumping millions of pounds into the development of mathematical and statistical skills training and resources for the social sciences. The wider the reach of maths and statistics across the curriculum, the greater the need to support not just the students but also the staff who suddenly feel out of their comfort zone.

Deeper. It is gratifying when students come to maths support, we help them solve their problem, and they go away happy. But we should be looking to provide a deeper level of provision than this, to help ensure that maths confidence becomes ingrained within the student experience. Models exist of embedding and integrating maths support within curriculum programmes, of making smarter use of diagnostic testing, and of ensuring access to high quality resources a natural entitlement throughout the student journey. Do we as maths support tutors feel equipped to respond to this?

The forthcoming [CETL-MSOR Conference](#) in Cardiff from 8th – 9th September 2014 is set to provide, yet again, a lively forum for the exchange of experiences of higher, wider and deeper support for learning in mathematics and statistics. The **sigma** Network will be present, seeking to share ideas with maths and statistics support practitioners from across the sector. I look forward to meeting you there.

Joe Kyle's Corner – One hundred years ago

Joe Kyle

I am writing these jottings on the 4th of August in Turkey where, for perhaps understandable reasons, they do not seem as concerned with 'marking' the centenary of the outbreak of the Great War as we in the UK are. There is a steady trickle from the antipodes paying homage to the tragedy at Gallipoli, an unfortunate adventure planned by the young and inexperienced Winston Churchill. Would Churchill have changed anything had he been aware of the work of Frederick Lanchester (after whom Lanchester Polytechnic, now Coventry University, was named) who was then applying the theory of differential equations to 'modern' warfare (to appear in "Aircraft in Warfare: the Dawn of the Fourth Arm")?



In contrast, G H Hardy expressed his views on the War thus: although he was ready to go off and have his body shot at he was not prepared to prostitute his brains for the purposes of war. There is something about

Hardy that I find pompous and egocentric, even when the sentiments are not unreasonable. But perhaps the most poignant memory from 1914 is that of René Gateaux. Gateaux published only five papers during his lifetime. All were published in 1913 or 1914. Still there is enough evidence of a promising mathematical career when World War I broke out. Gateaux was killed very early in the War. In addition to the few papers mentioned Gateaux left unpublished material that Paul Levy prepared for posthumous publication. It is in this work that the construct that we now know as the "Gateaux derivative" first appears.

For those of us with History of Mathematics in the curriculum (which I strongly favour) there is certainly plenty to direct students to if we are looking to avoid the usual topics that are often revisited in such courses.

John Blake

Chair, *sigma* Advisory Group

I have been involved with a wide range of activities associated with learning, teaching, assessment, popularisation of mathematics and acted as an external examiner at a number of universities in the UK and overseas. I am honoured to be invited to chair the Advisory Group of **sigma**.

During my 25 years at Birmingham it was a great pleasure to be associated with a number of leading learning and teaching developments such as the CTI initiative, MATHWISE, the LTSN Maths, Stats and OR Network in association with Nottingham Trent and Glasgow universities, later to become part of the HEA.



I formed an early impression of a dedicated cadre of practitioners – committed, professional, devoting their energies and enthusiasm to improving the learning experience for students in mathematics. They did this by sharing ideas and innovations widely both at a national level (MSOR was funded by all the HE funding bodies) and as well on the international stage. To be invited to chair the **sigma** Advisory Group continues this involvement in an exciting continuing chapter in the development in learning and teaching support in MSOR in a period of ever increasing change.

My educational background includes an undergraduate degree at the University of Adelaide and a Ph.D. at the University of Cambridge (under the supervision of Sir James Lighthill, whose long-time personal influence on mathematical education development is extensive). I have held positions at postdoctoral level at both Cambridge and CALTECH, before joining the CSIRO Division of Mathematics and Statistics in Canberra, under the dynamic leadership of Joe Gani who encouraged our involvement with educational activities in Australia. This led to a long-time association with the incredibly successful Australian Mathematics Competition – he was on the highly professional Problems Committee! The highlight of this activity was the Mathematics Olympiad held in Canberra in 1988 where a precocious 13 year old by the name of Terry Tao (later to win a Fields Medal), not only won a gold medal but was also asked to make a presentation to the Prime Minister on behalf of all the participants. After CSIRO I joined the University of Wollongong as Professor of Mathematics and Head of Department for almost 10 years before moving to Birmingham in 1989 as Professor of Applied Mathematics, and again Head of Department! As an applied mathematician my research interests involve attempts at solving practical problems from biology, medicine, engineering and industry, including sport. Some have been successful, others have not! I am best known for my research in Cavitation and Bubble Dynamics, Ciliary and Muco-ciliary transport and fundamental problems in Low Reynolds Number Fluid Mechanics.

To conclude, I am very much looking forward to my leadership role and meeting many of you in due course.

Trevor Hawkes

sigma Director

After repeatedly interrupting his formal education with National Service, an Assistant Lectureship at Makerere College in Kampala and a Research Fellowship in Cambridge, Trevor (Hawkes) finally settled down in 1967 at the University of Warwick, where he taught maths for more than 40 years. Since then, he has been a member of the maths and stats support team at Coventry University. He has a long-standing interest in teaching and, in particular, using IT to mediate learning. He believes that one day there will be descendants of IBM's Watson indistinguishable from an ideal maths tutor, responsive to each student's individual needs – but by then, perhaps brain implants will have made tutors redundant.



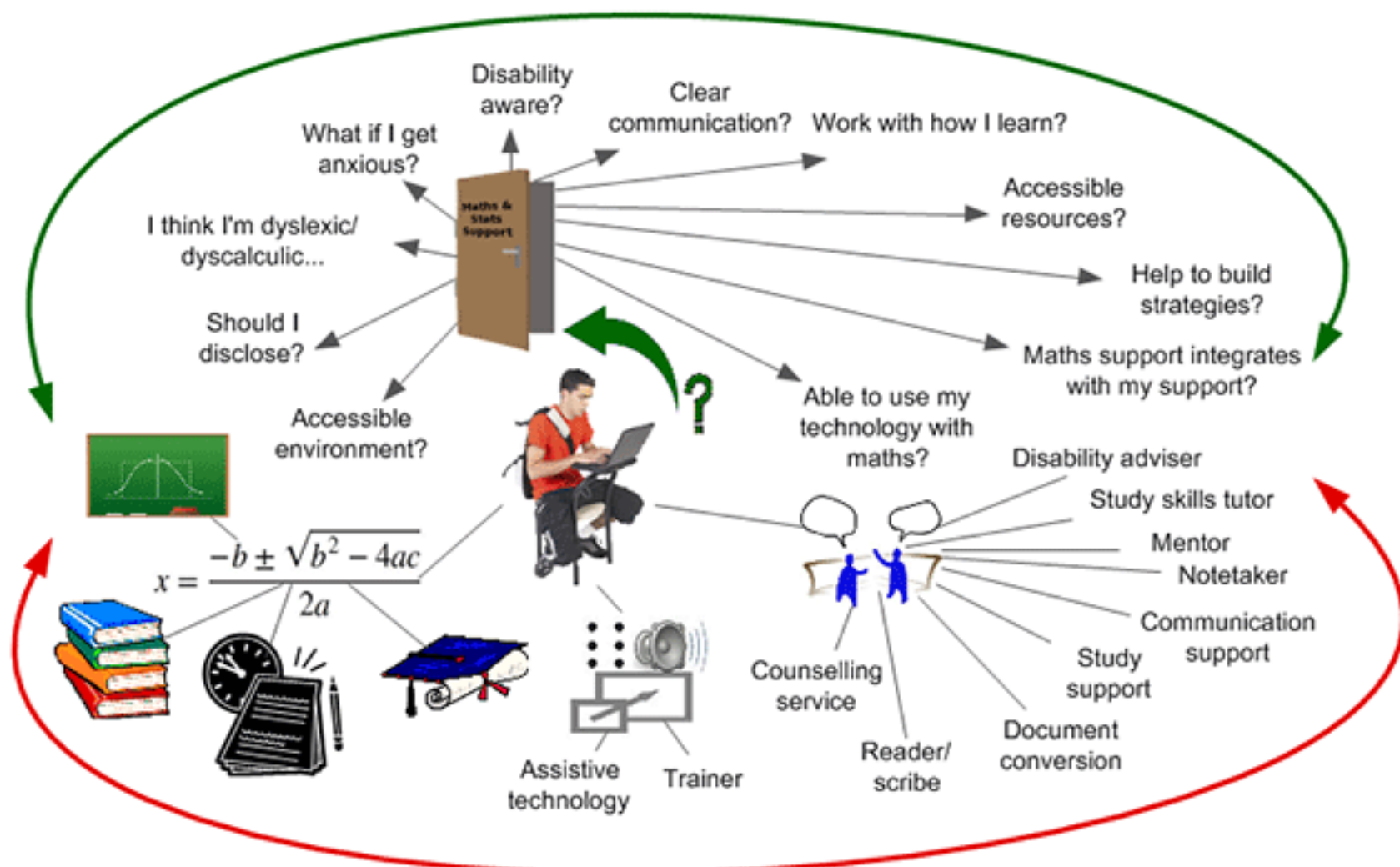
Trevor joined the **sigma** CETL at Coventry University in 2008 and now directs the small team offering mathematics and statistics support there. In 2013 he became a **sigma** Director at Coventry University.

Supporting disabled students in mathematics support centres: Making links with other staff

Emma Cliffe, University of Bath

This is the first of a series of articles on supporting disabled students. We start by looking at why it is important to make links with other staff.

Can mathematics support work with my other support?



Will my support work with mathematical parts of my studies?

Some disabled students seeking mathematics support will have specific learning differences, such as dyslexia, or difficulties with concentration, fatigue, memory or anxiety, which might impact on how they learn

mathematics. Others experience practical or technical barriers when working with mathematical notation and software and may be unsure if the mathematics support service will be accessible. Many of these students use assistive technology and may have a support worker, but sometimes the support does not work well for the mathematical components of their studies. Both the student and their support worker might value input on strategies since *'If these developments are subject [mathematics] specific, how can disability specialists access this information?'*. Correspondingly, mathematics support staff should understand how best to work with students, the boundaries of the service, how and when to refer and the roles of other staff.

Exchanges between staff can be fruitful for all!

Managers of services might consider cross-promotion, clarity on referral and information exchange between services. Joint training and workshops on disability awareness, dyscalculia, numeracy tests, etc., enable sharing of expertise, experience and costs!

Ongoing communication between specialist support staff with little experience of mathematics specific skills and strategies, and mathematics support tutors with little experience working with disabled students, can lead to practical ideas for helping students to gain skills and strategies and ensure better integration.

Be prepared!

Students expect specialist support to work for mathematics and mathematics support to work for them! Proactively making links between staff with a variety of backgrounds is key; since, as noted by a mathematics graduate with visual impairment: *'lack of anticipation is a barrier, you need to prepare in advance'*.

Extending our reach and building a sustainable future for sigma

Tony Croft, sigma Director

Looking beyond 2016, when the current round of HEFCE funding for **sigma** comes to an end, we recognise the need to establish a sustainable base for the future. It is critical that mathematics support remains firmly embedded within the higher education sector not only through the practices of individuals but also through institutional strategies. The central **sigma** team along with the Chair of the **sigma** Network are setting in place measures to build **sigma**'s own sustainability strategy. An important aspect of sustainability is the recognition by university senior managers of the importance of mathematics and statistics support. There are promising initial signs that this recognition is forthcoming. For example, a number of institutions already make reference to mathematics support in their access agreements with OFFA (Office for Fair Access) – these are publicly available documents on OFFA's website (<http://www.offa.org.uk/access-agreements/>) which set out an institution's commitment to, inter alia, student support. **sigma** Directors have already held an initial meeting with the Director of OFFA, Professor Les Ebdon, to look at ways **sigma** and OFFA can work together to better embed mathematics and statistics support within institutional strategies, to contribute to joint events, and to share good practice. As this aspect of our work develops we shall provide updates through this newsletter.

New statstutor and mathcentre Community resources

statstutor

A series of [15 PowerPoint Workshops](#) and [13 Quick Reference leaflets](#) with associated data files have been contributed to the **statstutor** Community Project by Peter Samuels from Birmingham City University. They have been reviewed by Ellen Marshall from the University of Sheffield. The resources have been contributed under a Creative Commons licence BY-NC-SA which means they may be used 'as-is' or **further adapted** for non-commercial use with attribution to the authors. The topics covered are :

PowerPoint Workshops

Introduction
Questionnaire design
Descriptive statistics
Excel introduction and Pivot tables
Excel charts
Probability
SPSS
Parametric testing
Nonparametric testing
ANOVA
Simple linear regression
Multiple linear regression
Sampling techniques
Sample size calculations
Critical appraisal

Quick reference leaflets

Measures of middle value
Measures of spread
Pivot tables in Excel
Statistical hypothesis testing
Paired samples t-test
Independent samples t-test
Chi-squared test
ANOVA
ANOVA: additional information
Pearson correlation
Simple linear regression
Simple linear regression: additional information

mathcentre

A Facts & Formulae leaflet containing [Mathematical Tools for Physical Sciences and Systems Biology](#) has been contributed by Morgiane Richard, University of Aberdeen and reviewed by Mamen Romano and Ian Stansfield, University of Aberdeen.

Two quick reference leaflets have been contributed by Josh Simpson and reviewed by Leslie Fletcher, Liverpool John Moores University:

- [Numerical Quadrature](#)
- [Equations of motion](#)

The source files have been contributed under a Creative Commons licence and are available [here](#).

If you have developed resources for staff or students that you would like to share, please contact community@mathcentre.ac.uk or community@statstutor.ac.uk. Details of the Communities Project may be found at [statstutor](#) and [mathcentre](#).

sigma Prizes for outstanding contributions in the field of mathematics and statistics support – 2014

The **sigma** prize winners for 2014 are:

Innovation of the Year: Shazia Ahmed and Sarah Honeychurch (University of Glasgow)

Student of the Year: George Hudson (Coventry University)

The **Innovation of the Year** prize is awarded to a project that has made a significant and demonstrable difference to mathematics/statistics support at its home institution and has the potential to be replicated or developed at other institutions. Shazia Ahmed and Sarah Honeychurch have developed, moderated and evaluated an innovative form of Virtual Peer Assisted Learning (VPAL) using Facebook for students at the University of Glasgow. By providing a place for students to talk and interact, and having minimal but

supportive tutor presence, students were encouraged to organise their own study groups and access Student Learning Service support. Once established, the groups became virtually self-supporting.

The **Student of the Year** prize is awarded to a student involved in mathematics and statistics support at their home institution, who could demonstrate a positive impact on the support experience. With an increasing number of students from disciplines other than STEM students patronising the Maths Support Centre (MSC) at Coventry University, George Hudson is the first student proctor from outside the Faculty of Engineering and Computing. As a student from the Business, Environment and Society (BES) Faculty, as well as the Bloomberg BAT Campus Ambassador and Treasurer of the Investment Society, George has established an excellent relationship with those departments in the BES Faculty with mathematics in their degree courses, successfully promoting MSC services to fellow BES students.

The awards will be presented at a ceremony to be held at the CETL-MSOR 2014 conference in Cardiff on 8th September 2014.

Math Support as part of the wider Skills@Library, University of Leeds

Vijay Teeluck, Senior Maths Support Tutor, University of Leeds

The Maths Support service at the University of Leeds is strategically positioned within Skills@Library, the university's academic skills support team. As well as the visible maths support services such as drop-ins and specialist in-curriculum teaching, I am in a novel position to collaborate on various cross-curriculum projects.



In particular, I have worked on the development of modules, numerical tests workshops, booster classes in calculus and supporting nurses with dosage calculations. The latest project, in partnership with one of our Academic Skills Development Officers, was to create a post-GCSE mathematics diagnostic test as part of a pre-admission module specifically designed for Widening Participation students. This module is split into two components: study skills and subject specific. The optional element, for students requiring mathematics specialism within their chosen discipline, allows them access to tools and web links to refresh their maths. The intention was for this baseline study support module to give the students a platform with which to enter their course confident in their academic skills. Feedback for the mathematics diagnostic test was provided in the form of detailed solutions, links embedding video clips created by the Maths Support team, and existing maths support websites.

Liaising with other departments and faculties is an integral part of my role here, however, the joint contribution to the pre-admission module has exposed how much more collaborative work can be done. Further work includes creating video clips on statistics-based problems using lecture capture technology which will be in collaboration with the Geography department, and liaising with my colleagues at Skills@Library to create further academic skills tools.

CETL MSOR 2014 – Off to Cardiff!

Moira Petrie, sigma Project Manager

Final arrangements are being made for this year's [CETL-MSOR conference](#), which is being held at Cardiff University on Monday 8 and Tuesday 9 September 2014. We received 25% more abstracts for this year's conference, compared with last year, and have over 100 delegates registered to attend. The programme is full and we are looking forward to seeing a number of new faces as well as old friends at this year's event. For

those unable to attend, we are planning on making the presentations available on the www.sigma-network.ac.uk website as soon as possible after the conference.

sigma SE and SW&SW Tutor Training event – 15 October 2014

This free **sigma** Network Tutor Training event is for mathematics and statistics support centres in the South East, South West and South Wales who wish to access **sigma** training for their tutors. It will be held at the University of Portsmouth on Wednesday 15th October from 10:30 until 16:00. The training will be delivered by members of **sigma** and is based around the **sigma** guide [Tutoring in a maths support centre](#).

For further information see <http://www.bath.ac.uk/study/sigma-sw/events/training-2014.html>.

Similar events are scheduled in other Hub regions and details will be published on the [sigma website](#) in due course:

- **sigma** Eastern England Hub – 5 November 2014, University of Lincoln
- **sigma** North East and Yorkshire Hub – 29 October 2014, University of Sheffield
- **sigma** South East – 6 October, Kings College, London

For further details, please contact the relevant Hub Co-ordinator.

Meeting the mathematics needs of pharmacy students – 19 November

The **sigma** North West and North Wales Hub, the British Pharmaceutical Students' Association and the Royal Pharmaceutical Society are arranging an event at Liverpool John Moores University on Wednesday 19 November 2014, starting at 10am. The aims of the day are to acquaint the maths support community of the needs of pharmacy students and to provide an opportunity for pharmacy academics to understand how the maths support community can help overcome issues with mathematics learning in pharmacy degrees.

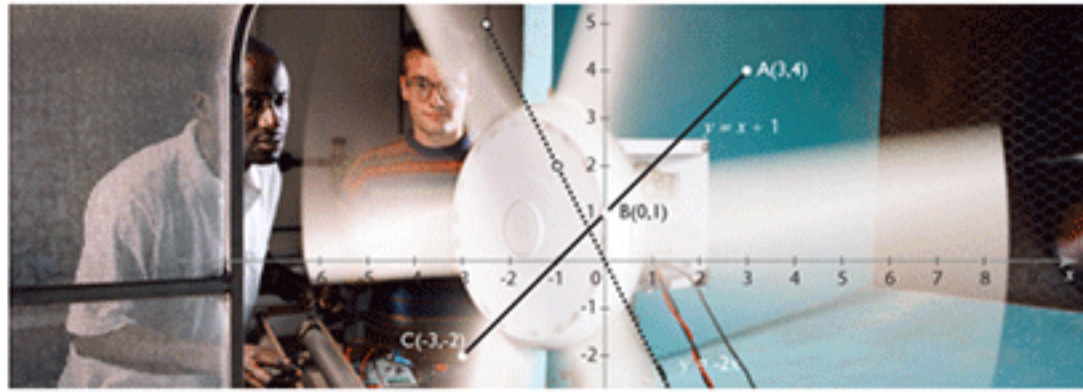
Planned for the morning programme are presentations from Professor Tony Croft, Mathematics Education Centre, Loughborough University, the Education officer of the British Pharmaceutical Students' Association and a representative from the Royal Pharmaceutical Society.

In the afternoon there will be an opportunity for presentations from colleagues around the UK on their experience in developing or using resources to support the mathematical needs of pharmacy students. We hope this will help identify gaps in the resources which are available and stimulate further activity in this area. If you would like to contribute to the afternoon session, please contact [Leslie Fletcher](#) the Hub coordinator at L.R.Fletcher@ljmu.ac.uk

There is no charge for attending this event and refreshments and lunch will be provided. Preliminary enquiries can be sent to [Leslie Fletcher](#) or [Bob Morris](#), School of Pharmacy and Biomolecular Sciences, Liverpool John Moores University (R.Morris1@ljmu.ac.uk).

Getting a Grip on Mathematical Symbolism – a FutureLearn course

[Janette Matthews, Loughborough University](#)



Getting a Grip on Mathematical Symbolism

Want to be an engineer or scientist? Lack mathematical confidence? Learn to think mathematically and explore essential concepts.

 Loughborough University

[Go to course](#)



Starts on 15 September

Feedback

[Getting a Grip on Mathematical Symbolism](#) is a three-week MOOC (Massive Online Open-access Course) produced for the [FutureLearn](#) platform by Tony Croft, Loughborough University.

The free course is aimed at students embarking on science or engineering foundation courses and examines equations of straight lines and their graphical representation. Week 1 introduces the concepts of points, lines and curves and mathematical symbolism. Students are invited to contribute their own images. Week 2 covers the equation of a straight line, gradients and vertical intercepts. The final week shows the use of these in science and engineering applications giving students a thorough grounding for their future studies.

The course was first run in April/May 2014 and was successfully received with over a thousand learners completing all three weeks. Students learn through video tutorials, onscreen articles, exercises with worked solutions, quizzes to check understanding and a final test. Learners may work at their own pace, repeating elements if necessary or moving forward if concepts are already understood. There are discussion forums for interaction with other learners.

"... my confidence and knowledge have increased. In spite of having a science degree my mathematical confidence is not high. I often could get the right answer without really understanding it. I am now wiser with linear equations and graphs due to clear explanations and videos and would welcome further courses to build my understanding."

A second presentation of this course will be offered on the Futurelearn platform on 15 September and learners should register [here](https://www.futurelearn.com/courses/mathematical-symbolism-2) (<https://www.futurelearn.com/courses/mathematical-symbolism-2>).

sigma at the HEA Social Sciences Conference 21/22 May 2014

Ruth Fairclough, sigma Midlands Hub Co-ordinator

Q Step is an initiative for increasing quantification within the social sciences (<http://www.nuffieldfoundation.org/q-step>). One of the strands within the Higher Education Academy Social Sciences Conference *Teaching forward: the future of the Social Sciences* held on 21/22 May 2014 in Birmingham dealt solely with this aspect of social sciences. There were some interesting talks on developing mathematics and statistics skills for social science students and embedding quantitative methods within social science research.

sigma presented at the conference to promote mathematics and statistics support for social sciences students, a group that historically has not been the primary user of maths support centres.

The main purpose of the sigma talk was to highlight the lack of mathematical skills many students have, the chronic shortage of students with mathematical skills prior to University study and to showcase the work sigma can do to help with this increasing quantification.

Some participants had already worked with the maths support centres within their institutions, and others reported they were going to investigate this possibility after the conference. After this, hopefully there will be a few more institutions setting up new maths support centres.

One issue that was reported by the participants was the lack of quantitative research skills within the social sciences academic community. Embedding increasing quantification within the curriculum is difficult if there is nobody who can teach this aspect of social sciences to their students.

The talk was well received, with about 20 participants attending from across the UK.

Use and Evaluation of Prezi for Mathematics and Statistics Support

Event held at the Eastern England sigma Hub, 18th June 2014

Prezi is becoming increasingly popular as a tool to present complex information in a dynamic and visually arresting form, which can accentuate links between concepts. This event was aimed at maths support tutors who wanted to find out more about this alternative to Powerpoint, and how it could be used specifically to present mathematics and statistics content.

The session was run by Robert Jenkins and Jeremy Schildt from the University of East Anglia's Learning Enhancement Team. Robert and Jeremy had submitted a paper discussing their experiences using Prezi for maths support at last year's CETL-MSOR Conference, which they took as a basis for this meeting. Prezi allows the production of "interactive mindmaps" which demonstrate how individual concepts are related. This is particularly useful for mathematics, due to the fact that many topics have necessary pre-requisites. With topics represented as nodes, and pre-requisite topics identified through directed paths, a well-crafted Prezi can guide the user through a structured sequence of learning.

Prezis also allow the embedding of documents, videos and other resources, meaning that one Prezi file can contain a rich variety of resources to support learning and understanding. An example of one of Robert's Prezis can be found here: <http://prezi.com/7enhnyzgjkov/steps-into-calculus/> Delegates at the meeting had time to investigate some existing Prezis, and practise creating their own, before reflecting on the educational value and any drawbacks of this technology.

This event was hosted at University Campus Suffolk. Twelve people registered for the meeting, representing seven institutions across the region.

sigma North East Hub Meeting – 19 June

Vijay Teeluck, University of Leeds

This event, held at the University of Leeds on 19 June 2014, was aimed at bringing together practitioners of maths support from different areas and institutions. The theme of the event centred on participants sharing their experiences and discussing issues affecting Maths support.

Vijay Teeluck highlighted the changes to A Level Mathematics in terms of content and assessment. The talk did not concentrate on the recent flurry of published reports on this topic but on the opinions and experiences of admissions tutors from different faculties. Although certain conclusions were of a speculative nature, it was fruitful and helpful to bring the proposed changes to the attention of those involved in maths support.

Ellen Marshall and Alun Owen provided a review and update of the **sigma** Statistics Advisory meeting: *Improving the support we give to students and each other*. The proposed tutorial videos on statistics support proved interesting and received positive feedback.

Statistics and Mathematics Support in the Geography Department (University of Leeds) is provided by Rachel Homer who gave a talk on her specific role, and how she has developed materials to provide the necessary support. Particular needs of different students were highlighted and Rachel described how she has structured her creation of new materials.

Data collection at different maths support centres was discussed. How was this done at different institutions? What was the most efficient way to do this? How was the collected data used, and by whom? Data collection is conducted in all centres and understandably of particular importance to centres still trying to establish themselves in their institutions. The data feeds into yearly reports at some institutions and demonstrates the importance of maths support centres.

The event generated several constructive and informative discussions which brought together maths support tutors, representatives of STEM and lecturers involved in supporting Widening Participation students. The event successfully culminated in strengthening ties between practitioners and brought to everyone's attention new resources and sources for material.

Creating and maintaining a social media presence – 20 June 2014

Leslie Fletcher, North West and North Wales Hub co-ordinator

Twelve people from six HEIs attended the **sigma** North West and North Wales Hub event ***Creating and maintaining a social media presence*** at Liverpool John Moores University on Friday 20 June. Appropriately the event had a Twitter hashtag #ljmutwt.

Alex Spiers, @alexgspiers, Learning Technology Developer, LJMU, opened proceedings with **Getting to grips with the technology** helping participants, many of them novices, better understand how to use Twitter. This was a highly interactive session lasting until lunch time. Some of the novices present used their favourite mobile device to send their first ever tweet! Alex's presentation can be found on Slideshare

<http://www.slideshare.net/alextronic/an-introduction-to-twitter-in-higher-education>

In the afternoon, Janette Matthews, @matthews_jb, Pedagogic Project Officer, Loughborough University explained how **Using the sigma network website**(www.sigma-network.ac.uk) and the associated Jiscmail list SIGMA-NETWORK@JISCMAIL.AC.UK provide an indispensable means of communication amongst mathematics and statistics support practitioners.

Finally, Mark Feltham, LJMU @MarkFeltham666 and Peter Rowlett, Nottingham Trent University @peterrowlett spoke about their experience of using Facebook and Twitter respectively in learning and teaching.

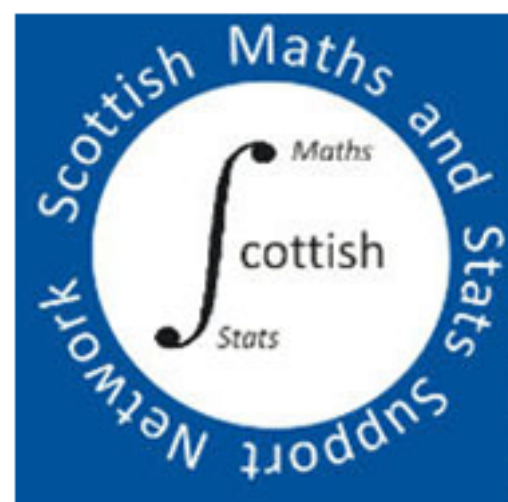
Hopefully most of those attending, not only the novices, took away something from the day so thanks are due to everyone involved, especially the presenters who created an air of excitement about the potential of social media in learning and teaching.

Leslie Fletcher @LRFletcher43 still has a lot to learn about Twitter, and still more about Facebook!

6th Annual Scottish Maths Support Network Meeting – 20 June 2014

Michael Allardice, Academic Skills Centre, University of Dundee

The 6th Annual **Scottish Maths Support Network** conference: '**Carrying the Remainder**', was held at the University of Dundee on 20th June, with colleagues from across Scotland and speakers from as far afield as Manchester and Keele universities. We heard from colleagues about the variety of practice and experience taking place in different institutions. Chris Foley offered a personal, cross-institutional perspective having worked at St Andrews, Edinburgh and Dundee universities. Ewan Russell from Keele highlighted a new approach based in 'real-world' practice for mathematicians, while Shazia Ahmed profiled the 'year in the life of Maths Support' at Glasgow University. The morning session ended with John Little recounting how Maths Support at Robert Gordon had changed since he had first begun to provide it in the late-1990s. The afternoon session focused on a new venture at Dundee: 'The numerate campus', part of a One Dundee approach to maths support. This discussion was led by Antonia Wilmot-Smith from the School of Maths. Colleagues offered their views as experience of similar approaches was shared around the table. The conference ended with a short business meeting of the Scottish Maths and Stats Support Network.



Using Puzzles and Games in Maths Support – 26 June 2014

Noel-Ann Bradshaw, sigma South East Hub Co-ordinator

On 26 June, the South East **sigma** hub organised a one day workshop on using puzzles and games in maths support. The event was hosted by one of the newest **sigma** Centres, King's College London.

There were six speakers who presented on a variety of connected topics:

- Using puzzles and games to motivate student engagement in maths – Danny Brown (Greenwich Free School)
- Promoting problem-solving through the Maths Arcade – Noel-Ann Bradshaw (University of Greenwich)
- Using a Rubik's Cube to teach group theory – Claire Cornock (Sheffield Hallam University)
- Using puzzles to develop problem-solving skills in undergraduate maths and outreach – Peter Rowlett (Nottingham Trent University)
- Puzzles to engage students in problem classes – Sally Barton (Sir George Monoux School)
- Using puzzles and games to help overcome numerophobia – Allison Smale (Bucks New University)

The meeting was well attended with 24 delegates from the following universities: Brighton University, Brunel University, Bucks New University, University of East London, University of Greenwich, King's College London, University of Kingston, University of Lincoln, Middlesex University, Nottingham Trent University, Portsmouth University, University of Reading, Sheffield Hallam University and University of Sheffield.

As well as listening to presentations the delegates were encouraged to try out various games and puzzles in the breaks and during some of the talks. The presentation slides have been made available to delegates and it is intended that the speakers will collaborate to produce a joint paper on the subject during the next academic year.



Delegates looking at the strategies behind Quarto

Maths support: Who needs it and why – 27 June 2014

Ruth Fairclough, sigma Midlands Hub co-ordinator

The **sigma** Midlands Hub held an event, *Maths support – Who needs it and why* at **The University of Wolverhampton, Walsall campus** on **Friday 27 June**, starting at **10:30am**. This event was aimed at those who have liaised with academics based in subjects whose students use maths support. Participants shared their experiences and the impact this has had on their support centres.

A representative from FE presented to give a fuller picture of the skills undergraduate students may typically possess in mathematics and statistics. A case study of collaborative work done at Wolverhampton University with nurses was presented as an example of good practice. There was ample opportunity for discussion highlighting good practice and issues that are common across support centres.

There were 12 participants from the following institutions: Aston University, BCU, Staffordshire University, The

Discussion regarding secondary and tertiary mathematics, including GCSE, A Level and BTech engineering

A sample of assessments from A Level Mathematics, GCSE Mathematics and the mathematics on BTech level 3 Engineering was used as the basis for discussion. There was some surprise at the level of structure provided in the A Level mathematics papers, the low pass marks required for some GCSE mathematics papers and the differing practices reported when assessing the mathematics in the BTech Engineering courses.

Discussion of good practice working with other subjects

A case study of working with nurses who were struggling with drug calculations was provided as the basis of the discussion for working with other subjects. Working with groups rather than one to one was felt to be a more effective way of conducting maths support for these types of issues.

Issues offering mathematics support for other subjects

One issue discussed at length concerned being asked to come into classes to teach mathematics. There is a fine line between doing this and service teaching. Maths support is free for the subjects we work with: Is this a request to do service teaching with no financial recharge?

Issues offering statistics support for other subjects

The usual issues of students being asked to complete relatively advanced statistics in final year projects without the underpinning knowledge was discussed at length. It was suggested that we need to identify subjects where this occurs frequently and offer assistance in their course development to include preparatory work for students to complete before their dissertation.

New Centres Induction Day – 1 July 2014

Moira Petrie, sigma Project Manager



Dr Alex Schady outlines plans at the University of the Arts London

the University of Birmingham for our second new centre induction day. The institutions represented were Lancaster University, University of the Arts London, Royal Holloway University of London, University of East London, University of Greenwich and Vision West Nottinghamshire College.

Each representative was asked to present a short profile of their planned provision, including any issues or worries they were facing. This proved to be a very informative session and showed those attending that there were common issues and concerns, which were talked through in more depth. Members of the **sigma** team offered advice and guidance on 'setting up' a support centre, reporting requirements and available resources, and provided participants with opportunities to seek advice specific to them and their institutions.

Workshop on Innovations in University Mathematics Teaching – 7/8 July 2014

This 2-day workshop took place in Cardiff University and focussed on the application of inquiry based learning (IBL) (where emphasis is placed on the student's role in making sense of mathematical ideas, and communicating those ideas clearly to peers), and the flipped classroom (a model in which students gain first-exposure learning prior to class and focus on synthesizing, analyzing, problem-solving, etc. in class) in higher education.

During the first day invited speakers from the UK and US shared their experiences of implementing IBL and the **flipped** classroom. Day two began with an interactive IBL session, which led in to broader discussion and reflection on how such methods might be embedded in practice. The conference was very positively received with a number of delegates commenting on how the ideas introduced and discussed will have a genuine impact on their approaches to teaching and learning.

Further details from each of the sessions, along with links to related material, is available [here](#). For additional information please contact the workshop organisers [Paul Harper](mailto:Harper@cardiff.ac.uk) (Harper@cardiff.ac.uk), [Vincent Knight](mailto:KnightVA@cardiff.ac.uk) (KnightVA@cardiff.ac.uk), and [Rob Wilson](mailto:WilsonRH@cardiff.ac.uk) (WilsonRH@cardiff.ac.uk).

sigma SW&SW hub meeting: Graduate Numeracy Tests workshop – 16 July 2014

Emma Cliffe



Delegates engaged in discussion led by Janice Richards

A **sigma** SW&SW meeting, on Graduate Numeracy Tests, was held on Wednesday 16th July at the University of Bath. Naureen Durrani who worked on the University of Central Lancashire *Every Student Counts: Promoting Numeracy and Enhancing Employability* project gave a valuable overview of project findings including student conceptions of maths, attitudes and approaches to maths, where students go for help, employer needs and use of tests.

Laura Lawrence of the University of Bath then outlined how tests are used in recruitment processes and we pondered the first example questions of the day. These were used to highlight difficulties students have and how the Careers Service assists them. After lunchtime networking Matthew Jones of Nationwide Building Society described how the financial services sector assesses proficiency for analytical roles during all phases of the recruitment process. Examples included pre-screening, individual face to face questions, group tests and logical reasoning.

Finally, Janice Richards of Mathematics in Education and Industry (MEI) led a structured discussion. Groups considered *what* skills students need to develop, *how* to support this, *when* support should be targeted and how to *engage* students. Janice illustrated the topics with examples of resources and case studies.

Twenty attendees, including speakers, came from Bath, Bedfordshire, Birmingham, Cardiff, Coventry, Greenwich, Liverpool John Moores, Loughborough, South of Wales, Sussex and Swansea. They felt that helpful things included: “*examples of numeracy tests*”, “*insight into the 'industry-take'*”, “*useful resources to support students and to use to highlight issues within my institution*”, “*discussion with other maths support practitioners*” and “*a good mix of expertise*”.

Presentations, handouts, links and photos of discussion summaries are available at:

<http://www.bath.ac.uk/study/sigma-sw/events/numeracy.html>

Recent reports and research publications

This regular column lists recent publications relevant to mathematics and statistics support practitioners. If you are aware of any publications that may be of interest to this community, please will you send them to J.Matthews@lboro.ac.uk. It is our intention to compile a bibliography which will be available from the **sigma Network** and **mathcentre** websites.

Reports

Vision for science and mathematics education. Royal Society Science Policy Centre. (2014)

<http://www.mathcentre.ac.uk/resources/uploaded/vision-full-report-20140625.pdf>

Michaela J Cottee, Amanda Relph and Karen Robins. (2014) *Skills in Mathematics and Statistics in Business and Management and tackling transition*. <http://www.mathcentre.ac.uk/resources/uploaded/ttmathsbusiness.pdf>

Pater Dawson (2014) *Skills in Mathematics and Statistics in Economics and tackling transition*. Higher Education Academy STEM project: Skills in Mathematics and Statistics in the disciplines and tackling transition. <http://www.mathcentre.ac.uk/resources/uploaded/ttmathseconomics.pdf>

Josh Hillman (2014) *Mathematics after 16: the state of play, challenges and ways ahead*. London: Nuffield Foundation. <http://www.mathcentre.ac.uk/resources/uploaded/mathematicsafter16vfinal.pdf>

Jeremy Hodgen, Mary McAlinden and Anthony Tomei (2014) *Mathematical transitions: a report on the mathematical and statistical needs of students undertaking undergraduate studies in various disciplines*. <http://www.mathcentre.ac.uk/resources/uploaded/heamathematical-transitionswebv2.pdf>

Julie Scott Jones and John Goldring (2014) *Skills in Mathematics and Statistics in Sociology and tackling transition*. Higher Education Academy STEM project: Skills in Mathematics and Statistics in the disciplines and tackling transition. <http://www.mathcentre.ac.uk/resources/uploaded/ttmathssociology.pdf>

Dudley E Shallcross and Paul C Yates (2014) *Skills in Mathematics and Statistics in Chemistry and tackling transition*. Higher Education Academy STEM project: Skills in Mathematics and Statistics in the disciplines and tackling transition. <http://www.mathcentre.ac.uk/resources/uploaded/ttmathschemistry.pdf>

Catherine Souch, Katherine Fitzpatrick and Richard Harris (2014) *Skills in Mathematics and Statistics in Geography and tackling transition*. Higher Education Academy STEM project: Skills in Mathematics and Statistics in the disciplines and tackling transition.

<http://www.mathcentre.ac.uk/resources/uploaded/ttmathsgeography.pdf>

Journal and Conference Publications

Cormac Breen, Michael Carr and Mark Prendergast (2014) *Investigating the Engagement of Mature Students with Mathematics Learning Support*. Proceedings of the 17th Mathematics Working Group Seminar, Dublin 2014, http://sefi.htw-aalen.de/Seminars/Dublin2014/17th%20SEFIMWG%20Seminar/Tuesday%20Session%201/MWG2014_Breen.pdf

Deborah C. Jackson, Elizabeth D. Johnson, Tania M. Blanksby. (2014) *A Practitioner's Guide to Implementing Cross-Disciplinary Links in a Mathematics Support Program*. IJISME, Vol 22, No 1.

<http://openjournals.library.usyd.edu.au/index.php/CAL/article/view/6898>

Jordan J.-A., McGladdery G. and Dyer K. (2014), *Dyslexia in Higher Education: Implications for Maths Anxiety, Statistics Anxiety and Psychological Well-being*, *Dyslexia*, 20, pages 225–240, doi: 10.1002/dys.1478

Eabhnat Ní fhloinn, Ciarán Macan Bhaird & Brien Nolan (2014) *University students' perspectives on diagnostic testing in mathematics*. *International Journal of Mathematical Education in Science and Technology*, 45, (1) pp 58–74 DOI:10.1080/0020739X.2013.790508

Jon Warwick and Anna Howard (2014) *Strengthening student engagement with quantitative subjects in a Business Faculty*. *e-Journal of Business Education & Scholarship of Teaching*, 8(1) pp: 32–43.

[http://www.ejbest.org/upload/eJBEST_Warwick_Howard_-_8\(1\)_2014.pdf](http://www.ejbest.org/upload/eJBEST_Warwick_Howard_-_8(1)_2014.pdf)

van Veggel N, Amory J. (2014) *The impact of maths support tutorials on mathematics confidence and academic performance in a cohort of HE Animal Science students*. *PeerJ* 2:e463 <http://dx.doi.org/10.7717/peerj.463>

The **sigma** e-Newsletter is a quarterly community publication and the views expressed do not necessarily constitute recommendations from the **sigma** Directorate.

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. Please contact [Janette Matthews \(J.Matthews@lboro.ac.uk\)](mailto:J.Matthews@lboro.ac.uk).

The deadline for contributions for the next edition is **14 November 2014**.

For more information, visit <http://www.sigma-network.ac.uk>
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