

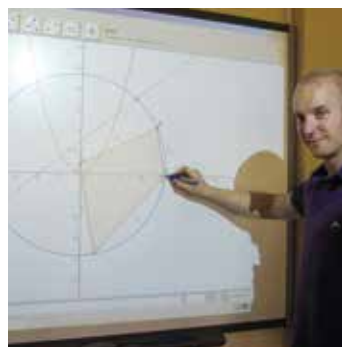


sigma  $\Sigma$   
network for excellence in  
mathematics and statistics support

# The sigma Network

for cross-university mathematics  
and statistics support

Annual Report 2013/14



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# Introduction

2013/14 has been a very significant year for **sigma**.

The **sigma** Directors were successful in a bid to the Higher Education Funding Council for England (HEFCE) to provide funding to support, enhance and develop the **sigma** Network project for a further three years until 2016. The following pages illustrate the variety of ways in which the funding is being used to strengthen and deepen the provision of mathematics and statistics support in higher education institutions across the country.

Our work during the three year funding period is guided by the **sigma** Advisory Group, consisting of high profile representatives from the higher education sector and professional bodies. Their names are listed on page 3. We are enormously grateful for their generosity of time and engagement with the work of **sigma**, and for the supportive yet robust challenge they provide to our project. Our twice-yearly meetings provide renewed direction and motivation to sustain the cause of university-wide mathematics and statistics support, and enrich our endeavours.

We are also greatly indebted to the work of the regional hub co-ordinators of the **sigma** Network. They, together with the ring of contacts and local "activists" that they have assembled around them, provide the day-to-day face of **sigma** for tutors working in maths support centres across the regions. This report contains an overview of some of the events and activities they have organised.

Of course, all of this activity would not take place without the commitment of the core team, Trevor Hawkes, Moira Petrie, Janette Matthews and Michael Grove to whom we are particularly grateful. We would also like to acknowledge the contribution of Daryl Davies, University of Birmingham, particularly for his role in the annual conference planning.

The work and commitment of **sigma** to help improve the mathematical, statistical and quantitative reasoning skills of students in all subjects and at all levels is becoming increasingly recognised in the national debate around higher education. David Willetts MP, until very recently the Minister for Universities and Science, made several public pronouncements over the year that acknowledged the importance of **sigma** (see for example: [www.hefce.ac.uk/news/newsarchive/2013/news83569.html](http://www.hefce.ac.uk/news/newsarchive/2013/news83569.html)). We welcome the continued interest from the Department for Business, Innovation and Skills in the progress of the **sigma** Network.

We hope this annual report gives a good overview of our activities over the past twelve months. Ways in which you can find out more and become involved in **sigma**'s continuing work are described on pages 16 and 20.

Members of the **sigma** Network will be present at the CETL-MSOR conference, to be held at Cardiff University on 8-9 September 2014. We will be keen to meet you and hear your ideas for the future.

*Tony Croft & Duncan Lawson (sigma Directors)*  
*David Bowers (Chair, sigma Network)*



Tony Croft



Duncan Lawson



David Bowers

# Key Groups and Personnel

The HEFCE funded **sigma** Network project is managed through the **sigma** Directorate and guided by the project's Advisory Group, with the Hub Network represented by its Chair, David Bowers.

## sigma Directorate

Professor Tony Croft	Loughborough University
Professor Duncan Lawson	Newman University
Dr Trevor Hawkes	Coventry University
Michael Grove	University of Birmingham
Moira Petrie [Project Manager]	Loughborough University

## sigma Advisory Group

Professor John Blake [Chair]	University of Birmingham
David Bowers	University Campus Suffolk
Professor Neil Challis [External Evaluator]	Sheffield Hallam University
Professor Tony Croft	Loughborough University
Lis Edwards	HEFCE
Michael Grove	University of Birmingham
Dr Trevor Hawkes	Coventry University
Professor Duncan Lawson	Newman University
Moira Petrie [Project Manager]	Loughborough University
Professor Nigel Steele	Institute of Mathematics and its Applications (IMA)
Charlie Stripp	National Centre for Excellence in the Teaching of Mathematics / Mathematics in Education & Industry
Dr Janet de Wilde	Higher Education Academy

## Hub Co-ordinators

Ruth Fairclough	University of Wolverhampton	Midlands
Noel-Ann Bradshaw	University of Greenwich	South East
Dr Emma Cliffe	University of Bath	South West & South Wales
Dr Leslie Fletcher	Liverpool John Moores University	North West & North Wales
David Bowers	University Campus Suffolk	Eastern England
Dr Chetna Patel	University of Sheffield	North East & Yorkshire

From August 2014, the Eastern England Hub will be co-ordinated by Dr Abdel Salhi, University of Essex.

*"[sigma].... is establishing approachable maths support services at institutions across the country. Thanks to their work, politics students suddenly confronted with a regression analysis have someone to turn to. STEM (Science, Technology, Engineering and Mathematics) undergraduates too are receiving expert support to bring their maths skills up to speed."*

*The Right Hon David Willetts MP, Robbins Revisited: Bigger and Better Higher Education (Social Market Foundation, 2013)*

## The **sigma** Network project

In October 2013, HEFCE agreed to provide funding of over £800,000 for the **sigma** Network in England over the next three years. Mathematics and statistics support has proved its worth in many HE institutions around the country over the last decade and more. Much has been achieved since the establishment of **sigma** as a Centre for Excellence in Teaching and Learning in 2005. Support centres have been set up at many HE institutions, countless thousands of students have been helped, training for staff provided, more resources for students are available and there is a growing volume of material for staff.

The need for mathematics and statistics support remains as clear as ever. The 2011 ACME Mathematical Needs report indicated that whilst 330,000 new entrants to HE would benefit from having studied some mathematics beyond GCSE, in fact only 125,000 have done so.

One key purpose of the current funding for the **sigma** Network is to further develop the community of mathematics and statistics support practitioners. Those working in this area have traditionally been co-operative and collaborative, offering support where they can to newcomers to the field. There has always been deliberate openness to the sharing of resources and expertise. This is essential, because often practitioners are isolated within their own institutions – either as the only “maths specialist” in a broad academic support service or as the only “support specialist” in a mathematics or statistics department where the primary focus is on research. To this end, the funding received has enabled us to resource the regional hubs so that they continue to play a key role in providing an environment in which there can be sharing of good practice and mentoring of new practitioners.

A second important goal is to reinforce the message of the value of mathematics and statistics support to senior

colleagues within institutions. This has been gathering momentum over the last two or three years – for example, around a dozen universities mention mathematics support in their OFFA Access Agreements. However, there is a need to further consolidate the growing reputation of mathematics and statistics support so that it is not viewed by senior managers as a nice-to-have-luxury but an essential feature of an excellent student learning experience. We are working closely with other bodies with interests in this area, such as the Higher Education Academy, OFFA and the Nuffield Foundation to ensure that issues around mathematics and statistics are prominent on the academic agenda.

Finally, part of the funding is being used to promote new developments of different kinds. So far there have been funding calls that have provided funding to 11 HE institutions to develop and enhance their mathematics and statistics support provision; 6 grants awarded for others to develop new resources, and 6 grants to fund student summer intern projects to contribute to the enhancement of mathematics and statistics support.

Over the next two years, there will be opportunities for the further funding of student intern projects and resource development projects.



## News and events from around the **sigma** Network

Thanks to the HEFCE funding, the **sigma** Network has formalised the co-ordination of the 6 hubs, with the appointment of co-ordinators and deputies for each regional hub region.

Over the past year, they have organised 12 hub events, helped inform the development of the wider project, provided support and encouragement to those institutions within their region and have been key to the successes of the HEFCE funded project in its first year.

The main responsibility of the hubs is to offer a programme of events to their constituents. These events are open to anyone but allow more local access to workshops and events of interest, and facilitate networking. The hub co-ordinators work hard to ensure a comprehensive and co-ordinated programme of events. The following pages give a flavour of some of the events held this year.

*Great opportunity for informal discussions to share experience*



Figure 1: Hub co-ordinators away day in July 2014

## North West & North Wales Hub

This Hub is co-ordinated by Leslie Fletcher, Liverpool John Moores University.

### Creating and maintaining a social media presence

Twelve people from six HE institutions attended the **sigma** North West and North Wales Hub event, *Creating and maintaining a social media presence*, at Liverpool John Moores University on 20 June 2014. Appropriately, the event had a hashtag #lmutwt.

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), Loughborough University, explained how *Using the sigma Network website* ([www.sigma-network.ac.uk](http://www.sigma-network.ac.uk)) and the associated Jiscmail list provides 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 experiences 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 and for mathematics and statistics support.



Leslie Fletcher

## Eastern England Hub

David Bowers, University Campus Suffolk, continued to co-ordinate the **sigma** Eastern England Hub over the past year. From August 2014, this role will be undertaken by Dr Abdel Salhi, University of Essex.

### Use and Evaluation of Prezi for Mathematics and Statistics Support

This event was held on 18 June 2014 and was hosted at University Campus Suffolk. Twelve people registered for the meeting, representing seven institutions across the region.

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 mathematics 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 mathematics support at last year's CETL-MSOR Conference, which they took as a basis for this meeting. Prezi allows the production of "interactive mind maps" 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. 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.

### Interactive Technologies for Mathematics and Statistics Support

This event was held at University Campus Suffolk (UCS) on 19 March 2014 and was attended by delegates from 8 universities in the Eastern region, all of whom left with at least one new idea to try out with their next group of unsuspecting students!

As mathematics support tutors, we do not just spend our time in one-to-one support situations. We are increasingly invited into courses to deliver occasional "guest lectures"



David Bowers

on mathematical or statistical topics to large groups of students. This event gave a hands-on overview of a variety of interactive technologies that can help to engage students and hopefully make the lecture memorable and meaningful for them.

We started with audience response systems, also known as "clickers", which enable the audience to vote on a range of options and the result of the vote to appear instantly. Delegates practised embedding interactive questions into PowerPoint presentations, and a discussion of the pedagogical considerations around the effective use of clickers in mathematics learning was led by our guest speaker Andy Ramsden, e-learning Manager at UCS.

We then considered the *Poll Everywhere* system, where text messages sent to a given number are projected on a screen. This can allow qualitative responses to be collected, which can be richer than simply responding to multiple choice questions. It also allows students to (anonymously) text in questions and comments either before, during or after a session, and these can be displayed collectively and discussed.

As an alternative to using text messages, response data can be submitted via Google Forms using a range of online devices (laptops, tablets, smart phones). Delegates experimented with designing Google Forms and collating the responses to a Google Sheet, from where they can be exported to Excel or SPSS and analysed.

Finally, a "show and tell" session for mobile apps allowed delegates to demonstrate and share apps and websites that they have found useful for teaching and learning.

## Midlands Hub

*The Midlands Hub is co-ordinated by Ruth Fairclough, University of Wolverhampton.*

### Maths support: Who needs it and why

This event was held at the University of Wolverhampton, Walsall campus on 27 June 2014. There were 12 participants from 8 different institutions.

This event was aimed at those who have liaised with academics based in the subjects whose students use mathematics support. Participants shared their experiences and the impact this has had on their support centres. A sample of assessments from A-level Mathematics, GCSE Mathematics and the mathematics on BTEC level 3 Engineering were used as the basis for discussion.

A representative from Further Education 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 on transition to university.

There was ample opportunity for discussion of good practice which highlighted issues that are common across support centres.

One issue that was discussed at length concerned being asked to come into classes to teach mathematics. This highlighted the 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?

The perennial 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 so it can include preparatory work for students to complete before their dissertation.

### Statistics advisory meeting

This workshop, held at Birmingham City University on 9 April 2014, was chaired by Peter Samuels (Birmingham City University) and jointly organised by the Midlands and North East & Yorkshire Hubs. The event was fully subscribed with 25 delegates representing 16 different HE institutions.



Ruth Fairclough

Issues considered related to the provision of statistics support in HE and included a number of focused sessions on "improving practice in the provision of statistics support", "centralised statistics resources", "supporting new statistics tutors" and "the use of Likert scales".

The first session included an activity based on a typical student scenario that raised a number of questions, such as "How can we help students to help themselves rather than doing the analysis for them?", "How do we help students if it's coursework?", "What if it's a final year project – can we still help them?", "What should you do if you don't know the answer?", along with many more, not always with a clear consensus!

The second session provided an opportunity for participants to suggest their favourite online resources, and included an overview of **stats**tutor ([www.statstutor.ac.uk](http://www.statstutor.ac.uk)) and CAST ([http://cast.massey.ac.nz/collection\\_public.html](http://cast.massey.ac.nz/collection_public.html)). Also discussed was the way new resources can be contributed to **stats**tutor via the **stats**tutor Community project ([www.statstutor.ac.uk/communities](http://www.statstutor.ac.uk/communities)) under a Creative Commons licence.

The final session included a presentation by Alun Owen (Loughborough University) and Ellen Marshall (University of Sheffield) about their ideas for the development of a training pack, aimed at new or less experienced statistics support tutors and PhD students who provide statistics support. There was strong support for the idea and, funding permitting, they hope to take this idea further. This session also included a useful presentation by Laurence Moseley (University of South Wales), who discussed the use of Likert scales and considered issues such as "How many points should you include on your Likert scale?".

## North East and Yorkshire Hub

*The North East & Yorkshire Hub is co-ordinated by Chetna Patel, University of Sheffield, assisted by Vijay Teeluck, University of Leeds.*

### Strengthening links

This event was held on 19 June 2014 at the University of Leeds and attracted 11 delegates from 7 different HE institutions. It was aimed at bringing together practitioners of mathematics support from different areas and institutions. The theme of the event centred on participants sharing their experiences and discussing issues affecting mathematics 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 change to the attention of those involved in mathematics supports.

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 and how Rachel has structured her creation of new materials were highlighted.



Chetna Patel



Vijay Teeluck

Data collection at different mathematics 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? Usage data is routinely collected in all centres and, understandably, is 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 mathematics support centres.

The event generated several constructive and informative discussions which brought together mathematics 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 teaching and learning materials.

## South West and South Wales Hub

The South West and South Wales Hub is co-ordinated by Emma Cliffe, University of Bath.



Emma Cliffe

### Ideas exchange and development

On 26 March, the first **sigma** SW&SW meeting of the year ran as an ideas exchange with the aim of re-establishing links between maths support practitioners in the region. Attendees representing Bath, Bristol, Bournemouth, Cardiff, Exeter, Swansea and UWE each provided a summary of their maths support work. This overview uncovered similarities and differences between services and enabled each institution to add to a list of shared challenges, interests and areas for future development. Updates provided a summary of their maths support work. This overview uncovered similarities and differences between services and enabled each institution to add to a list of shared challenges, interests and areas for future development.



In the afternoon small groups focussed on specific areas for development namely statistics support, maths study skills support and support for students with weaker mathematical backgrounds including diagnostic testing. Some items of the extensive list from the morning were agreed to be areas of strong interest which should be developed over time. This included planning how to set up and maintain an active virtual SW&SW community to enable sharing of practice more regularly despite the distances between institutions. The discussion groups in the afternoon were successful in sharing practice and produced ideas that could be built on into the future. Attendees felt that the most helpful things were: "extended informal discussions to share experience"; "hearing the overviews of different institutions" and "networking". The day was well received with comments including: "really useful to understand common problems [...] found some solutions and had some good ideas" and "will definitely be attending again in the future".



### Graduate numeracy tests

A meeting focussing on Graduate Numeracy Tests was held on 16 July 2014. Naureen Durrani who worked on the University of Central Lancashire *Every Student Counts: Promoting Numeracy and Enhancing Employability* project started the day. Naureen 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.

20 delegates from 11 different HE institutions attended. 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>



## South East Hub

Noel-Ann Bradshaw, University of Greenwich, co-ordinates the South East Hub.



Noel-Ann Bradshaw

### Sustainability and evaluating success: sharing good practice

The first meeting of the year was held on 14 February at the University of Greenwich on the theme of 'Sustainability and Evaluating Success'. Ten people attended from seven universities.

The primary motivation behind this meeting was to enable those involved in mathematics and statistics support in the region to share good practice and exchange ideas and experiences. Everyone who attended was asked to give a short presentation detailing the maths support provision in their institution. There was also a very productive discussion concerning ideas for future meetings and other ways in which the **sigma** Network could be used to enhance mathematics and statistics support provision in the region.

As a result of this meeting a local network of like-minded practitioners has developed and many ideas for future meetings have been generated.



### Using puzzles and games in maths support

On 26 June, the 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 14 universities.

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.

# Supporting students

The need to provide mathematics and statistics support for undergraduate and postgraduate students in higher education in England is now well-established. One of the key focuses of the recent HEFCE funding is to enable increased levels of mathematics support for students studying at HE institutions in England, regardless of the course they are undertaking. In addition, we are keen to support the wider skills development of students studying work within the mathematics support arena.

## The funding of new and enhanced provision

To this end, **sigma** has organised two funding calls for distributing funding to set up new mathematics and statistics support in institutions with little or no existing provision. This has enabled us to provide funding to 9 HE institutions and 2 FE colleges with HE provision over the lifetime of the project:

### 2013/14 – 2014/15

- Bournemouth University
- Halesowen College
- King's College London
- University of Leicester

### 2014/15 – 2015/16

- University of the Arts London
- University of East London
- University of Greenwich
- Lancaster University
- Royal Holloway, University of London
- Vision West Nottinghamshire College
- Nottingham Trent University (enhanced provision)

## Student intern projects

In addition, **sigma** is funding 6 undergraduate student summer internship projects:

- **University of Bath:** Developing resources to overcome specific language barriers in HE mathematics and statistics
- **University of Brighton:** Developing resources for mathematics and statistics on the University of Brighton Academic Study Kit (ASK)
- **University of Liverpool:** Creating online maths questions to enhance student learning in maths in a chemistry context
- **Liverpool John Moores University:** Designing a collection of practice questions to improve the numeracy, capabilities and confidence of pharmacy students
- **London Metropolitan University:** Data collection and analysis relating to usage of the maths support provision at London Metropolitan University
- **Sheffield Hallam University:** Investigating ways to promote engagement with students from subject areas which are under-represented as users of maths support

Each summer internship project has received a £2,000 grant, with the main purpose being to provide the student interns with experience of working on a time limited project. As part of the conditions of funding, the universities receiving funding had to provide match funding in the form of a second student intern project.

The outputs of the projects will be shared with the wider community. In addition, the students have been offered the opportunity to present their projects as part of one of the keynote sessions at this year's CETL-MSOR conference.



Mathematics support team at Bournemouth University

*It is a sign of a good conference when there are clashes which meant I missed some talks I wanted to see*



# Supporting practitioners

In addition to providing access to local events and support through the Hub Network, **sigma** organises a variety of activities to support mathematics and statistics support practitioners across the country.

## Mentors

All 11 provisions funded by the current **sigma** Network project have been assigned a mentor who will be available to share their experiences, helping the new provisions to avoid "re-inventing the wheel" and to steer clear of common pitfalls. In addition, provisions funded through the previous National HE STEM Programme **sigma** project have also been offered continued mentoring. All hub co-ordinators are keen to provide mentoring support to those who need it. This offer is open to all practitioners.

## Tutor training

Many mathematics support centres, including the majority of those established during the National HE STEM Programme, make extensive use of postgraduate students to act as tutors. Providing mathematics support is not the same as the routine tutorial assistance that many postgraduate students undertake. To prepare mathematics support tutors, **sigma** has developed a one day training workshop (with related materials) that was delivered several times during the National HE STEM Programme. This workshop is now being offered to each of the hubs as well as to the newly funded provisions. Given the optimal timing of these training workshops, the first tranche is planned for October 2014.

## CETL-MSOR Conference

The annual CETL-MSOR conference is now well-established as the principal national (and indeed, international) event for dissemination and sharing of good practice in mathematics and statistics support as well as wider mathematics and statistics education discussions.

In September 2013, the conference *Next Steps* was hosted by Coventry University in their new Faculty of Engineering and Computing building. More than 90 delegates took part over the two days. The programme included a keynote session presented by students completing **sigma** internships at four universities – Daniel Organisciak (University of Birmingham), Elisabeth Low (Cardiff University), Jack Tabear (Loughborough University) and Hayley Bishop and Sarah Jowlett (Newcastle University).

This year's conference *Mathematics and Statistics Teaching, Learning and Support: Real, Virtual, Mobile* will be hosted by Cardiff University on 8th and 9th September. We have received 20% more abstract submissions than in previous years and are looking forward to a great conference.

## sigma Prizes

The **sigma** prizes, which are awarded at the conference, have been important in promoting research and scholarly activity alongside hands-on practice in mathematics and statistics support. This year's winners will be announced at the conference in Cardiff on the 8th September 2014.



# Reaching out – resources and communication

Another avenue for **sigma** support is the development and provision of resources and information for both students and staff. We are keen to ensure that a number of approaches are used to achieve this.

## Resource development activities

Following a successful funding call, **sigma** awarded grants of £2,000 to 6 resource development projects.

- **University of Bath:** Emma Cliffe and Cheryl Voakes-Jones – “Getting started with...” screencasts and help guides
- **De Monfort University:** Eleanor Lingham – A bank of two-page ‘bite-size’ leaflets to provide targeted support to students who are preparing for numerical reasoning tests
- **University of Sheffield/ Loughborough University:** Alun Owen and Ellen Marshall – A pack of “scenario-based” training resources that can be used for developing statistics advisory skills amongst mathematics support centre staff who provide statistics support in Higher Education (HE)
- **Liverpool John Moores University:** Leslie Fletcher – A collection of online practice questions to improve the numeracy capabilities and confidence of Nursing students
- **London South Bank University:** Larry Krause – A series of help sheets with an accompanying bank of questions for Nursing students
- **University of York:** Francis Duah – 30 two-page Help Sheets for Economics and Finance students

It is a condition of the grant funding that all resource outputs are peer reviewed prior to being made available to the wider community via the **mathcentre** and **statstutor** Community Projects ([mathcentre.ac.uk](http://mathcentre.ac.uk) and [statstutor.ac.uk](http://statstutor.ac.uk)).

There will be similar funding opportunities offered over the next two years.

## mathcentre

**mathcentre** ([www.mathcentre.ac.uk](http://www.mathcentre.ac.uk)) is the online open access website established in 2003 with mathematics resources for both students and staff. Usage data<sup>1</sup> indicates that the site is well used attracting approximately 125 000 users viewing 1.3 million pages. New users have increased to 66% (61% in the same period last year). The majority of use originates in the UK (56%) and increasingly users are utilising **mathcentre** on mobile devices – desktop 83% (91% in 12/13), mobile 9% (5% in 12/13) and tablet 8% (4% in 12/13).

Staff resources were expanded by the addition of key reports relating to mathematics support. These are archived on **mathcentre** so that they are easily accessible to practitioners and other interested parties.

The mathematics support community has continued to enhance **mathcentre** through contributions to the **mathcentre** Community Project. The following have been received this year:

- Several formative tests using the DEWIS open-access, open-source e-assessment web-based system contributed by Dr Karen Henderson and Dr Rhys Gwynllyw, University of the West of England
- Quick reference leaflets on first and second order differential equations by Dr Morgiane Richard, University of Aberdeen
- Three Welsh language versions of the **mathcentre** Facts & Formulae leaflets translated by Dr Tudur Davies, a Coleg Cymraeg Cenedlaethol Lecturer of Mathematics, at the Institute of Mathematics, Physics & Computer Science, Aberystwyth University



## statstutor

The online open access website **statstutor** ([www.statstutor.ac.uk](http://www.statstutor.ac.uk)) was launched in 2012 with case studies and resources for students in higher education studying statistics. Usage statistics<sup>2</sup> show that **statstutor** was accessed by approximately 13,000 users for just under 17,000 sessions. A quarter (24%) of these are returning users. Half of all usage originates in the UK (49%) with the remainder representing an international audience – United States (14%), Romania (4%), India (4%), Australia (3%), Ireland (2%), Canada (2%), Malaysia (1%) and Germany (1%).

The **statstutor** Community Project enables the resource bank to expand by facilitating high quality peer reviewed resources developed by academics and support practitioners to be made available to a wider community. This year, a series of 15 PowerPoint Workshops for staff and 13 Quick Reference leaflets with associated data files covering a range of topics that are relevant to students learning statistics were contributed under a Creative Commons licence to the **statstutor** Community Project by Peter Samuels, Birmingham City University and reviewed by Ellen Marshall, University of Sheffield.

*[mathcentre]... is a wonderful resource that I recommend frequently to students – our Maths Learning Centre could hardly function without it*

## Mobile Apps

As part of this programme, we are looking to produce a set of apps suitable for use on mobile devices such as iPads and other tablets and smart phones. Our aim is to design and develop two apps for mobile devices during each of the three years of funding. The mobile resources we create will be compatible with the various common mobile platforms such as Android, Apple's iOS, and HTML5 for the web.

This year, we have been developing two apps. The first will be showcased at the CETL-MSOR conference in September 2014 and is re-purposing some of the existing resources on **mathcentre**, many of which were created under HEFCE FDTL programme for a PC environment. This will include new interactive material to support the passive video content with practical activities to reinforce learning. The second app is aimed at mathematics support providers, giving information about the **sigma** Network, its members and its activities, signposts to appropriate resources and a forum for discussion of issues relating to mathematics and statistics support.

<sup>1</sup> Google Analytics 01/07/2013 – 30/06/2014

<sup>2</sup> Google Analytics 01/07/2013 – 30/06/2014

# Find out more

Here are some of the ways to find out about what we are doing:

## sigma Network website

The **sigma** Network website ([www.sigma-network.ac.uk](http://www.sigma-network.ac.uk)) was redesigned in 2013 and is one of the primary communication tools used by the project. We have worked hard to ensure that all relevant news from the mathematics and statistics support sector, funding calls and all **sigma** and **sigma** hub events are publicised on the site. Details and materials such as presentations and hand-outs are archived following the event so that those not able to attend can also benefit.

The **sigma** Network website contains resources and key reports that will be of use to mathematics and statistics support staff and made available through the site. This includes all **sigma** publications and publicity leaflets as well as high level sector publications. All abstracts and presentations from CETL-MSOR 2013 have been archived on the site and it is the intention to make materials from CETL-MSOR 2014 available.

As a result of this activity, traffic to the **sigma** Network website has been increasing over the year (19,200 visits in total). Data<sup>3</sup> shows that the average monthly visits have doubled over the year.

Over the coming months, updates to the site will include a calendar of events making it easier to follow events, funding calls and other activities.

## sigma Network newsletter

We are keen to ensure that as much news and information as possible is available. To this end, a quarterly **sigma** Network e-newsletter has been published with the first issue in December 2013. Newsletters contain articles of interest to the mathematics and statistics support community, event publicity and reports as well as highlighting resources and research publications. Newsletters are archived on the **sigma** Network website. We are grateful for the contributions received. The newsletter is sent to all members of the **sigma** Network JISC mailing list.

We will continue to develop our online presence over the coming months to ensure the widest reach possible. Follow us on Twitter at @sigmahubs and utilise the hashtags #mathsupport and #statssupport when tweeting about events or updates.

## sigma Network mailing list

The **sigma** Network mailing list is hosted by JISCMAIL ([sigma-network@JISCMAIL.ac.uk](mailto:sigma-network@JISCMAIL.ac.uk)). It is used by **sigma** to communicate events and funding calls to the mathematics and statistics support community. It is increasingly being used by the community to advertise positions in mathematics and statistics support and to request relevant information.

Membership of the list has more than doubled over the past year and now stands at 166 subscribers. Do encourage your mathematics and statistics support colleagues to sign up.



<sup>3</sup> WordPress statistics 01/07/13-24/07/14

# Looking to the future

Prof Tony Croft, sigma Director, Loughborough University

In 2007, the University of St Andrews report – *Responding to the Mathematics Problem – the implementation of institutional support mechanisms* – contained a Foreword by Dr Joe Kyle, University of Birmingham.



Tony Croft

He wrote ... *"Looking back, I probably regarded mathematics support as a form of cottage industry practised by a few well meaning, possibly eccentric, individuals, who may themselves have been hard pushed to offer a credible rationale for this work..."*

*"Now only a few years on, we see that the concept of mathematics support has not only become firmly embedded in UK Higher Education, but colleagues have moved on to gather data on the way students use such resources and look for optimal strategies for the delivery of this support, and this is perhaps the most convincing evidence of acceptance. Mathematics support came of age in the first decade of the 21st century. What might once have been described as a cottage industry now plays a respected and widely adopted role in Higher Education."*

Over the last decade, the field of mathematics and statistics support has continued to grow and has benefitted from significant injections of funding that have enabled the community to thrive, support for students to be considerably enhanced through new centres and new activities and high quality resources to be developed. The current injection of funding from the Higher Education Funding Council for England will enable further growth and consolidation up to the end of the funding period in July 2016. At the time of writing this report, we have been able to disburse funding to almost thirty institutions to support **sigma** hubs, pump-prime brand new centres and provide resource development grants and funds for internships. Our Annual Conference programme is assured.

Looking beyond 2016, we recognise that we need to establish a sustainable base for the future. It is critical that mathematics support remains firmly embedded within the higher education sector through the practices of individuals and institutions; its profile needs to be raised along with increasing the number of individuals and institutions who engage. A vital element of sustainability is the establishment of a community of practice of sufficient critical mass that there will exist within it the capacity to continue many aspects of this project without becoming over-reliant on external sources of funding.

To this end, the central **sigma** team along with the Chair of the **sigma** Network are setting in place measures to build a sustainability strategy. An important aspect of sustainability is the recognition by senior university 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 make reference to mathematics support in their OFFA Access Agreements. **sigma** Directors have already held an initial meeting with the Director of OFFA, Professor Les Ebdon, to look at ways we can work together to better embed mathematics and statistics support within institutional strategies.

We have instigated a high-level sector needs analysis. This is taking the form of interviews with senior staff (generally at PVC level) in order to understand more about how they see the mathematics and statistics support needs of their students being satisfied and developed at an institutional level, and how **sigma** can assist in this. The work is being undertaken by Professor Harry Tolley and Dr Helen Mackenzie, two very experienced educational researchers. Their report will be available in Autumn 2014 and is expected to shape **sigma** developments over the remaining two years of funding and provide an evidence base for informing thinking at HEFCE. We have produced promotional material that is being used to highlight the need for mathematics and statistics support with university leaders.

We recognise there are several other key organisations, particularly the Q-Step Centres and professional bodies, which have an interest in sustaining the work of **sigma** and work already started will continue in 2014/15 in order to build bridges with them.

But the most valuable asset we have, and the surest sign that our work will continue, is the commitment, skill and dedication of all the individual members of the mathematics and statistics support community – lecturers, tutors, support staff, centre managers, learning technologists, administrators, student interns and others. We know how important this work is and we know of countless students who have benefitted. Long may it continue!

# Get involved with the **sigma** Network

People involved with cross-university mathematics and statistics support come from a broad range of backgrounds.

The **sigma** Network includes:

- specialist mathematics and statistics lecturers
- study skills tutors
- learning developers
- student peer learning leaders
- departmental managers
- educational researchers
- learning technologists
- and many others with a general interest in the teaching and learning of mathematics and statistics

There are several ways you can become involved in the **sigma** Network:

- (1) Visit our website at [www.sigma-network.ac.uk](http://www.sigma-network.ac.uk). We intend the website to contain news and updates of

events relevant to mathematics support practitioners, and also to include links to resources and key documents dealing with the theory and practice of mathematics and statistics support. So please don't just browse the website, let us know of content that you would like to see included.

- (2) Subscribe to our free email discussion list at [www.jiscmail.ac.uk/sigma-network](http://www.jiscmail.ac.uk/sigma-network). This will put you in touch with a growing number of professionals with an interest in cross-university mathematics and statistics support.
- (3) Get in touch with the co-ordinator of your local **sigma** hub (contact details on the website). The regional hubs are always keen to hear from new people working in mathematics and statistics support, especially if you have ideas for local or national meetings and events and could help to organise them.



The new website of the **sigma** Network

**mathcentre** ([www.mathcentre.ac.uk](http://www.mathcentre.ac.uk)) and **statstutor** ([www.statstutor.ac.uk](http://www.statstutor.ac.uk)) provide online open access mathematics and statistics resources to support students in all disciplines in their study of mathematics and statistics. The sites are also repositories for resources such as guides and research papers for mathematics and statistics academics and support practitioners working with students.

Developed in 2003 by a group from the Universities of Loughborough, Leeds and Coventry, the Maths, Stats and OR Network and the Educational Broadcasting Services Trust and upgraded in 2009 with funding from JISC, **mathcentre** is highly regarded by the sector, and used as a repository for high-quality formative assessment resources, such as Numbas (Newcastle University) and Maths EG (Brunel University).



**statstutor** was developed by staff from Loughborough and Coventry Universities and also the **sigma** Network (<http://sigma-network.ac.uk/>), with contributions from the Royal Statistical Society's Centre for Statistical Education as well as a number of other colleagues from other HE institutions in the UK.

The Communities area of both **mathcentre** and **statstutor** facilitate the contribution of high quality peer reviewed resources developed elsewhere so that these resources may be made available to the wider mathematics and statistics support community.





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