sigma Σ network for excellence in mathematics and statistics support

NEWSLETTER

Issue 26: Spring 2023

Editor's Introduction

Welcome to the Spring 2023 edition of the **sigma** Newsletter.

I would like to start by saying a big thank you to Chetna Patel, firstly on behalf of the **sigma** Steering Group for her sterling work in editing the newsletter for the past few years but also personally for her generosity in helping me into my new role. We wish her well in her retirement – and are pleased that she is not stepping away from **sigma** entirely.

I work at Middlesex University and at this time of year much of my time is spent helping Nursing & Midwifery students prepare for their Drug Calculations tests and advising BioMedical students doing a meta-analysis in their dissertation. I was disappointed not to be able to attend the recent event in Coventry on this topic. You can read a report on the event below. One of the strengths of the **sigma** Network is its international connections so I am pleased to include reports of workshops happening outside the UK, including what is probably the first of its kind in the Czech Republic.

I was also interested to read Peter Mitchell's article on how to analyse the results from a small number of experiments as students doing experimental work will understandably only be able to perform a few of these and I am never sure how to advise them.

You will also see an invitation to join one of the **sigma** Special Interest Groups and some introductions from new members of the Network.

You might be disappointed not to have received a Save the Date email for the coronation but we have some other exciting events coming up, with no obligation to dress up. Do save these dates and watch out for more details of each event on the **sigma** jiscmail list.

Thank you to all the contributors to this edition. The next edition of the newsletter will be published in the autumn – but you can send me articles at any time.

In my spare time I like to take photos and am naturally drawn to anything geometric. The photos used in this issue are of Cosmatesque patterns in Rome.

Finally, the views expressed in these articles do not necessarily constitute recommendations from the **sigma** Steering Group or any associated parties.

Lois Rollings

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Letter from the Chair of the sigma-Network Steering Group

Dear all,

It has been a busy and eventful six months since the last newsletter and it is great to see the **sigma** Network vibrant and much more active again following the pandemic. Since August 2022, we have seen a total of eight events being held, including bi-monthly virtual coffee mornings which were all very well-attended resulting in some very insightful discussions about the challenges we have been facing and how we have managed these. We have had workshops and other training events hosted by Greenwich University, The Open University and Coventry University – many thanks to those involved for organizing these and giving up their valuable time to give some much appreciated support to other colleagues. Reports on some of these events are included in this newsletter, as well as details of future events later this year. We have also had the hugely successful CETL-MSOR Conference at Abertay University in September 2022 and we look forward to the next one at Cardiff University in September.

The Steering Group has also been very busy working behind the scenes to ensure that our network continues to thrive. There are perhaps too many to mention, but I would like to say thank you to Mary Lorimer who has acted as the Steering Group Secretary for many years now, but is stepping down as she is retiring from her role at Loughborough University this summer. Many thanks for your significant contributions Mary – I will miss your support as Chair as I also now need to find a willing volunteer on the Steering Group to take on this responsibility!

The Steering Group is currently working hard to guide the Network in the direction you would like it to. We have discussed the need to sort out a few things in relation to our website https://www.sigma-network.ac.uk/ and so we hope to have those corrected in time. If you are aware of any problems with the website, again please do email me at chair@sigma.network.ac.uk. I would also be very happy to hear about any ideas, thoughts or indeed questions you may have about the way the **sigma** Network runs since it is your network and we need to make sure it works for you.

We have also been thinking about events for 2023/24 and we hope to have the programme available by the end of August so watch this space. If you have suggestions for events, or indeed would like to organize and/or host an event at your institution, please email me at chair@sigma.network.ac.uk. If you would like to find out what is involved and how the Steering group can provide help and support for you to host such an events please do email me. It is also worth bearing in mind that organizing such events represents ideal evidence for applications as a Senior Fellow of the HEA against the criteria of "Leading Learning".

Last but certainly not least, I would like to thank Lois Rollings from Middlesex University for agreeing to take on the role of Newsletter Editor, this being her first edition as Editor. Welcome Lois.

That's all folks. Have a great spring and summer and I hope to see some of you at upcoming events and/or indeed in Cardiff in September.

Alun Owen

Chair **sigma** Network Steering group

Special Interest Group – Accessibility

Ruth Hand | Bath University

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Are you interested in the pedagogy of supporting students whose barriers to learning are cognitive or neurological, e.g. **dyslexia, dyscalculia, maths anxiety**? Then the **sigma** Accessibility Special Interest Group is looking for you!

The Accessibility SIG has been running for several years but we are looking to re-focus and re-energise.

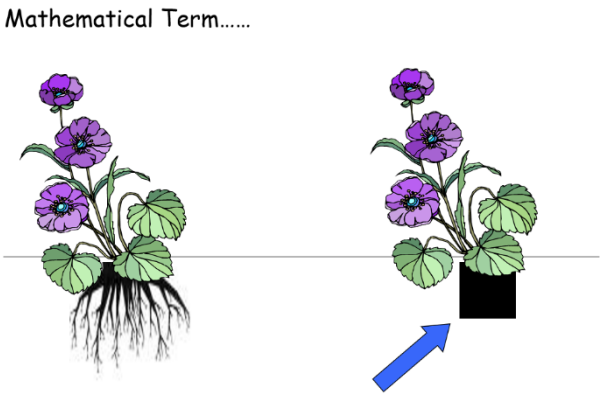
You might have expertise in this area, or just interest and enthusiasm – all are welcome. Since this will be a fresh group of practitioners, we currently have no specific projects or objectives – we would love ideas. We are hoping to create an opportunity to come together in person in the spring/summer to start this process.

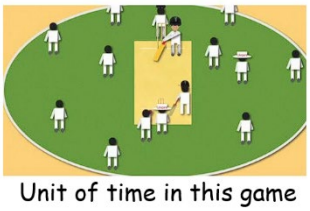
If you would like to join us please email a short introductory paragraph to mash-sigma@bath.ac.uk

Editor's Note: There are also SIGs on Statistics, Employability and Evaluation & Impact. More details can be found at SIGs | sigma Mathematics and Statistics Support Network (sigma-network.ac.uk).

Coffee Mornings

Have you attended one of the **sigma** online coffee mornings before? These are informal events providing a space for maths & stats support practitioners to get together and talk about issues affecting their work. We share good practice, offer each other support and sometimes solve silly puzzles – see below for some examples from the December meeting. There are no presentations and no formal agenda and you can drop in for as long (or short) a time as you like. You can read a report on the October event below. Do come along to a future event. Just bring yourself and a coffee (or other beverage) of your choice.





Steering Group Membership 2022/23

Alun Owen, Coventry University (Chair)

Emma Cliffe, University of Bath (Vice-chair Technical)

Mark Hodds, Coventry University (Vice-chair Operations)

Mary Lorimer, Loughborough University (Secretary)

Tony Mann, University of Greenwich (Treasurer)

Lois Rollings, Middlesex University (Newsletter Editor)

Peter Hart, University of Sheffield

Ellen Marshall, Sheffield Hallam University

Chetna Patel, Retired

Sue Pawley, Open University

Theresa Wege, Loughborough University

Rob Wilson, Cardiff University

Co-opted members

Ed Southwood, University of Bath (Membership secretary)

Samuel Walton, Birmingham City University (Early Career Representative)

Duncan Lawson, (Representative of the IMA)

Anne Savage, (Representative of the SMSN)

Kirsten Pfeiffer, (Representative of the IMLSN)

Supporting Students with Meta-Analysis and Qualitative Analysis

Alun Owen, Head of Statistics Advisory Service and Chair of sigma-Network | Coventry University

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This event held on 27th January 2023 and hosted by Coventry University, was organized by the **sigma** Network's SIG in Statistics Support and attended by 19 colleagues representing 13 different HE institutions.

Meta-analysis continues to be popular amongst final year undergraduate projects, after initially gaining in popularity during the pandemic when access to people or labs to obtain primary data was impossible. Colleagues therefore asked for skills development with supporting students with this. In addition, there had been demand for skills development in qualitative data analysis, both from the perspective of supporting students, but also in terms of informing our own practice.

The event kicked off with a morning session on meta-analysis delivered by me (Alun Owen) and Chetna Patel. Delegates heard about key aspects of meta-analyses using both SPSS and RevMan, including effect sizes, forest plots, heterogeneity and publication bias. The session included a hands-on session using SPSS to undertake a meta-analysis, but also focused on some the key difficulties students have and how to support them.

The afternoon was an invited session on qualitative analysis by Monica-Cristiana Hess, who after giving a great summary of the various methods available, gave a brief introduction to Content Analysis before moving on to the main topic of the session and putting us through an excellent exercise undertaking a Thematic Analysis. The session finished with a brief introduction to Grounded Theory, after which a very interesting and wide-ranging discussion was had about the various methods covered. Many thanks to Monica for travelling up from Brunel to Coventry to share her expertise and insights.

This excellent event concluded with a discussion of some of the sorts of things we felt we would like to see at future events. These included (but were not limited to) supporting students with panel data and time series analysis, Bayesian statistics, R, and RStudio, as well as a session on helping data science students. Watch this space!

Irish Mathematics Learning Support Network (IMLSN) Workshop Report

Anthony Brown | University College Dublin

Ciarán Mac an Bhaird | Maynooth University

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Aisling McGlinchey | Technological University Dublin

Claire Mullen | University College Dublin

Kirsten Pfeiffer | University of Galway

On Friday January 13th the IMLSN held the online workshop 'Experiences of Mathematics and Statistics Learning Support during semester 1 (2022-23)'. Following the challenges presented by the COVID-19 pandemic, this was a critical semester for engagement with maths and stats support, now that almost all students are back on-campus.

The workshop featured 11 five-minute talks from practitioners across Ireland, followed by four breakout room discussions which allowed other attendees, including many from around the UK, to discuss the presentations and add their own experiences. In summary, nine of the 11 institutions were offering both in-person and online support for students. One provided online only, and one in-person only due to a combination of staff shortages and a university governance emphasis that teaching/support be mostly face-to-face.

A broad range of online initiatives were implemented including student support hubs and suites of on-demand support materials on Virtual Learning Environments. Booking systems, 1-1 and small group appointments, workshops, and drop-in sessions were also used. Participants discussed the flexibility that online support allowed both students and tutors, especially in relation to remote teaching and learning, lack of office space, the facilitation of reduced transport and accommodation costs. The opportunities that new media provides for assisting students with learning disabilities was also raised.

In general, participants reported mixed take up of the hybrid support now on offer. Online support session attendance was not high except, in some instances, during examination periods. There was also an issue with students not attending booked 1-1 sessions. However, in-person support attendance increased when compared to 2021-22, and certain institutions witnessed increased engagement from first- and final-year students. Some workshop attendees expressed surprise at the 'rapid student return to in-person over online support'. Finally, participants reported that students required much more individual attention than before COVID-19, with increased inability to progress the problem after support from the tutor.

Promotional event of MSLS Net project in Brno (CZ)

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One day, more than 30 participants from 9 different institutions from two countries, and a lot of inspiration. That was the meeting titled "Good practices in mathematics and statistics learning provision" that took place at Masaryk University in Brno on January 26, 2023. This event was organized to share good practice with setting up, running, managing, and promoting support centres focused on learning support in mathematics and statistics at Czech and Slovak universities. The programme had four parts, each of them including presentations and discussion.

In the first part of the meeting, representatives of several universities presented the current support centres and their way of working. Most support centres in the Czech Republic provide combined support, face-to-face and online. The online support has proven itself very well, especially during the Covid-19 pandemic. Czech universities often see having a support centre as an advantage; therefore, the vast majority of the presented support centres receive some kind of support from their university. Students who help in the centres as tutors can receive a scholarship and some universities provide the centres with space and funding for purchasing literature and other facilities. Some support centres have prepared training and supporting materials like a codex of the tutor for their student tutors. They also prepared learning materials for students who need help.

In the second part of the meeting, the representatives spoke about their experience with managing their support centres. They shared both successes and failures: we got inspired by the successes of others and looked for possible solutions to existing challenges. Support centre managers keep collecting feedback from visitors focused on students' background, satisfaction, and the usefulness of their visit. Data analysis showed that students mostly leave the support centre satisfied. Many students came to a university with a fear of mathematics (a strong maths anxiety) and the belief that to be good at mathematics, a student must have a talent for mathematics. Students also came with insufficient knowledge of elementary and high school mathematics. Therefore, the tutors focus on two aspects of learning support – psychological, when they try to show the students that motivation and hard work lead to good results, and practical, when they help the students improve their mathematical skills. The most common challenges related to operating a support centre were limited use of available support capacity by students, inconvenient location of the support centre, and the difficulty of acquisition of student tutors.

Among the good practices related to promotion of the support service were organising an opening party at the beginning of each semester where students compete in a pub quiz, using social media, organising repetition workshops during the exam period, but most of all personal testimony ("word of mouth"). Experience with promoting a support centre in the form of short videos was presented by colleagues from the Technical University of Ostrava who shared their experiences and provided valuable tips.

In the third part of the meeting, the participants tested new materials prepared for training tutors through model situations. Colleagues from Tomáš Baťa University in Zlín have been developing an interactive environment to model situations that might happen during learning support provision in a drop-in centre. The material should be used to train new tutors in an engaging and entertaining way. The delegates were asked to test the material and give constructive feedback before it is put into practice.

In the concluding part, representatives of Brno University of Technology presented a proposal for establishing a network connecting Czech and Slovak support centres, tentatively called π (Pi) network. Most of the representatives expressed a need for a platform to share experience and ask for advice on issues related to support provision. In the end, participants of the meeting were asked to fill in a feedback survey where they had possibility to express their interest in the emerging π network initiative.

The event was organised as a part of the project "Capacity Building in Mathematics and Statistics Learning Support in Norway and the Czech Republic (MSLS Net)" supported by the EEA Grants under registration number EHP-CZ-ICP-3-009.

Iceland Liechtenstein Norway grants

October Coffee Morning – "This is How We Do It"

Samuel Walton, Learner Developer | Birmingham City University

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The "This is How We Do It" online coffee morning hosted by representatives from Birmingham City University took place in October. 13 members attended from various institutions, including Lincoln, Middlesex, Coventry, Loughborough, VCRP and Western Sydney. The theme of the event was focused on the discussion of mathematics support centres, and how they now operate.

Attendees engaged in discussions around the plethora of differences between mathematics support centres in different universities, considering what students want and how different institutions require different approaches to meet their student needs and cultures. The discussions centred around how to balance the demands of systems, administration, and conflicts, as well as the trade-off between appointments and drop-ins. Tutor preferences were also a topic of discussion, with some institutions finding that certain aspects of their support centres have become easier to manage online. Attendees found the opportunity to informally discuss these issues extremely rewarding.

In conclusion, the coffee morning event provided a valuable opportunity for representatives from different institutions to come together and share their experiences and perspectives on mathematics support centres. The discussions shed light on the complexities of running these centres and highlighted the importance of considering student demographics and university culture when making decisions about how to provide effective support.

Very small, but repeated, experiments

Peter Mitchell, Former Part-time Tutor, Mathematics and Statistics Help | University of Sheffield

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Has anyone else noticed this phenomenon, especially in biochemical research, of carrying out the same experiment several times, and reporting a selected single run as typical? A medical researcher proposed an experiment to compare two sorts of plastic support for cell cultures, each with two replications. I pointed out that this was a tiny experiment, with only two residual degrees of freedom, capable of detecting only a large difference between the treatment means. The researcher said that she will repeat the experiment with three or four runs in all, to ensure consistent results. My response was that she would certainly succeed—in showing that very small experiments give non-significant results consistently! She would be much better off using all the experimental units in a single experiment with six or eight replications to provide 10 or 14 residual degrees of freedom.

I worked out that she would need a standardized difference (difference divided by standard deviation, or Cohen's effect size) of 5.4 to be detectable at P=0.05 with n=2 and at 80% power, or 4.3 with 50% power. Cohen's effect size of 0.8 is considered large in psychological or biological work. She would need a very large difference between treatments or an exceptionally small standard deviation, perhaps because the experimental materials were unusually uniform. It is well recognized, particularly in medical research, that experiments, to be useful, must be large enough to detect a significant difference with sufficient power, and a difference that is also of practical significance.

There may be circumstances where, at any one time, experimental units are available only in small numbers, or only a few replications are possible because the treatments are difficult to apply, or there is limited capacity to make measurements of the response. If forced to do small experiments with several runs, then all the results should be analysed together. This can be achieved by taking the runs as blocks, a source of identifiable but uninteresting variation which can be removed from the residual variation. (Coming from a biological background, blocks are a familiar technique to me but often not known to students from other disciplines.) With n=2 in each run and five runs (14 residual degrees of freedom) a significant difference (P<0.05) would require a standardized difference of 1.3 at 80% power or 1.0 at 50% power, a considerable improvement compared with analysing each run individually. These standardized differences could be reduced to 1.1 or 0.8 if it was possible to increase n to 3.

What did the researcher do? Alas, we do not follow up drop-in queries such as this so I am left hoping that she took on board the points about enough replication, whether in one larger experiment or by analysing several runs together with blocks.

Hello everyone!

Sundeep Sehmbi, Assistant Lecturer in Mathematics Support I Coventry University

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I would like to introduce myself to you all. I work in the sigma mathematics support centre at Coventry University. I graduated from the University of Birmingham with a BSc (hons) in mathematics in 2006 and then completed my PGCE in secondary mathematics education in 2007. I taught for seven years in an inner-city secondary school in Birmingham. Through this experience, I acquired many skills and strategies of how to teach and support students of different ages and capabilities.

I started working at Coventry University in 2014 and have recently taken a full time post working with the sigma team. My role primarily involves supporting students (and staff) with mathematics questions/queries. I get to see students from many different subject areas including nursing, economics, biomedicine and engineering. This variety makes the role interesting while also keeping it challenging.

Outside of work, I enjoy spending time with my family and friends especially my beautiful 3- and 5-year-old nieces. The older niece clearly has good taste since her favourite subject in school is mathematics. She recently received a 'star of the week' award at school in……yes you guessed it, mathematics!

I do not support a particular football team, but having been born and brought up in Coventry I would say by default that makes me a Coventry City supporter! I love to cheer on England in major tournaments which means I only really watch football every two years. I also enjoy a good movie in the cinema and love to read; I am currently reading Prince Harry's book 'Spare' mainly to see what all the hype is about!

Thanks for reading about me. I am excited about starting my 'official' journey here at sigma working with such a brilliant team!

Hello

Dr Yamuna Dass, Assistant Professor (Academic) in Statistics Support | Coventry University

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I work at the **sigma** Maths and Stats Support Centre at Coventry University. I have a bit of history with Coventry as I studied here as a student for my undergraduate degree and also completed my PhD. During my studies, I provided support to students at the **sigma** Centre and developed my interest and passion for teaching in Higher Education.

In my role, I teach and support students (and staff) with statistics and mathematics queries, with a particular focus on statistics. Prior to this position, I worked at the Maths Learning Centre at De Montfort University where I also supported students from a range of levels and disciplines.

I started working at Coventry University in October 2021 and I have recently taken on a new role to lead the development of support for students with neurodiversity or disability which I'm really excited about! My interest in neurodiversity has grown over the last few years and I look forward to further developing my knowledge in this field.

Currently, I am involved in a small piece of research that investigates practitioners' experience of supporting neurodivergent students with statistics and/or mathematics. The research aims to help us to adapt the way we provide support to students in **sigma** but also to engage with the wider academic community in thinking about the best ways forward.

Besides teaching I enjoy travelling, trying new food and watching football (and supporting Arsenal!).

FUTURE EVENTS

Sigma events

Date	Event Details	Host Institution
March 31st 2023	**Workshop: Maths Anxiety** (Registration has now closed.)	Coventry University
April 2023	**Virtual Coffee Morning** (Online)	University of Bedfordshire
May 17th 2023	**Workshop: Embedding Maths & Stats Support** (Online)	Middlesex University
June 2023	**Virtual Coffee Morning** (Online)	TBA
July 2023	**Workshop:** Topic TBA	TBA

Other events

Date	Event Details	Host Institution
May 31st 2023	**Idea exchange: early career mathematicians and statisticians teaching in Higher Education.** Online. 1-4.30pm Details and registration at https://ima.org.uk/21568/early-career-mathematician-ecm-teaching-event/	IMA
June 19th - 30th 2023	**EAMS 2023** See below	Newcastle University
September 7th - 8th 2023	**CETL-MSOR Conference**	Cardiff University

EAMS 2023 conference dates announced

Christian Lawson-Perfect, Senior learning software developer | Newcastle University

eams@ncl.ac.uk

E-A×M+S 2023

The sixth international conference on E-Assessment in Mathematical Sciences (EAMS) takes place between 19th and 30th June 2023.

The conference aims to bring together researchers and practitioners with an interest in e-assessment for mathematics and the sciences. It will consist of a mix of presentations of new techniques and pedagogic research, as well as workshops where you can get hands-on with leading e-assessment software.

EAMS 2023 is an entirely online conference, with a mix of live sessions and web-based activities, and plenty of opportunity for discussion and collaboration.

Live talks will take place over Zoom at 9am and 4pm BST (UTC +1) each weekday, with recordings available later. The online format and longer timescale allow participants to engage more deeply with the material presented.

The call for talk and workshop proposals is currently open. If you have some research or an innovative technique related to mathematical e-assessment that you would like to present, then please submit an abstract at eams.ncl.ac.uk/call-for-speakers by 12th May.

We're actively seeking to increase the diversity of our attendees and speakers, and particularly encourage speakers from groups under-represented in previous editions of EAMS to submit proposals.

To attend the conference, please register for free at eams.ncl.ac.uk/register.