sigma Σ network for excellence in mathematics and statistics support

NEWSLETTER

Issue 18: Autumn 2019

Editor's Note

As many of you make your way back from CETL-MSOR conference in Dublin, I invite you to read the latest edition of the newsletter. This compact autumn edition focuses on the various training sessions our colleagues have organised and attended last term. The sessions reflect the wide ranging areas that are covered by the maths support community, including drug calculations for nursing students, inclusive teaching and using statistics software. Some of the summaries also include links to useful resources, and I am sure that you will find lots of new ideas that you can adopt in the new academic year.

The deadline for contributions for the next edition (Spring 2020) is **28th February 2020**. We welcome contributions on any topic that may be of interest to practitioners and academics supporting higher education students in their learning of mathematics and statistics. To submit an item, see http://www.sigma-network.ac.uk/sigma-newsletters/.

As usual, the views expressed do not necessarily constitute recommendations from the **sigma** Steering Group or any associated parties.

Finally, I would like to thank all authors for their contributions for this and previous editions, especially as my time as editor has come to an end. I have enjoyed this experience and I am pleased to announce that Chetna Patel, member of Steering Group and Treasurer of the sigma network will be taking over this role. Goodbye and all the best for the new academic year!

– Hansa Bissoondeeal
(University of Essex)

Congratulations!

Congratulations to **Professor Duncan Lawson** who has been awarded an **MBE for services to Mathematics in Higher Education**.

The **2019 National Teaching Fellowships** recognised the work of two well-known practitioners in the field of mathematics and statistics support.

Jane White (University of Bath) was the founding Director of the MASH Mathematics Resource Centre at Bath, and one of the first sigma Network regional hub co-ordinators. **Rob Wilson** (Cardiff University) is a member of the sigma Network Steering Group and an editor of the MSOR Connections journal.

We congratulate Duncan, Jane and Rob on their success, which will be an inspiration to others working in mathematics and statistics support across the country.

The Chair's piece: It's that time of year again

David Bowers
Chair | sigma Network
chair@sigma.network.ac.uk

As I write this, the long hot (and wet) summer is running its course and anticipation turns to the forthcoming CETL-MSOR Conference, hosted this September by Dublin City University. CETL-MSOR is a key gathering for those involved in mathematics, statistics and OR teaching, learning and support in higher education. It also provides an ideal opportunity for members of the sigma Network to meet, which is why we like to hold our Annual General Meeting during the conference.

At this year's AGM I look forward to sharing our successes – and there have been many! – of the past year, and receive input and motivation to develop our work in the year ahead. We have been able to implement the majority of suggestions received at last year's AGM, which helped shape our programme of meetings and events around the country.

A new development of the past year was the implementation of an Individual Membership scheme for the sigma Network. To date, over 100 people have demonstrated their commitment to maths support in this way, and the number grows each month. Individual Members are entitled to vote at our AGM, either in person or via an online ballot and they also receive advance notification of Network events which allows early booking. If you or your colleagues have not yet taken out Individual Membership, check the link on our website homepage – it is free and looks good on your CV!

A further thing that keeps us busy at the start of the new academic year is the co-ordination of training courses for new mathematics and statistics support staff. As in previous years, we encourage a collaborative approach, where centres with new staff to train join together in order to ensure a viable number of attendees. This also opens up new insights and experiences of operating maths support in different places. Institutions running training open to others will be identified on our website, and it is not too late for your centre to join the list.

I wish you all every success for the new academic year!

MBE for Services to Mathematics in Higher Education

David Bowers
Chair | sigma Network
chair@sigma.network.ac.uk

Professor Duncan Lawson MBE

The pioneering work of Professor Duncan Lawson, a member of the sigma Network Steering Group, has been recognised in the Queen's Birthday Honours announced in June 2019.

Duncan Lawson, and his long-term collaborator and fellow IMA Gold medal winner, Professor Tony Croft of Loughborough University, have been called 'the founding fathers of mathematics support in the UK' for their innovative work in developing mathematics and statistics support. They have helped steer mathematics and statistics support from what was previously called a 'cottage industry' and a 'Cinderella service' to an essential part of the Higher Education infrastructure.

Although Duncan has approached the development of mathematics and statistics support as a practitioner, he has always informed this practice by research and scholarship. In 2008, he supervised the first PhD in the UK in the field of mathematics support. He has published numerous articles and reports on mathematics and statistics support. He has been editor of the journal Teaching Mathematics and Its Applications for the last 12 years.

On hearing of the award, he said: "I'm thrilled that the hard work of developing new ways to help students improve their mathematics skills has been acknowledged in this way. Whilst this is a personal award, I hope that it will be seen as honouring all those who work selflessly to support students in their learning of maths and statistics. I'm delighted that mathematics and statistics support is now so widespread at universities across the country and that the sigma Network enables institutions of all sizes to access resources, events and specialist support to develop this provision further."

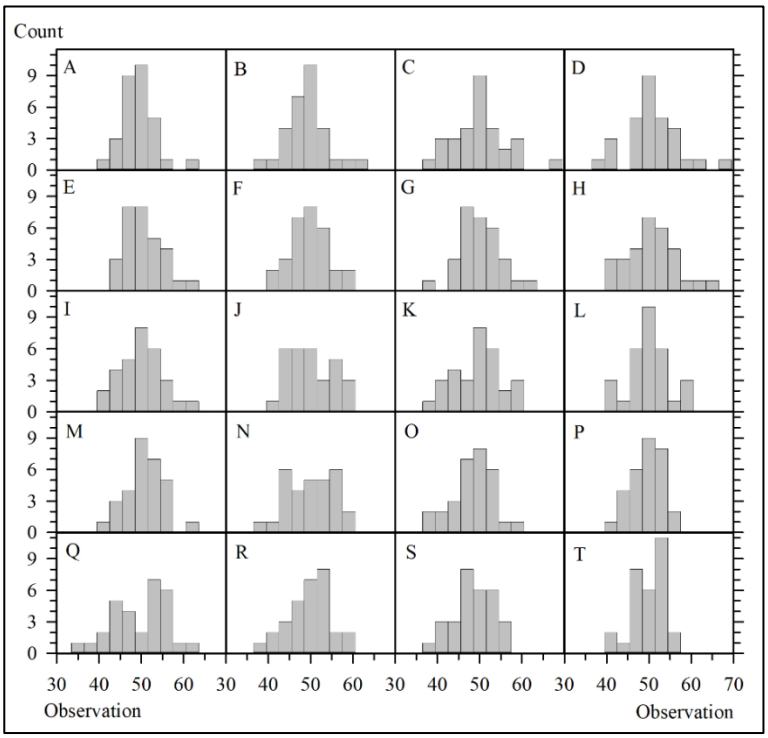
Duncan is currently a Co-Director of sigma at Coventry University.

What is acceptably Normal for analysis of variance?

Peter Mitchell
Part-time tutor | Mathematics and Statistics Help (MASH), University of Sheffield
P.L.Mitchell@Sheffield.ac.UK

A common query at MASH at the University of Sheffield is "Are my data Normal?" This is for a t-test or analysis of variance (ANOVA). We start by explaining that it is the residuals (i.e. observation minus treatment mean) that need to be Normally distributed, so try obtaining the residuals (most easily from a trial ANOVA) and plotting a histogram. What we want is a distribution that is roughly symmetrical around a single peak, without pronounced skew or multiple main peaks or many outliers. And remember that ANOVA is robust to moderate departures from its assumptions.

To provide context, and to develop the eye of experience, I generated 20 sets of Normally distributed values and drew the histograms on common axes (Figure 1). The samples that look closest to Normal are F and I: symmetrical, with a central peak. Samples J and N are rather blocky, with no real peak. In contrast, samples C, D and L are pointy, especially C with a drawn-out peak. Double peaks occur in samples Q and T. In samples C and D there is an outlier to the right: values that are 3.9 or 3.4 standard deviations, respectively, away from the mean. Sample D happens to have no value in the class centred on 43 which makes a gap. Sample R is a ramp up from the left and an abrupt drop to two small counts in classes to the right. Sample L turns out to be exactly symmetrical with the shape of a science fiction spaceship!



Of course, the shape of any histogram is sensitive to the class width and the starting point (left edge of the lowest class), especially with fewer than 30 values. It is worth trying different class widths or number of classes (whichever is easier to change in the software) to see if odd features persist or disappear in other histograms. Nonetheless, if we can find this much variation (Figure 1) in the shapes of histograms for samples from a perfect Normal distribution, we should not be surprised if samples of residuals from real data rarely appear close to Normal. Small samples, in particular, will often have histograms of peculiar shapes. Given the context from Figure 1, most of them are probably acceptably Normal for ANOVA.

Figure 1: Frequency distributions (as histograms) for 20 samples of 30 values taken at random from a Normally distributed population with mean 50 units and standard deviation 5 units. The class width is 3 units with a class centred on 50. The samples A to T are arranged from maximum positive skew (more tail to right) to maximum negative skew (more tail to left).

MSOR Connections Vol. 18 No. 1

Peter Rowlett
Editor | MSOR Connections
p.rowlett@shu.ac.uk

MSOR Connections
Volume 18 Issue 1

A new issue – volume 18, issue 1 – of MSOR Connections has been published. The articles are free to access from the table of contents.

This issue contains articles about practicalities around operating maths support (training tutors and advertising your service to students), as well as a case study on learning spaces (physical and virtual), interesting research articles on errors made by undergraduate students and the use of peer assessment to support student self-regulation in assessment, and a case study about teaching statistics. Something for everyone!

You may notice this is hot on the heels of the previous issue, volume 17 issue 3. MSOR Connections is published termly and each volume corresponds with an academic year. The next issue will be published in early 2020.

We are always looking for contributions to MSOR Connections and details of how to submit can be found at: https://journals.gre.ac.uk/index.php/msor/about/submissions

MSOR Connections is a practitioner journal that aims to publish peer-reviewed articles by and for those involved in learning, teaching, assessment and support of mathematics, statistics and operational research in higher education. Submissions could include case studies, opinion pieces, research articles, student-authored or co-authored articles, resource reviews (technology, books, etc.), short updates (project, policy, etc.) or workshop reports. Please encourage staff in your Department to contribute.

Interested staff can also volunteer to review articles for MSOR Connections. Reviewers should please provide a brief statement when requested saying what types of articles they are willing to review.

Induction Course for New Lecturers in the Mathematical Sciences 2019

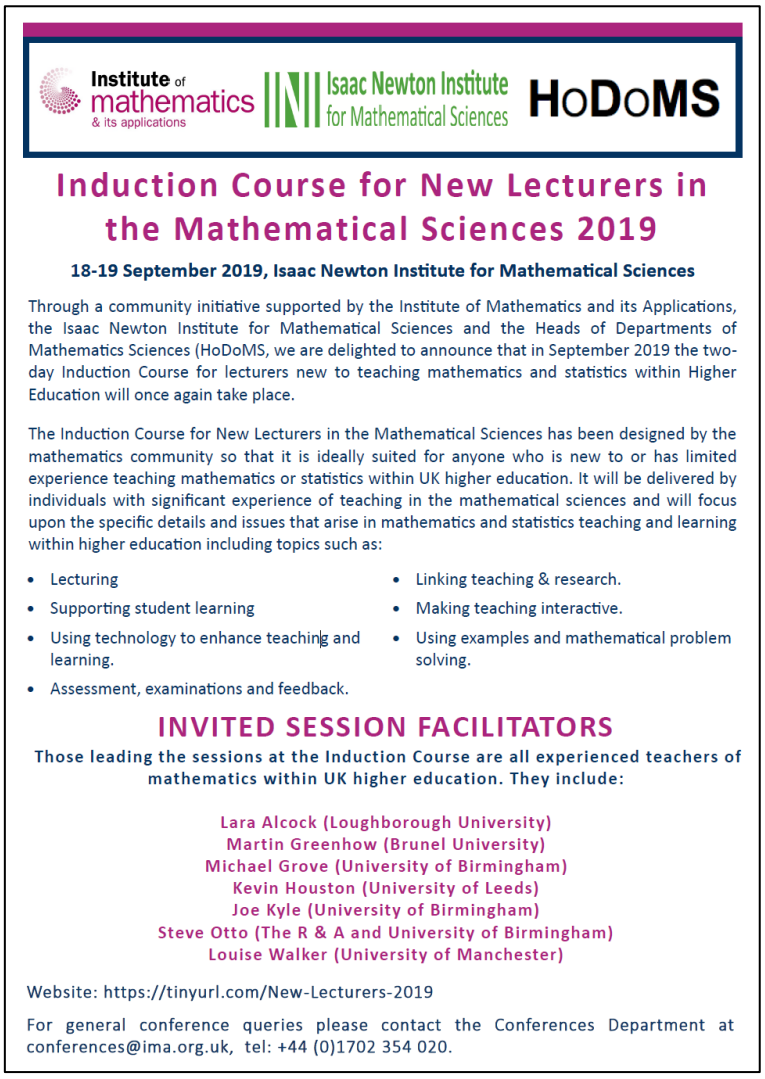
P. Bye
Conference Support Officer | Institute of Mathematics and it Applications
conferences@ima.org.uk

Induction Course for New Lecturers in the Mathematical Sciences 2019

Date: 18th – 19th September 2019

Location: Isaac Newton Institute for Mathematical Sciences, University of Cambridge

Through a community initiative supported by the Institute of Mathematics and its Applications, the Isaac Newton Institute for Mathematical Sciences and the Heads of Departments of Mathematics Sciences (HoDoMS) and endorsed by the Royal Statistical Society, the Operational Research Society and the London Mathematical Society, we are delighted to announce that in September 2019 the two-day Induction Course for lecturers new to teaching mathematics and statistics within Higher Education will once again take place.



Poster promoting the Induction course

Further details on how to register are available on the IMA webpage.

Training workshop for new mathematics and statistics support tutors

Robert Wilson
Senior Lecturer | School of Mathematics - Cardiff University
wilsonrh@cardiff.ac.uk

Date: 3rd October 2019
Location: Cardiff University

The sigma Network is offering a free one-day training workshop for new maths and statistics support tutors on Thursday 3rd October 2019, at Cardiff University.

OUTLINE PROGRAMME

10.30 – Welcome and introductions

10.45 – Maths Support – what is it?

11.15 – Problem solving session

12.00 – Principles of maths support – dos and don'ts

12.30 – Lunch

13.30 – Offering statistics support

14.00 – Tutoring in a maths support centre – exploring possible scenarios and student needs

14.45 – Resources and networking with others

15.15 – Question and Answer session

15.30 – Close

This training day is generously hosted by Cardiff University, and will be coordinated by Robert Wilson. If you are interested in attending, please contact Robert Wilson (wilsonrh@cardiff.ac.uk), noting any special dietary or access requirements.

For those working towards HEA Fellowship, engagement with this event and reflection on the implications for your professional practice can help provide evidence towards the following dimensions of the UKPSF: A1, A2, A3, A4, A5, K2, K3, K4, V1, V2, V3, V4.

Inclusive Teaching: Sharing Practice Event- 26 March, Lancaster University

Elena Luchinska
Maths/Stats Learning Development Coordinator | Lancaster University
e.luchinskaya@lancaster.ac.uk

Anna Karapiperi
Maths/Stats Learning Developer | Lancaster University
a.karapiperi@lancaster.ac.uk

On 26th March 2019, the Maths Learning Development (MLD) Team at Lancaster University organised a Sharing Practice event focusing on the inclusive, tailored and proactive approach developed by the MLD team to support students learning in maths. The event was sponsored by the Faculty of Science and Technology and the Teach-Learn-Share initiative between the Lancaster University Management School and the Faculty of Health and Medicine.

The MLD team was keen to promote and share its vision and achievements to support a diverse student body, to enhance students' learning experience and to improve retention (e.g. by supporting students from non-traditional university entry routes and students who have specific learning difficulties (SpLD)). The event programme was extensive and diverse. The key-note speakers were Michael Grove, Deputy Head of Education at the University of Birmingham, previously Director of the National HE STEM Programme and Associate Director of SIGMA, and Leif Bryngfors, Director of the European Supplemental Instruction/Peer Assisted Study Session (SI/PASS) Centre at Lund University, Sweden.

Michael gave an interesting overview of the evolution of maths support, demonstrating how it has been changing to accommodate students' increasingly diverse needs. He talked about the move from maths drop-in sessions, which used to be the main type of maths support, towards more embedded support linked to course curriculum. Leif discussed the advantages of using PASS as a way of supporting students on 'difficult' courses. In 2018-19 the MLD team ran a PASS pilot in the School of Computing and Communications and was keen to promote this approach to the Lancaster University staff more widely. The event provided maths tutors in the MLD team, Lancaster University staff and participants from a number of universities across the UK with an opportunity to give short presentations about their experiences.

The MLD team discussed the challenges they face and the approaches that they have developed to face these challenges. For example, the team runs weekly embedded workshops for Engineering students. However, it is not always possible to introduce the same type of approach in the Management School, where there are much larger numbers of students – the number enrolled on a particular module could easily exceed 400 students. In the case of big cohorts of students we tend to offer themed workshops and 1-1 support to referred students.

The Sharing Practice event attracted 40 colleagues from Lancaster University and eight other institutions from across the UK. The event was a very useful opportunity for colleagues to share existing experience and generate new ideas. The event fostered collaborative and informative discussion about types of tailored maths support provision that is helpful to a diverse student body.

More information about the event is available at http://wp.lancs.ac.uk/mathslearningdevelopment/

Supporting Nurses with Drug Calculations- 22 May 2019, Middlesex University

Lois Rollings
Lecturer in Maths, Stats & Numeracy | Middlesex University
L.Rollings@mdx.ac.uk

On 22nd May twenty Maths Support practitioners from 14 different institutions met at Middlesex University to share their experiences of working on drug calculations with helping students with drug calculations.

Mark Hodds explained how a diagnostic test, self-explanation training and Numbas questions have all contributed to an increased pass rate for second year students at Coventry. David Maynard shared his experience of introducing a filter system (from large classes, to drop-ins to bespoke 1-1 support) at Birmingham. Karen Symons outlined how she has introduced highly interactive mandatory embedded sessions for second year nurses at De Montfort. Karen Hudson shared the results of her practitioner research on using a blended learning approach using reflective group discussion, games and Tarsia puzzles, alongside structured and guided online learning. David Bowers (on behalf of Martin Greenhow) gave us an introduction to using the *mathseg* platform to provide randomised but realistic practice questions. Lois Rollings shared her concerns about students' reliance on formulas and the problems this can bring. Martin Ward talked about the benefits of using appear-in to give online tutorials, which are particularly appreciated by nursing students when on placement and Kim Fisher explained how she works alongside pharmacists to support students, both while they are undergraduates and during their pre-registration year.

We also heard from a Nursing lecturer on how Middlesex has responded to the new requirements of the NMC and from two Nursing students on their experiences.

Some themes that emerged during the day were:

- Nursing lecturers are not always confident about teaching maths.
- Working closely with nursing lecturers or NHS contacts is highly beneficial.
- Students like to see familiar faces.
- Support varies widely both across and within institutions as do drug calculation tests.
- Nursing students are often very anxious about engaging with mathematics.

Feedback on the day was positive with participants saying that they had valued knowing that we all face the same challenges and had gone away with some new ideas.

David Bowers presenting at the meeting

Online maths support for remote learners – 3 July 2019, Staffordshire University

Angela Evans
Academic Skills Tutor | Staffordshire University
angela.evans@staffs.ac.uk

Dr Tim Lowe

21 attendees from 17 different universities were present at the event with 6 others joining via the livestream. The first keynote speaker was Dr Tim Lowe from the Open University. Dr Lowe gave an interesting overview of how teaching remote learners at the institution had changed over the years before bringing us right up to the present with the methods and tools he currently uses to teach maths online. Dr Lowe's keynote was followed by three engaging 'show and tells' by Thomas Davenport from Aston University, Clare Smith from the University of Chester and Mohamed Mehbali from London Southbank University; the presentations gave a valuable insight into the challenges faced in supporting online learners as well as some tools (such as Baseline and Kahoot) that were being developed or used to try to meet these needs.

Dr Sue Pawley

In the afternoon session Dr Sue Pawley from the Open University was our guest speaker and she comprehensively addressed how students are supported between their formal teaching sessions, in particular highlighting some difficulties that had been presented and how they had been overcome.

Before the event closed, attendees took part in workshops looking at Blackboard Collaborate and Microsoft Teams, or had the opportunity to try out some graphics tablets to see if they could be of use in their remote maths support.

The speakers were livestreamed using a Surface Pro laptop and this was the first time we had tried this. The recordings of the sessions can be accessed here, along with the presenter's slides:

Dr Tim Lowe: video and presentation
Dr Sue Pawley: video and presentation

The Academic Skills Team thoroughly enjoyed meeting and networking with attendees from other institutions and hope to host a similar event in the future.

Getting started with free analysis software for statistics support – 18 July 2019, University of Chester

Nick Goddard
Maths Skills Adviser | University of Chester
n.goddard@chester.ac.uk

The University of Chester was pleased to host our first sigma-Network event, the 'Getting started with free analysis software for statistics support' free workshop on 18th July 2019. The workshop focussed on providing initial guidance on supporting students to use R. The two main sessions were led by by Alun Owen (Coventry), Ellen Marshall (Sheffield Hallam) and Brad Pilkington (Sheffield Hallam).

The morning session was devoted to R and R Studio. Alun demonstrated some of the functionality and principles of R, using R itself before moving on to the more user-friendly R Studio. Some of the key features were demonstrated, enabling delegates to gain an understanding of R syntax as descriptive statistics, plots and the importation of large data files were explored. Delegates then got the opportunity to try out R for themselves with a series of exercises of increasing complexity.

After an informal networking lunch, Ellen introduced the group to Jamovi. Jamovi is an open source menu-driven R-based software package that delegates agreed is simple to use. The R code underlying the analyses or plots can be viewed and, if a free add-on is downloaded, R code can also be edited directly in Jamovi. Ellen and Brad then demonstrated their online statistical test-chooser and requested feedback from delegates.

Delegates then viewed three five-minute lightning talks:

R is for Reproducibility (Suzanne Stewart, Chester),
Statistics: How is that relevant for me? (Paul Johnson-Whittle, Chester) and
Statistics Anxiety (Rizwan Nawaz, Leeds).

Each talk included a series of discussion points for delegates to consider in small groups and then feed back to the room.

The final activity involved participants offering suggestions on 3 topics: First seminars in R, pitfalls to avoid and queries to expect from students. The workshop was attended by 14 delegates, representing a total of 6 institutions, and feedback for the day was very positive.

First Joint ALDinHE and sigma Network Event – 22 July, University of Bedfordshire

Anthea Cowen
Maths, Numeracy and Statistics Tutor | University of Bedfordshire
anthea.cowen@beds.ac.uk

One of those gloriously sunny and (very) warm days in July saw the University of Bedfordshire-hosted event 'Current issues in differentiating Learning Development'. It was particularly notable as it was the very first joint symposium between sigma Network and the Association for Learning Development in Higher Education (ALDinHE).

We were delighted to welcome delegates from across the country and a full programme of presentations raised common differentiation issues and a range of approaches from tutors of all subjects, highlighting the good practice that can be shared when different streams of Learning Developers network together. Differentiation between students' subject abilities, English language abilities and computer skills were all considered, alongside issues of being able to offer an integrated service to students.

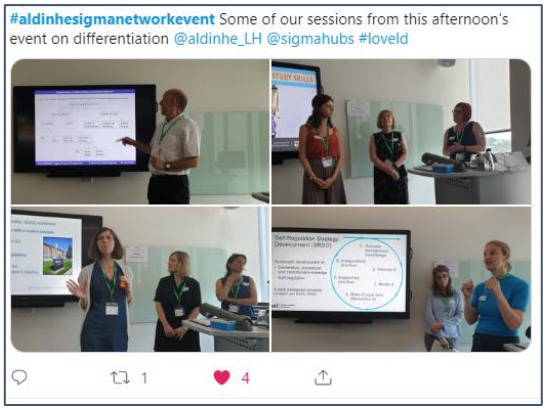
Theresa Elise Wege, Loughborough University, piloting Google Slides

Checklists were sent out to all the presenters so that all the presentations delivered on the day were accessible. Theresa Elise Wege piloted the use of Google slides, which creates automatic closed captions during a presentation. A positive, highly valuable and, at times, amusing service!

All presentations were recorded using Panopto and are accessible to all ALDinHE and sigma Network members, enabling us to broaden the reach of good practice from the event for those who were unable to attend. The recordings are hosted on YouTube so that the accessibility functions of closed captions and scripts are available to viewers where needed. They can be accessed via the Event page on the sigma Network website.

We also gave the Symposium a twitter hashtag – *#aldinhesigmanetworkevent*. This provided another marketing avenue for the day and delegates were able to interact online before and during the event.

Overall we have received some very positive and encouraging feedback from the Symposium and we hope it is not the last of joint events with ALDinHE!



Twitter Post using *#aldinhesigmanetworkevent*