Statistics support: Developing communities and sharing resources
A Workshop at the CETL-MSOR Conference
Dublin, Ireland, September 2019

This document contains hyperlinks to resources relevant to statistics support. An electronic copy of this document to access these links is available at http://www.sigma-network.ac.uk/sigs/statistics-support-sig/

1 Introduction to a Special Interest Group (SIG) in Statistics Support

The sigma-Network has established a Special Interest Group (SIG) in Statistics Support which aims to share expertise, good practice and resources. To date the SIG has focused its work on statistics support provision primarily in England and Wales. Therefore, one aim of this conference session is to share information about this SIG with the wider community of statistics support tutors across the UK and Ireland as well as Europe and other parts of the world where there is interest in this area.

Why is statistics support different?

The needs of students wanting statistics support are often quite different to the needs of students wanting mathematics support. Requests for help with statistics often relates to an individual project, involving a real (and typically messy) data set, and is also often within a specific practical context which adds layers to the complexities involved with assisting students. Even postgraduate research students with a statistics background working in a statistics support context, may struggle with moving from providing help with theoretical methods in statistics to the practical application to real data.

What additional skills/knowledge are needed?

Advising on the practical application of statistical methods is a much more demanding task, requiring a different set of skills and abilities than those skills used in providing mathematics support. Typically, statistics support staff require skills in both applied statistics and the use of statistical software, such as R or SPSS for example. In addition, well-developed listening, questioning and problem solving skills are required in order to ascertain and advise the correct method of analysis. There is also the need to be able to explain statistical concepts across a wide range of disciplines, often without using too much mathematical theory. Other skills required include an awareness of the need to ascertain the level of statistics knowledge of the student, and the potential expectations of their tutor or host department when providing statistical advice.

When did the SIG start and what has it achieved so far?

The SIG in Statistics Support (http://www.sigma-network.ac.uk/sigs/statistics-support-sig/) was formally launched in May 2016, to provide a platform for discussion, research, publication and dissemination of ideas and experiences relating to statistics support provision in higher education. Since it was set up the SIG has fostered the development/improvement of statistics resources for students, many of which are free to access via www.statstutor.ac.uk. In addition the SIG has developed a suite of free training resources (see later) aimed at staff needing to give statistics advice to students. The SIG has also fostered the sharing of good practice and facilitated a number of workshops to enhance skills in statistics support. More recently the SIG has established a more formalised committee and terms of reference.

1.1 Introducing the current SIG committee

The committee currently consists of the following colleagues:

Alun Owen (Coventry University, SIG Co-chair)
Ellen Marshall (Sheffield Hallam University, SIG Co-chair)
Ann Savage (Abertay University)
David Bowers (University of Essex)
Diane Haigney (University of Worcester)
Jonathan Gillard (Cardiff University)
Nick Goddard (Chester University)

1.2 Getting involved?

We would be delighted to receive expressions of interest from colleagues in Ireland and Northern Ireland from anyone interested in joining this committee. Please email Alun Owen (aa5845@coventry.ac.uk) or Ellen Marshal (ellen.marshall@shu.ac.uk)

2 Previous Events

The SIG has held events which primarily offer training on the additional skills or knowledge needed to provide project based statistics support in maths support centres. Materials used at the events and additional associated resources are usually available. Previous events include:

Event	Summary
Getting started with free statistical software (Chester University, July 2019)	The event included two short sessions introducing the R statistical programming environment (https://www.r-project.org/) and the newer free open source software package Jamovi (https://www.jamovi.org/) which is great for students not familiar with R or SPSS who need quick access to statistical software. These sessions was followed by some shorter lightning talks to promote specific discussion.
Scenario based statistics support training (Coventry University, October 2018)	The event concentrated on developing the additional skills required for statistics support through scenario based activities such as: • Listening and questioning skills • Choosing the right test • Explaining key concepts • Providing support rather than a consultancy • Tailoring to the individual • Dealing with difficult situations The resources used in this workshop are available at the following shared Padlet
Introducing Meta-Analysis and factor analysis (Coventry University, April 2018)	This event comprised of two workshops to help staff get started with these two more advanced techniques which students might ask for help with. Materials are not available for this event.
Resource in a day (Birmingham City University, April 2017)	The main idea behind this event was to get staff together to write or review resources for submission to statstutor but the day also included discussion and an introduction to using the online quiz package DEWIS from Iain Weir (UWE). Examples can be found here
Statistics support for mathematicians (University of Northampton, December 2014)	A two day training event to cover knowledge and skills required when a maths tutor is new to statistics support and included a full day's SPSS "Boot Camp".

3 Staff and Student Resources

Resources such as workshop slides, paper and video activities from training events are available freely through statstutor or a shared Padlet created for above event at Coventry University in October 2018.You are welcome to use these resources for training new tutors either in training sessions or as self-study. In addition, there are a large number of resources for use with/by students for the key statistical techniques using SPSS, R and some newly created resources using the packages SAS and Jamovi. Most of the SPSS and R resources are available through statstutor but the full set including the SAS and Jamovi resources can be accessed through the maths support website hosted at Sheffield Hallam University (maths.shu.ac.uk/mathshelp).

3.1 Other tutor training materials

The resources listed below are aimed mainly at staff working in statistics support, were all developed by Ellen Marshall and Alun Owen and are free to access here.

Resource Title	Resource Type	Details
The Statistics Tutor's Pocket Book Guide to Statistics Resources	Pocket Book Guide	This guide contains a list of resources for a wide range of statistical techniques. The suggestions for books and online resources were collated from the wider stats support network and includes direct links for specific techniques. An Excel files and booklet are available
SPSS Workbook for New Statistics Tutors	Work Book	New statistics tutors should know their subject but may not have used SPSS before. This workbook provides self-study training for tutors to carry out key topics in SPSS but assumes the new tutor is able to interpret the output.
	Solutions	Solutions to the workbook
	Excel file	Data sets for the workbook
The Statistics Tutor's Quick Guide to Commonly Used Statistical Tests	Booklet	A handy quick guide to statistical tests and techniques for those providing statistics support. This covers when to use each technique along with the interpretation of results, checking assumptions and what to do if the assumptions are not met.
Workshop on Statistics and Hypothesis Testing	PowerPoint slides	These slides are aimed to be used in a workshop to train mathematics (or new statistics) tutors who need to provide statistics support. They cover key topics including hypothesis testing and choosing the right test.
	Emissions Scenario Role Play	This is a paper-based scenario aimed to be used as part of the tutor training workshop using the resource entitled "Introductory Statistics and Hypothesis Testing."
Video Based Statistics Tutor Training: Mass Customisation Scenario	Video (download)	This scenario-based training video is aimed at statistics tutors and intersperses a recorded statistics support session with discussion points, questions and issues to consider. The video was designed for use in a training workshop but can be used for self-study.
	Video (stream)	
	Paper Transcript	Written transcript file for the video
Video Based Statistics Tutor Training: Porosity Scenario	Video (download)	This scenario-based training video is aimed at statistics tutors and intersperses a recorded statistics support session with discussion points, questions and issues to consider.
	Video (stream)	
	Paper Transcript	Written transcript file for the video
Video Based Statistics Tutor Training Do's and Don'ts: "Careful with the maths!"	Video (download)	This short video is aimed at statistics tutors and provides an illustration of how not to provide statistics support.
	Video (stream)	
	Paper Transcript	Written transcript file for the video
Video Based Statistics Tutor Training Do's and Don'ts: "Conjoint Analysis"	Video (stream)	This short video is aimed at statistics tutors and provides an illustration of good and bad practice in providing statistics support when the tutor is asked about an unfamiliar technique.
	Video (stream)	
	Paper Transcript	Written transcript file for the video
Sigma guide on tutoring in a mathematics support centre: a guide for postgraduate students	Booklet	This guide is a great starting point for new tutors. It is more of a guide for new maths tutors but the general guidance applies to both maths and stats and there is a specific section for statistics support.

3.2 What's new at SHU? Sheffield Hallam University student projects 2019

During Summer 2019 some of the 1st year maths students at Sheffield Hallam University have been working on learning tools relating to the teaching or support of statistics. The projects are initially linked to their 1st year Probability and Statistics module at the university but can also be used with any student in statistics support or within similar modules. The learning tools created will be evaluated and improved during Autumn 2019 and demonstrations will be given at the next event organised by the Statistics Support SIG scheduled to be held at Sheffield Hallam University on January 16th 2019. Once finished these tools will be made freely available via the staff pages of the Sheffield Hallam University maths support pages. Another aim of this conference session is to demonstrate one of these tools which is a new online test chooser and to ideally collect feedback from those present to help further improve this tool.

Project	Overview
SAS resources Bilal Mahmood, Tom Wells, James Dare, Brad Allison, Jarrod Lendrum	The existing stats sig SPSS/R resources were converted to SAS which is the package used within the Sheffield Hallam maths course and added to the SHU maths support pages. Jamovi (a new open source alternative to SPSS) resources are also in the process of being created for most statistical tests.
Statistics quizzes in Numbas Brad Allison	The Numbas system has been used to create some 'Probability and Statistics' quizzes on the topics covered in the first year such as One sample test for a mean and Poisson. All the tests generate new numbers each time a student tries one to allow multiple practice attempts.
Understanding statistical concepts using Excel simulation Kyle Causer	Students often struggle with understanding key concepts like standard error, confidence intervals and p-values. These Excel sheets will allow the user to simulate many samples quickly to build a visual picture of the variation in samples, distributions of sample means, how confidence intervals from the same population vary and the meaning of p-values. Dr Eugenie Hunsicker (Loughborough University) has also created some useful Excel sheets hosted at http://edgestats.lboro.ac.uk/
Interactive online test chooser Brad Pilkington and Emily Gower (Graphic design student)  We welcome feedback to improve the test chooser!	In addition to learning html to overhaul the Sheffield Hallam maths support website, Brad and Emily used their skills to design an online test chooser. The online tool is an updated version of the existing 'What test' site created by interns working on a summer project with Dr Eugenie Hunsicker (Loughborough University). This version has more paths to account for possible misunderstanding, optional information at each stage and finishes with a brief description and links to further resources relating to the chosen technique. A demonstration of how to use the online test chooser will be given in this conference session but there are also instructions on the main webpage for the tool: https://maths.shu.ac.uk/mathshelp/WhichTestIndex.php At each stage, choose the selection that best applies to the research question and then click 'Next' to get to the next question. Hover over the ⓘ for more information at any stage. The final stage gives you the suggested test with links to helpsheets and any other useful information. We think you should use: **One way ANOVA** which tests for a significant difference between the means of at least three independent groups. *Note:If the residuals (produced as part of the ANOVA procedure) are very skewed, a Kruskall-Wallis test is more appropriate* For resources on One-Way ANOVA click here and on Kruskall-Wallis click here