FACULTY OF HEALTH SCIENCES

STAFFORDSHIRE UNIVERSITY

A Research and Statistics training course designed by students for students:

design, delivery and course evaluation

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Executive Summary

The following is a report relating to the development of a research and statistic training course for staff members and post-graduate students at the Faculty of Health Sciences, Staffordshire University. As part of the research and advanced scholarship university agenda, the demand for increase in research and advanced scholarly outputs a need was identified by numerous staff and post-graduate students for additional research and statistics methods training. As a result, university funding was obtained to investigate the need for such training and appropriate content, design the relevant course that would result from the survey, conduct a pilot training and evaluate it with the aim to make the necessary improvements and deliver it on a larger scale. of the a survey was developed to explore the need for such a training and its appropriate content. The attached report discusses the findings of this survey and highlights areas that staff and post-graduate students have identified as requiring further training at all levels, introductory, intermediate and advanced. Following this the first part of larger research methods training programme was delivered, this first stage was then delivered and the evaluation of this is also discussed here.

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Contents

Introduction

Research comprises of work undertaken on a systematic basis to increase the stock of knowledge. Research methods cover a broad range of topics and can be broken down into different epistemologies (Field, 2013). However, within these there are two main distinctive approaches these are quantitative or qualitative. These methods vary by the sources of information that are drawn on, how that information is sampled, and the types of instruments that are used in data collection.

Quantitative research involves the investigation and evaluation of a research aim or objective using mathematically based methods and statistical estimation or statistical inference (Clark-Carter, 2009; Field, 2013). Asking a narrow question and collecting numerical data to analyse utilising statistical methods is the key process to quantitative research. Statistics derived from quantitative research can be used to establish the existence of associative or causal relationships between variables (Clark-Carter, 2009; Field, 2013).

Alternatively qualitative research focus on findings that are subjective and often focus on participants beliefs, thoughts and feelings surrounding events and experiences (Green & Thorogood, 2004; Silverman, 2010; Smith, 2007). This type of research aims to investigate a question without attempting to quantifiably measure variables or look to potential relationships between variables (Green & Thorogood, 2004; Silverman, 2010; Smith, 2007). Research skills, especially quantitative research design and basic statistics, are subjects that are feared by many academic staff and students, and yet a basic understanding of these is absolutely essential to health and social care professionals. Students from undergraduate and postgraduate levels tend to perform less well in the research and statistics methods related modules with reported failure rates up to 50%.   It is an expectation that health related postgraduate courses will already possess statistical ability, which is rarely met.

Further, as a result of the university research and advanced scholarship agenda which encourages staff to be involved in research and complete advanced scholarly outputs, has

led to discussions and anecdotal evidence from staff members suggesting a need for support and development of the staff research and statistical skills. This was particularly evident in those staff members which were not research active and have recently been involved in research or would like to be but lack confidence. In addition, staff who had previously specialised in one area qualitative or quantitative wished to have further training to develop their experiences and knowledge of research in the other area. As such, the decision was taken to further explore this and identify where training is needed.

Hence, the aim of the study was to design and deliver a short research skills and basic statistics course to staff and students across the faculty of Health Sciences, targeting those who need it the most. A key objective of the study was the involvement of prospective students in the development of this course.

The process of co-constructing the curriculum offers opportunities for greater clarity over the expectations of the teacher and students about the aims of the curriculum and the potential impacts on learning. Enabling students to contribute proactively in curriculum design not only enhances the curriculum but motivates students and helps them 'gain a sense of ownership in their own educational journey' (Davie & Galloway 1996). Facilitating "constructive alignment", is a key curriculum design principle to ensure the best possible learning by students, examiners, people working in practice and curriculum developers working together to develop the curriculum, reinforce the relation between learning activities and learning objectives (Biggs and Tagg, 2011).

As a result, the key study objectives were:
- The development of the content and structure of a short course in research skills and statistics
- the engagement of prospective students in the course development process, so as to strengthen the student voice in curriculum design
- to deliver this course as a pilot at a faculty level
- to evaluate the pilot course to enable improvements and fill any gaps

- redesign, validate and offer course within faculty and externally to health and social care professionals

Phase 1 – Course Curriculum Design

Method

Participants

An online survey (designed using Qualtrics software) was sent via electronic mail to all staff and postgraduate student members within the Faculty of Health Sciences, Staffordshire University. In total, 101 participants accessed the survey link, of these 96 responded to the first question asking for consent to engage in the study, 94 participants stated that they would be happy to continue with a further two stating that they did not wish to proceed and hence exited the survey. Of the participants 25 (29%) were post-graduate students, four (5%) were research staff, 49 (57%) were academic staff and eight (9%) technical or administrative staff. Ninenteen participants (22%) were from the School of Nursing and Midwifery, 20 (23%) were from the School of Social Work Allied and Public Health and 47 (55%) were from the School of Psychology Sport and Exercise.

Questionnaire development

The questions that were included in the online survey were developed by the authors who all have research expertise, particularly in quantitative research methodology. These questions were developed as a result of informal discussions with a range of staff members and compiled to develop a greater understanding of the research methods needs of the target population.

The survey comprised of 13 questions in total, of which 12 were closed and one was an open question. As part of the closed questions, there was ability for the participants to add qualitative comments if so they wished. The survey questions can be found in Appendix 1.

Procedure

Following identification of the relevant questions these were compiled into an electronic questionnaire format using the Qualtrics survey tool. A link to the online survey was sent via

electronic communication to all staff members and postgraduate students in the Faculty of Health Sciences at Staffordshire University. An information sheet and consent were attached as part of the survey prior to the main questions. The survey would only proceed to the first question if the participant consented to the study. The research project was approved by the Staffordshire University ethics panel.

The study has received ethical approval by the Staffordshire University Faculty of Health Sciences Research Ethics Committee.

Results – Phase 1

Survey responses are presented on question by question basis. In terms of participants interest in engaging in further research methods training 94% of respondents were interested in engaging with further research methods training. From this sample 77% of participants wished to have face-to-face training with 23% preferring a distance learning style of delivery. Of those participants who selected face-to-face teaching most (78%) preferred to undertake this on weekday during work time, with 14% preferring evening classes and 8% preferring weekend classes. As such the current preference appears to be for face-to-face training courses that are undertaken during work time.

In terms of course length participants were reasonably well divided. In total 33% preferred a short term course that would only run for a 2-3 consecutive days. However, 66% of people stated that they had a preference for a long term course that would consist of one day a week over a period of weeks. Following this participants were also asked about what they would expect to pay for a research methods training course. The most popular answer was that they would be unwilling to pay for a training course of this type with 46% of respondents selecting this answer. Table 1 offers a further breakdown of the costs participants would be willing to pay. Obviously, as staff members and students would not be expected to pay for the course, this question was rather hypothetical to determine what people would be willing to pay should this course be offered externally. From the responses, it would be reasonable to offer a relatively short course in the region of around £50-£100.

Table 1; breakdown of costs participants would be willing to pay

Amount to pay	N	%
No, I would not be willing to pay	39	46%
I would be willing for pay up to £50	18	21%
I would be willing to pay up to £100	11	13%
I would be willing to pay up to £150	5	6%
I would be willing to pay up to £200	7	8%
I would be willing to pay up to £250	4	5%
I would be willing to pay more than £250	0	0%

Table 2 indicates participant's responses to a question regarding how much experience of research they had, interestingly participants responses were evenly spread between all answers, suggesting a mixed background in research.

Table 2; research experience

Response	N	%
I have no experience of undertaken research	10	12%
I have a little bit of experience	21	24%
I have been involved with some research projects but not many	20	23%
I have a moderate amount of experience	18	21%
I have been involved in a lot of research projects and have an advanced understanding of research	17	20%
Total	86	100%

In addition to the above participants were asked about which aspects of research training they would be interested in. There appears to be more demand for and intermediate and advanced research methods training course then there is for and introductory one. Of those participants who selected other they indicated that they were interested in training that would be able to run alongside their current non science degree and support content they are already learning. Table 3 shows what level of training participants indicated they required.

Table 3; level of research training required

Research level	N	%
Introductory	26	18.70%
Intermediate	56	40.28%
Advanced	55	39.56%
Other (please state	2	1.43%

Following the previous questions users were asked to suggest what sort of content they would like to see in an introductory research methods training course, participants

were asked to select as many items from the list as they wanted to see included as well as being presented with an option to type their own content. The most popular answers with over 50% of the sample selecting them included training in sample sizes including sampling techniques, quantitative methods and questionnaire design, entering quantitative data into SPSS and descriptive statistics training. They also favoured reliability and validity, types of data and ethical issues in research. Table 4 offers a breakdown of the content participants selected as what they wanted to include at an introductory level, participants could select as many items as they wished. Of those participants who provided additional comments these generally included comments on using SPSS or NVIVO, effect sizes, power calculations, designing smaller scale quantitative research projects and the course being idiot friendly.

Table 4; introductory level course content

Content	N	%
Ethical issues/how to apply for ethics	43	56%
Types of data	43	56%
Reliability	47	61%
Validity	47	61%
Levels of evidence	39	51%
Literature searching	30	39%
Identifying academic sources.	26	34%
Epistemology	39	51%
Sample sizes (including basic sampling techniques)	54	70%
Quantitative methods and questionnaire design	52	68%
Qualitative methods and interview question development	36	47%
Introduction to conducting interviews and focus groups	31	40%
Introduction to analysing qualitative data	45	58%
Entering quantitative data into SPSS	51	66%
Descriptive statistics	55	71%
Introduction to statistical analysis using SPSS (please specify below)	45	58%
Other (please state)	5	6%

Participants were also asked about what content they would like to see included on a intermediate level research course. As with the introductory course participants could select any items from a list and also add additional comments. Those items which over 50% of the sample selected include amongst others training on effect size and power calculations, conducting literature reviews, advanced quantitative study design and inferential statistics. Only two participants provided additional comments, one stated that they required advanced use of NVIVO with the other stating that they were unfamiliar with all of the above which suggests that a need for the basic introductory course.

Table 5; intermediary level course content

Content	N	%
Conducting research literature reviews including systematic reviews and meta-analyses	46	60%
Effect size and power calculations	67	87%
Further sampling techniques	44	57%
Advanced quantitative study design	56	73%
Advanced qualitative study design	48	62%
Further descriptive statistics	45	58%
Parametric assumptions	49	64%
Inferential statistics (parametric)	50	65%
Inferential statistics (non-parametric)	43	56%
Further qualitative data analysis	32	42%
Other	2	3%

Participants were always asked if they would be interested in advanced research methods training of those that replied to these questions 52% stated that they would be interested in further training, 10% said they would not be interested whilst 38% stated that it would depend on how the other course went. Following this, participants who selected yes or maybe were offered the chance to highlight possible content that could be included in an advanced research methods training course, only 24 participants responded to this final question. Participants were asked to write possible advanced course content they

would be interested in. A full list of all responses is included in Appendix 2. Common responses to this question highlighted a wish for training in factor analysis, multilevel modelling, advanced quantitative and qualitative analysis as well as information on publishing and project managing.

Phase 2 - Post research and statistics training and evaluation

Introduction

Following the survey results, which highlighted a very real need for research and statistics training in higher education, the teaching team developed the basic introductory research and statistics course. The course was advertised in the faculty to both staff members and post-graduate students via electronic mail and the Health Matters monthly magazine and the first day training was delivered as a pilot course to gage interest.

Method

Participants

A total of seven participants took up an invitation to the first stage of the research methods and statistics training. These consisted of one male and 6 females. Five participants were staff members from within the faculty at Staffordshire University and two were postgraduate doctorate students. Although only seven participants were in attendance on the day there was considerable interest from over 20 staff/students who unfortunately could not attend due to teaching commitments. A separate course has been scheduled to enable these parties to attend.

Training

The research and statistic course was developed and the first stage (basic introductory phase) was delivered to gage interest and evaluate its quality in terms of content and delivery. . The training course consisted of an introduction to research methods, basic descriptive statistics, sample and sampling techniques, populations, types of data, types of graphs, measures of central tendency, p values, confidence intervals,

measures of association, and some basic parametric and non-parametric tests (e.g. *t*-test and *chi*-square). Also, practical SPSS exercises were offered to the participants as part of the course. This was delivered over a four hour afternoon time slot, in a computer lab within the Faculty of health Sciences, Staffordshire University. There was a teaching team of two tutors delivering the course, with research and statistics expertise. There was a 20- minute break in the middle of the course, where participants were offered light refreshments. Participants were able to ask questions throughout the course to enable their deeper understanding. Detailed handouts were also provided to all participants as part of the course. Following course completion participants were presented with a short evaluation questionnaire. The questionnaire contained short answer qualitative questions as well as four quantitative questions.

Course evaluation results

The evaluation questionnaire was set up to include qualitative and quantitative components. The results of these are presented below.

Table 6 displays the scores for each question; these show that generally the participants rated the service as *excellent* in terms of the role of the tutor, handouts, knowledge transfer and venue. It is important to note that these results are from and very small sample (N=7) and as such come with the limitation associated with small sample research.

Table 6; Descriptive questionnaire data

Rating	Handouts	Tutor presentation	Tutor pace	Tutor Knowledge	Training level	Venue facilities	Venue Accessibility
Excellent	7(100%)	7(100%)	6 (85.7%)	7 (100%)	6 (85.7%)	6 (85.7%)	6 (85.7%)
Good	0(0%)	0(0%)	1 (14.3%)	0(0%)	1 (14.3%)	1 (14.3%)	1 (14.3%)
Average	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
Poor	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)

In addition to the quantitative questions participants were asked to respond to a selection of short answer questions. The quality of responses to these varied, with many participant writing one word answers making analysis of limited value, as such a selection of the comments are provided here with some interpretation. However, despite a small sample size participant responses appear to be similar, with satisfaction being very high.

Participants generally discussed the idea that the training course was beneficial suggesting that the course acted as a refresher "*it gave a refresh of the basic statistics [which] will allow me to build on existing knowledge*" p4. Some participants stated that this course gave them an "*understanding of terms in basic statistics*" p3, other participants also stated that it allowed them to get "*a grasp of basic statistics*" P6. In addition, some participants saw the training as the start of a greater research journey "*it [the training] will help me analyse data and has helped me start to understand the research process and also become aware of SPSS*" P7. There appears to be a range of participants involved with this training course from those that are there to develop "*basic knowledge*", those who want a "*refresher*" along with those who see there is a start of their "*research journey*", this highlights the scope of the individuals who are after research methods training.

Participants were also keen to highlight that they would be interested in further courses "*further statistics [training]*" p4. Many highlighted that they would like to cover other areas of research methods "*I would like longer [courses] covering quantitative studies, further statistics, methods, data collection and analysis…. and further workshops on how to use SPSS*" p5. This was common across the participant responses with many keen to follow on and develop their statistics training further. Indeed, participants commented that they would be keen to "*follow up {the course] with more practice on SPSS*", this suggests that they are keen to further this knowledge and training with additional courses.

Indeed, those participants who took part in the course described it as a "*very good course*" P3 with many suggesting "*It was excellent and I learnt a lot*" P7. In terms of delivery participants suggested it was "*explained clearly with slides and examples*"P4, in particular the use of *"clear explanations and help*" p 2 was a common response regarding delivery of the course. Participants suggested that "*all parts [were] helpful; the use of examples was particularly helpful*". The use of examples was particularly highlighted by participants with many suggesting the examples were "*helpful* "suggesting to have aided understanding.

Some participants also commented that delivery by a teaching team of two tutors was positive as they complemented each other and facilitated learning.

Discussion

The central aim of the study was to design and deliver a research skills and statistics course to staff and students across the faculty of Health Sciences, with a key objective to involve prospective staff and students in the development process of this course.

Overall the first phase of the study (survey) highlights a need for further research and statistics training in this population. It also suggests a preference for this training to be free of charge or very low cost to participants, undertaken during worktimes and organised at a slower pace over a few weeks. This highlights a lot of potential for how the potential course could be developed and offered within the university or externally to health and scoail care professionals regarding key aspects of its delivery, such as blended learning (mixed of distance learning and face to face).

In terms of course content there was a mixed response. Different participants appear to require different levels of training, whilst some need an introductory level of training others wish to have more advanced training. As such, it could be suggested that a programme that moves through all levels of training, introductory, intermediate, and advanced would be preferred with an option to participants to all three or join at different points depending on their previous knowledge. A key point for those participants that were new to research was that the training needs to be "idiot proof". This suggests that for some respondents research and statistics skills may be an area that they have previously struggled to understand and require training that is tailored to focus on this.

The delivered course was offered as a pilot at an initial basic level, in a standard face-to-face seminar environment. Although this attracted lots of interest, only a small number of these participants arrived on the day. This links back to the previously discussed issues surrounding delivery identified in the initial questionnaire as both staff and students tend to have heavy workloads and other commitments that prevent them from attending. Despite participants wanting a face –to-face approach a blended learning style that incorporates online learning and discussion forums may be more beneficial for a wider audience, particularly when trying to arrange a time, during a busy week, when staff members are

available. The benefits of online delivery would allow for staff wishing to undertake training to do this in their own time. Nevertheless, should participants still wish face to face delivery, especially regarding the basic introductory course where more one to one support is essential, smaller face-to-face courses could become a viable option.

The pilot training delivered to staff and students who attended was noted as being particularly beneficial. As a result of the evaluation, participants highlighted its beneficial nature in improving knowledge as well as in the content contained, suggesting that it was delivered at the right level with the right material. Indeed, in terms of delivery participants who managed to attend were happy with the style and format of the session and particularly commented on activities being a beneficial factor.

The study evaluation confirmed that the objective of the study to involve prospective students in the course development process was beneficial, The process of co-constructing the curriculum in the present study, indeed offered opportunities for greater clarity over the expectations of the teaching team and students about the aims and content of the course, which in turn has a positive impacts on student learning. As Biggs and Tagg (2011) suggest, the present study is an excellent example of facilitating "constructive alignment", a key curriculum design principle that ensures the best possible learning, as prospective students and the teaching team worked ' together' to develop this pilot course, as well as reinforce the relation between learning activities and learning objectives.

There is a selection of limitations with the above research. All data was collection and training delivered within a particular faculty in a west-midlands university. In addition, samples sizes were particularly small with regard to attendance of the pilot course and completion of evaluation forms, despite keen initial interest in the training.

In conclusion, there is a very real need for research skills and statistics training and support in staff members and postgraduate, especially doctorate students in higher education institutions. Indeed, initial questionnaire responses highlighted a keen interest in training at all levels, this was reflected in the number of individuals interested in attending but who were unable to make it. Additional thought needs to be given to the delivery and timing of this training; consideration should be given to blended learning. This would allow for a greater number of people to complete the training course, and deal with the high number of people who are interested but were unavailable to make the session.

Key findings

- Research methods training is needed at all levels, from basic to advanced

- Face-to-face pilot basic statistics course were well received

- Attendance to face-to-face session was hampered by busy work schedules

- Consideration should be given to delivery via blended learning

Recommendations for practice

- Investigate alternative delivery methods to maximise uptake

- Consider blended learning or other alternative delivery methods

- Offer training in research methods and statistics at all levels from beginner to expert

- During training sessions provide worked examples and adequate time for student to practise

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Appendix 1 – Responses to advanced research methods content question

advance spss
Synthesising qual methods
detailed analysis of data collected from both qualatative and quatitative data sets as well for example cluster analysis and multivariant models
Not certain at this moment in time other than mixed methods NVIVO is a also a key gap
i would like to progress to advanced but at the moment have no knowledge at all in regards to research
Managing research projects desiging collaborative projects reporting and dissemination maximizing impact
multilevel modelling or SEM or Rasch analysis
I have already undertaken ARM during my third years at undergrad however I struggled with post hoc analysis and how to interpret these results factor analysis and how to use SPSS in this advanced state
Path analysis. Structured equation modelling. Discourse Analysis.
Structural.Equation.Modelling.and.Path.Analysis
meta-analysis
Publishing research within the literature
Emergent research designs and qualitative data analysis techniques. Also some information on mixed-methods research
enhanced quaittative and quantitative methodological and analysis techniques
Not sure at this stage
Factor analysis, SEM, multiple regression
How to go about publishing Research Material in a consultative role.
i am unsure as need a basic grounding in quantitaive methods and stats first
Advanced statistical methods
systematic review for qualittaive research, factor anaysis
How to conduct 'advanced research methods' analyses e.g. refresh on conducting MANOVA, learn about more advanced analyses
Structural Equation modelling, Factor Analysis, Multilevel Modelling
further on maths modelling