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Social Science Quantitative Methods Capacity Building in Wales: ESRC/HEFCW Scoping Study

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Mae CISHE yn gwneud ymchwil rhyngddisgyblaethol sy'n arloesol o ran ei methodoleg. Mae hefyd yn cydlynu'r ymchwil honno, gyda chyfraniad cryf o'r gwyddorau cymdeithasol ac ym meysydd perthynol biofeddygaeth, gwasanaethau iechyd, iechyd cyhoeddus a biofoeseg. Rydym yn gwneud ymchwil o'r radd flaenaf yn rhyngwladol ac yn ei hyrwyddo, gan roi pwyslais ar fynd i'r afael ag anghydraddoldebau iechyd a sicrhau bod ein hymchwil yn cael effaith ar bolisi ac ymarfer yng Nghymru a thu hwnt.

Social Science Quantitative Methods Capacity Building in Wales: ESRC/HEFCW Scoping Study FINAL REPORT

Abstract

Previous research undertaken by the ESRC has revealed a "deficit" of quantitative social science researchers and identified that this should be tackled early in the academic life course. However, there is substantial heterogeneity across disciplines with previous studies indicating what while some subjects suffer serious deficits in quantitative methods research capacity, other disciplines such as economics and psychology are perceived to have strengths in quantitative methods training and research.

There may be a particular problem in quantitative social science in Wales (possibly relating to the visible "Welsh deficit" in social science funding); however it is difficult to identify the configuration, strengths and weaknesses of quantitative social science in Wales from routine data. To provide more data on the current position of quantitative social science in Wales, and to identify potential ways forward to improve the situation in Wales, ESRC and HEFCW jointly funded this scoping study.

The study mapped quantitative social science research (and training) expertise in Wales by undertaking an all-Wales questionnaire survey of social scientists in Higher Education Institutions in Wales. This was complemented by a number of semi-structured interviews with key stakeholders with an interest or expertise in quantitative social science research methods. A workshop including key stakeholders was then held to discuss the outcomes of the survey and interviews and recommendations for future action.

This report presents the main findings of the study, which include the need for future actions to recognise the differences between disciplines, to not solely focus on advanced quantitative methods, and to be linked with wider initiatives to improve social science research methods training and capacity more generally. Many issues identified were not Wales specific and optimal solutions include increasing access to and participation in wider UK initiatives rather than solely Wales based actions. The report recommends the creation of a Centre in Wales to co-ordinate and deliver Wales-based solutions, link with UK initiatives and break down disciplinary and methodological barriers. Other recommendations address the deficit at different stages in the academic life course; undergraduate, postgraduate, post-doctoral and continued professional development, as well as suggestions for building wider quantitative capacity in Wales, monitoring and further research.

Keywords: quantitative methods, quantitative research, quantitative training, Wales, survey, social science

Recommendations:

- **The creation of a Wales Centre with responsibility for social science research capacity development, with sustained funding from ESRC and/or HEFCW.** The delivery of many of the following recommendations requires an organisation to co-ordinate and deliver Wales-based and Wales-focussed solutions. It is therefore recommended that a Centre based in Wales should be funded, which should link in strongly with and not duplicate national initiatives in research methods and capacity development. Ideally, such a proposed Centre and many of the recommendations below will not entirely focus on quantitative methods, as it has emerged strongly from this study that the advancement of quantitative methods will be greatly facilitated by breaking down barriers between quantitative and qualitative methods. An important role of the proposed Centre will also be to break down barriers to collaboration across disciplines and between institutions.

- **Undergraduate Level**
  a. Undergraduate quantitative social science teaching in Wales should be supported, particularly for teaching in "low" disciplines (paragraphs 3.4.6. and 4.3.1.). Training courses and other continuing professional development activities are required in the teaching of quantitative methods. Courses should consider the current teaching of quantitative methods and look at developing a distinction between teaching for quantitative methods "users" and quantitative methods "producers" (§ 4.1.7.) and differences between the needs of "high QM" disciplines and "low QM" disciplines (see section 3.7.).

  b. Improved access to and promotion of online and other resources to be used in undergraduate teaching, particularly up-to-date examples of high quality policy and theory-relevant quantitative research studies to be included in undergraduate courses with a substantive or theoretical focus (§ 4.3.1. and 5.4.3.). Again differences across disciplines should be taken into account so that the examples are relevant to the student's area of study.

  c. Developing a network of teaching staff with responsibility for undergraduate quantitative methods should be considered, with discipline-specific sub-groups and an annual meeting (§ 5.4.1.).

  d. These three recommendations, particularly a and c, could be co-ordinated by a Wales Centre such as recommended in 6.2.1.

- **Postgraduate Level**
  a. Greater provision and co-ordination of postgraduate quantitative social science training is required in Wales (§ 4.1.5.and 4.1.6.) In some disciplines there is a greater need for developing advanced quantitative methods training than in others, particularly students from "high QM" disciplines (see section 3.7.4.). An all-Wales MSc in quantitative research methods could be set up and be a compulsory or optional course for 1+3 students in Wales (§ 5.4.4.). However, it would be very difficult to configure a course that met the needs of specific disciplines, and issues of geography and the available number of students would also be major barriers. Dependent upon the outcome of the 1+3 review and other national initiatives by the ESRC, a preferred option is that a more flexible arrangement should be set up, in which there is a set of compulsory or restricted choice modules for all 1+3 students in Wales, run as a compulsory 'Autumn

School' for new 1+3 students at the beginning of their 1+ year, followed by a wide range of optional courses that may be run by institutions within Wales, or elsewhere in the UK. The varying needs of individual disciplines will need to be observed (see section 3.4.), but opportunities for developing multidisciplinary understandings and collaboration, and appreciation of other (non-quantitative) research methods should be taken. The experience of the Cardiff Research and Graduate School in the Social Sciences (RGS) will be useful here, where because of the critical mass (currently 93 ESRC students), four different sets of quantitative modules are offered in its research methods Masters', in Economics, Psychology, Business/Management Studies and Social Sciences, allowing subject-specific specialisation but with access to modules across disciplines. A Wales Centre should play a key role in co-ordinating the 'Autumn School', and providing mentorship and/or advice for students and supervisors on identifying bespoke training programmes for each student, with cognisance of the strategic needs of their discipline and interests such as the ESRC. Links could also be made with the South West and Wales hub of UKGrad (§ 5.4.1.).

b. The ESRC and other social science research funders should look to increase the number of MSc. studentships in quantitative social science research methods (§ 4.2.1.). The studentships should be eligible for social scientists to take certain other approved social science methods MSc courses which include mixed methods provision and MSc in related disciplines, for examples Statistics or Medical Statistics. Postgraduate applications from students in disciplines such as mathematics and statistics should also be encouraged to apply to undertake social science research training (§ 4.3.1.).

c. These funders should also continue efforts to increase the number of quantitative PhD studentships (also incorporating students who are undertaking postgraduate research in "low QM" substantive areas such as Sociology, Education and Criminology but who will utilise quantitative methodology). These efforts should include the enhanced stipend (§ 1.1.5.), and earmarked quantitative studentships, including specific encouragement of secondary analysis of datasets, particularly in collaboration with Welsh Assembly Government and Office of National Statistics (see section 4.3.6.).

- **Postdoctoral Level and Continuing Professional Development**
  a. Postdoctoral and established quantitative social scientists' training needs in quantitative social science in Wales should be identified. This is likely to differ depending on the disciplinary background of the individual (see sections 3.4. and 3.7.). A development of the NCRM website could be to provide a resource whereby social scientists can identify what training courses they would like to see provided (§ 4.3.1.), and this could be used to identify demand for courses not currently offered regularly. Alternatively, or in addition to the NCRM, the Wales Centre should play a pro-active and locally-focussed role in identifying training needs.

  b. The Centre should identify areas where there was sufficient demand in Wales for the provision of suitable training in Wales (§ 4.3.1.) to be provided by appropriate specialists including those within the NCRM and other relevant ESRC national initiatives. Our survey suggests that demand is high for training on multilevel modelling / MLwiN, structural equation modelling / LISREL, log-linear, non-linear, generalised linear modelling and Stata (see section 3.7.).

c. These research training events as well as other high-quality events should be set up by the Centre as a light-touch way of increasing communication and collaboration among social scientists in Wales (§ 5.2.2.). Possibilities include a satellite to the ESRC Research Methods Festival, in which a number of those presenting at the national festival could be brought together for a mini-festival in Wales (§ 5.5.3.). Alternatively, a number of NCRM training events could be brought together for a week-long NCRM Wales training week. A Wales social science conference, with peer-reviewed abstracts, may also work if there was strong support from senior management in respective HEIs. An anticipated spin-off effect of bringing people together from across Wales for the specific purpose of these events would allow networks to be created. Later collaboration through these may then occur more naturally rather than attempting to set up more fixed networks.

d. Continuation schemes to incentivise, encourage and support quantitative researchers throughout their research careers should be developed particularly for individuals from "low QM" disciplines and funded by the ESRC and other social science research funders (§ 4.2.2. and 4.3.3.). This should include earmarked funding and possibly enhanced conditions (such as higher pay, increased training budget) at postdoctoral fellowship, fellowship and career scientist level. These initiatives should ensure that the cohort created by increased MSc and PhD provision are retained in the social science research community, and that future research leaders are identified, nurtured and given access to secure senior posts (§ 5.3.4.).

e. The ESRC and other social science research funders should place greater emphasis on research training provision in applications for research grant funding (§ 5.5.1.). This should incentivise grantholders to provide opportunities for research staff to maintain and develop their quantitative research skills (see paragraph 5.5.1.), both those directly relevant to the funded project but also for investment in wider research capacity

f. The Welsh Assembly Government and the Office for National Statistics should co-ordinate linkages with HEIs in Wales with regard to quantitative skills capacity in Wales, training, consultancy, research and development, and engage with the recommended Wales Centre (§ 4.1.10).

- **Wider Capacity Building in Wales**
  a. The quantitative social science community in Wales should be coordinated and promoted through the proposed Centre (§ 4.2.4. and 4.3.5.). A website and dedicated staffing of the Centre could also promote quantitative social science in Wales (§ 5.2.1.). The website could contain a searchable directory of membership and their expertise and links to centres of expertise in Wales. It could act as the initial point of contact for individuals wishing to identify relevant expertise in Wales (§ 4.1.10). It would have links to Wales, UK and international websites and aim to complement the NCRM website and email distribution list.

  b. Greater provision and co-ordination of social science expertise in Wales is necessary to support research grant proposals and funded research projects (§ 5.3.1.). Through dedicated staffing in the Centre, researchers could be provided with access to key expertise (§ 4.3.2.). Particularly for researchers requiring

specific methodological input into a substantive grant proposal, the Centre may have a group of methodologists that could contribute to the proposal and then be co-applicants on the bid (§ 4.3.2. and 5.3.2.). Alternatively, the Centre could assist in identifying a potential partner.

c. Given the geographical problems in Wales, e-social science solutions should be considered (§ 4.2.3, 5.4.3., 5.5.2.). Grid nodes and other video conferencing solutions (including those downloadable from the internet) allow access to training across Welsh HEIs without the need for physical movement (§ 5.2.1.). Participants can use such systems from homes with broadband or from university video suites allowing entire classes of graduate students to be included. Again the proposed Centre could have a role in developing these solutions in their provision of training and events.

d. Increased use and linkage of social science and other datasets in Wales should be supported (§ 4.3.6.). Wales has many datasets which are either not publicly available, or are not well linked together (§ 4.2.5.). In conjunction with the ESRC Economic and Social Data Service, the Centre could promote better awareness, accessibility, linkage and use of Welsh datasets, and be a key point of contact for researchers in Wales and outside Wales wishing to identify or use such data.

e. The proposed Centre should also fund and co-ordinate exchange schemes, placements and secondments both between different HEIs and across organisations outside academic community such as Welsh Assembly Government, Office of National Statistics, Local Government etc (§ 4.2.6. and 4.3.7.).

f. Strategic links between the ESRC and the Welsh Assembly Government should be improved with the following key objectives:
    - To increase the Welsh Assembly Government's influence on and engagement with strategic developments and funding streams at the ESRC, preferably via the Welsh Assembly Government's Chief Statistician, Chief Social Researcher and Chief Scientist, rather than separate policy leads (§ 4.1.10)
    - To increase access to Welsh Assembly Government datasets, preferably via the ESRC Economic and Social Data Service (§ 4.1.10).
    - To establish jointly funded studentships for the secondary analysis of existing datasets in Wales (§ 5.3.3.).

- **Monitoring and further research**

a. It will be important to monitor the impact of any initiatives that are implemented (§ 5.2.3. and 5.6.2.). This should be an ongoing process and allow funds to be reallocated accordingly. For example, the following performance indicators could be monitored:
    - The uptake and evaluation of training and other events run through the Centre
    - The number of research grants made, number of successful grants and size of research grant
    - The number of applications for quantitative methods MSc and PhD training
    - MSc and PhD students in quantitative methods, and their pass/completion rates.
    - The number of publications in international journals
    - The number of research active staff in quantitative methods.

b. This scoping study has had a limited focus and limited resources. The questionnaires, interviews and roundtable discussion revealed gaps in knowledge particularly on the demand side (§ 5.6.1.). Further research should be conducted to elicit the experiences and perspectives of postgraduate students across Wales on quantitative methods and quantitative methods provision. This could be linked to the forthcoming review of the 1 + 3 system and consider the number of PhD studentships in Wales and why there is a low demand for quantitative PhDs.

Contents

Contributors and Acknowledgments

The scoping study was undertaken by an inter-disciplinary team at Cardiff University, who were awarded the competitively tendered contract in September 2006. The principal investigator of this team was Professor Laurence Moore; other co-applicants were Professor Greg Maio, Dr. Scott Orford, Dr. Amanda Robinson, Dr Chris Taylor and Professor Keith Whitfield. Rebecca Lynch was the researcher employed on this project, responsible for the day-to-day running of the study and the qualitative element of the research. Dr. Chris Taylor led the design and construction of the survey tool and also played a significant part in analysing these data. Further assistance in data analysis of the survey came from Graham Moore.

As well as this inter-disciplinary team, the study was informed by an external reference group of key stakeholders from different higher education institutes (HEIs) across Wales who worked in a range of social science disciplines. The external reference group also included representatives from the Welsh Assembly Government and the Office for National Statistics (based at Newport) in their roles as commissioners and users of quantitative methods as well as employers of those with quantitative skills. External Reference Group membership is given in Appendix I.

The study team gratefully acknowledge the co-operation and participation of external reference group members, key contacts, workshop attendees, interviewees and questionnaire respondents.

1. Introduction

1.1. Background

1.1.1. A quantitative 'deficit' amongst UK social scientists has been a policy concern for the Government and Research Councils for more than a decade. The ESRC *Demographic Review of the Social Sciences* noted this problem and particularly identified that more needed to be done to address the problem at earlier stages of the academic life course. Further, the recent HEFCE statement on 'strategically important and vulnerable subjects' (HEFCE 2005/24) comments that quantitative social science *'is a particular concern to the ESRC, as supply is seen as insufficient, particularly as this subject underpins other disciplines'.*

1.1.2. However, there is substantial heterogeneity in this position. For example, across disciplines – while Studies of Quantitative Methods in British Sociology (2003) and the Teaching and Learning Research Programme Research Capacity Building Network (RCBN) identified serious deficits in quantitative methods research capacity, other disciplines such as economics and psychology are perceived to have strengths in quantitative methods training and research.

1.1.3. Similarly, there may be a particular problem in quantitative social science in Wales, which may be related to the visible "Welsh deficit" in social science funding (Great Expectations: the Social Sciences in Britain 2003). Figures received from HEFCW and the ESRC demonstrate that in 2004/2005, Wales fell short of its 5% 'standard share' of all United Kingdom HEI activity for the percentage of total ESRC grant value awarded in 2004/2005 (3.3%) and also in grant expenditure that year (4.0%). The data suggest that success rates were above the UK average, but that the total value of grant applications was below par, and Wales was particularly weak in the number of large scale grant applications submitted. What social science research capacity there is in Wales is highly concentrated, particularly that which is rated to be of international excellence: in the 2001 Research Assessment Exercise, there were 11 social science submissions that were rated 5 or 5*, of which 8 were from Cardiff University. In 2004/2005, Cardiff University accounted for 81.8% of all ESRC expenditure in Wales, with the 10th highest level of research expenditure and the 8th highest level of training expenditure for any UK HEI. Indeed, RAE data suggest that Cardiff University represents the third greatest concentration of social science research excellence in the UK, with 289 research active staff in 5 or 5* departments, which ranks below only London School of Economics (368) and Manchester (309), and ahead of Warwick (264) and Lancaster (166).

1.1.4. Of the ESRC's overall expenditure in the United Kingdom, 61.1% was spent on research and 30.9% on training, whereas for Wales these figures were 59.3% and 40.7% respectively. Cardiff University was the only Welsh HEI appearing in the top ten UK HEIs, in terms of the value of funding received from the ESRC in 2004/05 (8th). Furthermore, in this current academic year, there are 161 ESRC funded postgraduate research students in Wales, the majority of whom are based at Cardiff University (93), with 5 registered at Swansea University and the remainder almost exactly evenly divided between the University Colleges at Bangor (31) and Aberystwyth (32). The number of PhD students in Wales is given by discipline in the table below:

Discipline	No of current ESRC funded postgraduate research students
Economic and Social History	1
Economics	6
Management and Business Studies	11
Psychology	36
Science, Technology and Engineering	2
Statistics, Computing and Methodology	2
Education	16
Environmental Planning	18
Environmental Sciences	1
Human Geography	12
Political Science and International Relations	17
Social Policy	17
Social Work	3
Socio-Legal Studies	3
Sociology	11
Interdisciplinary Studies	3
Linguistics	2

1.1.5. However, it is difficult to identify the configuration, strengths and weaknesses of quantitative social science in Wales from routine data. Some indication is provided by data on ESRC PhD funding, which indicate that only 3 (all based at Cardiff University) were awarded the advanced studentship stipend, although we are unable to distinguish whether these are enhancements under the quantitative methods scheme or under the economics scheme.

1.1.6. To provide more data on the current position of quantitative social science in Wales, and to identify potential ways forward to improve the situation in Wales, ESRC and HEFCW jointly funded this scoping study. The following were the key aims of the study, as directed by the ESRC/HEFCW call for tenders:

i) Review the current position of quantitative methods teaching and research in Wales;
ii) Identify current 'centres of expertise' of quantitative methodological expertise in Wales on which an initiative could build;
iii) Identify the particular needs in Wales in terms of quantitative methods capacity building;
iv) Consider different delivery modes, in particular the opportunity for collaboration across different Welsh institutions, as has been promoted by the HEFCW more generally;
v) Consider how any gaps in current need might *initially* be met by drawing up national provision from elsewhere within the UK; and
vi) Make recommendations on which of the activities being developed under the initiative or what additional activities would be most applicable in Wales.

1.2. Scope of Study

1.2.1. The study included all Social Science disciplines recognised by the ESRC as identified below:

Anthropology
Area Studies
Economic and Social History
Economics
Human Geography
Linguistics
Politics
Psychology
Sociology
Communication and Media Studies
Criminology
Development Studies
Education
Management and Business Studies
Socio-legal Studies
Social Work and Social Policy
Town and Country Planning

In addition, the study included other primarily practice-based disciplines where quantitative social scientists are located, such as in Medicine, Nursing and Health.

1.2.2. The main focus of the study was the HE sector in Wales and included both quantitative social science researchers in the HE sector and trainers/teachers in quantitative social science research in the HE sector. The study also included other major organisations that provide significant quantitative research expertise in Wales; The Welsh Assembly Government – Statistical Division and the Office for National Statistics (Newport).

2. Methods

2.1. Outline

2.1.1. The major component of the methodology was to map quantitative social science research (and training) expertise in Wales by undertaking an all-Wales questionnaire survey. This was complemented by a number of semi-structured interviews with key stakeholders with expertise/experience in quantitative social science research methods and the current state of quantitative methods capacity in Wales. A workshop including key stakeholders was then held to discuss the outcomes and future directions of the study.

2.2. Mapping of key contacts

2.2.1. The aim of this element of the study was to try to map *all* current units of social science research and teaching activity in Higher Education Institutions (HEIs) in Wales. All departments and research units in the HE sector in Wales with significant social science research expertise were identified and contacted through internet searches and consultation from the external reference group. In all, 93 "key contacts" were identified as potentially part of units of social science research activity in HEIs in Wales. Of these, 15 were excluded through further investigation and communication with the "key contact". Of the remaining 78 key contacts, 64 agreed to participate in the study. In order for our questionnaire to be distributed, key contacts agreed to either supply us with email addresses of all social science staff, who we then directly contacted with an invitation to participate in the questionnaire, or to forward our invitation to participate directly to all relevant academic staff with an indication to the study team of how many staff this was likely to be.

2.3. Online survey of social scientists across Wales

2.3.1. Potential respondents to the questionnaire were contacted either by the project or through key contacts at the respondent's institution. Two reminders to complete the online survey were issued and survey completion took place between 22nd November 2006 and the 6th January 2007. Results from this survey were analysed using SPSS. A total of 379 responses were received.

2.4. Interviews and brief qualitative questionnaires to key contacts

2.4.1. Interviews were conducted with the 17 members of the external reference group and 5 other key stakeholders. Interviewees were from a range of disciplines and HEIs and 3 individuals were interviewed from the Welsh Assembly Government and 2 from the Office of National Statistics. The interviews were undertaken by members of the project team, many in the same discipline area as the project team member. It this way a discussion could develop around the ideas. These were conducted between December 2006 -February 2007 with 18 conducted by telephone and 4 conducted face-to-face. Notes from the interviews were written up and sent to RL for qualitative analysis.

2.4.2. So that the views of a wider group could be considered, brief qualitative questionnaires were distributed in addition to the interviews. These were sent to all 64 participating key contacts throughout Wales and were emailed in December 2006 with a reminder in January 2007. Responses were gained from 14 key contacts which represented different institutions (Aberystwyth, Bangor, Cardiff, Glamorgan, Swansea and UWIC) and different disciplines (business, childhood studies, education, healthcare sciences, international politics, language and

communication, law, public health and medicine, rural sciences, sociology, sport sciences

2.4.3. Both the interviews and questionnaires were based around 3 questions:

1. What do you feel is the current state of quantitative methods in social science in Wales in terms of: a) teaching b) research?

2. What are the particular needs in Wales in terms of quantitative methods capacity building?

3. How do you think these needs could be met?

2.4.4. Responses to the interviews and qualitative questionnaires were compiled and analysed thematically under the three question headings.

2.5. Workshop

2.5.1. The aim of the workshop was to discuss the initial results of the study, other issues related to the research and to develop solutions and recommendations. The workshop was held at the start of February near Abergavenny and was attended by 26 participants. Again participants came from different disciplines and institutions across Wales and the day was also attended by a participant from outside the academic sector and representatives from the ESRC and HEFCW. Initial findings from the survey, interviews and qualitative questionnaires were presented and discussed. Group discussions were then held to discuss and focus on addressing needs in the following areas identified as important by the project team:

- ***Potential collaborative initiatives across institutions in Wales to address quantitative capacity building needs***
- ***Increasing research funding competitiveness across Wales***
- ***Undergraduate quantitative methods training***
- ***Postgraduate quantitative methods training***
    - *How can gaps in current need be initially met by drawing upon national provision from elsewhere in the UK?*
    - *What additional activities would be most applicable in Wales?*
- ***Postdoctoral training, continued professional development and career pathways***
    - *How can gaps in current need be initially met by drawing upon national provision from elsewhere in the UK?*
    - *What additional activities would be most applicable in Wales?*

2.5.2. All participants were asked to complete a “999” sheet which asked for suggestions regarding how quantitative methods capacity building in Wales should be addressed in 9 weeks, 9 months and 9 years. This then gathered ideas for short, medium and long term plans. The suggestions from these sheets were viewed and condensed by the project team. Many of these have been incorporated into the recommendations of the study.

3. Results of Survey

3.1. Sample description

3.1.1. Table 1 compares the number of responses for each institution with the total number of A/A* research active staff, and the number of research active staff in 4/5/5* social science departments within that institution. In total, there were 446 A/A* research active staff in 4/5/5* social science departments in Wales submitted to the 2001 Research Assessment Exercise, and 690 A/A* research active staff in all social science units. Although responses from Cardiff University make-up the majority of the total 379 responses, this over-representation of Cardiff is not so marked when considered in the context of the distribution of research active social scientists submitted to the RAE. Table 2 presents the frequency of responses by discipline, demonstrating relatively large representations from psychology, biological/medical sciences and management & business studies. For this table and future analyses by discipline, some of the 17 social science disciplines and practice based disciplines were combined due to small numbers of responses.

Table 1. Frequency of responses by institution, compared with the number of social scientists submitted for the 2001 research assessment exercise by each institution.

	Responses	RAE A/A*	RAE A/A* in 4/5/5* units
Aberystwyth	24	107	82
Bangor	26	70	36
Cardiff	207	263	263
Glamorgan	21	70	
Swansea	64	158	65
NEWI	12	13	
Others	25	9	

Table 2. Frequency of responses by discipline.

Discipline	Number of
Human Geography & related	34
Economics & related	27
Education	25
Psychology	75
Management & Business Studies	45
Political Science & International Studies	14
Social Policy & Social Work	17
Socio-legal Studies	24
Sociology & Social Anthropology	33
Science & Technology Studies, Statistics, IT	24
Biological & Medical Studies	50

3.1.2. Table 3 presents sample breakdowns by gender and age, demonstrating that of the 361 participants who provided both age and gender details, the sample was predominantly (60%) male, particularly in the middle and upper age categories. A higher representation of respondents from the middle age category is also observed, compared to roughly equal numbers from the lower and upper age groups. Table 4 shows the frequency of participants reporting high (64%) or low (36%) levels of quantitative methods usage in their own research, cross-tabulated with those who reported spending a proportion of their working time on research which was at least equal to (71%) or less than teaching time.

Table 3. Frequency of male and female respondents, from each of three age categories.

	Female	Male	
Age 18-35	54	52	106
Age 36-49	58	95	153
Age 50+	33	69	102
	145	216	

Table 4. Frequency of high or low users of quantitative methods who report teaching activity greater than or equal to teaching time or who report teaching activity greater than research.

	Research time greater than or equal to teaching time	Teaching time greater than research time	
Use quantitative methods all the time or often	160	57	217
Use quantitative methods not very often or never	78	42	120
	238	99	

3.2. Quantitative activity by institution

3.2.1. The percentage of participants within each institution reporting that they had published quantitative research in the past year and the percentage within each institution reporting that they had received funding for quantitative research in the past year are presented below in Table 5. Very high levels of quantitative publication were reported for Glamorgan, with more than half of respondents from Bangor, Swansea and Cardiff also reporting publication of quantitative research within the past year. Particularly high proportions of respondents reported funding receipt at NEWI and Swansea.

Table 5. Percentage of participants within each institution publishing quantitative research or receiving funding for quantitative research in past year

Discipline	Publication	Funding
Aberystwyth	46	22
Bangor	56	17
Cardiff	54	29
Glamorgan	71	20
Swansea	56	38
NEWI	33	42
Others	28	21

3.2.2. The frequencies and percentages of participants classified as active quantitative methods users (QMUs i.e., use quantitative methods in research all the time or often **and** research time at least equal to teaching time), quantitative researchers in predominantly teaching roles (i.e., use quantitative methods in research all the time or often **and** research time less than teaching time) or those rarely using quantitative methods are presented for each institution in Table 6. Overall, almost half of respondents were classified as QMUs, including at least half of respondents from Cardiff, Glamorgan and Swansea – the institutions with the highest percentage of respondents classified as QMUs. A relatively high percentage of quantitative researchers in predominantly teaching roles was observed for Glamorgan University (38.9%), with this figure markedly lower for Cardiff University respondents (8.8%). Overall, approximately one in six respondents was a quantitative researcher in a predominantly teaching role. Approximately one in three respondents rarely or never used quantitative methods, although percentages of non-quantitative researchers and teachers were highly variable between institutions, notably low for Glamorgan (11.1%), and highest for 'other' institutions (57.1%), NEWI (44.4%) and Cardiff University (39.2%).

Table 6. Frequency and percentages of participants within each institution classified as active quantitative methods users (QMUs), predominantly teaching staff using quantitative methods in much of their research and non-quantitative researchers/teaching staff.

HEI	**Quantitative methods category**		
	QMUs	**(% within HEI) Quantitative researcher - predominantly teacher**	**Non-quantitative researcher or teacher**
Aberystwyth	9 (39.1)	7 (30.4)	7 (30.4)
Bangor	9 (37.5)	7 (29.2)	8 (33.3)
Cardiff University	94 (51.9)	16 (8.8)	71 (39.2)
Glamorgan	9 (50.0)	7 (38.9)	2 (11.1)
Swansea	32 (52.5)	13 (21.3)	16 (26.2)
NEWI	3 (33.3)	2 (22.2)	4 (44.4)
Others	4 (19.0)	5 (23.8)	12 (57.1)
TOTAL	160 (47.5)	57 (16.9)	120 (35.6)

3.2.3. The frequencies and percentages of total respondents within each institution classified as *advanced* QMUs (i.e., QMUs who have: i) used and published with advanced software packages (i.e., other than SPSS) AND advanced analytical methods, or ii) only used and published with SPSS but have used and published with 3 or more advanced analytical methods) as well as the percentage of total QMUs categorised as advanced users is presented below in Table 7. The highest percentages of total respondents classified as *advanced* QMUs are observed for Cardiff, Glamorgan and Swansea. More than half of QMUs in Cardiff, Glamorgan, Bangor and Swansea universities are classified as advanced users, compared to slightly lower percentages for Bangor and Aberystwyth.

Table 7. Frequency, percentage of total respondents and percentage of research active, quantitative methods users (QMUs) classified as advanced QMUs within each institution.

	Number	Percentage of total respondents	Percentage of research active, quantitative methods
Aberystwyth	4	17%	44%
Bangor	5	21%	56%
Cardiff	53	30%	58%
Glamorgan	5	28%	56%
Swansea	17	28%	53%
NEWI	1	11%	33%
Others	1	5%	25%

3.3. Quantitative activity by discipline

3.3.1. The frequencies and percentages of participants classified as QMUs, quantitative researchers in predominantly teaching roles or those rarely using quantitative methods are presented for each discipline below in Table 8. Relatively high percentages of respondents from psychology, science & technology studies, economics & related, biological/medical sciences and management & business studies were classified as QMUs, compared to fewer than 40% of respondents from all other disciplines.

Table 8. Frequency and percentages of participants within each discipline classified as active quantitative methods users (QMUs), predominantly teaching staff using quantitative methods in much of their research and non-quantitative researchers/teaching staff.

HEI	Quantitative methods category (% within HEI)		
	QMUs	Quantitative researcher - predominantly teacher	Non-quantitative researcher or teacher
Human Geography & related	6(20)	6(20)	18(60)
Economics & related	13(52)	8(32)	4(16)
Education	5(22)	4(18)	15(63)
Psychology	59(76)	13(17)	6(8)
Management & Business Studies	18(47)	5(13)	15(40)
Political Science & International Studies	4(36)	1(9)	6(55)
Social Policy & Social Work	6(32)	2(11)	11(58)
Socio-legal Studies	6(27)	2(9)	14(64)
Sociology & Social Anthropology	7(27)	2(8)	17(65)
Science & Technology Studies, Statistics, IT	14(70)	2(10)	4(20)
Biological & Medical Studies	21(51)	11(27)	9(22)
Total	159(27)	56(16)	119(35)

3.3.2. The frequencies and percentages of total respondents within each discipline classified as *advanced* QMUs, as well as the percentage of total QMUs categorised as *advanced* QMUs is presented below in

Table 9. Again, clear divisions between disciplines are observed, with the highest percentage of respondents classified as advanced QMUs for economics & related subjects (44%) and psychology (40%) and the percentages for sociology/social anthropology and education as low as 7 and 8% respectively. For economics and related, psychology, management and business studies, biological/medical sciences and political science & international studies, the majority of QMUs were classified as *advanced* QMUs, with this figure somewhat lower for all remaining disciplines.

Table 9. Frequency, percentage of total respondents and percentage of research active, quantitative methods users (QMUs) classified as advanced quantitative researchers within each discipline.

	Number	Percentage of total respondents	Percentage of QMUs
Human Geography & related	4	13	67
Economics & related	11	44	85
Education	2	8	40
Psychology	29	40	52
Management & Business Studies	10	26	56
Political Science & International Studies	4	36	100
Social Policy & Social Work	3	20	50
Socio-legal Studies	2	9	33
Sociology & Social Anthropology	2	7	29
Science & Technology Studies, Statistics, IT	6	30	43
Biological & Medical Studies	12	30	60

3.3.3. The percentage of participants within each discipline reporting having published quantitative research in the past year and the percentage within each discipline reporting having received funding for quantitative research in the past year are presented below in Table 10. High levels of quantitative publication were reported for psychology, science and technology studies/statistics and IT, with low levels observed for education, sociology/social anthropology and social policy/social work. High levels of funding receipts were reported for economics and related, psychology and biological/medical sciences, with low levels observed for sociology/social anthropology and political science & international studies

Table 10. Percentage of participants within each discipline publishing quantitative research or receiving funding for quantitative research in past year

Discipline	Publication	Funding
Psychology	79	40
Science & Technology Studies, Statistics, IT	75	29
Economics & related	70	42
Biological & Medical Studies	56	39
Socio-legal Studies	48	17
Management & Business Studies	47	24
Human Geography & related	36	18
Political Science & International Studies	36	15
Social Policy & Social Work	29	25
Sociology & Social Anthropology	22	12
Education	20	24

3.4. Disciplinary divisions

3.4.1. Disciplines were broken down into two categories according to whether 'high' or 'low' levels of quantitative research activity were observed. Disciplines classified as 'high QM' were, psychology, economics & related, management & business, science & technology/statistics & IT, biological/medical sciences. Those classed as 'low QM' were human geography & related, education, social policy/social work, socio-legal studies, sociology/social anthropology, political science & international studies.

3.4.2. The frequency and percentage of participants within each of these two research activity categories classified as non-quantitative researchers or teachers, quantitative researchers in predominantly teaching roles, *basic* QMUs and *advanced* QMUs are presented below in Table 11. In disciplines classified as having a 'high' level of quantitative activity, advanced QMUs made up the largest single group (roughly one in three), whereas non-quantitative researchers or teachers account for the majority (61%) of those in disciplines with less healthy levels of quantitative activity.

Table 11. Frequency and percentage of participants within each research activity category for disciplines with high levels of quantitative activity and disciplines with low levels of quantitative activity.

	Non-quant Teacher / researcher	Quant – mainly teacher	Basic QMU	Advanced QMU
High QM	35 (18%)	39 (20%)	53 (27%)	68 (35%)
Low QM	81 (61%)	17 (13%)	17 (13%)	17 (13%)

3.4.3. For each of the aforementioned four research activity categories, and within disciplines with 'high' and 'low' levels of quantitative research activity separately, the percentage of i) female respondents, ii) respondents teaching quantitative methods to postgraduates, iii) respondents teaching quantitative methods to undergraduates and iv) currently supervising quantitative postgraduate research are presented below in Table 12.

3.4.4. For disciplines with 'high' levels of activity, females were underrepresented in all categories, although by a particularly large margin for *advanced* QMUs (72% male, 28% female). The percentage of participants teaching postgraduates or undergraduates, or supervising postgraduate research was highest for quantitative researchers in predominantly teaching roles, and advanced QMUs.

3.4.5. For disciplines with 'low' levels of activity, females were again underrepresented in all categories, although to a marked extent for *advanced* QMUs (males- 94%, females-6%). Again, the percentages of participants teaching postgraduates or undergraduates, or supervising postgraduate research were highest for quantitative researchers in predominantly teaching roles, and advanced QMUs, with percentages for *advanced* QMUs somewhat lower than their counterparts in disciplines with 'high' levels of quantitative activity.

Table 12. Percentage of participants in each category (classified according to research activity and disciplines category (high or low)) female, currently teaching postgraduates, currently teaching undergraduates, or currently supervising postgraduates.

		Non-quant Teacher / researcher	Quant – mainly teacher	Basic QMU	Advanced QMU
Percentage female	High QM	40	46	42	28
	Low QM	39	47	47	6
Percentage teaching postgrads	High QM	17	56	28	40
	Low QM	9	47	18	38
Percentage teaching undergrads	High QM	14	44	21	43
	Low QM	10	47	12	31
Percentage supervising postgrads	High QM	14	44	21	43
	Low QM	10	47	12	31

3.4.6. For disciplines with 'high' and 'low' levels of quantitative activity, the frequencies and percentages of research staff, lecturing staff and senior staff participants classified as non-quantitative teachers or researchers, quantitative researchers in predominantly teaching roles, *basic* QMUs and *advanced* QMUs are presented below in Table 5. For disciplines with 'high' levels of quantitative research activity, approximately one in three research staff participants, one in four lecturers, and more than half of senior staff were classified as *advanced* QMUs, with senior staff making up the largest percentage of this group. Almost half of research staff were classified as active *basic* QMUs, compared to approximately one in four and one in five of lecturers and senior staff respectively. For disciplines with 'low' levels of quantitative activity, approximately one in five researchers and senior staff were classified as *advanced* QMUs and only one in seventeen members of lecturing staff, again with senior staff making up the largest percentage of this group. Approximately one in five senior staff and researchers, and one in eleven of lecturers, were classified as *basic* QMUs.

Table 5. Frequencies (and percentages) of participants classified as non-quant teachers/researchers, quantiatitive researchers in predominantly teaching roles, active basic quantitative methods users (QMUs) and advanced QMUs within discplines with 'high' and 'low' levels of quantitative activity, for each job title category.

	Position	Non-quant Teacher / researcher	Quant – mainly teacher	Basic QMU	Advanced QMU
High QM	Researchers	9(21)	0	20(48)	13(31)
	Lecturing staff	16(17)	31(33)	22(24)	24(26)
	Senior staff	7(14)	6(12)	9(18)	29(57)
Low QM	Researchers	8(57)	0	3(21)	3(21)
	Lecturing staff	46(69)	11(16)	6(9)	4(6)
	Senior staff	20(49)	4(10)	8(20)	9(22)

3.4.7. For disciplines with 'high' and 'low' levels of quantitative activity, the frequencies and percentages of participants within each age category classified as non-quantitative teachers or researchers, quantitative researchers in predominantly teaching roles, active *basic* QMUs and *advanced* QMUs are presented below in Table 6. These figures indicate that, for disciplines with a 'high' level of quantitative activity, approximately one in three under 35s, and one in three of those aged between 36 and 50, were classified as advanced QMUs, compared to 43% of over 50s. The largest proportion of those classified as advanced QMUs was derived from the 36-50 age group. The youngest age group represented the largest proportion of those classified as *basic* QMUs by a considerable margin.

3.4.8. For disciplines with 'low' levels of quantitative activity, equal numbers of participants from each category were classified as advanced QMUs, though approximately only one in six under 35s and one in ten of the other two age groups. Comparable percentages from each age group were classified as *basic* QMUs.

Table 6. Frequencies (and percentages) of participants classified as non-quant teachers/researchers, quantitative researchers in predominantly teaching roles, active basic quantitative methods users (QMUs) and advanced QMUs within discplines with 'high' and 'low' levels of quantitative activity, for each age category.

	Age	Non-quant Teacher / researcher	Quant – mainly teacher	Basic QMU	Advanced QMU
High QM	<35	8(13)	7(12)	25(42)	20(33)
	36-50	19(22)	18(21)	20(24)	28(33)
	>50	6(14)	12(29)	6(14)	18(43)
Low QM	<35	18(58)	4(13)	4(13)	5(16)
	36-50	33(69)	3(6)	7(15)	5(10)
	>50	28(57)	10(20)	6(12)	5(10)

3.5. Perceived barriers, suggestions for improvement and learning needs

3.5.1. The fourteen quantitative research methods/software packages which the highest numbers of *advanced* QMUs identified as areas where further training is needed in Wales, are presented below in

Table 7. Training in specific software packages relating to advanced quantitative methods such as structural equation modelling and multi-level modelling were rated as important areas of learning need.

Table 7. The fourteen quantitative research methods/software packages which the highest numbers of advanced quantitative research methods users identified as areas where further training is needed.

Need for further training	Rank for advanced quant researchers
Structural equation modelling / LISREL	1
Multilevel modelling / MLwiN	2
Stata	3
Log-linear, non-linear, generalised linear modelling	4
GIS / spatial modelling	5
R	6
SAS	7
Large scale secondary datasets	8
Longitudinal survey design	9
Scientific visualisation	10
Multi-staged cluster sampling	11
Time series analysis	12
Classification / cluster analysis	13
Multidimensional scaling	14

3.5.2. Thirteen potential barriers to quantitative research capacity in Wales ranked according to average levels of perceived importance according to *advanced* QMUs are presented below in Table 16, followed by nine potential suggestions for addressing quantitative research capacity in Wales, ranked according to the number of advanced QMUs agreeing with the suggestion. Issues surrounding funding appear to be highly ranked in terms of both barriers and potential facilitators. Training issues, whilst rated as relatively unimportant as a barrier to quantitative research capacity, are recognised as relatively important in facilitating quantitative research capacity in Wales. Conversely, whilst cited as a highly important barrier to quantitative research capacity, relatively few *advanced* QMUs agreed with the suggestion of increasing recruitment of quantitative researchers as a means of improving capacity.

Table 16. Barriers to quantitative research capacity in Wales, and suggestions for improvement of quantitative research capacity in Wales ranked according to average levels of perceived importance according to advanced quantitative research methods users.

Barriers to quantitative research	Rank
Recruitment of quantitative researchers	1
Time available to develop quantitative research skills	2
Limited funding for quantitative research in Wales	3
Availability of appropriate data	4
Limited research methods training available	5
Time available to undertake quantitative research	6
Research career structure	7
Willingness of researchers to do quantitative research	8
Little requirements to teach quantitative research methods	9
Expenses relating to attending training	10
Retention of staff	11
Lack of collaboration between institutions	12
Limited access to the location of training	13
What else can be done?	Rank
Increased opportunities for research methods training	1
Increase in funding quantitative research in Wales	2
Incentives for researchers to do quantitative research	3
Greater exposure to quantitative research methods throughout undergraduate courses	4
Increased funding for attending research methods training	5=
Greater recruitment of quantitative researchers	5=
More locally situated research methods training	7
More available quantitative data	8
Increased collaboration between institutions	9

3.5.3. The percentage of participants from each institution agreeing with each of nine suggestions for improving quantitative research capacity in Wales are presented below in Table 8. Figures in brackets represent the rank for each suggestion by institution. The suggestion of providing opportunities for research training were consistently met with agreement by large numbers of respondents in all institutions, with conversely, suggestion of greater recruitment of quantitative researchers consistently receiving less agreement as a means of improving quantitative capacity in Wales. Levels of agreement for all other suggestions varied by institution.

3.5.4. The percentage of participants from each discipline agreeing with each of nine suggestions for improving quantitative research capacity in Wales are presented below in Table 9. Figures in brackets represent the rank for each suggestion by discipline. Although increased opportunities for research methods training is again consistently recognised as a useful suggestion for improving quantitative capacity in Wales, agreement with the majority of suggestions was highly variable by discipline.

Table 8. Percentage of respondents within each institution providing support for each of nine suggestions for improving quantitative research capacity in Wales, with ranks importance by institution (in brackets).

HEI	% of respondents who agreed with measure								
	A	B	C	D	E	F	G	H	I
Aberystwyth	42(=4)	63(1)	42(=4)	42(=4)	50(3)	63(1)	58(2)	38(9)	42(=4)
Bangor	39(=8)	69(2)	65(=3)	65(=3)	39(=8)	58(5)	54(6)	42(7)	81(1)
Cardiff University	44(8)	66(1)	44(6)	51(5)	44(7)	54(3)	54(2)	29(9)	53(4)
Glamorgan	43(8)	71(=1)	48(=6)	71(=1)	29(9)	57(=3)	57(=3)	48(=6)	52(5)
Swansea	38(=7)	77(1)	53(5)	63(2)	36(9)	59(4)	61(3)	37(=7)	45(6)
NEWI	25(8)	50(=3)	58(=1)	58(=1)	8(9)	42(=5)	33(7)	50(=3)	42(=5)
Others	32(8)	60(=2)	36(7)	56(4)	16(9)	44(=5)	60(=2)	64(1)	44(=5)
TOTAL	41(7)	67(1)	47(6)	55(3)	38(8)	55(4)	56(2)	36(9)	52(5)

A – More available quantitative data
B – Increased opportunities for research methods training
C – More locally situated research methods training
D – Increased funding for attending research methods training
E – Greater recruitment of quantitative researchers
F – Increase in funding quantitative research in Wales
G – Incentives for researchers to do quantitative research
H – Increased collaboration between institutions
I – Greater exposure to quantitative research methods throughout undergraduate courses

Table 9. Percentage of respondents within each discipline providing support for each of nine suggestions for improving quantitative research capacity in Wales, and rank importance by discipline (in brackets).

HEI	**Percentage of respondents who agreed with measure**								
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
Human Geography & related	56(=1)	47(4)	38(6)	44(5)	35(7)	50(3)	56(=1)	21(9)	29(8)
Economics & related	43(5)	48(=3)	22(9)	37(=6)	48(=3)	52(2)	74(1)	26(8)	37(=6)
Education	32(8)	64(=1)	48(6)	64(=1)	28(9)	56(4)	64(=1)	52(5)	40(7)
Psychology	32(=8)	67(2)	51(5)	65(3)	40(7)	68(1)	47(6)	32(=8)	53(4)
Management & Business Studies	38(=8)	69(1)	47(6)	58(=4)	40(7)	58(=4)	64(=2)	38(=8)	64(=2)
Political Science & International Studies	36(7)	71(1)	50(=5)	57(=3)	50(=5)	64(2)	57(=3)	21(9)	29(8)
Social Policy & Social Work	35(=7)	65(1)	47(=3)	47(=3)	47(=3)	35(=7)	47(=3)	35(=7)	59(2)
Socio-legal Studies	46(=5)	88(1)	54(4)	38(=8)	46(=5)	58(3)	63(2)	38(=8)	46(=5)
Sociology & Social	42(6)	76(=1)	49(=3)	49(=3)	27(=8)	27(=8)	46(5)	33(7)	76(=1)

Anthropology									
Science & Technology Studies, Statistics, IT	58(=3)	71(1)	42(9)	58(=3)	46(8)	54(6)	58(=3)	50(7)	63(2)
Biological & Medical Studies	34(=8)	74(1)	56(5)	62(=2)	34(=8)	62(=2)	50(=6)	50(=6)	58(4)

3.6. Quantitative methods – use, consumption, teaching and learning needs.

3.6.1. The percentage of all participants who report i) using and publishing with, ability to consume, iii) currently teaching or iv) perceiving a learning need for a range of quantitative research designs, large scale surveys, analysis software and analysis methods are presented below in Table 19. In general, simpler methods are more commonly used, with more specialised methods used increasingly infrequently. For almost all methods, a greater percentage of participants report the ability to consume the method than actually use it, with the exception of descriptive statistics, for which markedly more participants report use than the ability to consume, implying that many researchers use such statistics without understanding them. Trends for teaching are similar to trends for usage, with more basic methods more widely taught than advanced methods. The reverse pattern is apparent in relation to training needs, with a higher percentage of respondents reporting learning needs for more advanced methods, although this trend is less clear than the trend for usage.

3.6.2. The figures presented in brackets represent the percentage of *advanced* QMUs using, able to consume, teaching or perceiving a learning need for the same quantitative methods. Whilst similar patterns are observed in relation to usage, with basic methods (e.g., descriptive statistics) widely used and advanced methods (e.g., multi-level modelling) less so, a greater percentage of advanced QMUs report using almost all methods than the sample as a whole. However, differences for ability to consume the method are less clear. In many instances, percentages of advanced QMUs reporting ability to consume were comparable, or only marginally higher than the sample as a whole. For a greater number of instances than in the whole sample, the percentage of participants using and publishing with the method exceed the percentage who report ability to consume (i.e., simple random sampling, one-off surveys, SPSS, stata, descriptive statistics, correlation/regression/tests of means & frequency, PCA/factor analysis, time series analysis). These are mostly fairly basic quantitative methods, and figures imply that basic methods are regularly used by *advanced* QMUs who do not report confidence in being able to consume them. For more advanced methods, ability to consume almost always exceeded usage. Slightly more teaching of quantitative methods was generally reported for *advanced* QMUs than for the sample as a whole, although perceived national learning needs were comparable.

Table 10. Percentage of total participants (and percentage of advanced QMUs in brackets) who report i) using and publishing with, ability to consume, iii) currently teaching or iv) perceiving a learning need for a range of quantitative research designs, large scale surveys, analysis software and analysis methods.

	Percentage who have used and published with each method	Percentage who are able to consume the method.	Percentage who currently teach the method	Percentage who identify the method as an area of learning need
Research designs				
Systematic Reviewing	19(28)	44(40)	10(6)	25(30)
Experimental Design	26(50)	48(51)	18(23)	21(17)
Longitudinal Survey Design	17(42)	51(55)	9(14)	26(28)
Simple Random Sampling	33(56)	50(47)	16(15)	14(14)
Multi-staged cluster sampling	6(13)	35(40)	8(6)	31(27)
Large scale surveys				
One-off	38(54)	51(45)	16(15)	12(11)
Repeated	17(34)	53(54)	10(11)	14(19)
Email/internet	8(15)	53(52)	7(4)	24(22)
Large scale 2° datasets	18(37)	44(40)	9(12)	28(28)
Software				
SPSS	55(83)	53(50)	22(30)	22(21)
Stata	11(33)	13(23)	2(7)	34(33)
R	2(7)	6(13)	0	30(30)
MLwiN	2(6)	8(17)	1(1)	29(28)
SAS	3(11)	11(20)	1(0)	29(28)
Amos	2(7)	7(14)	1(1)	26(23)
LISREL	4(9)	9(20)	1(2)	30(34)
GIS	5(9)	10(19)	1(2)	31(30)
Scientific visualisation	2(2)	7(12)	1(1)	28(26)
Analysis methods				
Descriptive	65(92)	51(38)	28(34)	15(13)
Correlation / regression / tests of means & frequencies	45(98)	45(50)	18(33)	20(16)
PCA / Factor analysis	23(63)	35(45)	7(9)	26(14)
Multidimensional scaling	2(8)	16(29)	2(6)	33(21)
Classification / cluster	8(26)	29(42)	3(6)	31(23)
Multilevel modelling	8(23)	20(34)	2(1)	36(33)
Log-linear, non-linear, generalised linear modelling	11(55)	21(56)	2(9)	34(38)
Time series analysis	10(32)	24(30)	3(4)	31(27)
Spatial modelling	5(2)	11(16)	1(0)	31(26)

3.7. Variation by discipline

3.7.1. The above data indicate substantial differences between those groups of 'high QM' and 'low QM' disciplines. These groupings were developed and used in the quantitative analyses to highlight the fact that there clearly were differences between disciplines, and are thus useful to highlight that caution should be exercised in generalising findings and potential solutions across disciplines. However, by the same token, the groupings may serve to hide some important differences between disciplines within the 'high' and 'low' groupings. There was not sufficient sample size in each discipline to allow a meaningful analysis of each individual discipline, but brief outlines of case study disciplines were produced by project team members for their home discipline in light of the survey data. As well as revealing in greater depth the situation of individual disciplines this also demonstrates the differences found across disciplines and allows these to be highlighted. The case study disciplines are: economics, management and business studies, psychology, geography and related areas, socio-legal studies and education.

3.7.2. ***Economics***:

3.7.2.1. Economics clearly has a distinctive approach to quantitative analysis. Those researching in this area are the major deployers of quantitative analysis in their research, publications, funding applications and teaching, are highly likely to use the more mathematical concepts of probability and set theory in their work, are high users of the STATA package (with its associated advanced estimation methods), are high users of regression analysis and inequality measures, and are much more likely than most other social scientists both to use longitudinal data and undertake secondary analysis. This is, of course, congruent with the positivistic model of economic research that has come to dominate the discipline. It is notable that few economists have engaged with the newer sources of data emanating from email surveys and the internet. There is an air of a very traditional stance on quantitative methods, one that is heavily influenced by the scientific method, and that puts heavy emphasis on rigour rather than relevance.

3.7.2.1. Economists are highly engaged in postgraduate research and teach substantially in the quantitative area. However, it is notable that the group of economists responding to survey are, on average, older and more likely to be male than for the other social scientists. There is also a high proportion of respondents that hold chairs, possibly suggesting that the subject-area is not recruiting at the junior level as much as it might. This might pose problems for the future. The dominant view of the economics respondents is that the best way to encourage more quantitative research in the social sciences in Wales is via appropriate incentives, again congruent with their basic theoretical stance.

3.7.3. ***Management and Business Studies***:

3.7.3.1. Whereas the responses of those in the economics area are highly distinctive and narrowly-focused vis a vis their approach to quantitative methods, those in Management and Business Studies (MBS) are much less distinctive and are very broad in orientation. On most of the key measures, MBS tends to be on the average. This almost certainly reflects the heterogeneity of the field of study, drawing as it does on a range of analytical disciplines and related fields of study for its concepts and methods of analysis, from the more quantitatively inclined (but distinctively different) economics and psychology, to the much less quantitative

sociology and philosophy, and distinctive, but quantitatively very different, fields such as law, engineering. Thus, for example, accounting and finance draws heavily on economics, marketing on psychology, human resource management on sociology, operations management on mechanical engineering.

3.7.3.1. One area in which the use of quantitative methods in MBS is shown to be distinctive is in the use of the newer forms of data-collection – email questionnaire and the internet. This mainly reflects the close connection between MBS research and practitioner and policy concerns and the consequent need for current data – the elevation of relevance over rigour. MBS respondents also suggested that they used regression analysis more than the average social scientist, and that they were above average in the use of classifying techniques such as factor and cluster analysis. The dominant view among MBS respondents was that quantitative analysis can best be progressed in their area in Wales by more attention to the undergraduate curriculum.

3.7.4. *Psychology*:

3.7.4.1. When examined in the context of the other disciplines, the responses in psychology revealed good balance in age, gender, seniority, research/teaching emphasis, and use of quantitative and mixed methods. However, although classified as a 'high QR' discipline, the survey findings indicate a number of areas of concern, which were consistent with issues raised in interviews. Nearly half of the respondents were *not* supervising postgraduate students in a quantitative domain, the area where most psychologists first encounter difficulties in applying quantitative methods (i.e., they notice that graduates cannot use the methods). If respondents are not supervising in this area, they are less likely to know of the range of methods available and of students' competence with these methods. This problem makes it likely that the results underestimate the postgraduate training needs in psychology.

3.7.4.2. Most of the reported usage of methods and software was appropriate to experimental designs. However more than half of the respondents could not "consume" systematic reviewing, longitudinal methods, quasi-experimental designs, *all* sampling methods (including random), and *all* methods of data collection. This suggests that many psychologists in Wales do not feel competent in their knowledge of these aspects of research. If this conclusion is correct, then it (combined with the aforementioned potential for underestimation), reveals a large problem. Over the last 20 years, the field has changed in a manner that really requires that people at least *understand* the diverse methods. There are increasing moves toward integrative studies, using diverse approaches, and it is no longer sufficient to merely understand one method, no matter how good the method is. One interviewee indicated that most of the psychology users he has met in Wales have little understanding of the *meaning* of various tests, even though they use them.

3.7.4.3. To some extent, the respondents appear to recognize a deficit. They noted a need for training in all forms of modelling, especially for training in multi-level modelling and structural equation modelling. Again, given the lack of postgraduate supervisors of quantitative research, this need may be underestimated in the current sample. Responses also revealed that lack of training and time are barriers to the use of advanced methods. They also indicated a need for more researchers with this expertise. Provision for training in Wales and the UK lags far behind our

North American counterparts, who receive extensive undergraduate and postgraduate training in quantitative methods. If the difference continues at the current rate, psychologists conducting research in Wales will eventually be marginalized at the edge of the discipline.

3.7.5. *Human Geography and related areas*:

3.7.5.1. On the surface, human geographers appear to be reasonable users of quantitative methods with just over a third having published using quantitative methods and just over half having received some form of quantitative research funding within the past year. However, further analysis showed that only two fifths of geographers used quantitative methods often or all the time in their research and only half of these were defined as research active. In addition, just under a third teach quantitative methods. The majority of geographers were non-quantitative researchers or teachers. Moreover, of the third that had published using quantitative methods in the past year, only 15% had ever systematically reviewed quantitative methods literature in their use and publication of research. This suggests that over half the quantitative research publications were either collaborative with someone other than the respondent undertaking the quantitative element or half of the respondents publishing quantitative research are not engaging with the quantitative methods literature. Either way, this has very important implications for quantitative methods research and capacity building in geography. The age distribution of respondents was normally distributed and this was reflected in the positions of respondents with over half in lecturer or senior lecturer positions and a quarter in reader or professorial positions.

3.7.5.2. Overwhelmingly SPSS is the package of choice for statistical analysis with 40% of respondents having used and published with it, and 60% being able to consume it. Very few respondents use, consume or teach the other statistics packages. Very few geographers can use or consume methods beyond simple statistics, correlation or regression when it comes to data analysis skills. In terms of capacity building, geographers' rank school training as very high, undergraduate and postgraduate training about average and continued professional development as very low. Again, these findings support the idea that the geographers that are using quantitative methods are only using those skills learnt as part of their research training but are not necessarily going beyond this in their academic careers. Across disciplines, geographers have the second strongest support for data availability for encouraging quantitative research capacity but some of the weakest support for the other suggestions, particularly undergraduate teaching and increased collaboration.

3.7.6. *Socio-Legal Studies (SLS)*:

3.7.6.1. SLS can draw upon on a range of methodological traditions including both qualitative and quantitative; however, it would be fair to say that research outside the UK is more methodologically diverse. The qualitative/quantitative divide is particularly stark in British criminology, and this is seen as unsatisfactory and the topic of much debate. Relative to other disciplines, which were more heavily dominated by male respondents, there was a fairly even gender split as well as a fairly even age distribution compared to some other disciplines that have older age profiles. These findings reflect the fact that SLS is a relatively young 'discipline' that has experienced enormous growth in recent decades.

3.7.6.2. In line with most other social science disciplines, most SLS respondents could be classified as a non-quantitative researcher or teacher. In the past year, nearly half

had published quantitative research but only 18% had received funding for quantitative research. Nearly half had received funding for mixed methods research in the past year. This is consistent with a renewed emphasis on combining qualitative and quantitative approaches to effectively produce policy-relevant empirical research on topics in criminology and criminal justice. Thus, many would take the view that there are few (if any) areas of SLS research that would benefit from taking a purely quantitative approach absent of any qualitative data.

3.7.6.3. In terms of skills for quantitative data analysis, the most frequent skill 'used and published with' by respondents was describing quantitative data (46%) with only a quarter reporting being able to use and publish with multivariate regression. More training was desired by respondents in regression and comparing means, comparing frequencies, classification and cluster analysis. To build and encourage quantitative methods capacity in Wales, respondents were most likely to choose further investment in quantitative research methods at the postgraduate level and were the highest percentage of across all disciplines to suggest increased opportunities for research methods training.

3.7.7. *Education:*

3.7.7.1. Education has the oldest demographic profile of all subjects in this analysis. Nearly two-thirds of respondents are over 50 years old. This is certainly in keeping with recent demographic analyses by the ESRC and the TLRP. With social policy and social work it has the smallest proportion of respondents under 36 years of age of all the social science subjects. Of all the respondents to the survey, those in education were most likely to have received their postgraduate training in Wales. This may reflect lower levels of labour market mobility amongst education academics in Wales.

3.7.7.2. This analysis of responses by education academics highlights the considerable lack of quantitative research capacity in education. Education was amongst the lowest proportion of respondents who had used or published in a wide variety of methods, including: descriptive statistics, correlation, regression, the use of software for analysis, and in survey research tools. Just under a quarter of education respondents reported having received funding for quantitative research. Education respondents were consistently more likely to indicate a need for further training across most methods, particularly highlighted in methods with limited numbers of respondents using those methods overall which could indicate a greater willingness to develop or learn new methods or limited ability to be able to select most appropriate methods for further training (reflecting a methodological naivety).

3.7.7.3. More than half of the education respondents were involved in teaching as the dominant activity; this was greater than any other subject. This also reflected the greater proportion of education respondents who were categorised as non-quantitative teachers or researchers. This would suggest that education staff were nearly twice as likely as all social science staff to be 'non-quantitative academics'. Of those that did use quantitative research they were almost equally split between research active and teaching active suggesting that those using quantitative research methods in their work are under-represented in research activity rather than in teaching activities. Indeed, over a quarter of education respondents indicated that they teach quantitative research methods, although fewer were involved in teaching quantitative research methods on undergraduate courses, but this may reflect the lack of relevant undergraduate courses in the subject. There is

considerable breadth of coverage in teaching of quantitative research methods, a greater proportion of education respondents were active in teaching more of the methods listed than any other subject's respondents. However, although there was evidence of teaching in these methods respondents also reported not having used these methods and gave considerable indication that further training was still required. Comparatively in line with other social science areas, 'more time was needed to develop quantitative research skills' was seen as the most important barrier to social science quantitative research in Wales.

4. Results of Interviews and Qualitative Questionnaires

Data from the interviews and qualitative questionnaires are presented in the three broad thematic areas covered by the questionnaires: the perceived current situation of quantitative methods in Wales, current needs, and means by which these needs can be addressed.

4.1. Current Position of Quantitative Methods in Wales

4.1.1. Interviewees and respondents suggested that quantitative methods in social science can be seen as "*generally weak"*, not only in Wales but across the UK. For some interviewed this was part of a wider problem of a lack of numeracy in the labour market, others cited problems of the barriers between qualitative and quantitative researchers as many are resistant to working with other methods. It was observed that "*number crunchers*" are increasingly being brought in from North America to make up for a lack of indigenous capacity generation.

4.1.2. In Wales in particular it was perceived that there was a general dearth of research skills and that research council funding is relatively low in Wales. It was also suggested that there are no strong links between maths and statistics departments and social sciences departments which may contribute to the problem in Wales. Importantly however, there were seen to be pockets of expertise located within Wales. Those identified were mainly in the 'research-excellent' (RAE 2001) departments which are heavily concentrated in Cardiff University, but included pockets of quantitative expertise in lower ranked units of assessment, such as social policy and economics in Swansea. Overall, quantitative provision in Wales was viewed both within universities and public-sector bodies as being *"patchy"* or good in parts.

4.1.3. Differences across disciplines were seen by many interviewees/respondents with some subjects identified as strong quantitative social science subjects. Economics, business studies and psychology were perceived as quantitatively "strong". The reason for this was seen to be more due to the nature of the subjects generally than the Welsh context, it was suggested that in these areas there is a longer period of formal quantitative training as well as a tradition of the use of quantitative methods. Many of the difficulties outlined below do not apply to this "strong" group.

4.1.4. It was very clear that there are some disciplines in which there is a deficit. Sociology, geography, planning, nursing, criminology, education, politics, social policy, sport science, cultural studies were all suggested as being in this group. There were many possible explanations for this such as a tendency for people who are less numerate to go into disciplines that require less numeracy, a bias towards qualitative methods in these subjects (which is reflected in undergraduate provision of quantitative methods training and underexposure to quantitative research) and an active resentment to using quantitative methods in some fields. In nursing and other non-medical specialities it was suggested that there is awareness and a large demand for quantitative research skills but this is greater than that being provided. It was also noted that in these disciplines there may be problems with ageing staff profiles; those with quantitative expertise are often in the older age group and not amongst younger researchers.

4.1.5. The current position of teaching in quantitative methods in Wales was seen as basic with very little advanced teaching occurring. It was suggested that current teaching

is often done on a "*need to know*" basis, the teaching is for a specific purpose. Some interviewees / respondents felt that one of the problems was that teaching is being undertaken in areas where quantitative research is non-existent therefore making it difficult to teach well. It was argued that teachers need to be practising their methods and need current, relevant examples to enable good quality teaching. Others suggested that even where capacity does exist, quantitative methods are not necessarily being taught well (again exceptions given were economics and psychology where quantitative methods are compulsory and enforced in both undergraduate and postgraduate curricula).

4.1.6. Issues in teaching quantitative methods were viewed as being a problem with both staff and students. It was observed that there were fewer new staff with quantitative skills coming into the system than there had been previously. If supervisors did not have quantitative skills they were perceived to be unenthusiastic about their students using them. Even if the staff did have such skills it was suggested that they were less inclined to use them partly due to students being unenthusiastic and partly due to a culture of social science not using such methods. Student ability was perceived as a great problem, students were seen as less numerate and less willing to become numerate than previously (few students now have more than GCSE maths). It was suggested that if students were interested in numerical skills they would have gone into areas with a more mathematical edge. Where students do have skills, these can differ widely and it can be difficult finding a happy medium in teaching. There is not always the time to extend basic understanding for more in depth work such as dissertations. Student funding (relatively few quantitatively-based funded PhDs and post-docs in Wales) and student expectations (quantitative methods are not seen as necessary for a career for many students who are career orientated rather than research orientated) were both seen as further contributing to the problem.

4.1.7. Another point that was raised in the teaching of quantitative methods was whether students were being taught to be "*research users*" or "*research producers*", a clear distinction can be made between these groups and this will reflect on how methods are taught and later used by students.

4.1.8. The current situation of quantitative methods in research was also considered. It was acknowledged that publications could be misleading as often these do not reflect the actual skills of the researcher. It was felt that many researchers cannot use or interpret quantitative data and may use specialists to undertake this element of the work if it is needed. Interviewees/respondents found that in general it is easier to recruit research assistants with knowledge of qualitative methods rather than quantitative methods. In some disciplines (such as language and communication and nursing) there was recognition that there is a need for quantitative methods but researchers do not have the knowledge and/or confidence to undertake this.

4.1.9. Collaboration and Networks were seen as important as there is not enough shared knowledge of quantitative methods, much current knowledge is individualistic. However current networks are not often used much, not a great deal of interest is shown in these and all-Wales research events do not appear to attract much interest. It was acknowledged that it can be difficult to gather everyone together as there is too much to do already and that communication links can skew then distribution of social science. Not only was it considered important to collaborate

within Wales but that collaboration with the best people in the field is also necessary. Greater linking with non-academic institutions was also seen as important.

4.1.10. The views of representatives from the Welsh Assembly Government and the Office of National Statistics were seen as important as commissioners and users of research. These individuals felt that there was a dearth of quantitative ability outside academia, although this was not only restricted to Wales. It was felt that quantitative capacity in Wales does not present itself well to employers, it was considered as "*bitty*" and "*fragmented*" and individuals ended up linking up with those known to them as they were not aware of what else was available. There was recognition of need to strategise Wales' capacity in data, personnel and networks since it has become increasingly apparent that post-devolution powers and responsibilities are not matched by the Welsh Assembly Government capacity or systems for engaging with HEIs. This can be seen specifically in social survey data, data integration and policy evaluation. In terms of commissioning research there was a perceived lack of quantitative expertise in Welsh HEIs and a disadvantage seen to using English-based researchers who operate in a different policy scene.

4.1.11. The Welsh Assembly Government is never fully staffed for statisticians and most recruitment to both the Welsh Assembly Government and the Office of National Statistics comes from maths or statistics departments, it was suggested that it has never occurred for them to look within social science departments. The majority of the Office of National Statistics recruits do not need advanced quantitative skills and currently there is no difficulty in recruiting staff who are sufficiently numerate, albeit with limited advanced quantitative skills. However recruitment is likely to be a problematic issue when the Office of National Statistics develops further in Newport, this will be a volume issue rather than a skills issue. It was noted too that there will always be limitations in terms of capacity as Wales is a small country.

4.1.12. Overall there was seen to be a "s*ubstantial problem*" in some social science disciplines in some areas of Wales. It was suggested that an incremental change would not be enough to overcome this and a "*complete culture shift*" is needed. This was clearly demonstrated when benchmarked against international comparators, notably North America. High-level skills in quantitative methods are needed for research of an international standard otherwise social science in Wales will be "*doomed to parochial journals*".

4.2. Perceived Needs in Quantitative Capacity Building in Wales

4.2.1. There were many suggestions as to existing quantitative needs in teaching relating to staff and how quantitative methods are taught. It was felt that a greater number of staff with existing quantitative knowledge should be recruited to teach. Training needs to be given to existing staff as well as new staff and as there are currently no local courses (a constraint as time has to be taken up by travel) there is a need for flexible provision to build capacity at middle and senior levels. It was suggested that there needs to be a systematic re-structuring of how research methods are taught with consideration given to new delivery modes. It was seen as necessary for teaching to be relevant to students with the acknowledgement that different students have different end points and therefore different needs. However students should be taught to more question-led rather than method-led. There needs to be shared expectations of the minimum standards and competences that social

science graduates should have. A greater number of funded PhDs in quantitative methods in Wales was also seen to be needed.

4.2.2. In terms of research, there was seen to be a need for increased funding for quantitative methods and for access to appropriate software in universities. It was also suggested that there needs to be greater motivation for undertaking quantitative research, if it is easy to progress within social science without such skills then there is little motivation to develop them. An established career structure for quantitative social scientists as working in Wales was also seen as needed, and it was perceived that currently some of those who want to get ahead move out of Wales as opportunities for career development are limited in Wales.

4.2.3. Training needs were seen as important and these should be accessible in a way that fits in with living and learning requirements. Training should be based nearby or easy to get to and relevant to trainees. Summer schools, workshops, secondments and placements were all suggested as methods through which training could occur. It was felt to be necessary that teachers/researchers kept up with new and developing methodology.

4.2.4. A means of keeping up with skills (current and new) was seen to be being part of a network (if these skills are not being used then they will "*wither*"). It is easy for individuals to be isolated so being part of a wider network helps keep the community together. Networks are also needed so that who is doing what where can be identified so that the same work isn't being duplicated and it is possible to find other individuals from whom advice can be sought. It was also suggested that networks are needed to address barriers between disciplines more centrally and to allow greater collaboration across Wales.

4.2.5. Another area of need was seen to be in datasets. It was felt that there is a need to build-up more datasets from social science research but also that little work is currently being undertaken in Wales using existing data sets, firstly those already existing need to be fully exploited. Data sets can be difficult to obtain from public bodies and therefore there need to be mechanisms which make data more accessible.

4.2.6. Needs outside HEIs were also noted. It was felt that the public sector needs to develop more sophistication in understanding quantitative (and qualitative) research methods, and that advanced skills training is a problem. More effective links with universities need to be built, and with a wide range of departments, a key problem being that such academic links are supported in theory but not always in practice. Both the Welsh Assembly Government and the Office of National Statistics suggested that they need employees with "*soft skills*" (such as an ability to write reports, recognise the policy relevance of the technical work and present analyses in an accessible way, work in a multidisciplinary team) as well as "*hard skills*" which statistics/maths graduates don't always have. Universities need to prepare graduate for using quantitative skills in the workplace and therefore development of both hard and soft skills needs to be encouraged. The Office of National Statistics have found that courses with a practical element such as project work or sandwich years have been useful in producing good quality candidates.

4.2.7. A frequently mentioned concern was the risk that a focus on promoting quantitative methods would reinforce methodological and disciplinary barriers, whereas a critical

challenge for social science research is to increase the ability to undertake and engage with multidisciplinary and multi-method research. It was seen as important that social science students and researchers should be able to read/consume research that uses a variety of methods, and that research should be more problem orientated rather than driven by research paradigm or methodological hegemony. Instead of promoting quantitative methods on its own, the key requirement is to promote the importance of identifying important research questions, and then having individuals or teams who have the breadth and depth of skills to identify and utilise the appropriate methods (qualitative or quantitative) to address the research question.

4.3. Possible Means of Addressing Needs in Quantitative Methods Capacity Building

4.3.1. Suggestions of ways to address teaching needs included making teaching relevant and interesting, using real examples, and taught by those who use and conduct quantitative research. Existing expertise should be drawn on without over-burdening people. It was suggested that quantitative methods courses should be available to undergraduates, postgraduates and staff. Exposure of undergraduates to examples of quantitative social science research should be increased and basic quantitative skills should be taught compulsorily. It was suggested that in this core teaching students must pass to progress in their studies although quantitative methods should be on an opt-in basis beyond this. Others felt that quantitative methods should be incentivised to students as important, useful and valuable skills. Some interviewees felt that more students from disciplines such as maths and statistics should be encouraged to undertake postgraduate courses in social science.

4.3.2. Research needs could be addressed through a critical mass with sustainable expertise and capacity. National (Wales) or local quantitative methods research support to assist with grant writing could be included. This need not necessarily be in one place and small centres of excellence could be built on. More Wales-based social research should be conducted and it was felt that there should be collaboration across disciplines that are quantitatively strong and those that are not. The breaking down of the quantitative /qualitative divide should be encouraged so that research becomes question-focused instead of method-led.

4.3.3. In terms of researchers, there should be a building-up of research and research career infrastructure with the encouragement of continued professional development throughout the researcher's career, possibility of career sabbaticals being taken to focus on developing skills. Undertaking quantitative research should be further incentivised through increased funding and demonstrable evidence of quantitative analysis ability as part of the recruitment and promotion practice.

4.3.4. Means of addressing training needs included employing quantitative researchers with part of their job being to organise the training of postgraduates and staff. Training itself should be accessible and could be Wales based, include weekend courses, evening courses, workshops, and a summer school. Online resources should also be set-up. The training should be relevant to those attending and funding should be increased for attending or the courses made as cheap as possible. Quantitative methods trainers need to be trained themselves in how to teach quantitative skills. Training may benefit from interdisciplinary involvement and partnerships with public sector.

4.3.5. In terms of networks, again the pulling together of a critical mass was seen as important and that networks should include those from different disciplines and institutions and those outside academia. A centre or institute should be used for a base and a resource, useful too in organising training. A hub and spoke network was suggested as a solution where the hub has existing expertise. A virtual network with perhaps small team running this was also suggested. Undertaking more collaborative research was also suggested as a mean of bringing researchers together.

4.3.6. Existing datasets should be linked and there should be a repository of quantitative datasets to address needs in this area. Despite a divide in those wanting new datasets and those who prefer to make greater use of those already existing many suggested that it was important that datasets are easy to access. It was suggested that joint ESRC-Office for National Statistics studentships could be set up to look at existing Office for National Statistics data.

4.3.7. Two main methods of addressing needs outside academia emerged. These were creating more links between academia and other sectors through the following: independent advisory panels, shared events, being part of the same network and through collaboration through training with academic institutions.

4.3.8. The interviews and responses to the qualitative questionnaires were effective in illustrating a picture of the current state of quantitative methods in Wales, needs to be addressed and how these could be done. Both sets of responses did lead to further questions that need to be addressed; how can networks be set-up and maintained across Wales that will work and be used? Should investment be focused on increasing areas of expertise or where deficits are (can weaker areas be built on)? How can conducting Wales-based research and working with Welsh public sector organisations be managed with competing demands on being internationally recognised within academia? These were among many of the questions considered in the one-day roundtable discussion workshop.

5. Results of Workshop

5.1. Workshop Discussion

5.1.1. The workshop provoked many areas of discussion. Much of this was stimulated by the presentations of the initial results of the study. Areas of discussion included:

- Differences across disciplines. Vast differences already exist between quantitative methods capacity across disciplines; therefore, some initiatives may be more relevant to some areas than others.
- How "advanced" are "advanced skills" in quantitative methodology? Again this may differ across disciplines; for example, what is considered an advanced method in sociology may not be in economics.
- Problems with numeracy in students, as many lack basic skills and are not interested in maths-based work.
- The impact of the wider education system on university quantitative methods training must be acknowledged. If students have given up maths at 16 how can they re-engage with numerical work at university? Consideration should be given as to how mathematics and statistics can be encouraged in school.
- The profile of social science can be raised further in social science institutions and more widely across Wales.
- There is room for further collaboration between ESRC and WAG; for example, encouraging WAG to allow access to datasets it currently holds.
- While the scoping study set out to consider the particular position of quantitative methods, qualitative methods capacity building should not be forgotten. The focus in Wales should be on developing an internationally excellent standard of social science research that utilizes a diverse and sophisticated range of research methods. Researchers should be encouraged to be question-led rather than method-led.

5.1.2. In order to focus down on ways of addressing the issues and producing recommendations, further discussion was stimulated and directed through groups considering the following topics:

1. Potential collaborative initiatives across institutions in Wales to address quantitative capacity building needs
2. Increasing research funding competitiveness across Wales
3. Undergraduate quantitative methods training
4. Postgraduate quantitative methods training
5. Postdoctoral training, continued professional development and career pathways

5.1.3. The issues that arose from these discussions have been outlined below. The areas of discussion between groups 3 and 4 (undergraduate training and postgraduate training respectively) covered similar issues and have therefore been combined:

5.2. Potential collaborative initiatives across Welsh institutions to address quantitative capacity building needs:

5.2.1. Collaboration across Wales was seen as important so that "who is working on what area and where" becomes visible, thus reducing the likelihood that similar work is unnecessarily duplicated. It is also helpful in locating individuals to approach for advice. Methods of collaboration, such as grid nodes, were seen as useful and their use should be encouraged within institutions.

5.2.2. It was made clear by participants that collaboration cannot be forced; however, it was suggested that there are others way in which collaborative networks may be developed. Collaboration over light touch areas such as training or themes can enable people to be brought together from which other work may grow.

5.2.3. However, it was seen as important that any future initiatives in Wales should not put international research competitiveness at risk. Collaboration with those outside of Wales should also be encouraged. It was suggested that a risk assessment is needed of all recommendations regarding how they will affect UK research funding and international excellence.

5.3. Increasing research funding competitiveness across Wales:

5.3.1. Developing a critical mass of quantitative researchers was seen as essential for Wales to increase its competitiveness for research funding. This could be promoted in a distributed, collaborative way, nurturing and maintaining pockets of excellence to build upon. Collaborative bids were seen as important and should be encouraged not only within Wales but between Welsh and UK institutions.

5.3.2. In general, it was considered important to persuade academics to apply for research council funding in Wales. It was suggested that few large bids were applied for and that to work on larger grants, larger teams were needed. Building networks on a theme, or investing in thematic research networks (such as those supported by the Wales Office of R&D in Health and Social Care) may better facilitate this. In addition, national infrastructure such as the methodological support provided by the Clinical Research Collaboration Cymru, can provide capacity that all institutions and disciplines can use to develop bids. It was felt that a centre with a bank of research methods skills and advice and a databank with links to Welsh datasets would provide a useful resource for grant proposal development. Quantitative methods staff could also be attached to this to provide advice and support in relation to methods in existing projects and new bids and to deliver quantitative methods teaching and on-going professional development.

5.3.3. It was further suggested that the Welsh Assembly Government should be encouraged to fund secondary analysis of existing datasets. A greater number of PhD studentships should also be funded on policy relevant research which also has wider generalisability

5.3.4. Problems of recruiting and retaining staff (particularly early career staff) were also identified and it was suggested that this could be tackled by building on Welsh capacity. This can include identifying exceptional students and encouraging them to continue their studies. These individuals are more likely to be retained in Wales.

5.4. Undergraduate Quantitative Methods Training and 4. Postgraduate Quantitative Methods Training:

5.4.1. Workshop attendees felt that quantitative teaching needs to be embedded in the undergraduate curriculum. Basic quantitative methods training should be provided at undergraduate level so that students are taught to “consume” quantitative methods. This could be done by compulsory statistics courses and consideration should be given to streaming these classes. The scope of research methods training could be broadened to give greater recognition of the value of quantitative methods. The organisation UK Grad could also become involved by developing effective quantitative teaching classes, building on best practice in this area. A

network of those with responsibility for undergraduate quantitative methods teaching could be created, with an annual meeting, based on a model provided by the annual meetings of those responsible for teaching statistics to undergraduate medical students.

5.4.2. At postgraduate level, it was suggested that training should be provided at three levels, “user”, “basic producer” and “advanced producer”. All postgraduate students (MSc and PhD) should have “user” training and those undertaking quantitative research in their thesis should attend more advance training.

5.4.3. It was felt that methods “clinics” should be set-up to give advice where needed. This need not be limited to postgraduates and could include researchers. These should be provided at institutional level but could be combined with a website/national centre whose staff could try to locate individuals locally. In addition, it was suggested that e-learning resources should be set up to teach quantitative methods through multiple substantive examples and allowing for adaptation to individual needs. There should also be an accessible resource of policy-relevant material that can be used by individual institutions.

5.4.4. Some consideration should be given to a postgraduate research training MSc in the form of a national modularised mixed methods/quantitative programme. This would expose students to a diversity of methods and encourage them to become question-led rather than method-led. Alternatively current MSc provision should be expanded. Further incentives for postgraduate quantitative methods students should be considered.

5.5. Postdoctoral training, continued professional development and career pathways:

5.5.1. It was suggested that training and re-skilling in quantitative methods be built into a continued professional development framework with funds available to gain the necessary training. Staff should prove that they are developing methods skills in their chosen area of research for progression purposes. To encourage staff training and stress its importance, provision in research grants to allow for staff training was suggested. This could also be incorporated into grant proposals from government funding bodies which should contain scope for capacity building in research staff.

5.5.2. The geography of Wales was seen as a potential barrier in attending training courses so virtual research resources were suggested as helpful in allowing access to training. Those involved in training individuals in quantitative methods should be well trained themselves and continued professional development is needed for these staff. It was felt that Welsh researchers should be sent to the best training institutes including those outside of the UK to address this and that it would be helpful to have funding mechanisms to provide for this. Consideration should also be given to providing funding for career sabbaticals to boost research methods knowledge. Some funding should be provided for training the trainers of quantitative methods in each institution who can then run the courses locally.

5.5.3. Again collaboration and discussion were viewed as useful in quantitative training. It was seen as important too to build on quantitative capacity outside academia so that there is a greater understanding of different methods available and in what contexts they can be used. This group should be showcased examples of policy and inquiry from the UK and beyond. It was also suggested that means should be

provided by which Welsh social scientists can identify other Welsh social scientists that require similar training. Mechanisms should be set-up so that this training can be provided in Wales. To encourage collaboration and discussion an annual all-Wales conference could be put on. Researchers (including young researchers) would be able to put on posters and short papers of their research. Outputs from the conference could include a journal (or e-journal) or a book.

5.5.4. It was also noted that the problem of sending postdoctoral researchers on expensive training courses then losing them some months later makes it necessary to have mechanisms to retain researchers for capacity building to be a success.

5.6. Other Points

5.6.1. As well as discussion on the areas above which largely related to provision of quantitative methods capacity, in was noted that the scoping study methodology did not consider the demand for quantitative methods capacity. This was seen as a limitation of the study and it was suggested that further research on this area should be undertaken.

5.6.2. It was also felt that any initiatives that are produced should be monitored so that their effectiveness in building and developing quantitative methods capacity can be evaluated and improvements made where necessary.

5.6.3. Further recommendations were made by participants in their “999” sheets. These have been incorporated into the overall recommendations from the project.

6. Recommendations

This scoping study has considered the current situation of quantitative methods capacity in Wales and the needs that should be addressed. From the interviews and round table discussions, many suggestions have been made as to how to address quantitative methods capacity building in Wales. These have been pulled together into four principal findings and six key recommendations:

6.1. Principal findings that underlie recommendations

6.1.1. Policies and actions to increase quantitative methods research capacity in the social sciences in Wales and the UK should not focus exclusively on capacity and skills in *advanced* quantitative methods. This is merely the tip of the iceberg, being the most evident facet of a chronic deficit in awareness, knowledge and use of quantitative methods throughout the social sciences generally. Though there is evidence of strength in quantitative skills in some disciplines (§ 3.4.1.), there is a general need for action to improve the quantity and quality of undergraduate students' quantitative skills (§ 4.1.6.). The differences found between disciplines suggest that it is necessary to have different initiatives in different subjects as needs vary. In general, however, complementary initiatives are required to (i) improve the ability of all social scientists to consume quantitative research methods, (ii) for many more to become proficient in basic quantitative methods, and (iii) for a greater number to go on to develop and maintain high level advanced quantitative methods skills.

6.1.2. Related to the above was a consistent concern that overtly focussing purely on quantitative methods may be counter productive in that such efforts may provoke a negative response from those who associate themselves with more qualitative and/or theoretical approaches to social science (§ 4.2.7. and 4.3.2.). Better integrating efforts to increase quantitative methods research capacity within wider efforts to improve education, training and research in the social sciences may be more successful in engaging the wider social science research community with quantitative social science research methods, even if only as research consumers. It may also better facilitate an improved quality of social science research, with methods chosen appropriate to research questions, greater use of mixed methods, and greater ability to engage with multidisciplinary research teams, including disciplines outside social science.

6.1.3. For many problems and potential actions identified in the scoping study, it was unclear whether there was a 'Wales' solution, or whether it was more appropriate to concentrate in ensuring that social scientists in Wales have full access to and participate in wider UK initiatives (§ 5.3.1.). Common concerns were that there may not be the current capacity within Wales to support certain Wales-based actions (§ 4.1.11); that there is a tension between developing solutions based on geography (i.e. Wales) (§ 4.2.1. and 5.5.2.) rather than by discipline; that there are many institutional and disciplinary boundaries to bringing together multidisciplinary groups across Wales; and that effort spent on developing Wales-based solutions may reduce engagement with UK and international networks and activities (§ 5.2.3.). Another issue is the difficult geography of Wales (§ 4.2.1. and 5.5.2.), whereby HEIs in South Wales may have easier and stronger links with HEIs in South and South-West England than North Wales, and those in North Wales often more naturally linking with the West Midlands and North West England. Despite these

issues, and while certain solutions need to be discipline-based rather than regional or national, the problems in the social sciences within Wales need to be understood within the Welsh context (§ 4.1.10). Past history and current funding regimes make it necessary that there is a "Welsh" solution but with consideration given to the issues outlined above.

6.1.4. There was concern that quantitative social science was just one example of a perceived competitive disadvantage for academics based in HEIs in Wales due to (i) the emerging funding deficit for Welsh HEIs compared to their counterparts elsewhere in the UK (§ 1.1.3.) and (ii) the comparatively limited engagement of Welsh Assembly Government officials with the ESRC and other major research funders (§ 4.1.10).

6.2 Recommendations:

6.2.1. The creation of a Wales Centre with responsibility for social science research capacity development, with sustained funding from ESRC and/or HEFCW.
The delivery of many of the following recommendations requires an organisation to co-ordinate and deliver Wales-based and Wales-focussed solutions. It is therefore recommended that a Centre based in Wales should be funded, which should link in strongly with and not duplicate national initiatives in research methods and capacity development. Ideally, such a proposed Centre and many of the recommendations below will not entirely focus on quantitative methods, as it has emerged strongly from this study that the advancement of quantitative methods will be greatly facilitated by breaking down barriers between quantitative and qualitative methods. An important role of the proposed Centre will also be to break down barriers to collaboration across disciplines and between institutions.

6.2.2. Undergraduate Level

e. Undergraduate quantitative social science teaching in Wales should be supported, particularly for teaching in "low" disciplines (paragraphs 3.4.6. and 4.3.1.). Training courses and other continuing professional development activities are required in the teaching of quantitative methods. Courses should consider the current teaching of quantitative methods and look at developing a distinction between teaching for quantitative methods "users" and quantitative methods "producers" (§ 4.1.7.) and differences between the needs of "high QM" disciplines and "low QM" disciplines (see section 3.7.).

f. Improved access to and promotion of online and other resources to be used in undergraduate teaching, particularly up-to-date examples of high quality policy and theory-relevant quantitative research studies to be included in undergraduate courses with a substantive or theoretical focus (§ 4.3.1. and 5.4.3.). Again differences across disciplines should be taken into account so that the examples are relevant to the student's area of study.

g. Developing a network of teaching staff with responsibility for undergraduate quantitative methods should be considered, with discipline-specific sub-groups and an annual meeting (§ 5.4.1.).

h. These three recommendations, particularly a and c, could be co-ordinated by a Wales Centre such as recommended in 6.2.1.

6.2.3. Postgraduate Level

d. Greater provision and co-ordination of postgraduate quantitative social science training is required in Wales (§ 4.1.5.and 4.1.6.) In some disciplines there is a greater need for developing advanced quantitative methods training than in others, particularly students from "high QM" disciplines (see section 3.7.4.). An all-Wales MSc in quantitative research methods could be set up and be a compulsory or optional course for 1+3 students in Wales (§ 5.4.4.). However, it would be very difficult to configure a course that met the needs of specific disciplines, and issues of geography and the available number of students would also be major barriers. Dependent upon the outcome of the 1+3 review and other national initiatives by the ESRC, a preferred option is that a more flexible arrangement should be set up, in which there is a set of compulsory or restricted choice modules for all 1+3 students in Wales, run as a compulsory 'Autumn School' for new 1+3 students at the beginning of their 1+ year, followed by a wide range of optional courses that may be run by institutions within Wales, or elsewhere in the UK. The varying needs of individual disciplines will need to be observed (see section 3.4.), but opportunities for developing multidisciplinary understandings and collaboration, and appreciation of other (non-quantitative) research methods should be taken. The experience of the Cardiff Research and Graduate School in the Social Sciences (RGS) will be useful here, where because of the critical mass (currently 93 ESRC students), four different sets of quantitative modules are offered in its research methods Masters', in Economics, Psychology, Business/Management Studies and Social Sciences, allowing subject-specific specialisation but with access to modules across disciplines. A Wales Centre should play a key role in co-ordinating the 'Autumn School', and providing mentorship and/or advice for students and supervisors on identifying bespoke training programmes for each student, with cognisance of the strategic needs of their discipline and interests such as the ESRC. Links could also be made with the South West and Wales hub of UKGrad (§ 5.4.1.).

e. The ESRC and other social science research funders should look to increase the number of MSc. studentships in quantitative social science research methods (§ 4.2.1.). The studentships should be eligible for social scientists to take certain other approved social science methods MSc courses which include mixed methods provision and MSc in related disciplines, for examples Statistics or Medical Statistics. Postgraduate applications from students in disciplines such as mathematics and statistics should also be encouraged to apply to undertake social science research training (§ 4.3.1.).

f. These funders should also continue efforts to increase the number of quantitative PhD studentships (also incorporating students who are undertaking postgraduate research in "low QM" substantive areas such as Sociology, Education and Criminology but who will utilise quantitative methodology). These efforts should include the enhanced stipend (§ 1.1.5.), and earmarked quantitative studentships, including specific encouragement of secondary analysis of datasets, particularly in collaboration with Welsh Assembly Government and Office of National Statistics (see section 4.3.6.).

6.2.4. Postdoctoral Level and Continuing Professional Development

g. Postdoctoral and established quantitative social scientists' training needs in quantitative social science in Wales should be identified. This is likely to differ depending on the disciplinary background of the individual (see sections 3.4.

and 3.7.). A development of the NCRM website could be to provide a resource whereby social scientists can identify what training courses they would like to see provided (§ 4.3.1.), and this could be used to identify demand for courses not currently offered regularly. Alternatively, or in addition to the NCRM, the Wales Centre should play a pro-active and locally-focussed role in identifying training needs.

h. The Centre should identify areas where there was sufficient demand in Wales for the provision of suitable training in Wales (§ 4.3.1.) to be provided by appropriate specialists including those within the NCRM and other relevant ESRC national initiatives. Our survey suggests that demand is high for training on multilevel modelling / MLwiN, structural equation modelling / LISREL, log-linear, non-linear, generalised linear modelling and Stata (see section 3.7.).

i. These research training events as well as other high-quality events should be set up by the Centre as a light-touch way of increasing communication and collaboration among social scientists in Wales (§ 5.2.2.). Possibilities include a satellite to the ESRC Research Methods Festival, in which a number of those presenting at the national festival could be brought together for a mini-festival in Wales (§ 5.5.3.). Alternatively, a number of NCRM training events could be brought together for a week-long NCRM Wales training week. A Wales social science conference, with peer-reviewed abstracts, may also work if there was strong support from senior management in respective HEIs. An anticipated spin-off effect of bringing people together from across Wales for the specific purpose of these events would allow networks to be created. Later collaboration through these may then occur more naturally rather than attempting to set up more fixed networks.

j. Continuation schemes to incentivise, encourage and support quantitative researchers throughout their research careers should be developed particularly for individuals from “low QM” disciplines and funded by the ESRC and other social science research funders (§ 4.2.2. and 4.3.3.). This should include earmarked funding and possibly enhanced conditions (such as higher pay, increased training budget) at postdoctoral fellowship, fellowship and career scientist level. These initiatives should ensure that the cohort created by increased MSc and PhD provision are retained in the social science research community, and that future research leaders are identified, nurtured and given access to secure senior posts (§ 5.3.4.).

k. The ESRC and other social science research funders should place greater emphasis on research training provision in applications for research grant funding (§ 5.5.1.). This should incentivise grantholders to provide opportunities for research staff to maintain and develop their quantitative research skills (see paragraph 5.5.1.), both those directly relevant to the funded project but also for investment in wider research capacity

l. The Welsh Assembly Government and the Office for National Statistics should co-ordinate linkages with HEIs in Wales with regard to quantitative skills capacity in Wales, training, consultancy, research and development, and engage with the recommended Wales Centre (§ 4.1.10).

6.2.5. Wider Capacity Building in Wales

g. The quantitative social science community in Wales should be coordinated and promoted through the proposed Centre (§ 4.2.4. and 4.3.5.). A website and dedicated staffing of the Centre could also promote quantitative social science in Wales (§ 5.2.1.). The website could contain a searchable directory of membership and their expertise and links to centres of expertise in Wales. It could act as the initial point of contact for individuals wishing to identify relevant expertise in Wales (§ 4.1.10). It would have links to Wales, UK and international websites and aim to complement the NCRM website and email distribution list.

h. Greater provision and co-ordination of social science expertise in Wales is necessary to support research grant proposals and funded research projects (§ 5.3.1.). Through dedicated staffing in the Centre, researchers could be provided with access to key expertise (§ 4.3.2.). Particularly for researchers requiring specific methodological input into a substantive grant proposal, the Centre may have a group of methodologists that could contribute to the proposal and then be co-applicants on the bid (§ 4.3.2. and 5.3.2.). Alternatively, the Centre could assist in identifying a potential partner.

i. Given the geographical problems in Wales, e-social science solutions should be considered (§ 4.2.3, 5.4.3., 5.5.2.). Grid nodes and other video conferencing solutions (including those downloadable from the internet) allow access to training across Welsh HEIs without the need for physical movement (§ 5.2.1.). Participants can use such systems from homes with broadband or from university video suites allowing entire classes of graduate students to be included. Again the proposed Centre could have a role in developing these solutions in their provision of training and events.

j. Increased use and linkage of social science and other datasets in Wales should be supported (§ 4.3.6.). Wales has many datasets which are either not publicly available, or are not well linked together (§ 4.2.5.). In conjunction with the ESRC Economic and Social Data Service, the Centre could promote better awareness, accessibility, linkage and use of Welsh datasets, and be a key point of contact for researchers in Wales and outside Wales wishing to identify or use such data.

k. The proposed Centre should also fund and co-ordinate exchange schemes, placements and secondments both between different HEIs and across organisations outside academic community such as Welsh Assembly Government, Office of National Statistics, Local Government etc (§ 4.2.6. and 4.3.7.).

l. Strategic links between the ESRC and the Welsh Assembly Government should be improved with the following key objectives:
    - To increase the Welsh Assembly Government's influence on and engagement with strategic developments and funding streams at the ESRC, preferably via the Welsh Assembly Government's Chief Statistician, Chief Social Researcher and Chief Scientist, rather than separate policy leads (§ 4.1.10)
    - To increase access to Welsh Assembly Government datasets, preferably via the ESRC Economic and Social Data Service (§ 4.1.10).
    - To establish jointly funded studentships for the secondary analysis of

existing datasets in Wales (§ 5.3.3.).

6.2.6. Monitoring and further research

c. It will be important to monitor the impact of any initiatives that are implemented (§ 5.2.3. and 5.6.2.). This should be an ongoing process and allow funds to be reallocated accordingly. For example, the following performance indicators could be monitored:
   - The uptake and evaluation of training and other events run through the Centre
   - The number of research grants made, number of successful grants and size of research grant
   - The number of applications for quantitative methods MSc and PhD training
   - MSc and PhD students in quantitative methods, and their pass/completion rates.
   - The number of publications in international journals
   - The number of research active staff in quantitative methods.

d. This scoping study has had a limited focus and limited resources. The questionnaires, interviews and roundtable discussion revealed gaps in knowledge particularly on the demand side (§ 5.6.1.). Further research should be conducted to elicit the experiences and perspectives of postgraduate students across Wales on quantitative methods and quantitative methods provision. This could be linked to the forthcoming review of the 1 + 3 system and consider the number of PhD studentships in Wales and why there is a low demand for quantitative PhDs.

7. Appendices

Appendix I. External Reference Group

Name	HEI/Organisation	Department
Professor. Mike Maguire	Cardiff University	Criminology
Dr. Gordon Harold	Cardiff University	Psychology
Professor Paul Furlong	Cardiff University	European Studies
Professor Huw Williams	Cardiff University	City and Regional Planning
Dr. Martyn Senior	Cardiff University	City and Regional Planning
Phil Satherley	Cardiff University	SONMS
Mike Robling	Cardiff University	General Practice
Professor Chris Webster	Cardiff University	City and Regional Planning
Dr. Roger Scully	Aberystwyth University	International Politics
Dr. Gary Higgs	University of Glamorgan	Computing
Professor Steve Hill	University of Glamorgan	Glamorgan Business School and Welsh Development Agency
Professor Peter Sloane	Swansea University	Labour Market Research Group
Professor Andrew Henley	Swansea University	Economics Group
Professor Jane Raymond	Bangor University	Psychology
Professor Odette Parry	North East Wales Institute	Unit for Social Inclusion
Kate Chamberlain	Welsh Assembly Government	Chief Statistician at WAG
Gareth Morgan	Welsh Assembly Government	Head of Economic Research
Dr. Felix Ritchie	Office for National Statistics, Newport	Data-Linking Group, Newport

Appendix II. Questionnaire

ESRC and HEFCW Scoping Study to Identify Quantitative Methods Capacity-Building Needs in Wales

CARDIFF SCHOOL OF SOCIAL SCIENCES • CARDIFF UNIVERSITY • KING EDWARD VII AVENUE • CARDIFF • CF10 3WT

ESRC/HEFCW Scoping Study of Quantitative Research Methods in Wales

Welcome-Quantitative Methods Capacity-Building Needs in Wales: Consultation Survey

Thank you for participating in this scoping study. The ESRC and HEFCW have jointly funded this study in recognition of the need to develop quantitative skills amongst the social science population in Wales. This will lead to recommendations on developing a strategy to improve the supply and training of quantitatively trained social scientists.

The study is being undertaken by a multidisciplinary team at Cardiff University and relies on the participation of ALL social scientists across Wales to give a picture of the current state of quantitative methods and the future of this area in Wales.

We would be very grateful for your participation in this project through the completion of this survey. We encourage all researchers to complete this survey irrespective of whether you think you use quantitative research methods or not in your work.

If you have any questions about this research please contact either Rebecca Lynch (Tel: 02920 879609 or email lynchR@cardiff.ac.uk) or Dr Chris Taylor (Tel: 02920 876938 or email TaylorCM@cardiff.ac.uk) at Cardiff University.

Data Protection

For the purpose of this survey Cardiff University is the data controller. All data collected in this survey will be held securely by the survey software provider (Bristol University) under contract until the survey closes and then retained by the project team in the Cardiff School of Social Sciences, Cardiff University, in accordance with the Data Protection Act (1998). Data from the survey including answers to questions where personal details are requested, will only be used by the research team for aggregated analysis.

Cookies, personal data stored by your web browser, are not used in this survey.

Individual responses to this survey will be dealt with in the strictest confidence.

Thank you for your assistance

Instructions

This questionnaire can either be completed and submitted in one session or you can fill in partially, bookmark it and then return later to add additional information. You can then submit it when it is completed.

If you want to bookmark and finish the survey later, please use the finish later button at the bottom of the page. You will then receive instructions on how to bookmark the page.

Once you have completed all the questionnaire below and are ready to submit the fully completed survey click the CONTINUE button at the bottom of the page. Your answer will be submitted or you will be prompted to fill in an answer you may have over-looked. Once your answers are accepted as submitted you cannot return to review or amend this page.

The survey is divided into three parts:

Section A – Research Skills
Section B – Your Research Background
Section C – Quantitative Methods Capacity Building

Sampling Information

To ensure we can monitor responses to this survey please answer the following questions. Please note that your email address will not be passed on to other parties, nor will it be used to identify individuals against your responses.

1. Before proceeding with the survey could you please enter the name of the Institution or Organisation that you work for:

	University of Wales, Aberystwyth
	University of Wales, Bangor
	Cardiff University
	University of Glamorgan
	University of Wales Institute, Cardiff
	University of Wales, Lampeter
	The Open University in Wales
	University of Wales Swansea
	University of Wales Newport
	North East Wales Institute
	Swansea Institute of Higher Education
	Trinity College, Carmarthen
	Royal Welsh College of Music And Drama
	Other (please specify):

2. Also, in order for us to ensure the validity of your response could you please enter your email address in the space below. Please note : this will be kept separate from your responses and will not be passed to anyone outside the research project.

SECTION A Your Research Background

3. Your year were you born?

4. What is your sex?

	Female
	Male

5. What is your current position or job title?

Research Assistant	
Research Associate	
Senior Research Associate	
Research Fellow	
Senior Research Fellow	
Lecturer	
Senior Lecturer	
Reader	
Professor	
Other (please state)	
……..	

6. How many years (to the nearest year) have you held this position?

7. Are you **currently** attached to an externally funded research centre?

	No
	Yes

If yes please indicate who primarily funds this (eg. ESRC, Welsh Assembly Gov, MRC, Leverhulme):

8. Could you estimate approximately what proportion of your working time you spend undertaking the following activities:

a. Teaching or teaching related activities:	
b. Research or research related activities:	
c. Administrative or management related activities:	

9. How often do you use quantitative methods in your research? (please select one of the following answers)

- ☐ All the time
- ☐ Often
- ☐ Not very often
- ☐ Never

10. Within the last year have you: (please tick all that apply)

	No	Yes
a. Published quantitative research?		
b. Received funding for quantitative research?		
c. Received funding for mixed methods (quantitative and qualitative) research?		

11. Do you teach any quantitative research methods?

- ☐ No
- ☐ Yes

a. If yes, approximately how many contact hours with postgraduates are you likely to be contributing this academic year?

☐

b. If yes, approximately how many contact hours with undergraduates are you likely to be contributing this academic year?

☐

12. Are you currently the lead supervisor for one or more postgraduate research students who will be using a significant amount of quantitative research in their study?

☐ No
☐ Yes

If Yes, how many are you currently supervising?

☐

13. According to the ESRC classification of disciplines, with which discipline do you feel the greatest affiliation? (If you are not a social scientist, please skip to the next question.)

Area Studies (AS)	☐
Demography	☐
Economic and Social History	☐
Economics	☐
Education	☐
Environmental Planning	☐
Human Geography	☐
Linguistics	☐
Management and Business Studies	☐
Political Science and International Studies	☐
Psychology	☐
Social Anthropology	☐
Social Policy	☐
Social Work	☐
Socio-Legal Studies	☐
Sociology	☐
Science and Technology Studies	☐
Statistics, Methods and Computing	☐
Arts and Humanities	☐
Biological Sciences	☐
Engineering and Physical Sciences	☐
Environmental Sciences	☐
Medical Sciences	☐

14. In which of the following have you received training, where and in what subject discipline did it take place? (Please complete for **any** of the following that apply)

	Have you received training				**Place of Study**		
	Completed	Currently Undertaking	Neither	Subject discipline (e.g. sociology)	In Wales	Rest of UK	Outside UK
a. Masters Level in Social Science research methods (or equivalent, e.g. MRes)				(not applicable)			
b. Other taught masters level degrees				……			
c. Research Degree training- PhD/Professional Doctorate/MPhil				……			
d. Other similar (please specify)_____				……			

15. Have you undertaken any additional training with a specific focus on quantitative research methods during your career?

☐ No
☐ Yes

If yes, what was this on and where was it held?

SECTION B Quantitative Research Methods

In this section you will be presented with many potential quantitative research methods or 'skills' drawn from across the social sciences. We have tried to make these lists as comprehensive as possible.

For each method or skill we ask you to indicate whether you agree with the following statements:

Used & published with this method

Please tick this box if you have used this method in any research you have undertaken. It is important that this ***does not include cases where someone***, other than yourself, has used this method/skill in collaborative research.

Can 'consume' this method

Please tick this box if you feel comfortable in understanding others' research that uses this method. For example, you feel comfortable reading journal articles that employ this method or reviewing journal articles that employ this method.

Currently teach/supervise this method

Please tick this box if you are currently involved in teaching this method. This can be to either undergraduates or postgraduates, or on other educational programmes. This also includes the supervision of other researchers (e.g. postgraduate research students) in the explicit use of this method.

There is need for further training in this method

Please tick this box if you believe that there is a need for further training provision in Wales in the use or 'consumption' of this method. This could be for yourself, for undergraduates or postgraduates, for those working in your research unit, or for social scientists more generally.

PLEASE NOTE: You are not expected to tick any of the boxes – a 'no' response is just as important to us

Section B.01 Quantitative research designs

16. Research designs and sampling strategies

	Please tick the boxes for any of the statements you agree with (you may tick more than one)			
	Used and published with this method	Can 'consume' this method	Currently teach/supervise this method	There is need for further training in this method
a. Systematic reviewing				
b. Programme evaluation				
c. Action research				
d. Experimental design				
e. Quasi-experimental design				
f. Longitudinal survey design				
g. Convenience/Opportunistic sampling				
h. Snowball sampling				
i. Quota sampling				
j. Purposive/Theoretical sampling				
k. Simple random sampling				
l. Systematic sampling				
m. Stratified random sampling				
n. Multi-staged/Cluster sampling				

17. Other research design or sampling strategies that you would like to add

		Please tick the boxes for any of the statements you agree with (you may tick more than one)			
	Please state the method	Used and Published with this method	Can 'consume' this method	Currently teach/supervise this method	There is need for further training in this method
a. Other 1					
b. Other 2					
c. Other 3					
d. Other 4					

Section B.02 Large-scale and quantitative data collection

18. Large-scale surveys (methods for collecting data)

	Please tick the boxes for any of the statements you agree with (you may tick more than one)			
	Used and Published with this method	Can 'consume' this method	Currently teach/supervise this method	There is need for further training in this method
a. One-off				
b. Repeated (same people)				
c. Repeated (different people)				
d. Self completion				
e. Face-to-face				
f. Telephone				
g. Email				
h. Internet				
i. Accessing large-scale secondary datasets (e.g. UK Census, BHPS, LFS)				

19. Other large-scale and quantitative data collection methods that you would like to add

		Please tick the boxes for any of the statements you agree with (you may tick more than one)			
	Please state the method	Used and Published with this method	Can 'consume' this method	Currently teach/supervise this method	There is need for further training in this method
a. Other 1					
b. Other 2					
c. Other 3					
d. Other 4					

Section B.03 Computer software for quantitative data

20. Computer software for quantitative data

	Please tick the boxes for any of the statements you agree with (you may tick more than one)			
	Used and published with this method	Can 'consume' this method	Currently teach/supervise this method	There is need for further training in this method
a. SPSS				
b. STATA				
c. R				
d. MLwiN				
e. SAS				
f. Amos				
g. LISREL				
h. Geographical Information Systems (e.g. ArcGIS)				
i. Scientific visualisation (i.e. interactive graphical techniques)				

21. Other computer software that you would like to add

		Please tick the boxes for any of the statements you agree with (you may tick more than one)			
	Please state the method	Used and Published with this method	Can 'consume' this method	Currently teach/supervise this method	There is need for further training in this method
a. Other 1					
b. Other 2					
c. Other 3					
d. Other 4					

Section B.04 Skills for quantitative data analysis

22. Quantitative data analysis

	Please tick the boxes for any of the statements you agree with (you may tick more than one)			
	Used and Published with this method	Can 'consume' this method	Currently teach/supervise this method	There is need for further training in this method
a. Describing quantitative data (e.g. means, standard, deviations, frequencies)				
b. Transforming data distributions				
c. Probability				
d. Set theory				
e. Indices of inequality				
f. Correlation (bivariate)				
g. Regression (multivariate)				
h. Comparing means (e.g. ANOVA, t-tests)				
i. Comparing frequencies (e.g. Chi-squared, Mann-Whitney)				
j. Principal components/Factor analysis				
k. Multidimensional scaling (MDS)				
l. Classification/Cluster analysis				
m. Multi-level modelling				
n. Log-linear modelling				
o. Non-linear modelling				
p. Generalised linear modelling				
q. Time-series analysis				
r. Structural euation modelling				
s. Agent-based simulation				
t. Spatial modelling (e.g. cellular automata and micro-simulation)				
u. Spatial modelling (e.g. cellular automata and micro-simulation				
v. Geographically weighted regression (GWR)				
w. Genetic algorithms				

23. Other quantitative data analysis methods that you would like to add

		Please tick the boxes for any of the statements you agree with (you may tick more than one)			
	Please state the method	Used and Published with this method	Can 'consume' this method	Currently teach/supervise this method	There is need for further training in this method
a. Other 1					
b. Other 2					
c. Other 3					
d. Other 4					

SECTION C Further Quantitative Methods Capacity Building

Section C Further Quantitative Methods Capacity Building

24. What do you see are the main barriers to social science quantitative research **in Wales**? Please indicate how important you feel the following factors are:

	Please tick the one statement you most agree with			
	Very important	Quite important	Not very important	Not at all important
a. Availability of appropriate data				
b. Limited research methods training available				
c. Limited access to the location of training				
d. Expenses related to attending training				
e. Recruitment of quantitative researchers				
f. Limited funding for quantitative research in Wales				
g. Willingness of researchers to do quantitative research				
h. Lack of collaboration between institutions				
i. Retention of Staff				
j. Research career structure				
k. Time available to undertake quantitative research				
l. Time available to develop quantitative research skills				
m. Little requirement to teach quantitative research methods (at undergraduate or postgraduate levels)				

25. What other barriers do you think there are to social science quantitative research methods in Wales?

26. If there were to be greater investment in encouraging more quantitative research methods training in Wales, where would this best be spent? Please rank the following in order of priority with 1 being the greatest priority and 4 the least

	Please rank between 1 and 4 (1 is the greatest priority; 4 is the least priority)
School level (compulsory level	
Undergraduate level	
Postgraduate level	
Continued Professional Development	

27. What else could be done to encourage quantitative research capacity in Wales? Please tick all that apply: (*Select all that apply)*

More available appropriate data	☐
Increased opportunities for research methods training	☐
More locally situated research methods training	☐
Increased funding for attending research methods training	☐
Greater recruitment of quantitative researchers	☐
Increase in funding quantitative research in Wales	☐
Incentives for researchers to do quantitative research	☐
Increased collaboration between institutions	☐
Greater exposure to quantitative research methods throughout undergraduate courses:	☐

28. What else do you think should be done to encourage quantitative research capacity in Wales?

29. Would you be willing to participate in a telephone interview with regard to the subject of this study?

☐ No
☐ Yes

If yes, please provide us with a telephone number and a contact name that we could use to contact you:

_____

Appendix III. Interview Schedule

Scoping Study Interview Schedule

DATE: ……

INTERVIEWEE: ……

INTERVIEWER: ..……

1. **What do you feel is the current state of quantitative methods in social science in Wales in terms of:**
   a) **teaching?**
   b) **research?**

   Is there a deficit? How has this come about?
   In what ways and why is there a deficit? Root causes
   How does this differ across the disciplines?
   How does this differ across different HEI staff?

2. What are the particular needs in Wales in terms of quantitative methods capacity building?

- Where are these needs?
- Who has these needs?
- How do these differ across the disciplines?
- How does this differ for different HEI staff?
- What about needs outside the academic sector?
- Which particular needs: Training
  Data
  Networks
  Research funding

3. How do you think these needs could be met?

For example:

- Different delivery modes?
- Collaboration across Wales?
- Drawing on national provision from elsewhere in the UK?
- More available appropriate datasets?
- Increased opportunities for research methods training?
- More locally situated research methods training?
- Increased funding for attending research methods training?
- Greater recruitment of quantitative researchers?
- Increase in funding quantitative research in Wales?
- Incentives for researchers to do quantitative research?

Appendix IV. "999" Sheet

ESRC/HEFCW Scoping Study to Identify Quantitative Methods Capacity Building in Wales

ROUNDTABLE WORKSHOP
1st February 2007

"999" Exercise

1. What are the priorities for quantitative methods capacity building in Wales in the next **9 weeks**?

2. What are the priorities for quantitative methods capacity building in Wales in the next **9 months**?

3. What are the priorities for quantitative methods capacity building in Wales in the next **9 years**?