



**EVALUATION OF THE ESRC/NERC  
INTERDISCIPLINARY RESEARCH  
STUDENTSHIP SCHEME**

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**OCTOBER 2005**

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# EXECUTIVE SUMMARY

In 1999 two Research Councils came together to launch the joint Economic and Social Research Council/Natural Environment Research Council Interdisciplinary Research Studentships. The overarching goal was to promote greater interaction between social and environmental sciences and indeed, to help generate a community of professional researchers capable of working across these sets of disciplines. The Scheme has now awarded some 123 studentships for a total investment of just over £4M.

## Conclusions and Recommendations

- The overarching recommendations of this Evaluation are to **continue the Scheme** and to consider both increasing the numbers of interdisciplinary studentships and extending the Scheme to include additional Research Councils.
- If Research Councils wish to **become extremely significant players in embedding interdisciplinarity into the future landscape of academia**, they need to **go further in building and legitimising an interdisciplinary community**.
- Thus the Evaluators recommend very strongly that the Research Councils **visibly encourage interdisciplinarity by funding sequential stages of a career path**. A critical missing step would be addressed by **cross-Council interdisciplinary postdoctoral fellowships** that would allow consolidation of the gains made during the PhD studentship (similar to the aims of the ESRC Postdoctoral Scheme). **Research funding explicitly oriented toward interdisciplinarity, in small research grants as well as themed programmes** (such as RELU), would allow post-PhD students to prove themselves as academics and therefore go on to influence academia.
- The PhD studentships themselves are likely to be more productive if, as the Evaluators recommend, the Research Councils hold **annual community-building student conferences** at which problems and solutions can be shared, publication strategies and career options discussed, and lasting networks formed.
- In assessments of proposals for this Scheme, in particular, and in decision-making at various levels more generally, the Research Councils should **utilise the expertise of the community of former/current supervisors of interdisciplinary studentships**.

This independent Evaluation has been undertaken to provide ESRC and NERC decision-makers with a sound evidence base with which to assess the future of this Scheme and consider applicability of the model elsewhere. Addressing five main areas (summarised below), the review processes included: preparation of a database of some 113 Students and their Supervisors; 49 semi-structured telephone interviews; surveys collected from 59 supervisors and 51 students; a focus group of students and one of supervisors; and data analysis and integration.

### **Capacity**

- The Scheme has helped students to work effectively in both social and environmental sciences and to develop an interdisciplinary way of working
- The Scheme has also helped to foster interdisciplinary collaborations between supervisors and co-supervisors
- Over 100 disciplines were found to contribute to the Scheme, with ecology, economics, environmental science and geography the most frequently cited
- Interdisciplinary areas vary in the extent to which they have evolved to an accepted identity
- Students vary in the degree to which they feel “isolated” professionally

### **Operation**

- Awardholders were suitably qualified and ready for the challenge of an interdisciplinary PhD, driven by a willingness to learn about new disciplines and a desire to pursue real world problems
- Delayed timing of award announcement bothered some, but was not a deal-breaker in terms of positive attitudes toward the Scheme
- The requirement for a Master’s degree was generally felt to be sensible provided it was not applied too rigidly
- Nearly all projects conducted appear to have been genuinely interdisciplinary but the degree of interdisciplinarity and the balance between contributing disciplines can (i) vary significantly between projects and (ii) often shift at different stages of the research
- Although over half the students were embedded in already-established interdisciplinary centres or collaborations, still a spectrum of experiences appeared among students, with some ploughing a lonely furrow
- Experience of supervision/co-supervision support varied, with most situations working well but a few quite problematic for the students. Institutional support per se was generally seen as sufficient

### **Skills and Outcomes**

- This studentship has allowed students to tackle problems that would not have been funded through conventional ESRC or NERC awards
- Innovative approaches have been developed and methods from one discipline have been brought to bear on problems within another discipline
- While many students have not yet published, those who have are thought to have achieved as high a standard as mono-disciplinary students
- There are often challenges in placing interdisciplinary work in mainstream journals; students are likely to need a strategic portfolio of different types of articles
- Constraints on academic career paths for interdisciplinary students are a serious issue, although there is some hope that academia is slowly evolving towards greater acceptance
- Institutional departmentalism, the RAE and indeed the current Research Council set-up all work against academic employment prospects. (Non-academic posts may welcome interdisciplinary backgrounds)

### **Development**

- Continuance of the Scheme is supported very widely indeed, both due to its perceived success and to the absence of other opportunities for interdisciplinarity
- Perceived benefits of an interdisciplinary approach include research *outputs* and fostering a more creative research *process*. Supervisors saw especial benefit in the breaking of disciplinary logjams in tackling complex questions
- The RAE and its ripple effects provide serious disincentives, such that there are real concerns as to the growth of interdisciplinarity as a valued approach
- Other disincentives included the extra time and effort necessary for interdisciplinary work
- Administrative recommendations to the Research Councils include:
  - clarify selection criteria for genuine interdisciplinarity
  - include truly interdisciplinary experts in the selection process
  - simplify application forms
  - continue to spread awards across institutions, based on students' proposals
  - provide a handbook on supervising interdisciplinary PhDs to new supervisors and guidance to examiners

### **Generic Lessons**

Lessons learned were gathered from students and supervisors, and captured, in the body of the Evaluation and at more length in an Annex, so that future students, supervisors and sponsoring Councils can benefit from them.



# I. Introduction

## (i) Overview

In 1999 two Research Councils came together to launch the joint Economic and Social Research Council/Natural Environment Research Council Interdisciplinary Research Studentships. By supporting individuals during their PhD study, the intent of this Scheme was to allow them to undertake genuinely interdisciplinary projects and in so doing to develop new research skills. The overarching goal has been to promote greater interaction between social and environmental sciences and indeed, to help generate a community of professional researchers who can work across these sets of disciplines.

Now that some 123 studentships have been awarded, for a total investment of just over £4M, the Scheme has a track record of sufficient duration to make evaluation feasible and timely. The intent of this Evaluation is to inform ESRC and NERC decision-makers as they weigh the Scheme's future and the applicability of the model in other areas.

## (ii) Focus of the Evaluation

As defined by ESRC, the evaluation addresses five main areas:

- (i) *Capacity*: Has the Scheme significantly increased the numbers of researchers who are able to work effectively in both the social and environmental sciences? Which academic disciplines have benefited and how far has the Scheme been successful in fostering interdisciplinarity between these social and natural science disciplines? What impact has the Scheme had on the future of social/environmental research – is a community developing?
- (ii) *Operation*: Did the Scheme attract suitably qualified students; does the timing of the application process and scheme's requirement for a Masters qualification affect this? To what extent were students able to tackle projects that were genuinely interdisciplinary in nature; do students come from a mainly social or environmental science background? What was the distribution among HEIs and was this appropriate? Was institutional support sufficient?
- (iii) *Skills and Outcomes*: Have the students been able to develop innovative new approaches and methods through the interdisciplinary nature of the scheme? Are publications and papers produced by students of a high academic standard and mainly interdisciplinary in type? What do students do after the Scheme – do many generally remain in academia or follow alternative careers?

- (iv) *Development:* Should the Scheme be continued and, if so, how might it be developed and improved?
- (v) *Generic Lessons:* Are there any generic lessons that can be applied to the development of interdisciplinary studentship schemes in other areas?

### **(iii) Structure of the Report**

In addition to an accessible Executive Summary, Introduction and Summary of the review process, this report is structured around analysis of the above five sets of key issues. Conclusions and Recommendations are offered, with Annexes providing more detail.



## **II. Summary of Review Processes**

### **(i) Overview**

Review Processes utilised were deliberately diverse, encompassing both quantitative and qualitative approaches. The five main areas, and their translation into a core set of questions, provided an integrative framework such that results from the different review processes could be synthesised and key points distilled. Methods used included: review of documents; meeting with programme managers; surveys of supervisors and of students; semi-structured interviews (primarily of a sample of students and of supervisors, but also individuals with useful perspectives on the Scheme or interdisciplinarity); and focus groups with supervisors and students.

### **(ii) Review of Scheme and Related Documents**

LRM and CL met representatives from ESRC and NERC on 26 April to set the scheme and its evaluation in context and identify priority questions and themes.

Documents related to the Scheme were reviewed and a framework of “core questions” was developed based on the issues identified by ESRC. This framework was used subsequently in the development of the questionnaires, the semi-structured interview format and focus group agendas.

### **(iii) Sampling Methodology**

In conjunction with ESRC staff, LRM/CL prepared a detailed database updating the whereabouts of 113 Students<sup>1</sup>, their Supervisors and, when identifiable, Heads of Departments to use as the base sample for the survey, telephone interviews and focus groups. Locating individuals was at times challenging, particularly in the older cohort.

A sample of 27 students was selected as the pool from which interviewees were drawn, split approximately evenly between the Student Cohort starting in 2001 and the Cohort starting in 2003. These were chosen to represent a diversity of perspectives, from different disciplinary affiliations, institutions, and host departments.

A sample of 24 Supervisors for interview was developed as the pool from which interviewees were drawn (four per year, 1999-2004) that represented distribution across: institution, subject/discipline, social or environmental science affiliation, primary/co supervisor status, degree of involvement in the scheme. Three supervisors who were also heads of department were also interviewed.

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<sup>1</sup> 123 awards have been made in total during the period 1999-2004 of which 10 have been terminated according to ESRC records.

In addition, interviews were conducted with individuals having an overview of the Scheme or a knowledge of interdisciplinarity; and with a small number of former students.

#### (iv) Interviews

In addition to discussions with research council staff, semi-structured telephone interviews lasting around 45 minutes each were conducted with 49 individuals (**Table 1**). While most interviews were conducted with students, supervisors and heads of departments involved in the Scheme, additional interviews were held with individuals having an overview of the Scheme (e.g. members of the Scheme's Competition Panel or senior Research Council staff) and with individuals having a useful perspective on interdisciplinarity (e.g. managers involved with other interdisciplinary programmes or individuals knowledgeable about implications for employment in academic or non-academic settings.)

**Table 1: Interviews Completed**

Students in 2001 cohort	7
Student in 2002 cohort	1
Students in the current cohort (2003)	10
Sub-total Students	18
Supervisors	15
Supervisors who were also Heads of Departments	3
Sub-total Supervisors	18
Individuals with a useful perspective on interdisciplinarity and/or employability	8
Individuals having an overview of the Scheme	5
Research Council staff	5
Sub-total Overview	18
<b>TOTAL</b>	<b>54</b>

Two former students, now in non-academic posts, provided additional materials, including thoughtful short essays.

With interview transcripts for each individual typed from dictation, providing "profiles", coded responses were aggregated by question, for analysis.

Genuine notes of appreciation were sent to interviewees, who were willing to reflect quite deeply upon complex issues of interdisciplinarity and to contribute their thoughts to this evaluation (See **Annex C** for interview topic guide).

#### (v) Surveys

Surveys were distributed to 15 Students in the 2001 Cohort; 52 Students in the Current Student Cohorts (2002, 2003 and 2004), and 78 Supervisors (across all years, 1999-2004) (**Annex D**). Surveys were distributed on 22 and 23 May, three reminders were sent and the data collection was closed on 27 June. As shown in the following charts (**Charts 1 and 2**), response rates were **75% from supervisors** and **77% from students** yielding quantitative

data from 59 supervisors and 51 students<sup>2</sup> . All were thanked individually for their input.

## **Charts 1 and 2: Survey response rates: supervisors and students**

Responses were entered into a database and histograms and percentage figures produced for each question<sup>3</sup> (**Annex E**).

### **(vi) Focus Groups**

The planned focus group for Supervisors was postponed to Thursday 1 September, due to the bombings in London on 7 July. This changed timing made it possible to also hold a focus group for students, many of whom were away on fieldwork during the summer<sup>4</sup>. Questions were designed to be high-level, for example, relating to broader issues on the future of interdisciplinarity in academia, in order to take best advantage of this particular discussion format (see **Annex F** for Focus Group Agendas).

### **(vii) Consideration of Similar Schemes**

In addition to information sought in surveys and interviews, discussions were held with programme managers of two interdisciplinary PhD schemes: MRC/ESRC PhD Studentship Scheme and the EPSRC funding scheme managed by the Royal Geographic Society.

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<sup>2</sup> A small number of individuals responded to say that they were unable to complete the survey; in the case of students this was generally because they were abroad doing fieldwork without reliable internet connections. Other reasons included illness and bereavement and in two cases the email address we had was no longer valid. "No response" means that the email appeared to have been delivered successfully but the individual did not respond after three reminders and gave no reason for their lack of response.

<sup>3</sup> Percentage figures quoted are based on the number of respondents answering that particular questions.

<sup>4</sup> The postponement also made it possible to incorporate subtle questions arising from analysis of interviews and surveys.

### (viii) Data Analysis and Integration

This Report represents integration across methodologies with the “core questions” of the evaluation providing an integrative tool with which to analyse survey responses, interviews, focus groups and documents. Conclusions and recommendations thus draw upon the entirety of quantitative and qualitative data gathered<sup>5</sup>.

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<sup>5</sup> In the body of the report, italicised phrases are taken from the language used by respondents in interviews and free text survey questions. Further illustrative highlights from these responses are reported in **Annex G**.



### III. Analysis

#### (i) Capacity

***Has the Scheme significantly increased the numbers of researchers who are able to work effectively in both the social and environmental sciences?***

##### Ability to pursue interdisciplinarity

Most (87%) survey respondents felt that the Scheme helped students work effectively in both social and environmental sciences. For example, one supervisor interviewed felt that, while *to some extent this depends on where they end up*, he thinks that his students *will probably be functioning in both fields; basically students will work with the problem area they have chosen, and they can use different ways to get on with it*. In interviews, most students saw themselves as able to work effectively in both social and environmental sciences, even beyond their particular project topic. One cited, in particular, the *confidence* gained to go to whatever area was needed in pursuit of a problem. Another cited the *formal linkages* provided to both social science and environmental science worlds. A somewhat smaller majority (74%) felt that the Scheme helped students work effectively in either the social or environmental sciences but with a broader perspective.

While many supervisors saw their students as being able to move in both circles, several felt that their students would never be a conventional member of either environmental or social sciences, but would instead continue to play a role at the interface. One was described, for example, as *carving out a niche in the middle, and that is where his future will be*.

##### Fostering Interdisciplinarity

When asked whether the Scheme has helped students develop an interdisciplinary way of working, nearly all survey respondents (89%) agreed, split quite evenly between strongly agreeing and agreeing. (Supervisors saw this as happening nearly unanimously, 98%.) Supervisors' and students' suggestions for mechanisms that foster interdisciplinarity are provided in Section (iv), Exploration of Interdisciplinarity.

Survey respondents, while still agreeing, were somewhat less positive about the idea that the Scheme had helped foster interdisciplinarity in the Supervisor/Co-Supervisors. Three quarters (75%) of all respondents answered affirmatively, but only around one-quarter of these strongly agreed. More detail from supervisors' surveys conveyed a picture of some lasting impact of the studentship upon the academics involved, in that, although only 44% agreed that publications had ensued, 68% have seen other professional interactions between the supervisor and the co-supervisor result from the

studentship. Interactions cited most frequently included: research collaboration, grant applications and professional dialogue.

Survey respondents were far less convinced that the Scheme has helped to foster interdisciplinarity among others in the department(s) involved, with less than half (46%) agreeing or strongly agreeing, over a third (38%) neutral, and 16% disagreeing or strongly disagreeing. (The response was the same whether students were or were not in an interdisciplinary unit.)

***Which academic disciplines have benefited and how far has the Scheme been successful in fostering interdisciplinarity between these social and natural science disciplines?***

The survey sought information regarding the disciplines contributing to the studentship (student, supervisor and co-supervisor). Across the combined sample, we identified **101 contributing disciplines, with ecology, economics, environmental science and geography the categories with the greatest numbers of respondents (Annex B).**

When asked if particular environmental and social science disciplines lend themselves readily to interdisciplinary work, interviewees tended to mention ecology as a natural science (and sometimes “environmental science” broadly) and economics as a social science. Quantitative approaches of economics makes the field suited for incorporation with any natural science field (e.g. climatology) that involves quantitative modelling. GIS was identified as useful for interdisciplinary efforts, as it can crunch massive numbers from any field. It was noted that some social science disciplines (e.g. sometimes political/legal fields but also what were described as post-modernists who question everything) are less suited than others (e.g., economics primarily but also risk, public perception and ethics). Geography was cited by several as inherently interdisciplinary, as was the more specific area of conservation. Anthropologists were described as *boundary transgressors*, inherently interested in the relationships between things that other disciplines open up. Social issues and policy responses are often drivers of interdisciplinarity.

Interestingly, some interviewees emphasised outlook rather than discipline. *Interdisciplinarity could include anything; it depends on your perspective about how distant things are.* Or, as another noted, *it is fairly easy to find a link between most disciplines if you are looking!* This attitude may be problematic for young people starting academic careers: one supervisor noted that it was easier for him, as a senior person, to *just get interested in questions* rather than worry about his discipline.



### ***What impact has the Scheme had on the future of social/environmental research – is a community developing?***

The question of community-building has implications for the long-term shape and nature of research and teaching — yet, even at six years old, the Scheme is still operating “in the short term”.

#### Emerging communities

Students interviewed were certain that they would continue in their interdisciplinarity. This same expectation is reflected in survey responses regarding the professional community to which students feel they belong. Over a third (38%) saw this as an interdisciplinary community and over a half (54%) saw membership in both an interdisciplinary community and a single discipline. Only 8% chose a single discipline as their professional community. When supervisors were asked the same question about themselves, their responses were nearly identical: allegiance to interdisciplinary community, 37%; belonging to both interdisciplinary community and single discipline, 56%. An alignment of orientation between supervisors and students, whether innate or instilled, is clearly present.

Interviews investigated further the extent to which affiliation to an interdisciplinary area was felt. Several students feel affiliated with an established or emerging field which is interdisciplinary, such as conservation, environmental economics or landscape. Some felt they were early on in a gradually developing coherence of disciplines around a particular problem area. For some students, it can be problematic to determine which conferences to attend, which papers to present where. (In fact, one supervisor had begun to explore the possibility of incorporating an interdisciplinary ESRC/NERC postgraduate session into a British Ecological Society meeting, since these students can be *torn between ecological conferences and developmental conferences, but there don't seem to be many right in between.*) Some students simply do not feel strongly that they belong to a professional community.

Supervisors reflected in interviews about the degree to which the interdisciplinarity of the studentship affected their own perception of professional community. Many were already interdisciplinary, but felt that their leanings in that direction were strengthened and their opportunities to collaborate were broadened and enhanced. Somewhat typically, the studentship allowed one supervisor to link into an interdisciplinary community, leading him to believe that *studentships can be effective in fostering cross-over between disciplines*. The boost given by interdisciplinary studentships to at least one supervisor's research has so reinforced his work that he *focuses almost entirely on interdisciplinary work as a direct result*. Another noted that the innovative studentship has enabled him to consolidate his work with his old interdisciplinary professional community.

Supervisor interviews also led to insights as to evolution of particular interdisciplinary fields or communities with which they or their students might affiliate themselves. Some belong to well-established interdisciplinary fields, such as environmental economics or geography. Some noted interdisciplinary professional communities that are international in scope, while focusing on a particular specialist niche; sometimes this international network is especially important for students as the field may be “coalescing” earlier in the international community than the UK. One referred to his interdisciplinary field as an emerging *community of fellow travellers* with formal or informal networks, — and yet, even though it is possible to *have local, regional, national or international networks...it can be easy to feel terribly isolated*. Indeed some supervisors worried that their students may feel no affiliation with a professional community, even if their interdisciplinary area has emerged or is emerging as a sub-discipline. The hope was expressed that the ESRC/NERC studentship scheme is helping to consolidate and develop interdisciplinary professional communities (see also Section (v) Development).

## **(ii) Operation**

***Did the Scheme attract suitably qualified students; does the timing of the application process and scheme's requirement for a Masters qualification affect this?***

### Qualifications

**The majority (95%) of supervisors surveyed agreed that the student had been suitably qualified and ready for the challenge of an interdisciplinary PhD.** These results were broadly mirrored by current students' views (41% strongly agree, 44% agree) but the earlier cohort of 2001 students were slightly less positive (20% strongly agree, 60% agree, 20% disagree).

A cross-tab analysis to determine whether students responded differently depending on their disciplinary background<sup>6</sup>, showed that those with a natural or environmental science background seemed slightly less positive about their suitability to undertake an interdisciplinary project (25% disagreed or were neutral whereas none of the social science respondents was in either category).

In interviews, supervisors all felt that their incoming students had been suitably qualified but, perhaps more importantly, several mentioned the importance of their personal qualities such as their motivation, open mindedness and willingness to learn about new disciplines. Responses were a little more varied from the students although the majority clearly felt qualified. One student with a natural science background described feeling like a *bit of a gatecrasher* but others commented that the ESRC postgraduate training in the social sciences was very helpful. Another pointed to the advantage of a Scottish undergraduate training where the additional year permits a wider range of topics to be studied. Several students recognised the need to be selective when learning new skills and realised that they would not have the same in-depth knowledge as their single discipline peers.

### Timing

When asked whether the timing of the application process negatively affects the Scheme's ability to attract suitable candidates: 49% of supervisors were neutral on this, 38% disagreed and only 14% agreed.

Supervisors who were interviewed and who took part in the focus group had mixed opinions on this question, possibly reflecting whether their previous experiences had been mainly with ESRC or NERC. There were some (see **Annex G**) who held very strong views and at least two commented that they had lost good students because the notification of awards came later than for

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<sup>6</sup> Based on ESRC's previous qualification categorisation.

other schemes. Although supervisors were not suggesting a “quota” approach to the scheme, it was noted that the NERC quota system does give departments greater predictability and the ability to offer awards to the best students at an earlier stage.

In general, students who were interviewed did not seem to have an issue with the timing of the application process. (However, only students who were participating in the Scheme were interviewed, not any who had already gone elsewhere.)

### Master’s requirement

On the question of whether the requirement for students to hold a Master’s qualification (or equivalent) negatively affects the Scheme’s ability to attract suitable candidates, there was a spread of responses from supervisors with 42% disagreeing, 19% strongly disagreeing and 19% neutral but 20% agreed or strongly agreed.

Students who were interviewed generally felt much better prepared having a Master’s qualification (partly because it provides an opportunity to try out innovative interdisciplinary problems) and indeed some suggested that the Master’s should specifically have an interdisciplinary focus.

**In general, supervisors felt that the Master’s requirement was sensible but should not be applied too rigidly.** The Master’s provides a transition into interdisciplinarity but, as more than one interviewee noted, it depends on the quality of the training and the MRes was not always held in high regard. In particular, one supervisor was unhappy with the requirement for a distinction at Master’s level (because of the way his institution graded the degree); another felt that the requirement can exclude very bright and engaged undergraduates.

***To what extent were students able to tackle projects that were genuinely interdisciplinary in nature; do students come from a mainly social or environmental science background?***

### Motivation/origins of projects

The survey asked respondents to rank the importance of the following four potential motivations for the interdisciplinary PhD research that had been undertaken:

- Desire to pursue problems with social, technical or policy relevance in the “real world”
- Desire to contribute to advancement/evolution of academic disciplines or new (sub) disciplines

- General interest in the interface between environmental and social sciences (or between particular disciplines therein)
- Excitement over a particular research issue that required an interdisciplinary approach

Combining results across all student and supervisor responses shows (**Table 2**) a relatively equal spread between those who rank the desire to pursue real world problems (40%) and an excitement over a particular issue (43%) as the most important motivating factor.

**Table 2: Motivation/Origin of Project (All Students and Supervisors)**

Motivation	Total no. of respondents	%age of Respondents				
		Rank 1	Rank 2	Rank 3	Rank 4	Rank 5
Real World Disciplines	107	40%	26%	21%	10%	3%
Interface	107	5%	15%	19%	52%	9%
Issue	108	19%	29%	34%	13%	5%
Other	107	43%	31%	14%	11%	1%
	22	18%	18%	27%	5%	32%

Rank 1 = most important

Fourteen of the students surveyed gave additional reasons in response to this question. They spoke of wanting to integrate disciplines, develop particular skills and tackle particular real world problems (**Annex G**).

Although we asked in interviews about how (and by whom) the research project had been defined, we found no one single predominant model. In some cases the student had defined the research possibly as a development from their Master's interests or from previous work experience, either from the department where they were now studying or from outside employment. In other cases the problem had been defined by the supervisor, sometimes in discussion with the co-supervisor, or was a genuine team effort.

#### Interdisciplinary nature

**By far the majority (92%) of supervisors surveyed believed that the project(s) they supervised were genuinely interdisciplinary in nature** with more than one discipline truly integrated into the project. **Student respondents were equally positive** (current students 45% strongly agree, 48% agree; 2001 students 45% strongly agree, 36% agree).

In interviews, supervisors tended to be a little more reflective than students who almost all claimed that their research was interdisciplinary: supervisors

were more likely to make the distinction between projects which were genuinely *interdisciplinary* and those that were *multidisciplinary* (**Annex G**). One supervisor suggested that PhDs are primarily multidisciplinary and that it may take the postdoctoral level before they become genuinely interdisciplinary. Supervisors in the focus group spoke of their own *long journey* to becoming fully interdisciplinary.

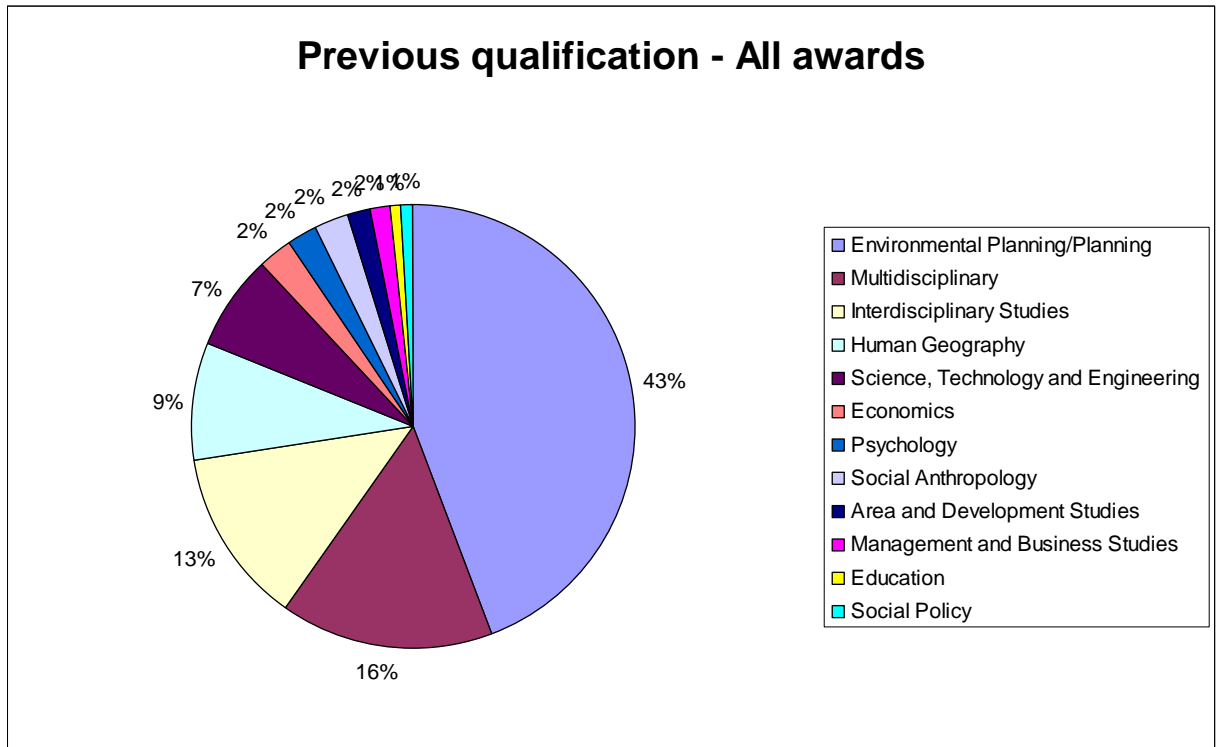
Another supervisor felt that his supervised projects were genuinely interdisciplinary because they *internalised the methodology of disciplines in which they were working*. In contrast, one student interviewee was quite pragmatic in her approach and admitted to finding it more productive to use the methods she was used to.

In general, there was a sense from both supervisors and students that **the degree of interdisciplinarity and the balance between contributing disciplines can (i) vary significantly between projects and (ii) often shift at different stages of the research.**

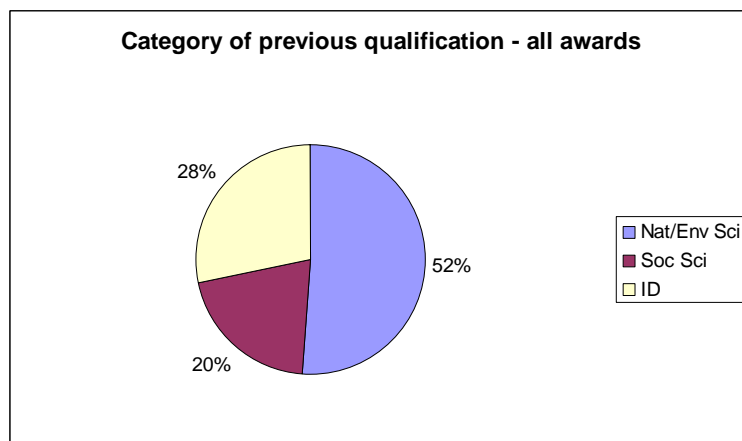
#### Students' backgrounds

We analysed the previous qualifications of all awardholders according to ESRC's previous qualification categorisation (**Chart 3**) and from this we derived a more aggregated analysis (**Chart 4**) which suggests that **52% of awards go to candidates with a background in the natural or environmental sciences; 20% to candidates from the social sciences; and 28% to candidates whose previous qualifications ESRC classify as interdisciplinary or multidisciplinary.**

**Chart 3: Previous qualifications of awardholders**



**Chart 4: Category of previous qualification**



***What was the distribution among HEIs and was this appropriate?***

Our analysis of the distribution of the awards in the period 1999-2004 (**Table 3, Annex B**) shows that the scheme appears to be both helping to consolidate centres of excellence in interdisciplinary research and encouraging interdisciplinary research in departments without such a track record.

**Table 3: Distribution of awards (1999-2004)**

<b>Institution</b>	<b>No. of awards</b>
University of East Anglia	21
University of Oxford	7
University of York	7
University of Cambridge	6
University of Newcastle	5
University of Birmingham	4
University of Durham	4
University of Kent at Canterbury	4
University of London: Imperial College	4
University of London: King's College	4
University of Aberdeen	3
University of London: University College	3
University of Manchester	3
University of Nottingham	3
University of Plymouth	3
University of Stirling	3
University of Wales	3
Oxford Brookes University	2
University of Bath	2
University of Edinburgh	2
University of Exeter	2
University of Glasgow	2
University of London: Royal Holloway and Bedford New College	2
University of Manchester: Institute of Science and Technology (UMIST)	2
University of Reading	2
University of Sussex	2
Roehampton University	1
University of Bradford	1
University of Bristol	1
University of Dundee	1
University of London: Birkbeck College	1
University of London: Queen Mary	1
University of London: School of Hygiene and Tropical Medicine	1
University of Surrey	1
<b>Grand Total</b>	<b>113</b>



According to supervisors, 54% of awards were embedded in an already established interdisciplinary centre or collaboration. When we asked this question of students, 59% of current students and 64% of 2001 students claimed to be in such an establishment.

Across the total student sample, only around a quarter (26%) had been involved in an already established interdisciplinary centre or collaboration at first degree level but nearly two-thirds (65%) had been so at Master's level. Of those who had such previous exposure, nearly all (95%) agreed that this had had a positive impact on their PhD experience. We asked the converse question of those who had not had any previous interdisciplinary experience but few responded: seven respondents were neutral as to whether this lack of exposure had a negative impact on their experience as a PhD student; six disagreed; and no one agreed with this statement.

Interviews revealed a broad spectrum of experiences from those students who felt that they were clearly embedded within a multi- or interdisciplinary environment to those in mono-disciplinary departments where the students saw themselves building bridges between disciplines. The background and interests of the supervisor can be key: as one student noted it was primarily the fact that her supervisor was interdisciplinary which gave her an immediate interdisciplinary context. Supervisors acknowledged that some students had *ploughed a lonely furrow* where the student may have been the first member of a research group to straddle different disciplines. In these cases some students can be vulnerable, relying on committed supervisors, or perhaps co-supervisors in other departments, to include them in relevant activities such as seminar programmes. Other students are more able, perhaps because of their maturity or simply personalities, to seek out such activities themselves and create their own interdisciplinary context. What the interviews did demonstrate were the contrasts that can exist between the experiences of students who are embedded within well-developed interdisciplinary centres where they know that interdisciplinarity is valued and taken as the norm, and those students who are acting as a vector for change within a more mono-disciplinary context.

Related to the question about timing of the application process (above), the focus group raised the issue of whether the scheme should adopt a quota system. It was felt that, while this would be easier from the point of view of timing, it could discriminate against some departments by reinforcing departments with track records in this Scheme. It was felt that such an approach could fossilise interdisciplinarity and potentially stifle innovation. However, it was noted that it can be harder to recruit candidates from within the department for universities that do not have the sort of interdisciplinary environmental Master's degrees that UEA and York run.

### ***Was institutional support sufficient?***

Support provided by the institution/department was generally seen as sufficient:

- Supervisors: 93% strongly agree/agree (three respondents disagreed and one strongly disagreed)
- Current students: 77% strongly agree/agree, 23% neutral
- 2001 students: 73% strongly agree/agree (three respondents disagreed)

While institutional support did not seem to be a problem, students' experience of support in terms of supervision varies. Most supervision arrangements appear to work well.

However, interviews revealed experiences which, while not the norm, were still extremely problematic for the students involved. Among these were: co-supervisors only starting to collaborate—with various degrees of success—over the PhD; co-supervisors or multiple supervisors who do not talk to each other; extremely infrequent meetings with either or both co-supervisors; inability of co-supervisors to agree on format/approach to a thesis<sup>7</sup>.

The Scheme encourages interactions between supervisors and co-supervisors. Of 45 supervisors responding (some with multiple entries) to a survey question concerning additional interactions resulting from the co-supervision:

- 12 are involved in research collaborations
- 10 have submitted joint grant applications
- 8 have published jointly

These activities were in addition to ongoing professional dialogue or workshop organisation. One noted, as a result of this interaction, the development of a RELU scoping study between co-supervisor and supervisor's institutes. Just under half of the supervisors responded positively to a specific question on joint publications.

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<sup>7</sup> Such that, for example, at least one student felt it necessary to write the thesis alternating chapters with separate methodologies for each co-supervisor.

### (iii) Skills and Outcomes

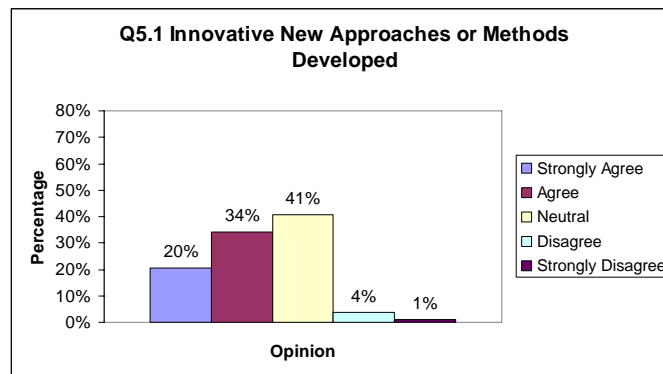
*Have the students been able to develop innovative new approaches and methods through the interdisciplinary nature of the scheme?*

**Two-thirds (66%) of supervisors agreed that innovative new approaches or methods had been developed** through the interdisciplinary nature of the scheme but a third (33%) were neutral on this question and one person disagreed.

Current students were much more non-committal on this issue although this may partly reflect the stage they are at with their research: 15% strongly agree, 21% agree, 56% neutral, 8% disagree. (For the smaller 2001 student sample the results were: 0% strongly agree, 64% agree, 27% neutral, 9% strongly disagree.)

The combined results for all students and supervisors (**Chart 5**) show, despite a majority of positive responses, that there is a considerable degree of neutrality on the issue of whether the scheme has generated innovative new methods or approaches.

**Chart 5: Innovative new approaches or methods**



When we asked those students and supervisors who had responded positively to this question to elaborate in a free text survey question it was hard to discern any particular trends as responses tended to be specific to the particular research project. However, several did mention new model-building approaches or made reference in different ways to combining methods, or applying existing methods in a novel domain.

This question of novel approaches was explored further in interviews where **students and supervisors generally seemed reluctant to claim ground-breaking innovations but did certainly point to taking a range of established methods and approaches and bringing them to bear in different contexts. The idea of integrating methods from different disciplines was also a fairly common theme.**

Many discussed awareness-raising concerning the benefits/needs of an interdisciplinary research method or approach – appreciation of the challenges of working with different approaches and the new level of understanding that this can bring. Students noted their current and projected advances in their ability to combine different types of analysis (qualitative and quantitative) in one research framework. Supervisors also noted students' growth in ability to integrate and ability to develop new approaches and methods by evaluating work in different disciplines and applying knowledge from one discipline to another or indeed to an interdisciplinary problem. As an example, one supervisor cited proudly his students' tendency to go to workshops addressing other problems, as this demonstrated that they had *developed a curiosity in trying to understand how others tackle a problem* and thus have realised that there are many different possible methods to be used. *Broad-mindedness, ability to see linkages and interactions* were seen as enhancing ability to produce interdisciplinary work.

Interviewees became quite thoughtful when asked if skills critical to interdisciplinarity can be taught<sup>8</sup>. Some felt that the capacity to work in an interdisciplinary fashion is innate and attitudinal requiring a vital open-mindedness that provides flexibility. Many felt that, although essential willingness to explore how different people approach problems cannot be taught, it can be honed through:

- a. exposure to others working in different and/or integrative ways (and learning how and why they do so)
- b. actually working on a problem, perhaps especially when working as part of a team.

More than specific technical skills, *the ability to communicate and the willingness to listen and to throw away some of your preconceptions about approaches are critical*. A general sense is that students go through a learning curve in these areas, as well as in acquiring specific methodologies, as they work on an interdisciplinary project<sup>9</sup>.

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<sup>8</sup> In fact one student project looking at language and communication across paradigms may address the extent to which such abilities can be taught.

<sup>9</sup> Of course the Scheme's students are not a random sample, they may well come into the project with some innate capacity. A question was raised as to whether it is realistic to expect even from these students a "deep interdisciplinarity" after only three years of a PhD, that perhaps the level of interdisciplinarity of this cohort should be compared in 5-10 years with individuals who had received either NERC or ESRC studentships.

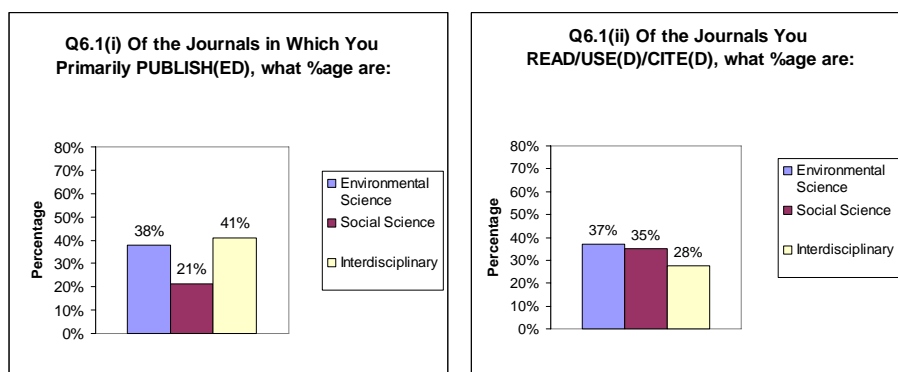
From interviews there was **clearly a sense, from both students and supervisors, that this particular studentship had enabled the student to do things that could not have been funded through a conventional ESRC or NERC award.** Supervisors suggested that the award had helped students gain access to others, for example, in one case where the additional NERC affiliation facilitated links with scientists at other institutions that the supervisor believed would not have been open to just an ESRC affiliated student. Another supervisor spoke about the competition forcing supervisors to work together and think more critically about the definition of the project which he believed had resulted in a better project. A third supervisor saw the wider benefits of the scheme beyond just the funded project, because he felt it provided a vehicle for collaboration with other departments and gave him a credibility when approaching potential collaborators elsewhere in his institution.

Students felt that the scheme provided a unique opportunity, as one said *to make the story more complete*, to see different sides to an issue and to develop a richer proposal than a single Council application. At least two of the students interviewed were adamant that their proposals would not have been funded by a single Council and others pointed to the fact that the joint studentship enabled them to tackle different aspects (human and physical) of policy issues that a single discipline grant would not fund.

***Are publications and papers produced by students of a high academic standard and mainly interdisciplinary in type?***

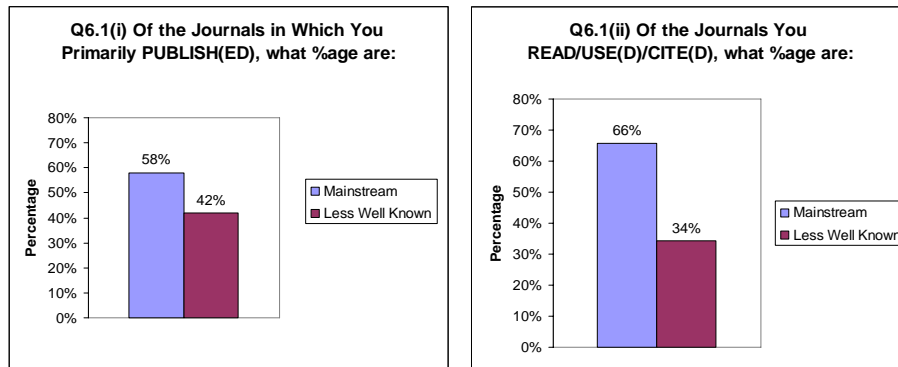
Many students are not yet at the publishing stage but, when we asked all students who had published to assess what type of journals they published in, the largest group (41%) published in interdisciplinary journals (**Chart 6**). However, when we asked all students to estimate the breakdown of journals which they read or cited, interdisciplinary journals were slightly in the minority (28%) (**Chart 7**).

**Charts 6 and 7: Types of journals**



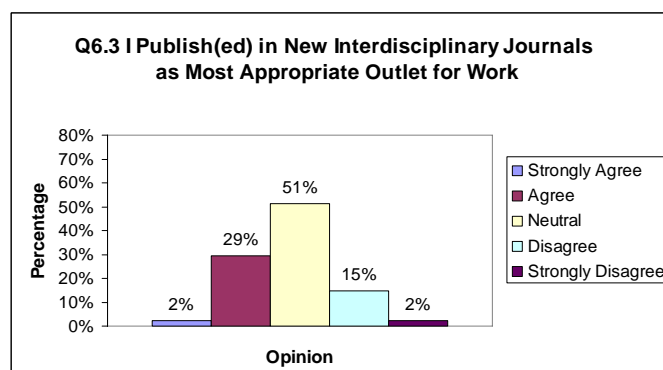
We tried to ascertain whether students were tending to stick with mainstream journals or whether there was a greater tendency to use or publish in less well-known journals. In both cases we found that the well known journals still predominate (**Charts 8 and 9**).

**Charts 8 and 9: Mainstream or less well known**

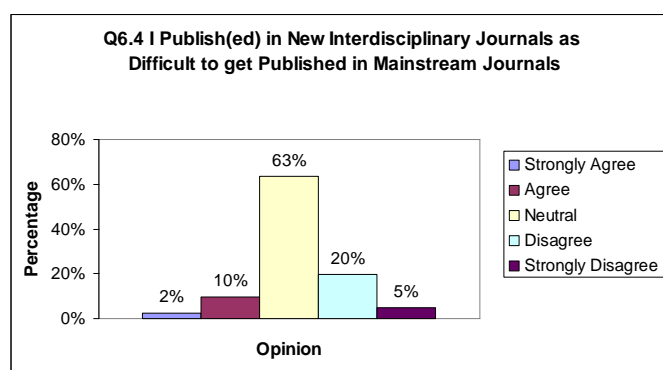


We tried to explore students' motivations to discover whether they were having difficulty publishing their work and whether they were making a conscious decision to publish in less traditional outlets: 31% agreed or strongly agreed that they published in new interdisciplinary journals because they were the most appropriate outlet for their work (**Chart 10**) but only 12% agreed or strongly agreed that they published in new interdisciplinary journals because it was difficult to get interdisciplinary articles published in mainstream journals (**Chart 11**). Generally, student respondents were neutral on these questions and again this might reflect their level of experience. However, one former student, now working outside of academia, described a very dispiriting experience trying to publish his work in the top journals in his fields.

**Chart 10: Appropriate outlet for work**



**Chart 11: Ease of publication**



We asked the same survey questions of supervisors and again they were quite neutral on whether the student tended to publish in new interdisciplinary journals because they were the most appropriate outlet for their work (12% strongly agree, 23% agree, 42% neutral, 17% disagree, 6% strongly disagree). There was a similar spread of opinion on the question of whether the student tended to publish in new interdisciplinary journals because it was difficult to get interdisciplinary articles published in mainstream journals (9% strongly agree, 21% agree, 40% neutral, 21% disagree, 9% strongly disagree).

**Supervisors tended to believe that the quality of published outputs were of as a high a standard as those of mono-disciplinary students** but depended on the quality of the student and were not necessarily due to interdisciplinarity (93% of supervisors disagreed or strongly disagreed with the statement “The academic standard of papers produced by the student is lower than those produced by more conventionally trained students at the same stage in their career”).

The interviews revealed some variations according to contributing disciplines: **some interdisciplinary areas are becoming a sub-discipline in their own right and new, well-regarded interdisciplinary journals are starting to emerge but there are some high profile journals that still do not publish interdisciplinary work.** One supervisor told us that if students want to become academics, it might be tougher to get into mainstream economics journals and they could be excluding themselves from some professional routes by becoming interdisciplinary rather than specialist.

In general, however, there was a sense of a changing situation with more reputable journals having a policy of opening up to articles which included both natural and social science. One supervisor told us that, five years ago, the academic standing of outputs from interdisciplinary work was lower than that from single discipline research, but he believes that this is much less marked now and a number of explicitly interdisciplinary journals now exist with an editorial policy to establish academic respectability. However, **the RAE**

**was still seen as presenting difficulties for interdisciplinarity in terms of publications strategies:** this same supervisor noted that the general perception amongst the research community had made less progress and too many people still think that the only good science is single discipline science.

Many interviewees, both supervisors and students, spoke about the need to have a publications strategy for interdisciplinary work which encompassed both interdisciplinary and more mainstream mono-discipline journals. Students spoke of planning **a strategic portfolio of different types of articles:** theoretical, social, interdisciplinary, physical, policy, etc. As one student noted, this does mean that interdisciplinary students have to be more creative in order to publish in a range of well-regarded journals but there is very little time to do this the PhD. This is when a postdoctoral position can be useful to allow the researcher to think laterally about the strategic placement of publications. This view was reinforced by a supervisor who felt that it was harder for interdisciplinary students to write papers as they went along, possibly because interdisciplinary work requires more time to reflect on the potential connections between different aspects of the research.

***What do students do after the Scheme – do many generally remain in academia or follow alternative careers?***

This was a difficult question to answer as we did not have contact details for graduates of the scheme. Interviews with supervisors provided brief glimpses into current positions, with most students not yet finished their PhDs. More current students seem to hope to go into academic positions than non-academic jobs, although real-world relevance of policy and/or consulting roles is attractive to some.

However, we did ask supervisors whose student(s) had graduated, whether they were currently engaged in an activity that draws on both social and environmental sciences and 83% of those who answered this question responded positively. In a follow up email we asked these 24 supervisors if they could tell us the destinations of these students. Of the 16 who responded we found that 10 had stayed in academia and six had followed alternative careers:

- permanent academic, 3
- temporary research, 5
- temporary teaching, 2
- professional, non-academic, 6

Of those graduates who had found employment outside academia, two were working in the public sector (e.g. the Environment Agency), two in the private sector (one for an accountancy firm and the other as an independent consultant), and two in NGOs related to conservation and biodiversity.



Supervisors and students responding to the survey were generally optimistic that the interdisciplinary nature of the studentship will or did enhance the student's employability, with three quarters (75%) agreeing (36%) or strongly agreeing (39%). A fifth were neutral and only 5% of the respondents disagreed or disagreed strongly. Although the 2001 cohort responding to the survey was small (11 respondents), it is perhaps telling to note that, while 79% of the larger sample of supervisors were positive, only 45% of students from the 2001 cohort (five respondents) – who are closer to employment stages of their career – agreed that it had made them more employable.

When asked a similar question, nearly two-thirds (61%) of supervisors disagree that in the future interdisciplinary training could be viewed as a disadvantage in academia; 18% remain neutral and about a fifth (21%) agree.

However, frank and open focus group discussions flagged a serious issue in **constraints on academic career paths for interdisciplinary students**. This is in spite of the fact that these tend to be highly motivated and good students. Institutional “departmentalism”, the RAE and indeed the current Research Council set-up are seen to mitigate against employment prospects in academic careers. Even students whose innovative interdisciplinary work is received well at conferences, for instance, can feel that they are disadvantaged when prospective university employers prioritise ability to teach in a discipline.

In interviews, again more searching than surveys, only a handful of supervisors were flat-out positive about the interdisciplinary studentship contributing to academic employment, and some had mixed feelings, with many voicing real concerns about employment prospects in “tribal” academia. Some felt that the quality of an individual student, excellence of preparation and the credibility conferred by the ESRC/NERC studentship would position a student for an academic career. However, others think that priority placed on coverage of teaching, which is still discipline-based, can work against a student from this sort of scheme. This was demonstrated quite directly by one interviewee who, while starting to respond in an extremely positive way, then remembered a developmental stage in his own department in which people were hired to deliver undergraduate, discipline-based courses: *The person who is full square in the subject may have an edge over someone who seems to be somewhere on the margins*. A similar disadvantage can lie in research and publication records if a student applies for a straight lectureship in a discipline.

It appears possible to some that academia *is* changing, however slowly, to be more accepting of interdisciplinarity – or at least for interdisciplinarity to be less of a negative. In part, this may be due to an increase in interdisciplinary funding opportunities (e.g. EU and RELU). At this point in time, too, should an interdisciplinary post be advertised, there may be fewer candidates than for a conventional post, giving an advantage to students trained in a deliberately interdisciplinary way. If the number of truly interdisciplinary departments in the UK were to grow, there could be more interdisciplinary posts available. Finally, some inherently interdisciplinary areas are coalescing or evolving into

recognition, with conservation a case in point, such that the research and teaching abilities of interdisciplinary students in those areas is likely to be appreciated and career paths are likely to open up.

Students discussing employability in interviews appear to be fairly optimistic that they will be prepared to take advantage of such changes in academia, although they are often aware of perception and other problems, frequently using the word “hope”.

In interviews, many supervisors and at least half of the students pointed out the good match between interdisciplinary skills and learning with non-academic jobs, such as consulting, small companies needing breadth in their employees, international organisations, policymaking or other government work. One person now in government, for instance, underscored the need for teams which include not only experts in narrow fields but also people who can “mediate” between experts and policymakers, developing bridges. Even those supervisors who might concede the possibility that, over a period of time, interdisciplinary research funding might increase and thus there would be a place for interdisciplinary individuals in academia, still suspect that for some time many interdisciplinary graduates will need to go out of academia for satisfying careers.

#### (iv) Exploration of Interdisciplinarity<sup>10</sup>

##### Benefits

We asked supervisors and students what they saw as the benefits for researchers to engage in interdisciplinary research between social and environmental sciences. Many of the students spoke about being able to *bridge gaps* or develop a more holistic approach to their research which enabled them to communicate with a broader range of people. They spoke about its importance in applied or policy-oriented work in order to solve real world problems and produce realistic and useable outputs rather than “ideal” solutions. The pragmatists also recognised that it brought additional funding to universities. But as well as this application-oriented benefit, a few of the students also reflected on the benefit to the research process. These respondents talked about interdisciplinarity generating *a more creative research process*; another student felt that he had become a better problem-solver as a result of this scheme; someone else pointed out that coming from a different disciplinary perspective enabled the researcher to challenge accepted norms. So, in sum, as far as the student group was concerned there seemed to be **two areas of benefit**: on the one hand in terms of **research outputs**, but on the other, to the **research process** itself.

While supervisors did also talk about the benefits of being engaged in problem focused research and of engaging with and influencing policy, they did, understandably, reflect more extensively on the benefits to research. So interdisciplinary work was seen as a **way of breaking disciplinary logjams** and addressing research questions that a mono-discipline researcher could not tackle on his or her own. It was seen as exposing researchers to new ways of doing things and new ways of asking questions, often forcing them to rethink quite radically core belief systems. It can expand researchers’ repertoires of research methods, epistemologies and analytical tools. A more holistic, interdisciplinary approach brings a greater realisation of how things are connected and, particularly in the environmental area, a better understanding of the complexity of systems and the connectivity of people and the environment.

In practical terms, supervisors pointed out that an interdisciplinary approach could open up new publishing outlets, enable different funding sources to be accessed and permit greater flexibility in the job market.

##### Disincentives

We asked interviewees what they saw as the disincentives for researchers to engage in interdisciplinary research between social and environmental sciences. Supervisors certainly did not view interdisciplinarity as an easy option, one describing it as “an uphill struggle”, another pointing to the complicated demands at the level of data, methods and theory. **Many**

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<sup>10</sup> These issues are explored further in a number of publications listed in **Annex H**.

**reflected on the disincentives presented by the RAE.** This was seen as a particular disincentive to young researchers: it was suggested that, until one was well-established, it was necessary to keep a core discipline as well as a twin track in interdisciplinary research. (One student observed that the older geographers in her department tended to be fairly interdisciplinary but the younger ones were more focused on the RAE.) RAE concerns showed through in recruitment as well where it was seen as safer to go with someone with a well-defined (and by implication, mono-disciplinary) research programme.

**Lack of time** was cited as a significant disincentive to interdisciplinarity – in terms of the time it takes to read around a new discipline, and a lack of time to break down barriers and talk to colleagues in other departments – but also the fact that a three-year studentship was probably not long enough to conduct an interdisciplinary research project. A further disincentive was seen by supervisors to be the refereeing process where it was often hard to satisfy both environmental and social science referees with an interdisciplinary proposal.

**Lack of status** was a concern to some supervisors who talked about (single discipline) colleagues *looking down on you*, about the continuing *misapprehension and antagonism about 'soft science'* and a marginalisation of interdisciplinary research because it is seen as *frothy and not very respectable*.

Students pointed out that it is more work to do an interdisciplinary PhD (see **Annex G**). Some also seemed to feel that there was less kudos in it and raised concerns about being viewed as a “jack of all trades and master of none”. This led to some of them feeling that they were more open to challenge (e.g. when presenting their work at a seminar) than their single discipline peers.

### Research-related problems

We asked interviewees whether the pursuit of interdisciplinary research had run into research-related problems (e.g. language and communication, different worldviews or paradigms, institutional structures, procedures, etc). A number of students felt that they had not encountered any such problems although others did point to **the difficulty of communicating across different disciplines**. Perhaps one benefit of this is that some interdisciplinary researchers worked harder at their own communication and tried to avoid using disciplinary jargon in their own writing.

The problem of language was also highlighted by supervisors who acknowledged that contributing disciplines often hold very different world views, with one supervisor noting that language and paradigms are of such importance that, if you are not accustomed to integrated approaches, then they can present strong disincentives. However, another supervisor noted that he was far enough apart in terms of discipline from his co-supervisor that their language was so different that there was little opportunity for

misunderstanding (i.e. two different vocabularies rather than a shared vocabulary interpreted differently).

Other research-related problems raised by supervisors were, once again, the RAE (in particular, departments not knowing how to apportion RAE credit for studentships), problems with grant proposal referees not fully understanding the interdisciplinary approach, and general problems of mismatch between different departments'/faculties' working procedures.

### Barriers and constraints

**There are real concerns as to the growth of interdisciplinarity as a valued approach;** one premise put forward in the focus group is that, with the vast expansion of the body of knowledge, departmentalism will rise again as people retreat into their own, somewhat finite, disciplines. Certainly the RAE is seen as blocking interdisciplinarity: while the leadership may espouse interdisciplinarity, panel reviewers on the coal face revert to their natural discipline-orientation. A united plea from the Supervisors' Focus Group plea is: *The RAE blocks interdisciplinarity—get rid of it! It is distracting and divisive. A change in mindset is needed to break down departmentalism. The academic world runs on discipline lines but the real world does not.*

In interviews students tended (understandably) to respond from the perspective of their own research experience and many said that they had not encountered any barriers. Others commented on the (potential) problems they might encounter finding publishing outlets. Some suggested this depended on the topic – some areas had achieved recognition as an interdisciplinary field with journals in their own right. Supervisors reported a range of experience with some saying that there were no real barriers within their institutions, to others who said they had to *struggle all the time*. In general, the barriers mentioned were often at the institutional level (e.g. problems registering students across departments or issues with research committees).

### Mechanisms that foster interdisciplinarity

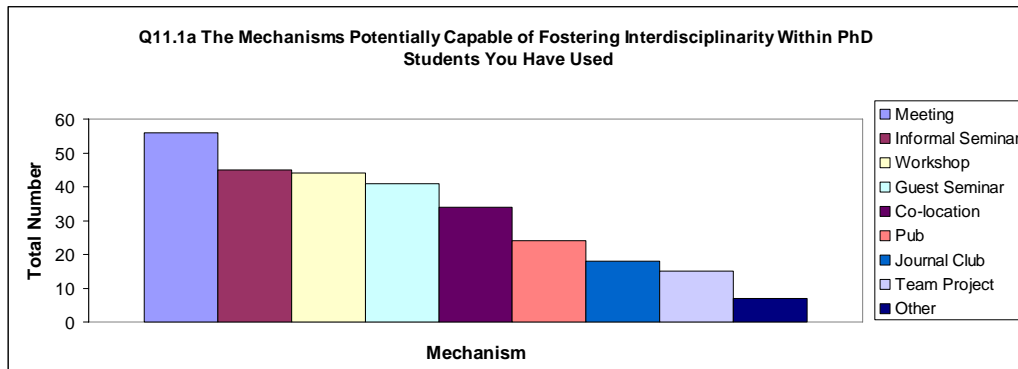
In surveys we asked both supervisors and students to indicate which of the following mechanisms potentially capable of fostering interdisciplinarity within PhD students they had used:

- Seminars where guest speakers are requested to make their comments accessible to individuals from different disciplines
- Informal seminars in which academics and students from different disciplines are deliberately brought together
- “Journal clubs” in which students from different disciplines present, share and discuss together papers
- Problem or issue based workshops/conferences/think tanks, convening individuals from different disciplines

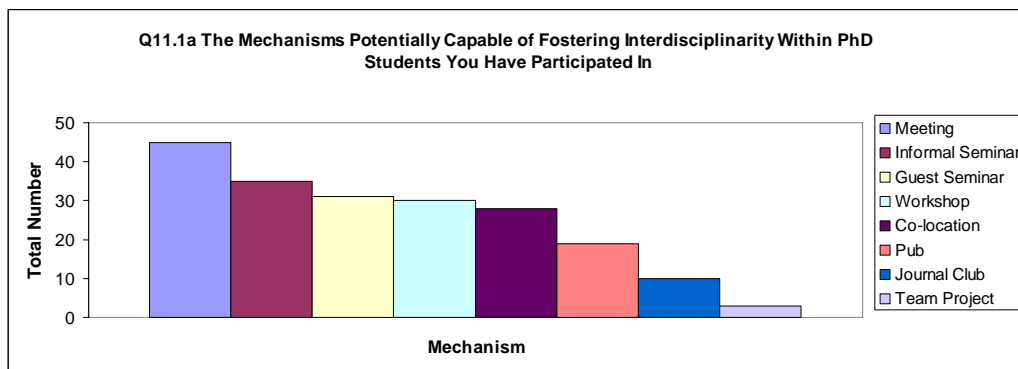
- Regular/frequent pub or food-related informal get-togethers for students from different disciplines
- Co-location of students from different disciplines (e.g. in labs, field sites and/or offices)
- Regular meeting of Supervisor, student and co-supervisor(s)
- Assigned team projects, requiring joint working by students from different disciplines

The results for the first part of this question were very similar with supervisors and students identifying the same mechanisms (**Charts 12 and 13**).

**Chart 12: Supervisor view of mechanisms capable of fostering ID**



**Chart 13: Student view of mechanisms capable of fostering ID**



NB The 'other' category was too small to depict on this chart.

When asked to rank the effectiveness (low/moderate/high) of the mechanisms they had used, **supervisors perhaps tended to stick with the more traditional methods** such as meetings between the student and supervisors, whereas **students ranked a broader range of mechanisms (Tables 4 and 5)**. Of the “other” mechanisms suggested, supervisors proposed:

- Arranging meetings with end-users
- Teaching postgraduate interdisciplinary modules to students from a variety of disciplines and getting them to work together in mixed groups to tackle topical problems
- Writing multiple author interdisciplinary papers

Students suggested:

- Conferences with single subject and joint subject streams integrating different approaches to common policy issues
- Easy access to journals publishing interdisciplinary papers
- A group facilitator to help students recognise that other disciplines have relevant contributions to make
- Meetings/discussions (possibly online) with other interdisciplinary researchers

**Table 4: Supervisor ranking of mechanisms**

Mechanism	No. Ranked As:				%		
	Low	Medium	High	TOTAL	Low	Medium	High
Meeting	1	8	44	53	2%	15%	83%
Co-location	0	12	19	31	0%	39%	61%
Workshop	0	17	25	42	0%	40%	60%
Team Project	2	4	8	14	14%	29%	57%
Other	1	2	4	7	14%	29%	57%
Informal Seminar	4	17	21	42	10%	40%	50%
Journal Club	1	8	8	17	6%	47%	47%
Guest Seminar	6	20	12	38	16%	53%	32%
Pub	7	11	4	22	32%	50%	18%

**Table 5: Student ranking of mechanisms**

Mechanism	No. Ranked As:				%		
	Low	Medium	High	TOTAL	Low	Medium	High
Other	0	0	4	4	0%	0%	100%
Workshop	2	8	20	30	7%	27%	67%
Informal Seminar	1	14	20	35	3%	40%	57%
Journal Club	1	3	5	9	11%	33%	56%
Meeting	3	17	25	45	7%	38%	56%
Co-location	5	9	14	28	18%	32%	50%
Guest Seminar	6	14	12	32	19%	44%	38%
Pub	4	8	7	19	21%	42%	37%
Team Project	0	3	1	4	0%	75%	25%

In interviews with supervisors, suggested mechanisms for fostering interdisciplinarity included:

- more interdisciplinary expertise on RAE panels and more interdisciplinary Research Council referees
- more cross-council initiatives to support interdisciplinary working
- more interdisciplinary events and conferences
- streamlining internal university procedures (e.g. registry), including perhaps the appointment of a senior official of the university with responsibility for interdisciplinarity university-wide
- making students aware from the outset that an interdisciplinary PhD requires that bit more effort – *they don't just have to be as good as their mono-discipline peers but better.*

Students reflected on their immediate PhD experience, recommending, for example, regular meetings between the student and supervisors to foster interdisciplinarity but also pointed to wider issues within the research system such as funding for explicitly interdisciplinary research institutes. Several commented on the value of such an interdisciplinary centre in running events and seminars that bring a diverse group of like-minded people together to increase researchers' exposure to different methodologies and research rationales - simply putting people in a building is not enough without a managed programme of activities geared towards fostering interdisciplinarity. Others felt that training should be more explicit and concrete with follow up by ESRC as to what training had been conducted.



## (v) Development

### *Should the Scheme be continued?*

**The Scheme is viewed very positively indeed. Survey respondents were nearly unanimous (99%) that the Scheme should be continued** (only one respondent was neutral). While offering suggestions for its expansion or improvement (as below), interviewees and focus group participants strongly encouraged the Councils to continue the Scheme.

### *If so, how might it be developed and improved?*

In considering the potential development and improvement of the scheme, we have identified two categories of findings:

- a. the micro issues related to the *operation* of the current scheme and
- b. the macro issues which relate to the *changing academic landscape* for interdisciplinary research.

### Operation

#### Selection Criteria

As the criteria seem to change, perhaps as numbers of applications increase, the focus group felt that it was not always clear what the Research Councils mean by interdisciplinarity; whether, for instance, environmental scientists turning to social science are preferred. More guidelines (including examples of funded projects, with, at least, titles from more than one year and perhaps more detail on disciplines involved) from the Research Councils and more feedback on assessment criteria would be useful.

The focus group told us that a truly interdisciplinary mindset is needed to ensure a holistic selection process that recognises the added value of an interdisciplinary proposal so that an applicant is not *bitten by both camps*, i.e. disadvantaged by not being sufficiently strong in either the social or the natural sciences. Especially on a small panel, one or two discipline-based views can dominate. This requires more genuinely interdisciplinary experts to act as reviewers and there should, by now, be a large enough pool of experienced supervisors from this Scheme who could be called on to referee proposals.

ESRC/NERC are further encouraged to see if more could be done to assess how genuine the interdisciplinarity of a proposed studentship is likely to be such as, for example, evidence of coordination (not merely juxtaposition) of proposed methods. In considering prospective students, more attention could

be paid to open-mindedness and flexibility, a track record in interdisciplinarity, and/or work-experience in order to give more attention to *daring, experimental, unusual research*.

### Application Process

Focus Group participants and others strongly recommended that ESRC/NERC *not* go with a quota system that reinforces only departments with track records in this Scheme. Giving other departments a chance would mean that important sources of innovation would not be missed.

ESRC/NERC were praised for basing the selection on an individual, and that individual's *driving urge* to conduct an interdisciplinary project. (Some supervisors, however, might prefer to get an award and then advertise for a student.) Some sort of "e-dating" service could help prospective students and supervisors find each other.

As noted above, flexibility as to what Master's degrees are accepted is recommended and support for interdisciplinary Master's degrees was encouraged. The Focus Group also raised the point that some Master's degrees which are recognised by NERC are not recognised by ESRC, suggesting a need for greater consistency.

Joint Master's degrees across all Research Councils would help to provide a natural stage for individuals developing interdisciplinary approaches.

The timing of the award announcement is a frequently-voiced (although not damning) concern, as often good students will naturally take up earlier NERC awards or offers of employment.

ESRC is encouraged to simplify and streamline its application, with the *massive amount of information* required for part three and difficulty of coordinating the components as particular disincentives, and to include room to justify fieldwork costs.

### Scheme Management

Providing more studentships was a frequent recommendation. Extending the scheme to collaborations with other Research Councils was suggested.

It was often noted that NERC seemed far less involved than ESRC. Although this could to a great extent be predicted due to ESRC's role in administering the Scheme, still students seemed to desire more contact with NERC and its activities for postgraduates, even as they appreciated ready access to ESRC activities.

Students appear to be unevenly informed about "bonus opportunities" such as the (commended) flexibility of placements in international universities or government bodies such as POST.

More flexibility to allow students to audit courses, go on specialised training courses, learn tools such as spatial analysis, is recommended. Some feel that

interdisciplinary PhDs, particularly when involving fieldwork, would benefit from longer duration.

Adequate field budgets are requested, with some students spending time and effort raising funds. Students working in the UK bemoan the absence of a conference budget.

Dissemination of an executive summary of this evaluation was requested on several occasions.

### Supervision and examination

Asking supervisors in interviews about the academic standard of student publications threw up the issue of different conceptions of what constitutes a PhD thesis whereby the natural sciences have a much greater focus on publishing papers, so that each thesis chapter corresponds to a paper, whereas a social science thesis more usually resembles a monograph. This is one example of potential divergence in supervisors' views; students need to be given early guidance as to which approach to follow.

Variability in student experiences with supervision and co-supervision suggest that ESRC/NERC provide guidance (e.g. a good practice handbook) for supervisors. Perhaps even more urgently, development of guidance on expectations of interdisciplinarity within this scheme is recommended for External Examiners (who in any event must be chosen carefully, quite possibly drawing on experienced Scheme supervisors).

### Changing Academic Landscape to Promote Interdisciplinarity

Although fundamental transformation will take longer, Focus Group participants expect the academic landscape to change in 15 years. This will come about in great part through the efforts of currently established academics who have "travelled the journey" to interdisciplinarity themselves.

Research Councils are encouraged by supervisors and students not to *blow hot and cold on interdisciplinarity* but to participate fully in the movements occurring that will promote interdisciplinarity. Former Chief Executive of NERC John Lawton was quoted as having said "Interdisciplinarity has not reached its escape velocity". The primary message is **to provide interdisciplinary funding opportunities at all career stages.**

### Postdoctoral opportunities

An observation made during a focus group echoed the thoughts of many: *The current Research Council set-up mitigates against successful career paths in interdisciplinarity.* Students are frustrated by the feeling that they need to be in a single discipline to get jobs. *Going wide in your PhD is what seems right, then there is the feeling that academia wants you to narrow.*

Students felt very deeply the absence of explicitly interdisciplinary postdoctoral fellowships<sup>11</sup>, wondering, for instance, if this means that the Research Councils are merely paying lip service to interdisciplinarity. Just as they proudly finish their interdisciplinary studentships, many students feel disadvantaged in competition for mono-disciplinary postdoctoral fellowships, *making them retreat back into one or the other of the disciplines. This undermines their previous three years' training.*

The **often-recommended year of interdisciplinary postdoctoral training** (about which some thinking has already been done within the Councils) would allow not only the writing up of a strategic portfolio of publications as discussed above but also further networking and development of a professional identity.

After the postdoctoral fellowship, small research grants dedicated to interdisciplinarity were recommended to allow researchers to mature and demonstrate their ability to produce high quality work. As one supervisor commented, *the Councils must address the afterlife – where PhD students go after the PhD studentship.*

Funding an **interdisciplinary research continuum was very strongly recommended** (see **Figure 1**) as it would signal genuine value placed on interdisciplinarity at each sequential stage of a career path.

### **Figure 1: Interdisciplinary Research Funding Continuum**

In addition, opportunities such as working with ESRC/DfID or ODPM, Research Council thematic grants (e.g. RELU or Environment & Health) are seen as encouraging interdisciplinary work and providing opportunities for students post-Scheme. Availability of funding for interdisciplinary research would also provide an incentive for established researchers to become engaged in interdisciplinary work through collaboration with younger interdisciplinary researchers and, indeed, to become more receptive to their employment within academia.

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<sup>11</sup> This was not a question we specifically asked in the survey so we do not have a quantitative analysis of this issue, but the desirability of a postdoc scheme was raised frequently (and spontaneously) by many informants in free text survey responses, telephone interviews and, particularly, focus groups.

### Community-Building

Simultaneous challenges of managing an interdisciplinary PhD and a sense of isolation were frequently noted. ESRC and NERC were encouraged to **aid in community-building** related to the scheme. A very strong recommendation, explored in more detail below, was to: *Bring together students together through community-building events.* Furthermore, the Research Councils were encouraged to: *Provide a support network for supervisors as well as for students.*

A strong Focus Group recommendation to the Research Councils is that: *The pool of supervisors who are now experienced in guiding interdisciplinary PhD students could be drawn upon to work with the scheme, advise staff and students, and serve as mentors for new supervisors. More broadly, such individuals (who are both senior and interdisciplinary) should be placed in decision-making roles at various levels, including key committees and membership on Research Councils to ensure that funding for interdisciplinarity is not dropped automatically as a non-discipline frill when budgets get tight.*

**A more closely networked community of interdisciplinary supervisors would add value** by:

- sharing lessons learned
- mentoring
- helping to track tracking students and post-PhD destinations/careers
- providing a pool of experienced interdisciplinary external examiners and referees for future applications

A thoughtful comment offered by a supervisor on the survey looked to the future of the Scheme's impact on interdisciplinarity: *At the moment, the scheme is excellent for producing graduates with interdisciplinary skills and constructive attitudes to inter- and multi-disciplinary projects. In future, more emphasis on development of new interdisciplinary theory could enhance the academic reputation of interdisciplinary work.*

One interviewee observed that future career opportunities will be created for these students by (a) internal reasons such as retirements and the widespread restructuring of institutions toward cross-school courses and programmes, and also (b) external reasons, such as the rise of sustainability and other complex policy issues or themes. Another interviewee is cynical about the degree to which such changes are espoused rather than fundamental, and suspects that changing the academic landscape will be a long, slow process. Yet another interviewee underscores, albeit reluctantly, the relatively small number of students produced by the scheme, using phrases like *might be a drop in the bucket*. Certainly demand might seem to be increased because some problems are *really too difficult to handle with just one discipline* and because Research Councils have been expanding their interdisciplinary work, but *countervailing pressures* such as universities' internal structures and especially the RAE, exist.

Certainly, even interdisciplinary students recognise the value of mono-disciplinary work as critical pillars of learning, across which integrative interdisciplinary work can build bridges. Edges of single disciplines may become *blurred* over time. It has been observed, for instance, that some areas are fairly far along the way to evolving into interdisciplinary “fields” (e.g. water policy, conservation); in other areas interdisciplinarity is just emerging.

***Would it be helpful for diverse interdisciplinary students and/or supervisors to be brought together to share experiences, issues, problems and solutions/good practice regarding interdisciplinary working?***

**Students would very much like to be brought together to share experiences, lessons learned and challenges regarding interdisciplinary working. Supervisors also see this transfer of lessons learned, along with community-building, as positive.**

In the survey, the idea of coming together to share experiences in some sort of ESRC/NERC conference/event met with an very positive response (80% of all participants agreeing or strongly agreeing); the response was especially enthusiastic among students (90%); supervisors were also positive (70%).

The idea of being given specific training in how to tackle interdisciplinary projects also met with a positive response, although not so strongly: students were noticeably more positive toward the idea (86%) than supervisors (67%). However, training per se was not given much emphasis during interviews, perhaps on the assumption that it could be folded into the conference’s coverage. (It was noted that care needs to be taken not to overload with training students who are already burdened with the challenge of completing an interdisciplinary thesis in three years.)

Interviews confirmed a positive response to the conference proposal, especially for a mutual self-help support occasion for students. A typical response, from one student, was: *Yes, it would be useful to bring students together in a conference, talk about their present work, deal with some of the challenges, realise they are not alone, share experiences.* This Scheme apparently held one such conference early on that was well-received. Some have had positive experiences with other events bringing people together, such as a cross-Research Council residential Grad School on transferable skills, or the Tyndall Centre’s annual PhD meeting. It was suggested that it might be possible to include other Research Council funded interdisciplinary students (e.g. EPSRC/RGS, Tyndall Centre).

Not all students were equally excited; some of those students who work within a unit that is already highly interdisciplinary see less added-value for

themselves in attending such a conference. They are already able to discuss problems with others around them who are also tackling interdisciplinarity.

Yet for some, particularly those who are not immersed in a local support network, the idea of belonging to a “community” is very compelling: *It would be a wonderful idea to discuss things, you would feel part of a wider ESRC/NERC community.* Networking can occur that lasts beyond the fellowship; as one supervisor noted: *This kind of thing allows you to be exposed to other research, see similar approaches to your own and to forge collaborations with other like minded people.* A slightly different, or complementary, approach would be to initiate regional networking groups among ESRC/NERC (or indeed other cross-Council) students, with regular meetings (possibly with overarching interdisciplinary themes such as sustainability or conservation) over a period of time to build relationships.

The two focus groups suggested subjects to be covered at such a student conference: sharing of problems and lessons learned; marketing oneself for posts while maintaining one’s interdisciplinary approach; development of publication strategies; funding possibilities/pursuit strategies; career advice including awareness of non-academic jobs as well as challenges facing interdisciplinary junior academics, and potential applications of work to policymaking and other areas.

Although some assume that this would merely be an induction event, most seem interested in attending such a conference more than once during their studentship, perhaps at least twice, at the beginning and in the last, post-field work year when problems in analysis and writing up will arise. Others recommend it as a yearly event. Students coming together from different years would make it possible to transfer lessons learned about different stages of the process. Some recommended inclusion of Scheme alumni as well.

Regarding inclusion of supervisors, emphasis was placed during interviews on students as participants, probably without supervisors. Some thought that supervisors would not have/make the time; others thought their presence would constrain student-to-student interactions. However, participants in the supervisor focus group strongly recommended some form of community-building and networking among supervisors as outlined above.

ESRC/NERC could extend the building of a community beyond a conference, for example with a website that allows continuing communication and sharing of concerns/solutions after students have met face to face. A targeted email bulletin might contribute to network-building among students and supervisors. Small-scale funding could allow students to visit other ESRC/NERC students and supervisors at other institutions. The student focus group encouraged community-building at all levels, so that linkages can continue long after the studentship.

***Would it be helpful for Supervisors and co-Supervisors of interdisciplinary studentships to have some formal or informal training in the supervision of interdisciplinarity?***

**Over half the survey respondents overall (61%) think that specific training in how to supervise interdisciplinary projects would be helpful,** while nearly a third are neutral on the subject. Interestingly, **there is quite a difference in views between students and supervisors:** 82% of students support the suggestion but only 43% of supervisors agree.

*As one very experienced supervisor observed, Before the supervisors start, they should be made more aware of what it is going to involve, what to expect, what the constraints and problems are going to be. Supervisors need to be better informed and more prepared for these problems. ... There are 2 issues, one is psychology - the ability of supervisors to move out of their box, and the other issue is how to manage students so that you retain the interdisciplinarity of it, so that you don't feel that it all has to go into your own area. This is really quite difficult.*

Prospective participants would need to see the benefits. For example, it might be attractive were the session/meeting to be hosted by a well-known recipient of many ESRC/NERC studentships such as the University of East Anglia. Perhaps informal get-togethers to talk about scheme processes, and possible research funding, may be better than actual training; *it would be a disaster to try to have some formal teaching of skills to foster interdisciplinarity.* (At one university, mentoring is done internally through putting together experienced and new supervisors for interdisciplinary PhDs, in teams of three but this might only be possible in larger interdisciplinary research units.)

Cynicism regarding the likelihood of many supervisors taking time out of their schedules to attend a training event gave rise to the suggestion of an alternative approach: a **guidebook or short handbook on good supervisor practice.** Sent to supervisors and co-supervisors upon award of a studentship, this could convey key points particular to interdisciplinary research and PhDs. The content might be put together through structured brainstorming on good and bad practice by students at a session of an ESRC/NERC conference.



## ***Other interdisciplinary studentship schemes***

**Very few other interdisciplinary PhD studentship schemes appear to exist.** Those we identified through surveys and interviews which are either explicitly interdisciplinary or permit interdisciplinary research within their scope were:

- Wellcome Trust
- US foundations, e.g. Pew awards
- Existing Research Council schemes
  - CASE
  - MRC/ESRC
  - EPSRC/NERC Environmental Maths and Statistics
  - EPSRC/Royal Geographic Society
  - EPSRC/BBSRC
  - NERC/EPSC
  - the RELU programme (recognised as being a joint scheme which is interdisciplinary as it tackles broad questions)
  - ESRC/ODPM
  - EPSRC/Department of Transport
  - some AHRC funding
- some EU funding
- Leverhulme
- Commonwealth Scholarships Commission
- NGOs or Foundations funding multi-disciplinary topics such as conservation.

It was noted that many students from overseas are funded for interdisciplinary work as an investment by their own governments.

## (vi) Generic Lessons

*Are there any generic lessons that can be applied to the development of interdisciplinary studentship schemes in other areas?*

### For Supervisors

Lessons learned that were passed along to future supervisors of interdisciplinary PhD students tended to fall into the following major points:

1. It takes **effort and time** to supervise interdisciplinary students; involvement in advisory committees and/or mentoring can help prepare supervisors.
2. **Close supervision and guidance** are particularly important for interdisciplinary students, as for example, in encouraging genuine integration within the student's mind and keeping students from slipping back into mono-disciplinary comfort zones.
3. A key role for supervisors is to **keep students focused** and on track; students need help in balancing focus and breadth.
4. Yet, another role for supervisors is to **think outside of the box** with their students, encouraging them to use their initiative.
5. Supervisors are encouraged to hold **regular meetings** (formal and informal) with their students to develop good relationships.
6. Supervisors need to develop a strong bond of **team working with co-supervisors** if the students are to benefit rather than suffer.
7. Supervisors, co-supervisors and students need to **meet regularly** enough, with sufficient **clarity of communication**, that such issues as methodologies and approaches to be used, format and focus of the thesis, are agreed mutually and explicitly well before the endpoint of the studentship.
8. An important factor in the success of a student's experience is development of **an interdisciplinary culture** within their working environment. Cross-discipline meetings, seminars, informal debates and critiques of other interdisciplinary theses/efforts all contribute to an environment shaped by natural interactions.
9. **Bringing people together**, sometimes by virtue of physical layout of a building, and **helping them talk together**, e.g. by a student giving a seminar to all disciplines involved, can help to create a supportive environment.

10. When possible, instigate institutional change so that the practicalities of **working across departments** are facilitated.
11. Supervisors need to be flexible and retain **open minds**, respecting different approaches.

### **For Students**

12. “Managing supervisors” is a key challenge. **Achieving agreement** as to what is expected of the thesis is helped significantly when students are encouraged to **meet regularly with their supervisor and co-supervisors**, sometimes all together and sometimes separately, maintaining a team approach.
13. Students need to **utilise different expertise**, learning from and reconciling different views, even beyond their supervisors and co-supervisors; yet they also need to **stay strong-minded** in pursuing what they see as important.
14. **Open-mindedness** is critical to effective interdisciplinary studentships; students can listen to others’ perspectives, talk informally with other students, attend a variety of seminars and learn about foundations of and follow developments in both involved fields.
15. At the same time, students must for their survival **stay focused**, knowing what part of which disciplines they will use to answer which research questions. It appears that more planning may well be needed for interdisciplinary projects than for disciplinary projects.
16. By definition, interdisciplinary students will not be specialists –and they should not feel as if they are failing because this is true; **they cannot afford to yield to the temptation of trying to become experts in all fields** involved.

## For Research Councils (ESRC, NERC and others)<sup>12</sup>

17. Because PhD students are vulnerable, Research Councils could make a difference by **helping supervisors learn how to supervise interdisciplinary projects** and guide interdisciplinary students.
18. Research Councils need to **recognise the difficulties and length of time** an interdisciplinary PhD can involve.
19. Research Councils can help to **build an interdisciplinary community** through: providing a forum for interdisciplinary students, building networks, helping interdisciplinary students to communicate.
20. Interdisciplinary students very often have difficulty finding a satisfying **career path post-PhD**. For meaningful career trajectories to materialise, Research Councils will need to rethink approaches to allocating research grants, perhaps providing an interdisciplinary funding continuum.
21. **Interdisciplinarity needs to be celebrated visibly**; Research Councils could demonstrate the value they place on interdisciplinarity and could perhaps even encourage journals to accept broader, interdisciplinary papers or institutions to become more flexible.
22. In selecting interdisciplinary PhD students, particularly telling **characteristics** that might predict success could include: genuine interest in interdisciplinarity, some sort of interdisciplinary experience if possible, creativity, open-mindedness and the capacity to be a good listener; in addition, proposals should be both feasible and genuinely interdisciplinary.

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<sup>12</sup> Inevitable overlap exists between lessons learned/messages included here and recommendations for development of the Scheme. For the most part, points picked up here represent messages that could be relevant in any cross-Council interdisciplinary studentship scheme.

## **IV. Conclusions & Recommendations**

### **(i) Evaluators' Conclusions**

The ESRC/NERC Interdisciplinary PhD Studentship Scheme is working. It is valued by students and supervisors.

The Scheme performs an important role in promoting the role of interdisciplinarity in academia, as it:

- visibly underscores the importance of interdisciplinary research
- allows research to be done that could not otherwise be conducted
- prepares next generation researchers to conduct good quality interdisciplinary research.

High quality, highly motivated students are producing strong work that is in most cases genuinely interdisciplinary.

Students have developed interdisciplinary ways of working and are capable of working in both social and environmental sciences and/or at the interface.

Interdisciplinarity is being fostered in students and fostered or reinforced in supervisors/co-supervisors and, in the process, lessons have been learned as to how to foster genuine interdisciplinarity.

A cadre of supervisors exists who, particularly now that they are experienced in the Scheme, represent a real resource for the Research Councils at all levels, from refereeing applications to the Scheme to sitting on high-level committees ensuring that interdisciplinary work more generally is supported.

There is a strongly felt need for a sense of community during the studentship among the PhD students and a keen desire that ESRC and NERC could add value to the Scheme by bringing students together to share challenges of interdisciplinarity, share solutions, learn about publications strategies and career options, and network to form lasting linkages.

While some students appear to have no sense of belonging to a professional community, most students have some sense of affiliation with an interdisciplinary field or with an evolving niche at the overlap of other disciplines. Even so, this affiliation is often more abstract than operational in terms of opening professional career opportunities.

Next steps along a career path are not straightforward for these students, however strong they or their theses might be. Because of the demands of the RAE, the tendency is still to hire individuals who (a) can deliver teaching coverage for a particular discipline and/or (b) can produce the sorts of discipline-based publications in mainstream journals that score highly in the assessment exercise.

## (ii) Evaluators' Recommendations

### Summary

Drawing upon all aspects of the Evaluation, the Overarching Recommendations offered here by the Evaluators fall into two inter-related themes: building an interdisciplinary community and aiding development of interdisciplinary career paths. Both themes are predicated upon the primary Recommendation: to continue the Scheme. Together, these key themes can contribute to positive long-term change toward an academic landscape with an increased – and valued – capacity to tackle complex, multi-faceted problems. (More specific Recommendations are also provided as to improved delivery of the Scheme and its immediate aims.)

### Overarching Recommendations

1. The immediate recommendation from this evaluation is to **continue the Scheme**. Indeed, increasing the numbers and involving additional Research Councils in interdisciplinary PhD studentships are recommended as well.
2. If the Research Councils are genuinely committed to diversifying the academic landscape of the future through interdisciplinarity, they should not only continue this scheme but also go further in **building and legitimising an interdisciplinary community**. Thus key overarching recommendations here relate to funding career path stages and to community-building activities for students.
3. The critical missing link in fostering interdisciplinarity lies in the absence of an obvious “next step” for those Scheme students who wish to go on in academia. (Many are well-prepared to go into non-academic positions.) Thus the Evaluators would recommend very strongly that the Research Councils **visibly encourage interdisciplinarity by funding sequential stages of a career path**. Interdisciplinary Masters programmes, available across Research Councils, would be a good starting stage, all the way through the PhD Studentship, Postdoctoral Fellowships and small research grants.
4. Given the complexity of the students' PhD work, and the need to work carefully through a strategic portfolio of publications in different outlets, opportunities to compete for **cross-Council interdisciplinary postdoctoral fellowships** would allow consolidation of the gains made during the PhD studentship (similar to the aims of the ESRC Postdoctoral Scheme).
5. **Research funding explicitly oriented toward interdisciplinarity, in small research grants as well as themed programmes** (such as RELU), will allow these students to prove themselves as academics and therefore go on to influence academia. Furthermore, the availability of such funding sends an unambiguous message from Research

Councils to senior academics, department heads and universities that interdisciplinary work is not only legitimate but valued --- thus perhaps having a follow-on effect on recruitment for academic posts and promotion.

6. So that students can navigate as effectively as possible through what is inevitably a challenging course to an interdisciplinary PhD, we recommend that the Research Councils hold **annual community-building student conferences**, at which problems and solutions can be shared, publication strategies and career options can be discussed, and lasting networks can be formed. These conferences, which could be augmented by smaller regional events and/or themed seminars, will help provide support and a sense of community to the Scheme students. Indeed, the events could be made even richer by inclusion of other interdisciplinary PhD students from other schemes as such emerge. Users, such as policymakers, can be included as well.
7. Research Councils should **utilise the expertise of the community of current/former Supervisors of interdisciplinary studentships** to ensure rigorous assessment of interdisciplinary proposals and efforts and consolidate consistent, positive messages about interdisciplinarity.
8. ESRC, NERC and other Research Councils can become **extremely significant players in embedding interdisciplinarity into the future landscape of academia**.

#### More Detailed Recommendations

9. Clarify criteria for interdisciplinarity and streamline student-based application forms, allowing applicants to demonstrate academic or non-academic track records of commitment to interdisciplinarity.
10. Enhance the visible involvement of NERC in the Scheme.
11. Continue to spread studentships across a variety of institutions, some with established interdisciplinary units and some just launching collaborations, but, particularly in the latter case, assess carefully the commitment of supervisors and co-supervisors to guide a genuinely interdisciplinary thesis.
12. Develop, with students, a brief guidebook for supervisors as to how best to supervise interdisciplinary students. Encourage the sharing of good practice by networking supervisors, current and past.
13. Provide a guidebook on interdisciplinarity and PhD theses to External Examiners, assist universities in developing a pool of potential External Examiners for interdisciplinary PhDs (e.g. providing names of other successful Supervisors).

14. Provide information and (electronic) networking opportunities to students and supervisors, in addition to the annual community-building conference recommended above.
15. Particularly because the changing of an academic landscape is a long-term challenge, students in this and other interdisciplinary PhD schemes should be tracked through the early stages of their careers, utilising recommended network-building and also supervisor assistance.
16. When possible, provide input into policymaking (e.g. regarding the RAE) that will encourage value being placed upon interdisciplinarity.



**Evaluation  
of the  
ESRC/NERC Interdisciplinary Research  
Studentship Scheme**

**ANNEXES**

**Submitted by Laura R. Meagher, PhD  
Technology Development Group  
with Catherine Lyall, PhD  
Information Browser Ltd**

**September 2005**

## **ANNEXES**

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# **ANNEX A**

## **PhD Studentships Database**

Personal Details not provided in this public version

## ANNEX B

### Distribution of Awards

#### 1 Awards by institution

Institution	No. of awards
University of East Anglia	21
University of Oxford	7
University of York	7
University of Cambridge	6
University of Newcastle	5
University of Birmingham	4
University of Durham	4
University of Kent at Canterbury	4
University of London: Imperial College	4
University of London: King's College	4
University of Aberdeen	3
University of London: University College	3
University of Manchester	3
University of Nottingham	3
University of Plymouth	3
University of Stirling	3
University of Wales	3
Oxford Brookes University	2
University of Bath	2
University of Edinburgh	2
University of Exeter	2
University of Glasgow	2
University of London: Royal Holloway and Bedford New College	2
University of Manchester: Institute of Science and Technology (UMIST)	2
University of Reading	2
University of Sussex	2
Roehampton University	1
University of Bradford	1
University of Bristol	1
University of Dundee	1
University of London: Birkbeck College	1
University of London: Queen Mary	1
University of London: School of Hygiene and Tropical Medicine	1
University of Surrey	1
Grand Total	113

## 2 Awards by department

Subject group	Department name	Total
Agriculture & forestry	School of Agricultural and Forestry Sciences	1
<b>Agriculture &amp; forestry Total</b>		<b>1</b>
Anthropology	Department of Anthropology	6
	Social Anthropology Subject Group	1
<b>Anthropology Total</b>		<b>7</b>
Archaeology	Department of Archaeological Science	1
<b>Archaeology Total</b>		<b>1</b>
Biological sciences	Department of Biological and Molecular Sciences	1
	School of Biological and Chemical Sciences	1
	School of Biological Sciences	2
<b>Biological sciences Total</b>		<b>4</b>
Development studies	Centre for African Studies	1
	School of Development Studies	5
<b>Development studies Total</b>		<b>6</b>
Ecology	Institute of Ecology and Resource Management	1
<b>Ecology Total</b>		<b>1</b>
Economics	Department of Agricultural Economics & Food Marketing	1
	Department of Economics	1
	Department of Economics & International Development	1
	Economics	2
<b>Economics Total</b>		<b>5</b>
Environmental sciences	Centre For Environmental Technology (ICCET)	1
	Department of Environment	2
	Department of Environmental Science	1
	Department of Environmental Science & Technology	2
	Department of Environmental Sciences	1
	Environment Centre	1
	Environment Department	4
	School of Environmental Sciences	14
<b>Environmental sciences Total</b>		<b>26</b>
Geography	Department of Geography	24
	Department of Geography and Environment, Dept of Land Economy and Arkleton Centre for Rural Development Research	1
	Research Institute of Sedimentology	1
	School of Geography	6
	School of Geography and the Environment	6
	School of Geography, Politics and Sociology	3
	Scott Polar Research Institute	1
	The School of Geography and Environmental Sciences	2
	<b>Geography Total</b>	
History	Department of History	1
<b>History Total</b>		<b>1</b>
Management	Manchester School of Management	2
	School of Business, Social Sciences and Computing	1
<b>Management Total</b>		<b>3</b>
Mining	T H Huxley School - Royal School of Mines	1

<b>Mining Total</b>		<b>1</b>
Ocean Sciences	School of Earth, Ocean and Environmental Sciences	2
	School of Ocean Sciences	1
<b>Ocean Sciences Total</b>		<b>3</b>
Planning	Department of Planning & Landscape	2
	School of Planning	1
<b>Planning Total</b>		<b>3</b>
Politics	Department of Politics	1
<b>Politics Total</b>		<b>1</b>
Psychology	Department of Psychology	1
	Institute of Work, Health & Organisations/ School of Psychology	1
<b>Psychology Total</b>		<b>2</b>
Public Health	Department of Public Health & Policy	1
<b>Public Health Total</b>		<b>1</b>
Science policy	Science Policy Research Unit	1
<b>Science policy Total</b>		<b>1</b>
Social Policy	Department of Social Policy & Social Work	1
<b>Social Policy Total</b>		<b>1</b>
Social science	School of Social Sciences	1
<b>Social science Total</b>		<b>1</b>
<b>Grand Total</b>		<b>113</b>

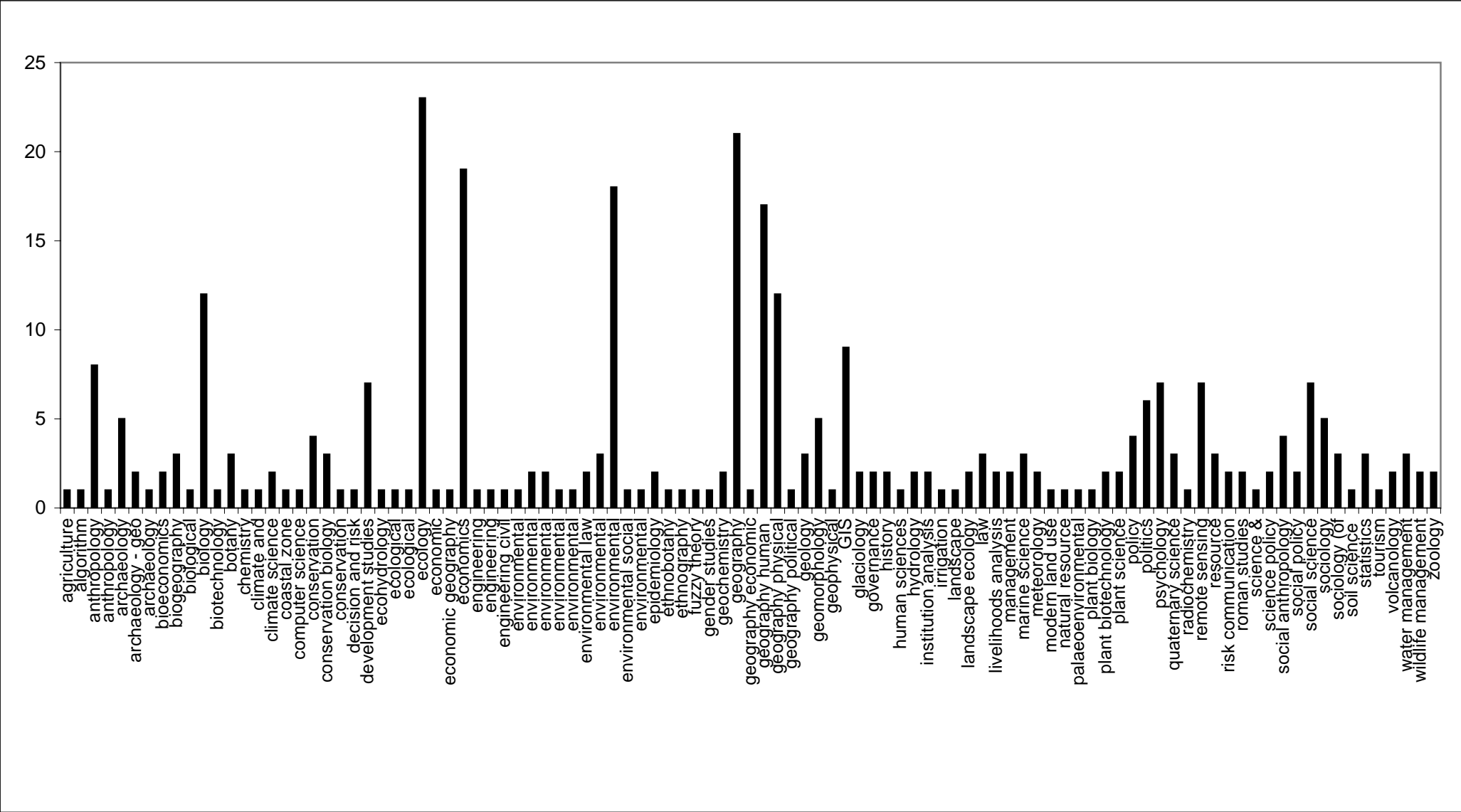
### 3 Awards by discipline

Discipline	Total
Economics	1
Human Geography	10
Interdisciplinary Studies	97
Interdisciplinary Studies in Science, Technology and Innovation	1
Management and Business Studies	1
Multidisciplinary	1
Social Policy, Social Work and Health Studies	1
Sociology	1
<b>Grand Total</b>	<b>113</b>

### 4 Awards by gender

Gender	Total
F	52
M	58
Unknown	3
<b>Grand Total</b>	<b>113</b>

**Survey Question 7.1 (All respondents): Please list all the disciplines involved in this studentship (student's, supervisor's, co-supervisor(s)'s)**



# ANNEX C

## Core Questions – Interview Templates

### SUPERVISOR INTERVIEW QUESTIONS

#### I. Operation

##### Motivation/Origin of Project

I.A) How were the studentship project/dissertation *topic* and *approaches* defined? By whom? From what discipline(s)? What rationale or motivation drove selection/definition of the project?

##### Context

I.B) How did the level of interdisciplinarity already established (or not) in the student's "context" affect the nature of the education the student received? (were you as supervisor already involved in a collaboration/interdisciplinary unit or was the student more of a vector helping to launch collaboration?)

##### Level of interdisciplinarity

I.C) To what extent (or in what way) was the project *genuinely* interdisciplinary in nature?

I.D) What did this particular studentship enable the student to do that could not have been done with a conventional ESRC or NERC award?

I.E) Did you as a Supervisor feel that your student was suitably qualified to take on an interdisciplinary challenge? Why/why not?

I.F) Do you have any recommendations for the ESRC & NERC regarding either the timing of the application process or the requirement for a Master's degree?

#### II. Skills and Outcomes

II.A) Have you/your student developed any innovative new approaches or methods through the interdisciplinary nature of the scheme? If so, what?

II.B) What do you think of the academic standard of the publications and papers produced by your former student/the former student you hired? Compared to those by other students trained more conventionally in one discipline? Are they primarily interdisciplinary? (what %?)

#### III. Capacity

##### **Baseline information**

III.A) Do some environmental and social science disciplines in particular lend themselves readily to interdisciplinary work? If so, which? Why?



### **Fostering Interdisciplinarity**

III.B) Can you identify any specific new skills or approaches that have *enhanced the student's ability to work in an interdisciplinary way*? Do any such skills useful in interdisciplinarity lend themselves to being taught -- in a PhD programme or in some central way?

### **Ability to pursue interdisciplinarity**

III.C) To what extent do you feel that the Scheme has helped you (your former student/ the former student that you hired) to **work effectively** in both the social and environmental sciences? (Only) in specific areas that bridge the two? In either social or environmental sciences only, but with a broader perspective?

### **Employability**

III.D) What position does your former student now hold? (Academic permanent; temporary teaching; temporary research; other academic; professional non-academic, unknown)

III.E) Do you think that interdisciplinarity of training contributes to or detracts from employability? (Positive or negative factors? Compared to single discipline portfolios of approaches and methods?)

### **Impact of studentship upon Supervisor**

III.F) Has the interdisciplinarity of the studentship had any effect upon your own work, the professional community with which you associate? (For example, have you had any subsequent interactions with the co-supervisor or co-supervisor's discipline?)

### Emerging communities

III.G) Is an interdisciplinary community emerging in this area, to which your student and/or yourself have a sense of belonging?

(As an employer, have you seen any early indicators that the former ESRC/NERC Student you hired is having any influence on openness to interdisciplinarity in your department, unit, sister departments?)

## **IV. Interdisciplinarity**

IV.A) What do you see as the **benefits** for researchers to engage in interdisciplinary research between social and environmental sciences?

IV.B) What do you see as the **disincentives** for researchers to engage in interdisciplinary research between social and environmental sciences?

IV.C) Did pursuit of the interdisciplinary research run into **research-related problems** (e.g. language and communication, different worldviews or paradigms, institutional structures, procedures, other)?

IV.D) Did interdisciplinarity run into **barriers/constraints posed by aspects of the research system** (e.g., supervision; department home, university infrastructure, examination; journals, conferences, job-seeking)?

IV.E) Recommendations for others as to **mechanisms** that foster interdisciplinarity or address such problems?

## V. Development

V.A) What recommendations would you give to ESRC & NERC regarding the development and improvement of the Scheme? (or do you think it should be discontinued?)

(Selection criteria; Application process; Management of the Scheme; Community-building activity; Follow-up)

V.B) Would it be helpful for diverse interdisciplinary students and/or supervisors to be brought together to share experiences, issues, problems and solutions/good practice regarding interdisciplinary working?

V.C) Would it be helpful for Supervisors and co-Supervisors of interdisciplinary studentships to have some formal or informal *training* in the supervision of interdisciplinarity?

V.D) Are you aware of other interdisciplinary studentship schemes? What do you regard as their best/worst features? What can ESRC & NERC learn from them?

## VI. Generic Lessons

What lessons have you learned that you would pass along for the development of interdisciplinary studentships even in other areas? **S+I+FG**

VI.A) For future supervisors (and departmental managers) of interdisciplinary students? (For example, what lessons have you learned regarding facilitation of ability to develop new approaches and methods by drawing on different disciplines?)

VI.B) For future interdisciplinary students?

VI.C) For ESRC, NERC or indeed other funding bodies? (For example, what criteria could be used to select students in the future? Supervisor teams?) **S+I+FG**

VI.D) Any other advice or messages?

## STUDENT INTERVIEW QUESTIONS

### I. Operation

#### Motivation/Origin of Project

I.A) How were the studentship project/dissertation *topic* and *approaches* defined? By whom? From what discipline(s)? What rationale or motivation drove selection/definition of the project?

#### Context

I.B) How did the level of interdisciplinarity already established (or not) in the student's "context" affect the nature of the education the student received? (at any point in your education, were you involved in a pre-existing collaboration/interdisciplinary unit? For this studentship, were you more of a catalyst or "vector" helping to launch collaboration?)

#### **Level of interdisciplinarity**

I.C) To what extent (or in what way) was the project *genuinely* interdisciplinary in nature?

I.D) What did this particular studentship enable the student to do that could not have been done with a conventional ESRC or NERC award?

I.E) Did you as a Student feel that you were suitably qualified to take on an interdisciplinary challenge? Why/why not?

I.F) Do you have any recommendations for the ESRC & NERC regarding either the timing of the application process or the requirement for a Master's degree?

### II. Skills and Outcomes

II.A) Have you developed any innovative new approaches or methods through the interdisciplinary nature of the scheme? If so, what?

II.B) Are the papers you write/expect to write primarily interdisciplinary? Aimed at interdisciplinary or single-subject journals?

### III. Capacity

#### **Baseline information**

III.A) Do some environmental and social science disciplines in particular lend themselves readily to interdisciplinary work? If so, which? Why?

#### **Fostering Interdisciplinarity**

III.B) Can you identify any specific new skills or approaches that have *enhanced the student's ability to work in an interdisciplinary way*? Do any such skills useful in interdisciplinarity lend themselves to being taught -- in a PhD programme or in some central way?

### **Ability to pursue interdisciplinarity**

III.C) To what extent do you feel that the Scheme has helped you to **work effectively** in both the social and environmental sciences? (Only) in specific areas that bridge the two? In either social or environmental sciences only, but with a broader perspective?

### **Employability**

III.D) What position do you now hold? (Academic permanent; temporary teaching; temporary research; other academic; professional non-academic, unknown)

III.E) Do you think that interdisciplinarity of training contributes to or detracts from employability? (Positive or negative factors? Compared to single discipline portfolios of approaches and methods?)

### Emerging communities

III.F) Do you expect to continue to pursue interdisciplinary problems? Why or why not?

III.G) Is an interdisciplinary community emerging in this area, to which you have a sense of belonging?

### **IV. Interdisciplinarity**

IV.A) What do you see as the **benefits** for researchers to engage in interdisciplinary research between social and environmental sciences?

IV.B) What do you see as the **disincentives** for researchers to engage in interdisciplinary research between social and environmental sciences?

IV.C) Did pursuit of the interdisciplinary research run into **research-related problems** (e.g. language and communication, different worldviews or paradigms, institutional structures, procedures, other)?

IV.D) Did interdisciplinarity run into **barriers/constraints posed by aspects of the research system** (e.g., supervision; department home, university infrastructure, examination; journals, conferences, job-seeking)?

IV.E) Recommendations for others as to **mechanisms** that foster interdisciplinarity or address such problems?

### **V. Development**

V.A) What recommendations would you give to ESRC & NERC regarding the development and improvement of the Scheme? (or do you think it should be discontinued?)

(Selection criteria; Application process; Management of the Scheme; Community-building activity; Follow-up)

V.B) Would it be helpful for diverse interdisciplinary students and/or supervisors to be brought together to share experiences, issues, problems and solutions/good practice regarding interdisciplinary working?

V.C) Would it be helpful for Supervisors and co-Supervisors of interdisciplinary studentships to have some formal or informal *training* in the supervision of interdisciplinarity?

V.D) Are you aware of other interdisciplinary studentship schemes? What do you regard as their best/worst features? What can ESRC & NERC learn from them?

## **VI. Generic Lessons**

What lessons have you learned that you would pass along for the development of interdisciplinary studentships even in other areas?

VI.A) For future supervisors (and departmental managers) of interdisciplinary students? (For example, what lessons have you learned regarding facilitation of ability to develop new approaches and methods by drawing on different disciplines?)

VI.B) For future interdisciplinary students?

VI.C) For ESRC, NERC or indeed other funding bodies? (For example, what criteria could be used to select students in the future? Supervisor teams?)

VI.D) Any other advice or messages?

## **ANNEX D**

### **Evaluation Survey Instrument**

1. Supervisors
2. Current Students (2003, 2004, 2005)
3. 2001 Student Cohort

## ESRC/NERC INTERDISCIPLINARY RESEARCH STUDENTSHIP SCHEME

### ESRC Evaluation of Scheme - Supervisor Survey

If you have supervised more than one student under this Scheme please provide answers based on your general experience, taking the opportunity to record any noteworthy differences between students on the final page. (Alternatively, if you prefer, please feel free to complete one survey per student.) Please complete your answers in the shaded boxes; most simply require marking with an X, some require ranking or a short free text response. All responses will be anonymised in our final report but it would be helpful if you could complete your contact details for us:

<b>Name:</b>										
<b>Institution:</b>										
<b>Department:</b>										
<b>Email:</b>										
<b>I. OPERATION OF STUDENTSHIP SCHEME</b>										
<b>Motivation/Origin of project</b>										
1.1	Please rank the importance of the following possible motivations for the interdisciplinary PhD research undertaken ( <b>1 most important, 5 least important; use each ranking once</b> ):									
	Desire to pursue problems with social, technical or policy relevance in the “real world”									
	Desire to contribute to advancement/evolution of academic disciplines or new (sub) disciplines									
	General interest in the interface between environmental and social sciences (or between particular disciplines therein)									
	Excitement over a particular research issue that required an interdisciplinary approach									
	Other (please state)									
<b>Initial qualifications and implementation</b>										
2.1	The student was suitably qualified and ready for the challenge of an interdisciplinary PhD:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
2.2	The timing of the application process negatively affects the Scheme’s ability to attract suitable candidates:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
2.3	The requirement for students to hold a Master’s qualification (or equivalent) negatively affects the Scheme’s ability to attract suitable candidates:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
2.4	Was the studentship embedded in an already-established interdisciplinary centre/collaboration?									
	Yes				No					
2.5	Compared with a single discipline PhD, interdisciplinary projects tend to take:									
		To define		To conduct		To analyse		To write up		
	More time									
	Less time									
	The same time									

<b>Level of interdisciplinarity</b>										
3.1	The project is <i>genuinely</i> interdisciplinary in nature with more than one discipline truly <i>integrated</i> into the project:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
3.2	Where would you place the impact of the interdisciplinary nature of the project (select one):									
	Provision of an additional perspective(s) and/or methodological tool(s) as an extra dimension of a project rooted primarily in one discipline									
	Development of an unusually diversified portfolio of existing approaches and methods drawn from both the environmental and social sciences									
	Generation of novel methods or approaches, drawing on more than one discipline									
3.3	A new discipline or sub-discipline is evolving in the interdisciplinary area tackled by this project:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
<b>Institutional support</b>										
4.1	The support provided by the institution/department is sufficient:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
4.2	The co-supervision arrangements work well:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
<b>II. SKILLS AND OUTCOMES</b>										
<b>Innovative approaches and methods</b>										
5.1	Innovative new approaches or methods have been developed through the interdisciplinary nature of the Scheme:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
5.2	If you agree/strongly agree with this statement, please list:									
<b>Publications and conferences as indicators of interdisciplinarity</b>										
6.1	Of the journals in which the student (i) primarily publishes and (ii) reads/uses/cites, what % are:									
		Environ Sci		Social Sci		Interdisciplinary		Total		
(i) Publish in							100%			
(ii) Read/use/cite							100%			
	Mainstream			Less well known			Total			
(i) Publish in							100%			
(ii) Read/use/cite							100%			
6.2	Of the conferences which the student (i) speaks at or (ii) attends, what % are:									
		Environ Sci		Social Sci		Interdisciplinary		Total		
(i) Speak at							100%			
(ii) Attend							100%			
6.3	The student tends to publish in new interdisciplinary journals because they are the most appropriate outlet for their work:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	



6.4	The student tends to publish in new interdisciplinary journals because it is difficult to get interdisciplinary articles published in mainstream journals for their work:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
6.5	The academic standard of papers produced by the student is lower than those produced by more conventionally trained students at the same stage in their career:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
<b>III. CAPACITY</b>											
<b>Contributing disciplines</b>											
7.1	Please list all the disciplines involved in this studentship (student's, supervisor's, co-supervisor(s)'s):										
	Student discipline(s):										
	Supervisor discipline(s):										
	Co-supervisor discipline(s):										
<b>Fostering interdisciplinarity</b>											
8.1	The Scheme has helped the student to develop an interdisciplinary way of working:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
8.2	If you agree/strongly agree, can you identify any specific new skills/approaches that the student has learned that have improved ability to work in an interdisciplinary way?										
8.3	The Scheme has helped to foster interdisciplinarity in my own work:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
8.4	The Scheme has helped to foster interdisciplinarity among others in the department:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
8.5	Have you published anything with your co-supervisor?										
	Yes			No							
8.6	Have any other professional interactions with your co-supervisor resulted from the studentship?										
	Yes			No							
	If 'Yes', describe briefly										
<b>Future work and employability</b>											
9.1	The Scheme has helped the student to work effectively in <i>both</i> the social and environmental sciences:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
9.2	The Scheme has helped the student to work effectively in <i>either</i> the social <i>or</i> the environmental sciences but with a broader perspective:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
9.3	The interdisciplinary nature of the studentship will/did enhance the student's employability:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		

9.4	In the future, an interdisciplinary training could be viewed as a disadvantage in academia:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
9.5	If the student has now graduated (or left the Scheme) is he/she currently engaged in an activity that draws upon both social and environmental sciences?										
	Yes			No			Don't know				
9.6	(If you answered 'Yes' to 9.5) In approximately what proportion would you estimate, social to environmental sciences?										
	Soc Sci				Env Sci				Genuine mix		
<b>Emerging communities</b>											
10.1	What type of informal professional gatherings with an interdisciplinary focus has the student participated in (e.g., local or institutional seminar series, workshops)?										
									(If none, put X here)		
10.2	Which best describes your sense of the professional community to which you yourself belong?										
	I view myself as a member of an interdisciplinary community										
	My primary affiliation is with a single discipline's community										
	I view myself as a member of both an interdisciplinary community and a single discipline.										
<b>IV. Interdisciplinarity</b>											
<b>Mechanisms and Training</b>											
11.1	Please (i) indicate with an X which of the following "mechanisms" potentially capable of fostering interdisciplinarity within PhD students you have used, and										
	(ii) for the mechanisms you have used, please rank their effectiveness ( <b>rank Low (L), Moderate (M) or High (H)</b> ):										
	<b>Mechanism</b>							<b>Used</b>		<b>Rank</b>	
	Seminars where guest speakers are requested to make their comments accessible to individuals from different disciplines										
	Informal seminars in which academics and students from different disciplines are deliberately brought together										
	"Journal clubs" in which students from different disciplines present, share and discuss together papers										
	Problem or issue based workshops/conferences/think tanks, convening individuals from different disciplines										
	Regular/frequent pub or food-related informal get-togethers for students from different disciplines										
	Co-location of students from different disciplines (e.g. in labs, field sites and/or offices)										
	Regular meeting of Supervisor, student and co-supervisor(s)										
	Assigned team projects, requiring joint working by students from different disciplines										
	Other (please state)										

11.2	Please (i) rank the importance of various personal skills/characteristics for effective interdisciplinary research ( <b>1 most important, 7 least important; use each ranking once</b> ) and (ii) enter a X in the 2 <sup>nd</sup> column for each attribute which could be enhanced by deliberate training efforts being incorporated into a PhD studentship									
	<b>Personal skills/characteristics</b>					<b>Rank</b>		<b>Training?</b>		
	Flexibility, adaptability, creativity									
	Curiosity/willingness to learn from other disciplines									
	Open mind to new ideas									
	Good communication/listening skills									
	Able to bridge gap between theory & practice									
	Ability to work well in teams									
	Other (please state)									
<b>V. Development</b>										
12.1	The ESRC/NERC Interdisciplinary PhD Studentship should be continued:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
<b>Improving the scheme</b>										
13.1	Specific training in how to tackle interdisciplinary projects would be useful:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
13.2	Specific training in how to supervise interdisciplinary projects would be helpful:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
13.3	Bringing students and/or supervisors from interdisciplinary backgrounds together from across institutions to share experiences regarding interdisciplinary working would be helpful:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
13.4	What recommendations would you give to ESRC & NERC regarding the development and improvement of this particular Scheme in the following areas?									
	Selection criteria									
	Application process									
	Community-building activities									
	Follow-up/ongoing contacts									
13.5	Are you aware of other interdisciplinary studentship schemes? (Give funder and name of scheme if known)									

<b>VI. GENERIC LESSONS</b>	
What is <b>the most important lesson</b> you have learned that you would pass along for the development of interdisciplinary studentships (even in other areas)?	
14.1	To future interdisciplinary students? (e.g., what lessons have you learned about how a student can make the most of both Supervisor's and Co-supervisor's input?)
14.2	To future supervisors (and departmental managers) of interdisciplinary students? (e.g., what lessons have you learned regarding facilitation of ability to develop new approaches and methods by drawing on different disciplines?)
14.3	To ESRC, NERC or indeed other funding bodies? (e.g., what criteria could be used to select students in the future?)
14.4	Any other advice?
15	<b>If you have supervised more than one student under this Scheme and wish to tell us about any differences in the supervision experience between students please do so below:</b>

Thank you very much for completing this questionnaire.  
Please now email it to [catherinelyall@informationbrowser.com](mailto:catherinelyall@informationbrowser.com)

If you have any queries or feedback on this questionnaire please contact Catherine Lyall at the above address.

# ESRC/NERC INTERDISCIPLINARY RESEARCH STUDENTSHIP SCHEME

## ESRC Evaluation of Scheme - Student Survey

Please complete your answers in the shaded boxes; most simply require marking with an X, some require ranking or a short free text response. All responses will be anonymised in our final report but it would be helpful if you could complete your contact details for us:

<b>Name:</b>									
<b>Institution:</b>									
<b>Department:</b>									
<b>Start Date (Year):</b>									
<b>Email:</b>									
<b>I. OPERATION OF STUDENTSHIP SCHEME</b>									
<b>Motivation/Origin of project</b>									
1.1	Please rank the importance of the following possible motivations for the interdisciplinary research you are undertaking ( <b>1 most important, 5 least important; use each ranking once</b> ):								
	Desire to pursue problems with social, technical or policy relevance in the “real world”								
	Desire to contribute to advancement/evolution of academic disciplines or new (sub) disciplines								
	General interest in the interface between environmental and social sciences (or between particular disciplines therein)								
	Excitement over a particular research issue that required an interdisciplinary approach								
	Other (please state)								
<b>Context and initial qualifications</b>									
2.1	Were you previously involved in an already-established interdisciplinary centre or collaboration?								
	At first degree level		Yes		No				
	At Masters level		Yes		No				
	Other (please state)								
2.2	(If you answered ‘Yes’ to 2.1) This previous exposure to an interdisciplinary way of working had a positive impact on my experience as a ESRC/NERC student:								
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree
2.3	(If you answered ‘No’ to 2.1) This lack of exposure to an interdisciplinary way of working had a negative impact on my experience as a ESRC/NERC student:								
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree
2.4	I felt suitably qualified and ready for the challenge of undertaking an interdisciplinary PhD:								
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree
2.5	Is your PhD studentship embedded in an already-established interdisciplinary centre or collaboration?								
	Yes				No				

<b>Level of interdisciplinarity</b>											
3.1	The project is <i>genuinely</i> interdisciplinary in nature with more than one discipline truly <i>integrated</i> into the project:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
3.2	Where would you place the impact of the interdisciplinary nature of the project (select one):										
	Provision of an additional perspective(s) and/or methodological tool(s) as an extra dimension of a project rooted primarily in one discipline										
	Development of an unusually diversified portfolio of existing approaches and methods drawn from both the environmental and social sciences										
	Generation of novel methods or approaches, drawing on more than one discipline										
3.3	A new discipline or sub-discipline is evolving in the interdisciplinary area tackled by this project:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
<b>Institutional support</b>											
4.1	The support provided by the institution/department is sufficient:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
4.2	The support provided by the supervisor is sufficient:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
4.3	The support provided by the co-supervisor is sufficient:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
<b>II. SKILLS AND OUTCOMES</b>											
<b>Innovative approaches and methods</b>											
5.1	Innovative new approaches or methods have been developed through the interdisciplinary nature of the Scheme:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
5.2	If you agree/strongly agree with this statement, please list:										
<b>Publications and conferences as indicators of interdisciplinarity</b>											
6.1	Of the journals in which you (i) primarily publish and (ii) read/use/cite, what % are:										
	Environ Sci		Social Sci		Interdisciplinary			Total			
(i) Publish in								100%			
(ii) Read/use/cite								100%			
	Mainstream				Less well known			Total			
(i) Publish in								100%			
(ii) Read/use/cite								100%			
6.2	Of the conferences which you (i) speak at or (ii) attend, what % are:										
	Environ Sci		Social Sci		Interdisciplinary			Total			
(i) Speak at								100%			
(ii) Attend								100%			

6.3	I prefer to publish in new interdisciplinary journals because they are the most appropriate outlet for my work:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
6.4	I prefer to publish in new interdisciplinary journals because it is difficult to get interdisciplinary articles published in mainstream journals for my work:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
<b>III. CAPACITY</b>											
<b>Contributing disciplines</b>											
7.1	Please list all the disciplines involved in this studentship (student's, supervisor's, co-supervisor(s)'s):										
	Student discipline(s):										
	Supervisor discipline(s):										
	Co-supervisor discipline(s):										
<b>Fostering interdisciplinarity</b>											
8.1	The Scheme has helped me to develop an interdisciplinary way of working:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
8.2	If you agree/strongly agree, can you identify any specific new skills/approaches that you have learned that have improved your ability to work in an interdisciplinary way?										
8.3	The Scheme has helped to foster interdisciplinarity in the Supervisor/Co-Supervisor(s):										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
8.4	The Scheme has helped to foster interdisciplinarity among others in the department:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
<b>Commitment to interdisciplinarity as a career path</b>											
9.1	I am committed to following an interdisciplinary career path:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
9.2	As a result of the ESRC/NERC studentship my level of commitment has:										
	Increased										
	Decreased										
	Stayed the same										
<b>Emerging communities</b>											
10.1	What type of informal professional gatherings with an interdisciplinary focus have you participated in (e.g., local or institutional seminar series, workshops)?										
									(If none, put X here)		
10.2	Which best describes your sense of the professional community to which you belong?										
	I am a member of an interdisciplinary community										
	My primary affiliation is with a single discipline's community										
	I am a member of both an interdisciplinary community and a single discipline.										

IV. Interdisciplinarity										
<b>Mechanisms and Training</b>										
11.1	Please (i) indicate with an X which of the following “mechanisms” potentially capable of fostering interdisciplinarity within PhD students you have used, and									
	(ii) for the mechanisms you have used, please rank their effectiveness ( <b>rank Low (L), Moderate (M) or High (H)</b> ):									
	<b>Mechanism</b>							<b>Used</b>	<b>Rank</b>	
	Seminars where guest speakers are requested to make their comments accessible to individuals from different disciplines									
	Informal seminars in which academics and students from different disciplines are deliberately brought together									
	“Journal clubs” in which students from different disciplines present, share and discuss together papers									
	Problem or issue based workshops/conferences/think tanks, convening individuals from different disciplines									
	Regular/frequent pub or food-related informal get-togethers for students from different disciplines									
	Co-location of students from different disciplines (e.g. in labs, field sites and/or offices)									
	Regular meeting of Supervisor, student and co-supervisor(s)									
	Assigned team projects, requiring joint working by students from different disciplines									
Other (please state)										
11.2	Please (i) rank the importance of various personal skills/characteristics for effective interdisciplinary research ( <b>1 most important, 7 least important; use each ranking once</b> ) and									
	(ii) enter a X in the 2 <sup>nd</sup> column for each attribute which could be enhanced by deliberate training efforts being incorporated into a PhD studentship									
	<b>Personal skills/characteristics</b>							<b>Rank</b>	<b>Training?</b>	
	Flexibility, adaptability, creativity									
	Curiosity/willingness to learn from other disciplines									
	Open mind to new ideas									
	Good communication/listening skills									
	Able to bridge gap between theory & practice									
	Ability to work well in teams									
Other (please state)										
<b>V. Development</b>										
12.1	The ESRC/NERC Interdisciplinary PhD Studentship should be continued:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
<b>Improving the scheme</b>										
13.1	Specific training in how to tackle interdisciplinary projects would be useful:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	



13.2	Specific training in how to supervise interdisciplinary projects would be helpful:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
13.3	Bringing students and/or supervisors from interdisciplinary backgrounds together from across institutions to share experiences regarding interdisciplinary working would be helpful:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
13.4	What recommendations would you give to ESRC & NERC regarding the development and improvement of this particular Scheme in the following areas?									
	Selection criteria									
	Application process									
	Community-building activities									
	Follow-up/ongoing contacts									
13.5	Are you aware of other interdisciplinary studentship schemes? (Give funder and name of scheme if known)									
<b>VI. GENERIC LESSONS</b>										
What is <b>the most important lesson</b> you have learned that you would pass along for the development of interdisciplinary studentships (even in other areas)?										
14.1	To future interdisciplinary students? (e.g., what lessons have you learned about making the most of both Supervisor's and Co-supervisor's input?)									
14.2	To future supervisors (and departmental managers) of interdisciplinary students? (e.g., what lessons have you learned regarding facilitation of ability to develop new approaches and methods by drawing on different disciplines?)									
14.3	To ESRC, NERC or indeed other funding bodies? (e.g., what criteria could be used to select students in the future?)									
14.4	Any other advice?									

Thank you very much for completing this questionnaire. Please now email it to [catherinelyall@informationbrowser.com](mailto:catherinelyall@informationbrowser.com)

If you have any queries or feedback on this questionnaire please contact Catherine Lyall at the above address.

## ESRC/NERC INTERDISCIPLINARY RESEARCH STUDENTSHIP SCHEME

### ESRC Evaluation of Scheme - Student Survey

Please complete your answers in the shaded boxes; most simply require marking with an X, some require ranking or a short free text response. All responses will be anonymised in our final report but it would be helpful if you could complete your contact details for us:

<b>Name:</b>										
<b>Institution:</b>										
<b>Department:</b>										
<b>Start Date (Year):</b>				<b>Finish Date (Year):</b>						
<b>Email:</b>										
<b>I. OPERATION OF STUDENTSHIP SCHEME</b>										
<b>Motivation/Origin of project</b>										
1.1	Please rank the importance of the following possible motivations for the interdisciplinary research you undertook ( <b>1 most important, 5 least important; use each ranking once</b> ):									
	Desire to pursue problems with social, technical or policy relevance in the “real world”									
	Desire to contribute to advancement/evolution of academic disciplines or new (sub) disciplines									
	General interest in the interface between environmental and social sciences (or between particular disciplines therein)									
	Excitement over a particular research issue that required an interdisciplinary approach									
	Other (please state)									
<b>Context and initial qualifications</b>										
2.1	Were you previously involved in an already-established interdisciplinary centre or collaboration?									
	At first degree level		Yes		No					
	At Masters level		Yes		No					
	Other (please state)									
2.2	(If you answered ‘Yes’ to 2.1) This previous exposure to an interdisciplinary way of working had a positive impact on my experience as a ESRC/NERC student:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
2.3	(If you answered ‘No’ to 2.1) This lack of exposure to an interdisciplinary way of working had a negative impact on my experience as a ESRC/NERC student:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
2.4	I felt suitably qualified and ready for the challenge of undertaking an interdisciplinary PhD:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	

2.5	Was your PhD studentship embedded in an already-established interdisciplinary centre or collaboration?										
	Yes			No							
<b>Level of interdisciplinarity</b>											
3.1	The project was <i>genuinely</i> interdisciplinary in nature with more than one discipline truly <i>integrated</i> into the project:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
3.2	Where would you place the impact of the interdisciplinary nature of the project (select one):										
	Provision of an additional perspective(s) and/or methodological tool(s) as an extra dimension of a project rooted primarily in one discipline										
	Development of an unusually diversified portfolio of existing approaches and methods drawn from both the environmental and social sciences										
	Generation of novel methods or approaches, drawing on more than one discipline										
3.3	A new discipline or sub-discipline is evolving in the interdisciplinary area tackled by this project:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
<b>Institutional support</b>											
4.1	The support provided by the institution/department was sufficient:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
4.2	The support provided by the supervisor was sufficient:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
4.3	The support provided by the co-supervisor was sufficient:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
<b>II. SKILLS AND OUTCOMES</b>											
<b>Innovative approaches and methods</b>											
5.1	Innovative new approaches or methods were developed through the interdisciplinary nature of the Scheme:										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		
5.2	If you agree/strongly agree with this statement, please list:										
<b>Publications and conferences as indicators of interdisciplinarity</b>											
6.1	Of the journals in which you (i) primarily published results of your studentship research and (ii) read/used/cited during the studentship, what % were:										
	Environ Sci		Social Sci		Interdisciplinary			Total			
(i) Published in								100%			
(ii) Read/used/cited								100%			
	Mainstream				Less well known				Total		
(i) Published in									100%		

(ii) Read/used/ cited			100%
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6.2	Of the conferences which you (i) spoke at or (ii) attended, during the studentship, what % were:			
	Environ Sci	Social Sci	Interdisciplinary	Total
(i) Spoke at				100%
(ii) Attended				100%
6.3	I published in new interdisciplinary journals because they were the most appropriate outlet for my work:			
	Strongly Agree	Agree	Neutral	Disagree
6.4	I published in new interdisciplinary journals because it is difficult to get interdisciplinary articles published in mainstream journals for my work:			
	Strongly Agree	Agree	Neutral	Disagree

### III. CAPACITY

#### Contributing disciplines

7.1	Please list all the disciplines involved in this studentship (student's, supervisor's, co-supervisor(s)'s):	
	Student discipline(s):	
	Supervisor discipline(s):	
	Co-supervisor discipline(s):	

#### Fostering interdisciplinarity

8.1	The Scheme helped me to develop an interdisciplinary way of working:			
	Strongly Agree	Agree	Neutral	Disagree
8.2	If you agree/strongly agree, can you identify any specific new skills/approaches that you have learned that have improved your ability to work in an interdisciplinary way?			
8.3	The Scheme helped to foster interdisciplinarity in the Supervisor/Co-Supervisor(s):			
	Strongly Agree	Agree	Neutral	Disagree
8.4	The Scheme helped to foster interdisciplinarity among others in the department:			
	Strongly Agree	Agree	Neutral	Disagree

#### Future work and employability

9.1	At the start of the studentship, I was committed to following an interdisciplinary career path:			
	Strongly Agree	Agree	Neutral	Disagree
9.2	As a result of the ESRC/NERC studentship my level of commitment:			
	Increased			
	Decreased			
	Stayed the same			
9.3	The Scheme helped me to work effectively in <i>both</i> the social and environmental sciences:			
	Strongly Agree	Agree	Neutral	Disagree

9.4	The Scheme helped me to work effectively in <i>either</i> the social <i>or</i> the environmental sciences but with a broader perspective:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
9.5	The interdisciplinary nature of the studentship enhanced my employability:									
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
9.6	Are you now engaged in an activity that draws upon both social and environmental sciences?									
	Yes							No		
9.7	(If you answered 'Yes' to 9.6) In approximately what proportion (expressed as %), social to environmental sciences? Or is it a genuine mix?									
	Soc science							Env science		

### Emerging communities

10.1	What type of informal professional gatherings with an interdisciplinary focus do you participate in (e.g., local or institutional seminar series, workshops)?									
										(If none, put X here)
10.3	Which best describes your sense of the professional community to which you belong?									
	I view myself as a member of an interdisciplinary community									
	My primary affiliation is with a single discipline's community									
	I view myself as a member of both an interdisciplinary community and a single discipline.									

## IV. Interdisciplinarity

### Mechanisms and Training

11.1	Please (i) indicate with an X which of the following "mechanisms" potentially capable of fostering interdisciplinarity within PhD students you have participated in, and									
	(ii) for the mechanisms you have used, please rank their effectiveness ( <b>rank Low (L), Moderate (M) or High (H)</b> ):									
	<b>Mechanism</b>							<b>Used</b>	<b>Rank</b>	
	Seminars where guest speakers are requested to make their comments accessible to individuals from different disciplines									
	Informal seminars in which academics and students from different disciplines are deliberately brought together									
	"Journal clubs" in which students from different disciplines present, share and discuss together papers									
	Problem or issue based workshops/conferences/think tanks, convening individuals from different disciplines									
	Regular/frequent pub or food-related informal get-togethers for students from different disciplines									
	Co-location of students from different disciplines (e.g. in labs, field sites and/or offices)									
	Regular meeting of Supervisor, student and co-supervisor(s)									
	Assigned team projects, requiring joint working by students from different disciplines									
	Other (please state)									

11.2	Please (i) rank the importance of various personal skills/characteristics for effective interdisciplinary research ( <b>1 most important, 7 least important; use each ranking once</b> ) and (ii) enter a X in the 2 <sup>nd</sup> column for each attribute which could be enhanced by deliberate training efforts being incorporated into a PhD studentship			
	<b>Personal skills/characteristics</b>		<b>Rank</b>	<b>Training?</b>
	Flexibility, adaptability, creativity			
	Curiosity/willingness to learn from other disciplines			
	Open mind to new ideas			
	Good communication/listening skills			
	Able to bridge gap between theory & practice			
	Ability to work well in teams			
	Other (please state)			

## V. Development

12.1 The ESRC/NERC Interdisciplinary PhD Studentship should be continued:

Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
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### Improving the scheme

13.1 Specific training in how to tackle interdisciplinary projects would be useful:

Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
----------------	--	-------	--	---------	--	----------	--	-------------------	--

13.2 Specific training in how to supervise interdisciplinary projects would be helpful:

Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
----------------	--	-------	--	---------	--	----------	--	-------------------	--

13.3 Bringing students and/or supervisors from interdisciplinary backgrounds together from across institutions to share experiences regarding interdisciplinary working would be helpful:

Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
----------------	--	-------	--	---------	--	----------	--	-------------------	--

13.4 What recommendations would you give to ESRC & NERC regarding the development and improvement of this particular Scheme in the following areas?

Selection criteria	
Application process	
Community-building activities	
Follow-up/ongoing contacts	

13.5 Are you aware of other interdisciplinary studentship schemes? (Give funder and name of scheme if known)

--

## VI. GENERIC LESSONS

What is the **most important lesson** you have learned that you would pass along for the development of interdisciplinary studentships (even in other areas)?

14.1	To future interdisciplinary students? (e.g., what lessons have you learned about making the most of both Supervisor's and Co-supervisor's input?)
14.2	To future supervisors (and departmental managers) of interdisciplinary students? (e.g., what lessons have you learned regarding facilitation of ability to develop new approaches and methods by drawing on different disciplines?)
14.3	To ESRC, NERC or indeed other funding bodies? (e.g., what criteria could be used to select students in the future?)
14.4	Any other advice?

**Thank you very much for completing this questionnaire.**  
**Please now email it to [catherinelyall@informationbrowser.com](mailto:catherinelyall@informationbrowser.com)**

**If you have any queries or feedback on this questionnaire please contact Catherine Lyall at the above address.**

# **ANNEX E**

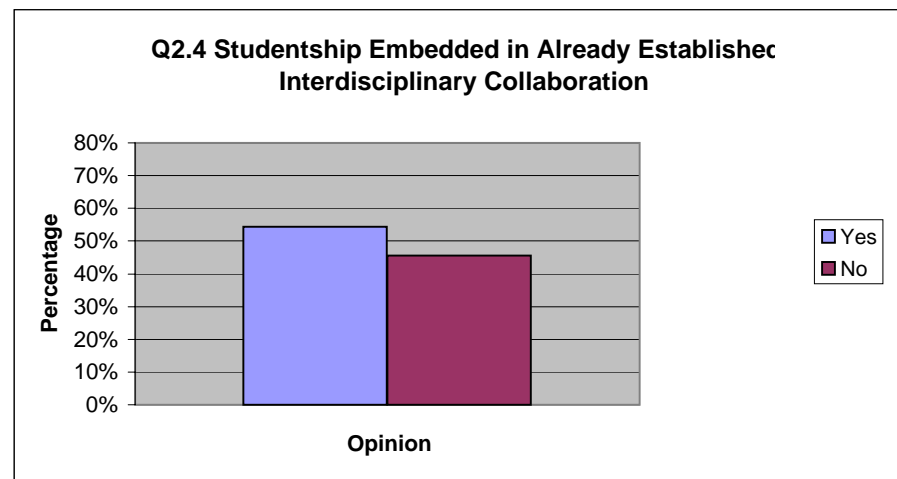
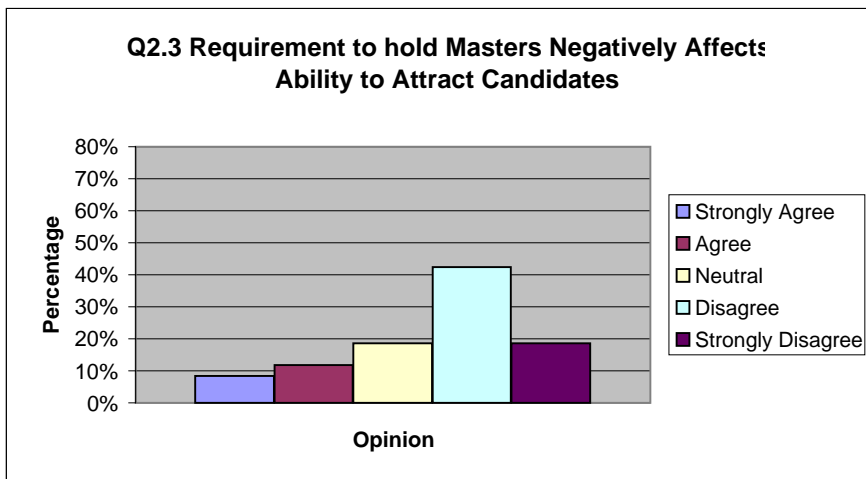
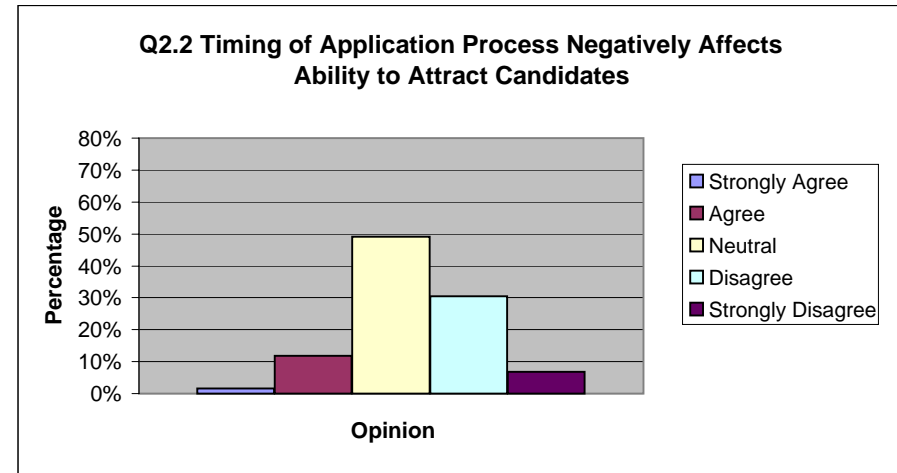
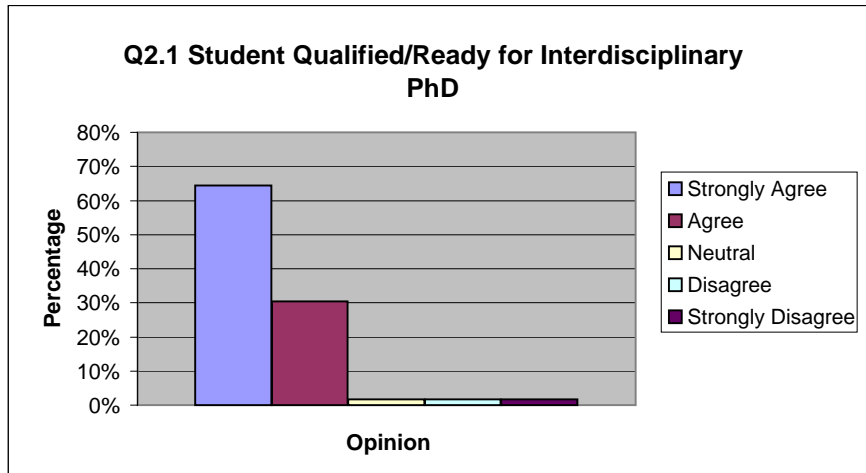
## **Survey Analysis**

1. Supervisors
2. All Students (2001, 2003-2005)

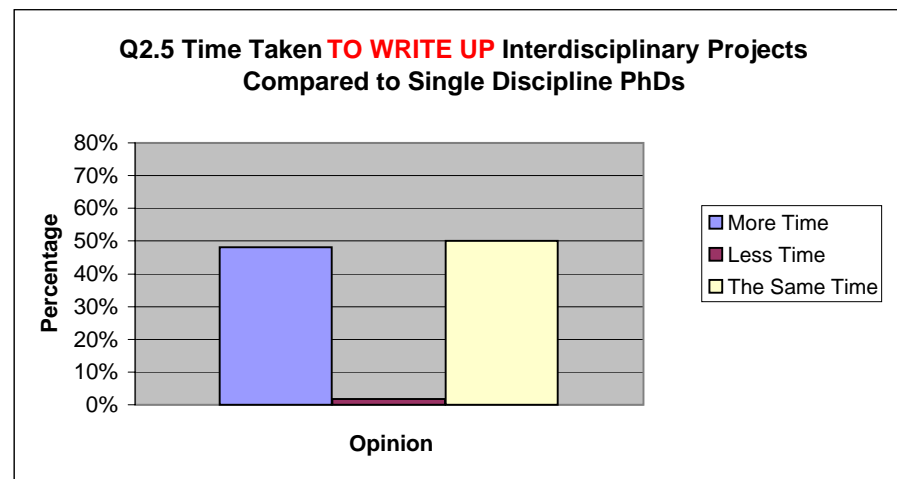
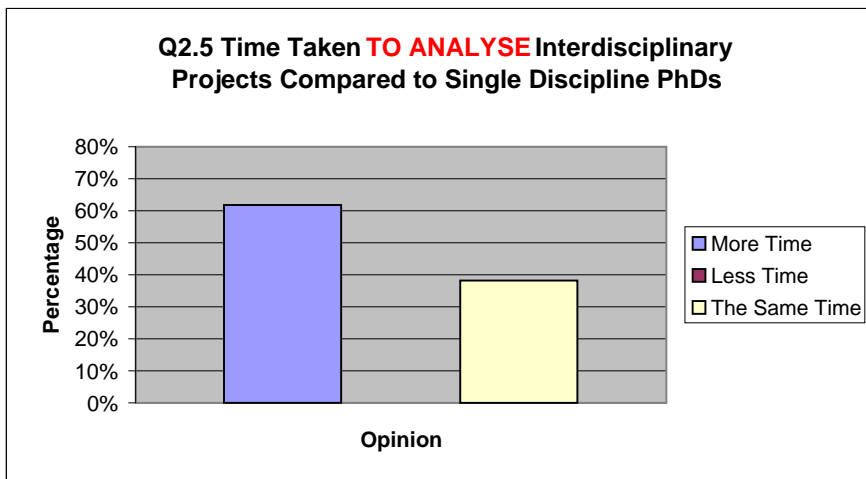
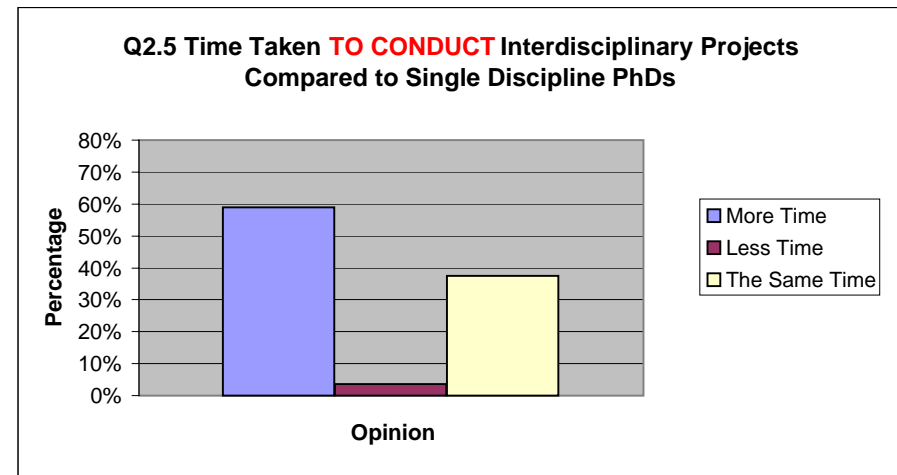
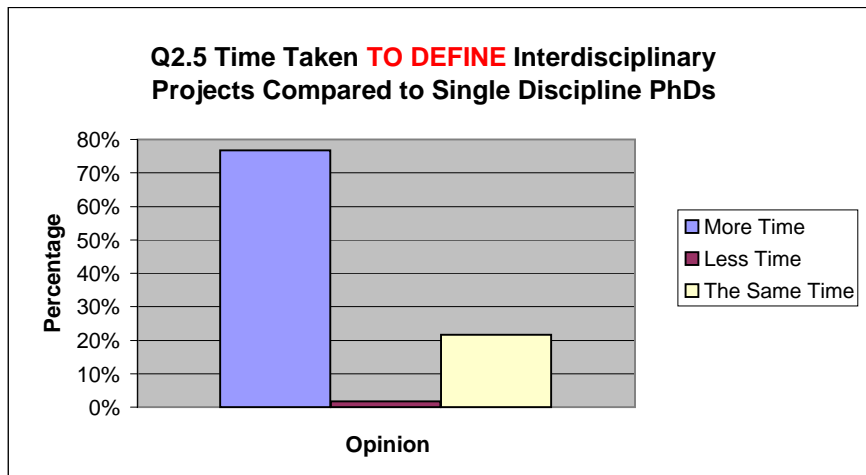


<b>SUPERVISOR SURVEY - Q1.1 Motivation / Origin of Project</b>												
<b>Motivation</b>	<b>Number of Respondents</b>					<b>TOTAL RESPONDENTS</b>	<b>%age of Respondents</b>					<b>TOTAL</b>
	<b>Rank 1</b>	<b>Rank 2</b>	<b>Rank 3</b>	<b>Rank 4</b>	<b>Rank 5</b>		<b>Rank 1</b>	<b>Rank 2</b>	<b>Rank 3</b>	<b>Rank 4</b>	<b>Rank 5</b>	
<b>Real World</b>	22	12	15	7	1	<b>57</b>	39%	21%	26%	12%	2%	<b>100%</b>
<b>Disciplines</b>	3	10	7	32	5	<b>57</b>	5%	18%	12%	56%	9%	<b>100%</b>
<b>Interface</b>	12	14	24	6	2	<b>58</b>	21%	24%	41%	10%	3%	<b>100%</b>
<b>Issue</b>	24	22	7	4	0	<b>57</b>	42%	39%	12%	7%	0%	<b>100%</b>
<b>Other</b>	2	1	2	0	1	<b>6</b>	33%	17%	33%	0%	17%	<b>100%</b>

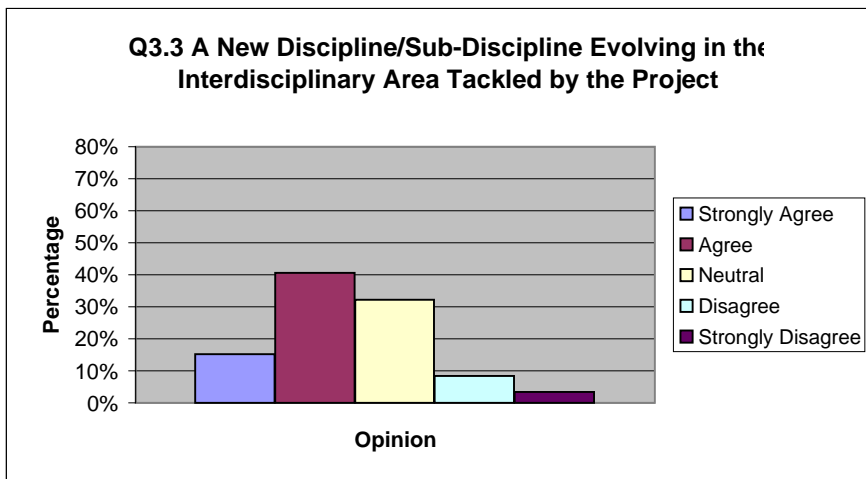
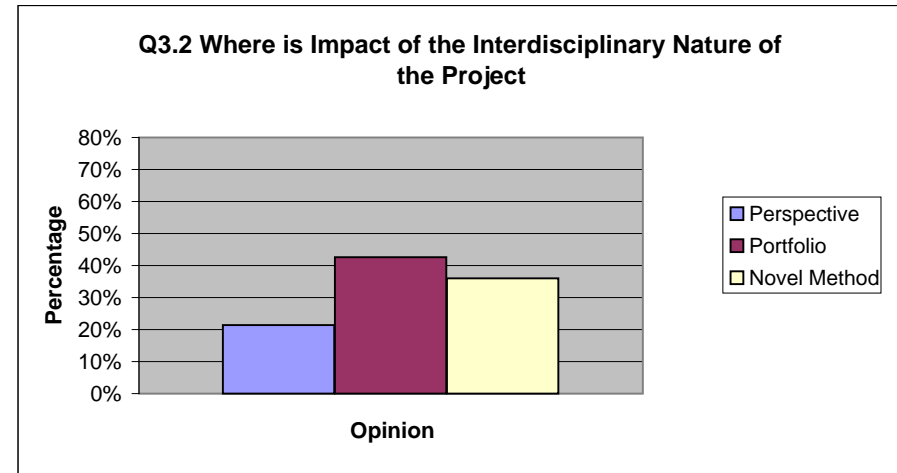
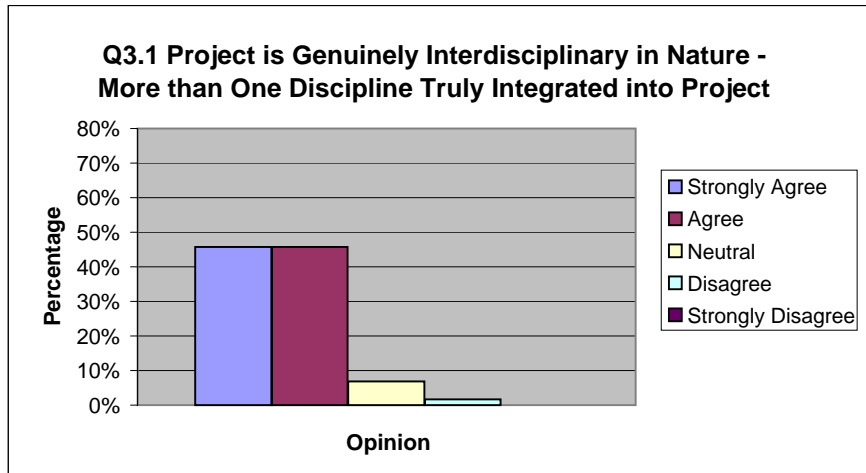
## SUPERVISOR SURVEY - Q2 - Initial Qualifications and Implementation



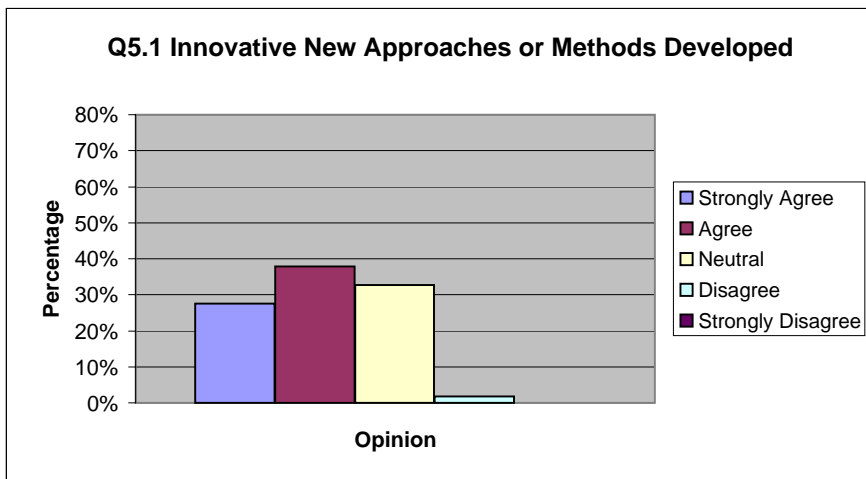
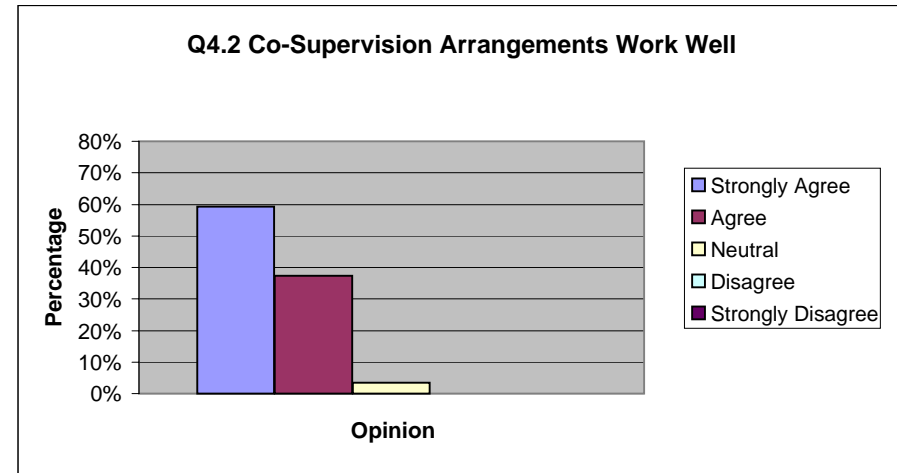
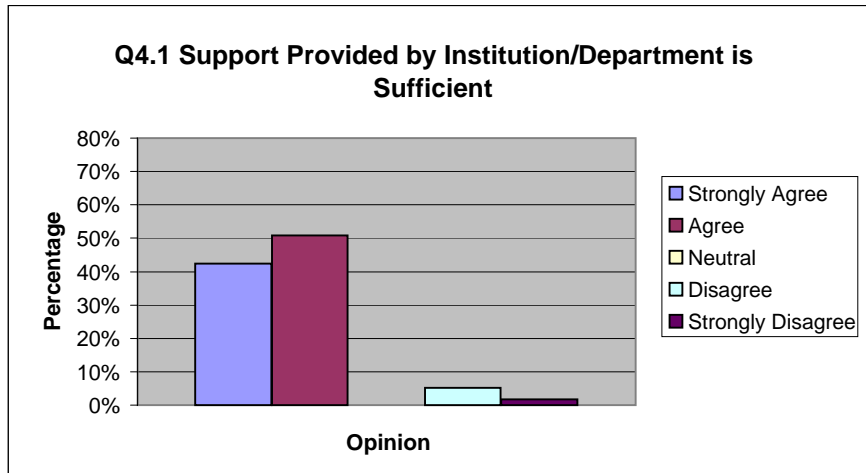
## SUPERVISOR SURVEY - Q2 - Initial Qualifications and Implementation



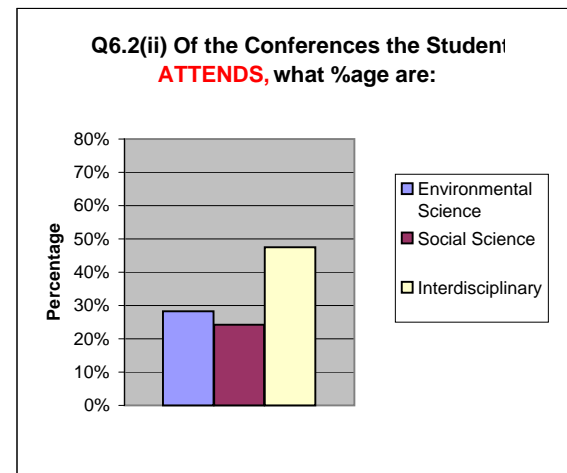
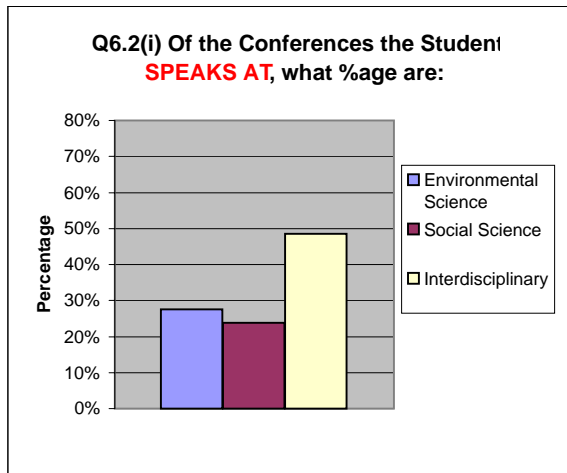
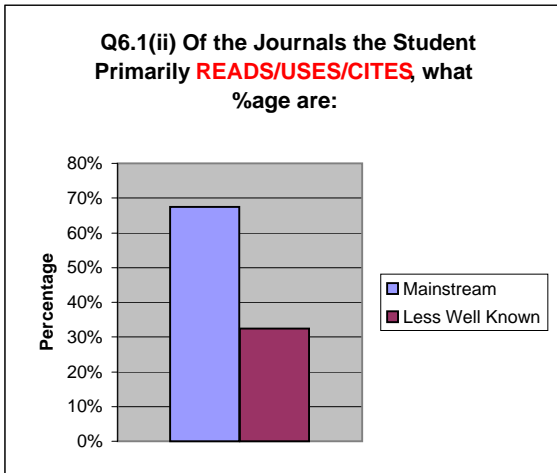
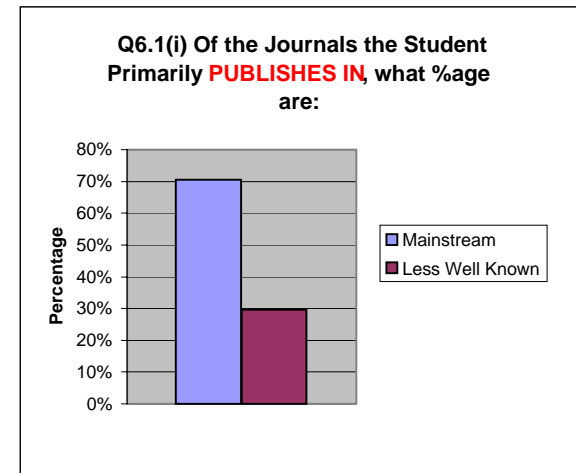
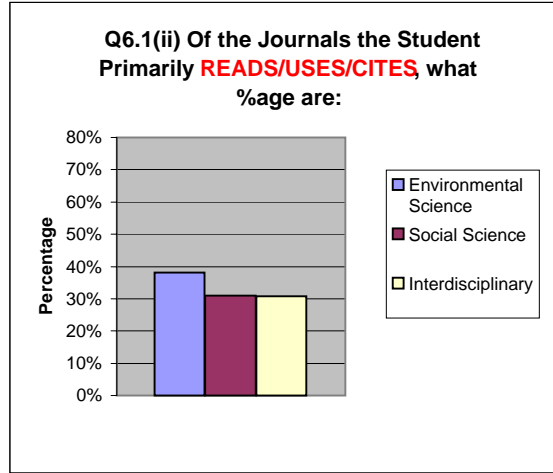
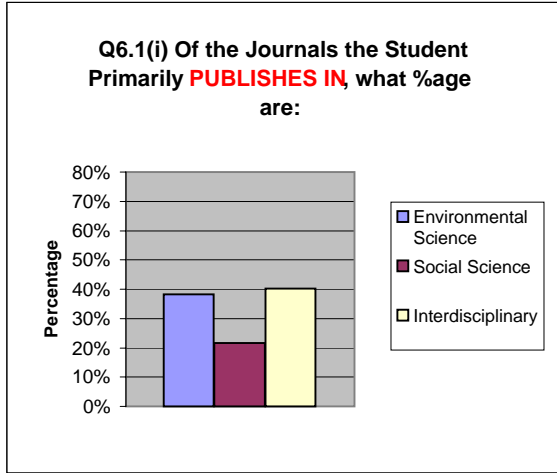
## SUPERVISOR SURVEY - Q3 - Level of Interdisciplinarity



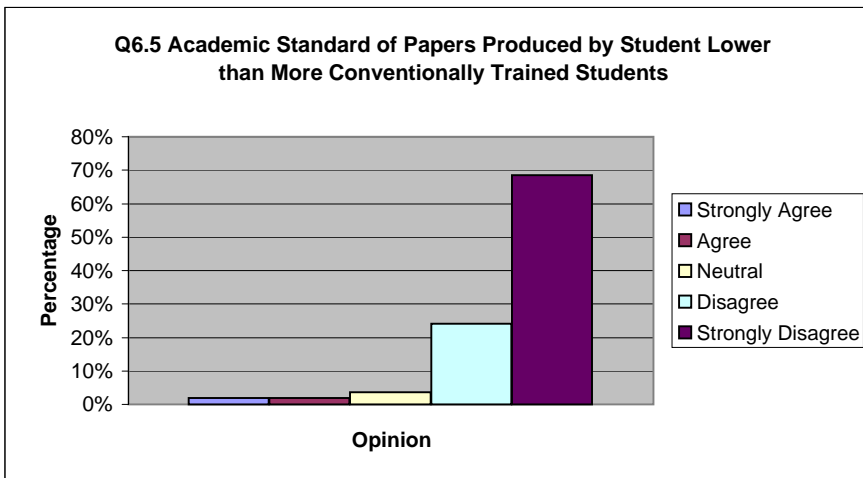
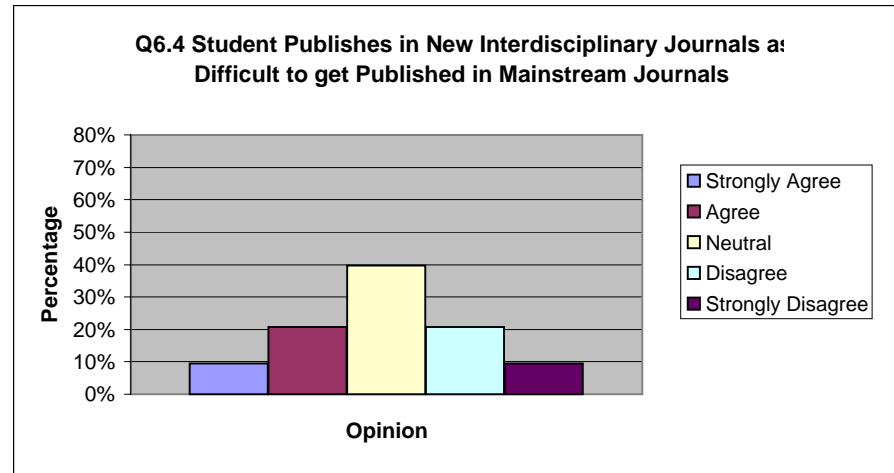
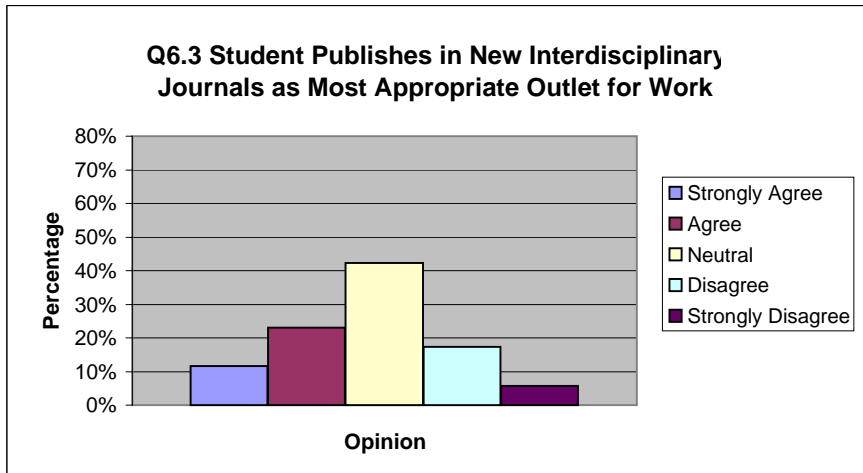
## SUPERVISOR SURVEY Q4 - Institutional Support & Q5 - Innovative Approaches and Methods



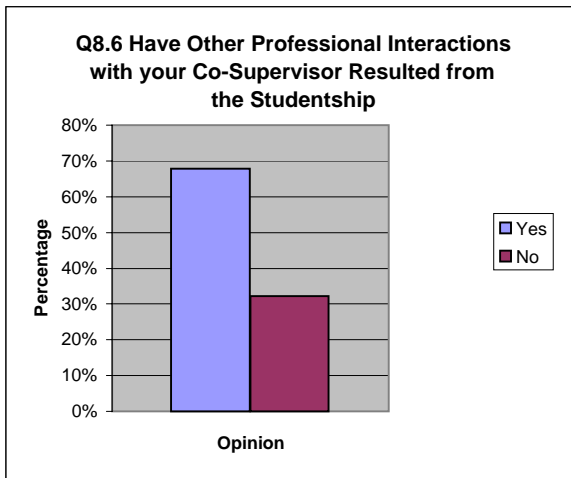
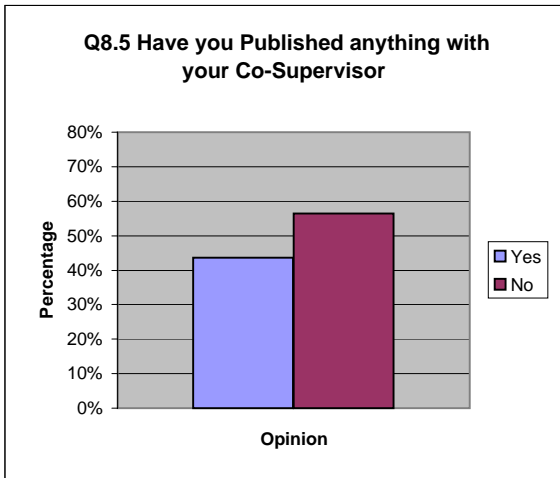
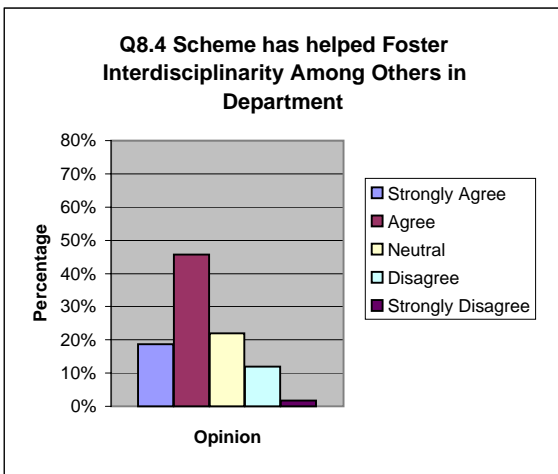
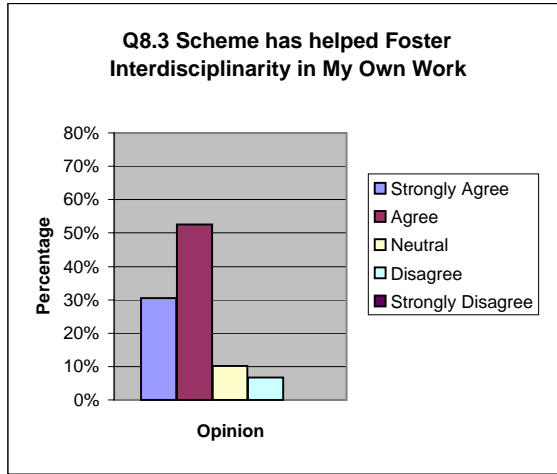
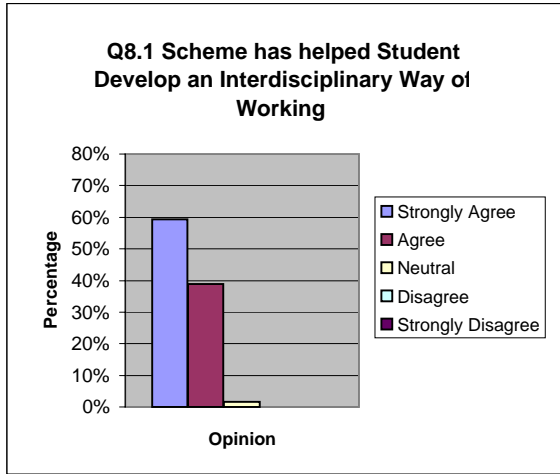
# SUPERVISOR SURVEY - Q6.1/Q6.2 - Publications and Conferences as Indicators of Interdisciplinarity



## SUPERVISOR SURVEY Q6 - Publications and Conferences as Indicators of Interdisciplinarity

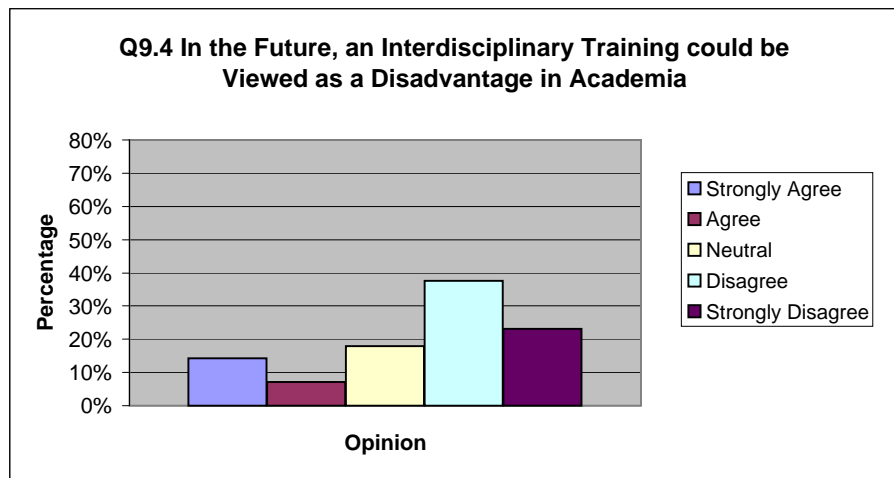
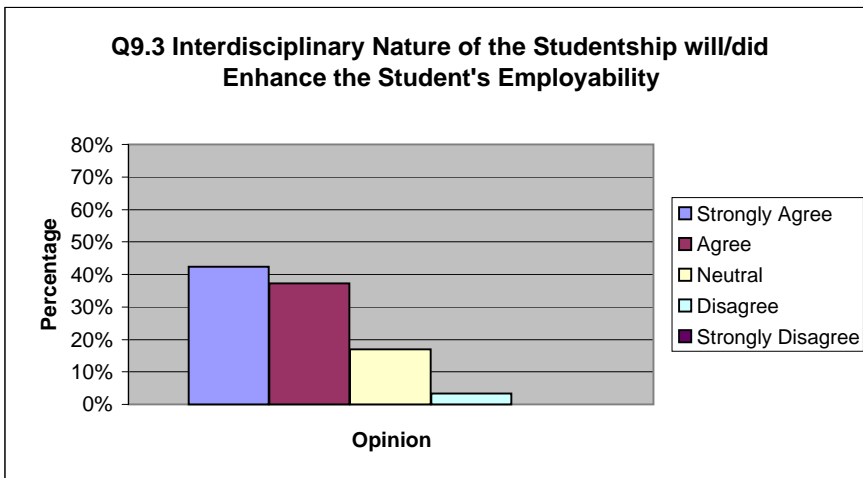
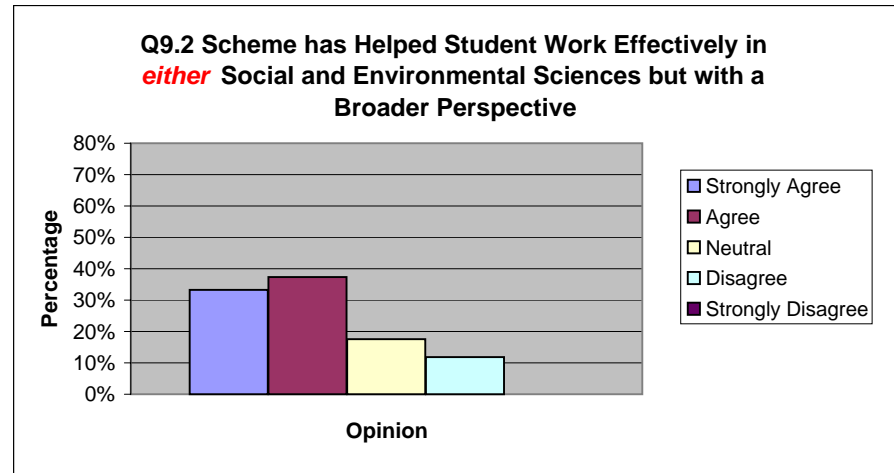
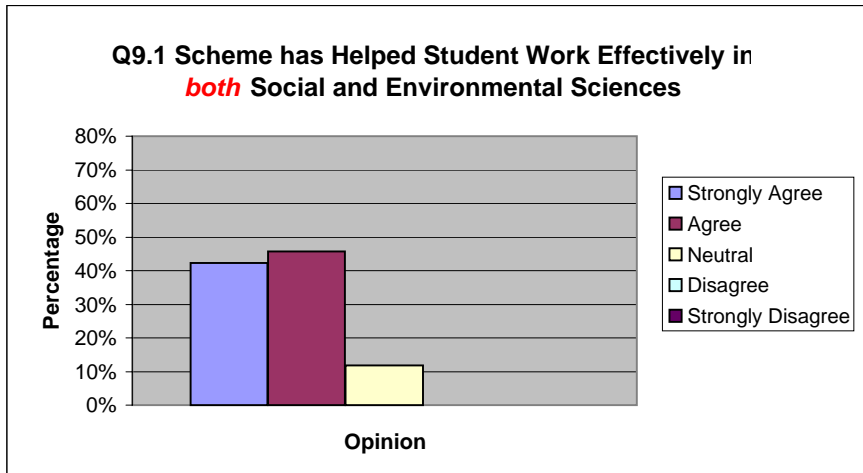


# SUPERVISOR SURVEY - Q8 - Fostering Interdisciplinarity

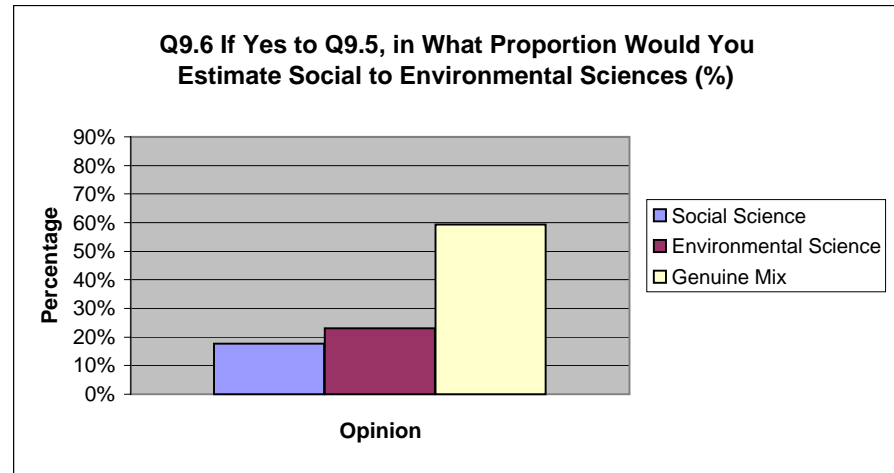
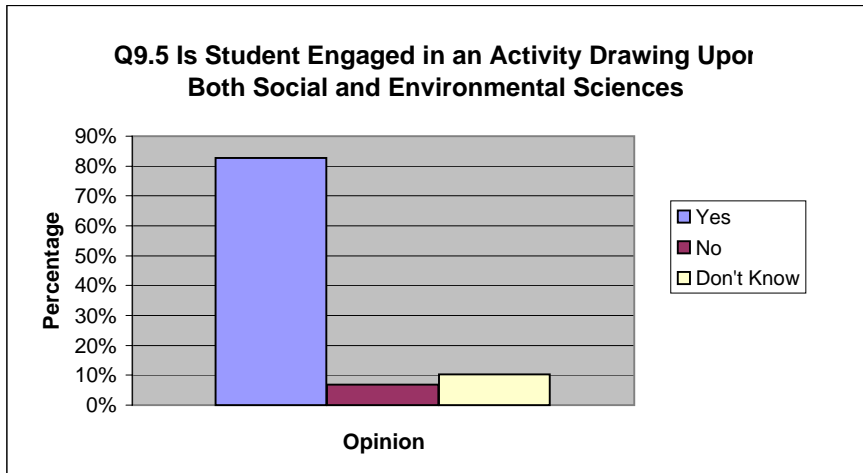




## SUPERVISOR SURVEY - Q9.1-Q9.4 - Future Work and Employability

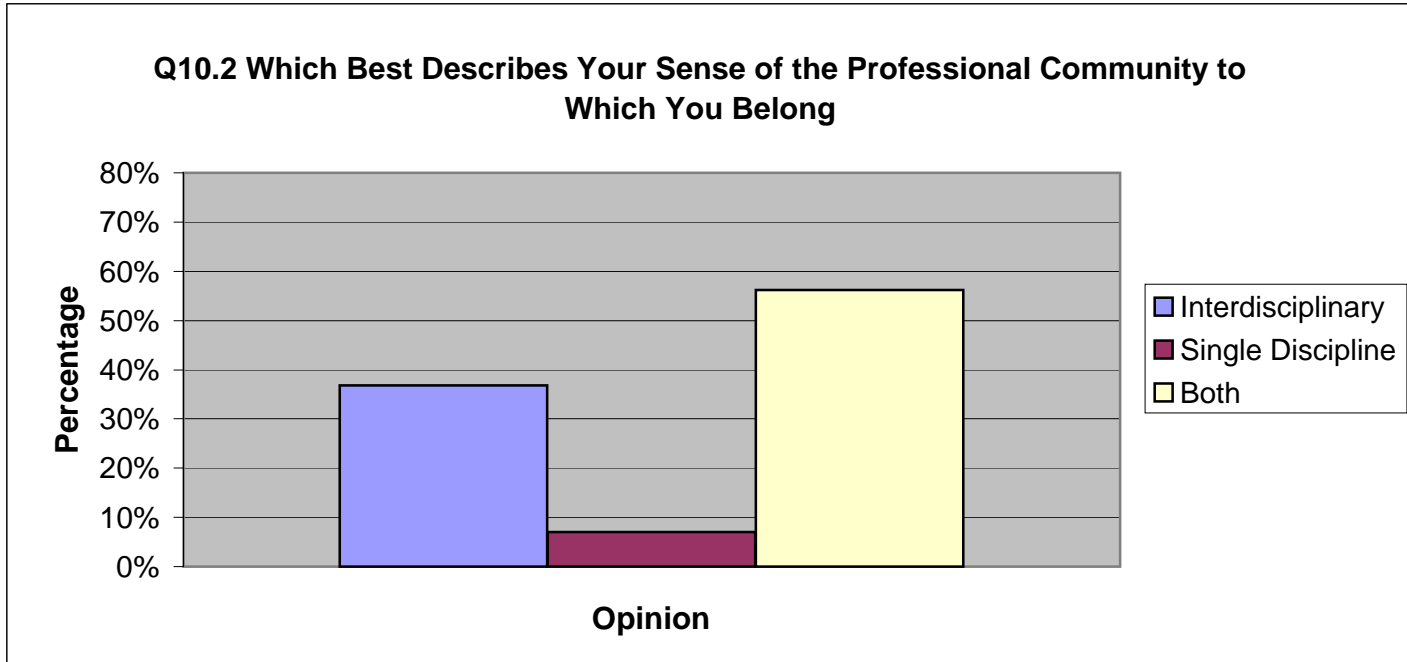


## SUPERVISOR SURVEY - Q9.5 & 9.6 - Students Activities Drawing on Social & Environmental Scien

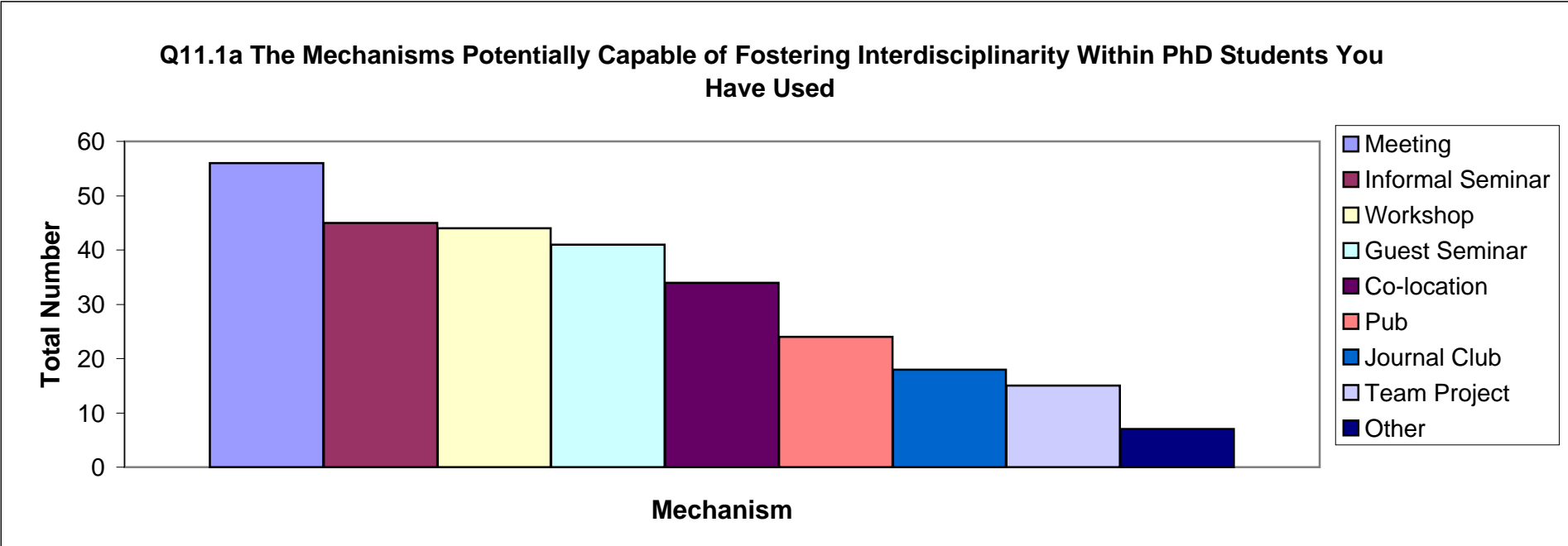


\*14 of 26 (54%) respondents to this question answered 100% Genuine Mix

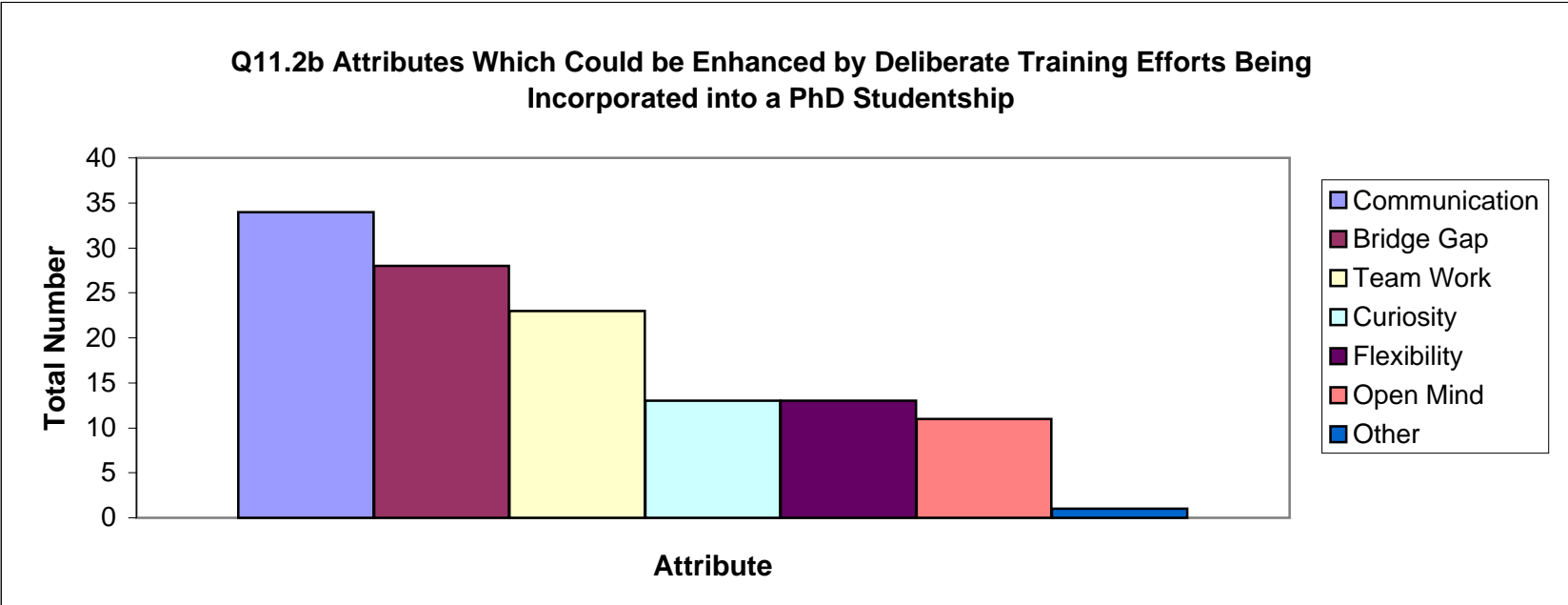
# SUPERVISOR SURVEY - Q10 - Emerging Communities



# SUPERVISOR SURVEY - Q11.1 - Interdisciplinarity - Mechanisms & Training

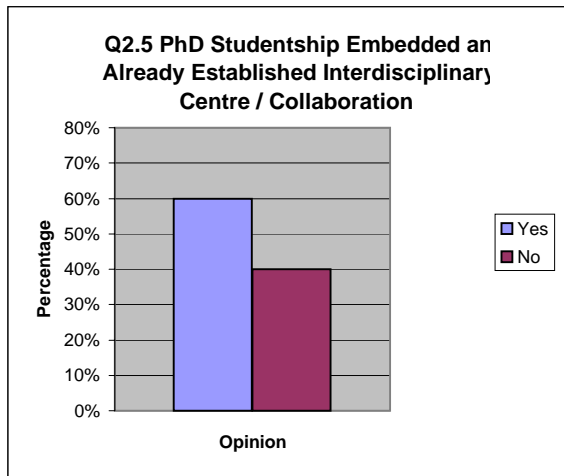
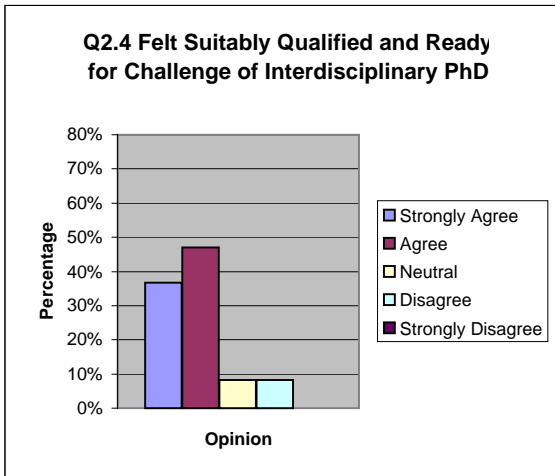
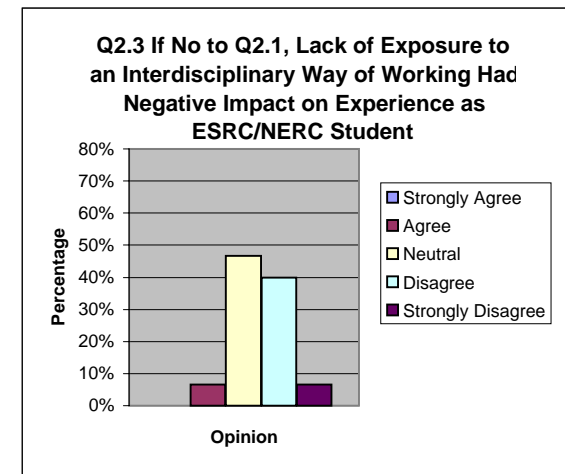
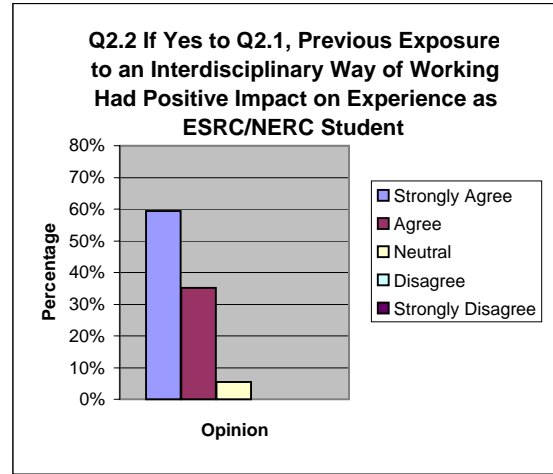
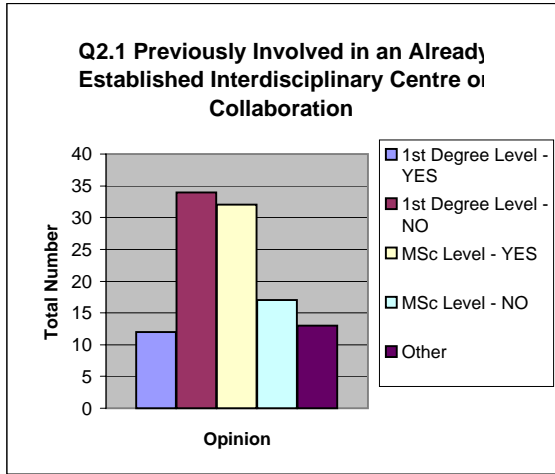


# SUPERVISOR SURVEY - Q11.2 - Interdisciplinarity - Personal Skills / Characteristics

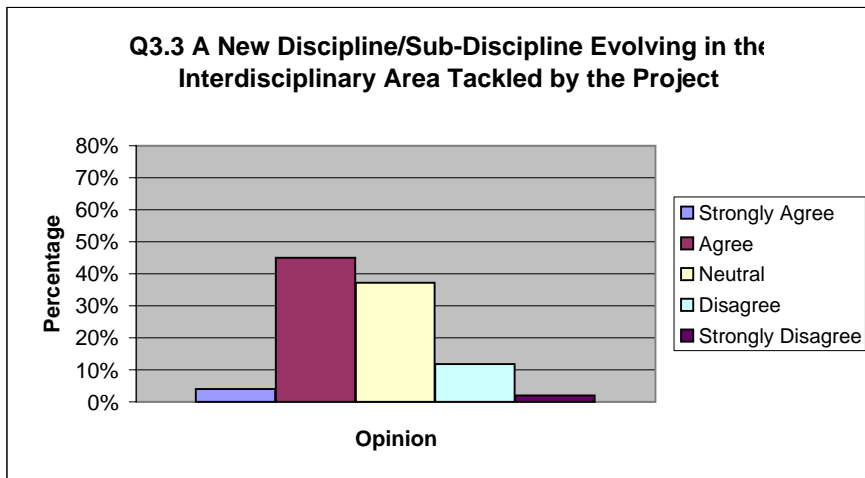
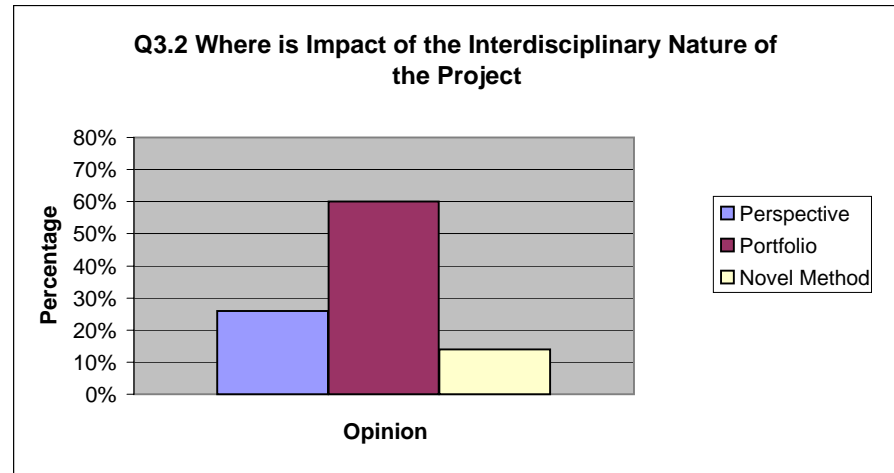
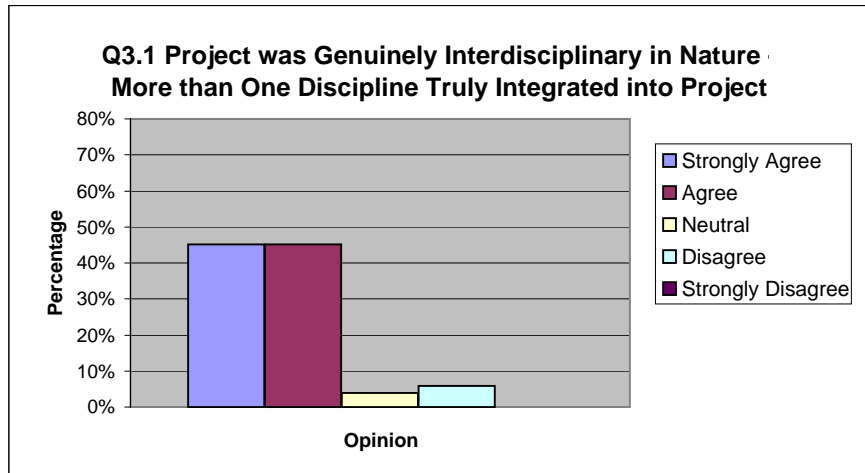


<b>ALL STUDENTS - Q1.1 Motivation / Origin of Project</b>												
<b>Motivation</b>	<b>Number of Respondents</b>					<b>TOTAL RESPONDENTS</b>	<b>%age of Respondents</b>					<b>TOTAL</b>
	<b>Rank 1</b>	<b>Rank 2</b>	<b>Rank 3</b>	<b>Rank 4</b>	<b>Rank 5</b>		<b>Rank 1</b>	<b>Rank 2</b>	<b>Rank 3</b>	<b>Rank 4</b>	<b>Rank 5</b>	
<b>Real World</b>	21	16	7	4	2	<b>50</b>	42%	32%	14%	8%	4%	<b>100%</b>
<b>Disciplines</b>	2	6	13	24	5	<b>50</b>	4%	12%	26%	48%	10%	<b>100%</b>
<b>Interface</b>	9	17	13	8	3	<b>50</b>	18%	34%	26%	16%	6%	<b>100%</b>
<b>Issue</b>	22	11	8	8	1	<b>50</b>	44%	22%	16%	16%	2%	<b>100%</b>
<b>Other</b>	2	3	4	1	6	<b>16</b>	13%	19%	25%	6%	38%	<b>100%</b>

## ALL STUDENTS - Q2 - Context and Initial Qualifications

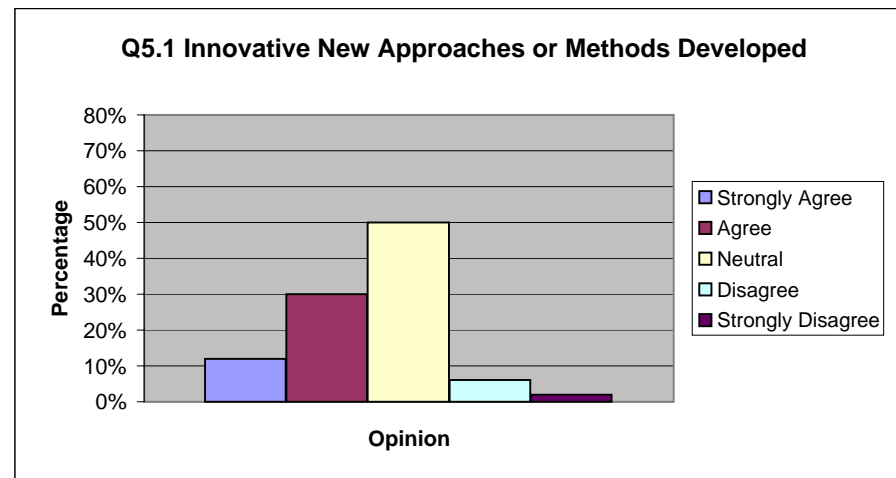
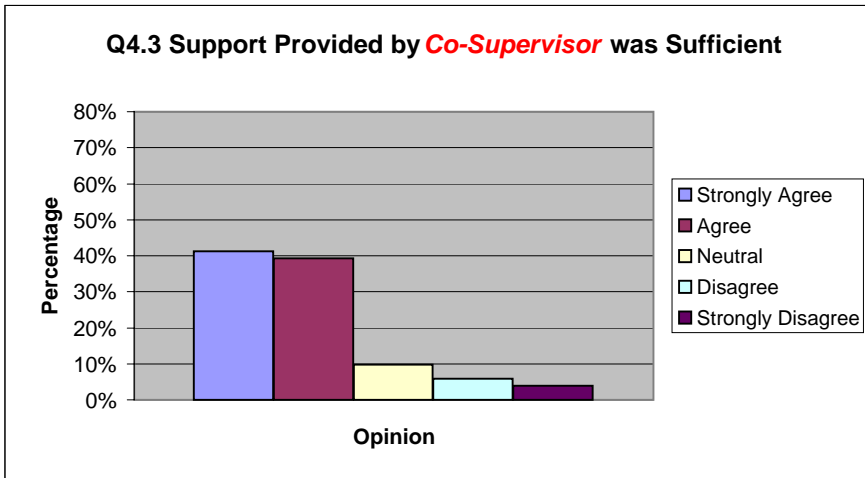
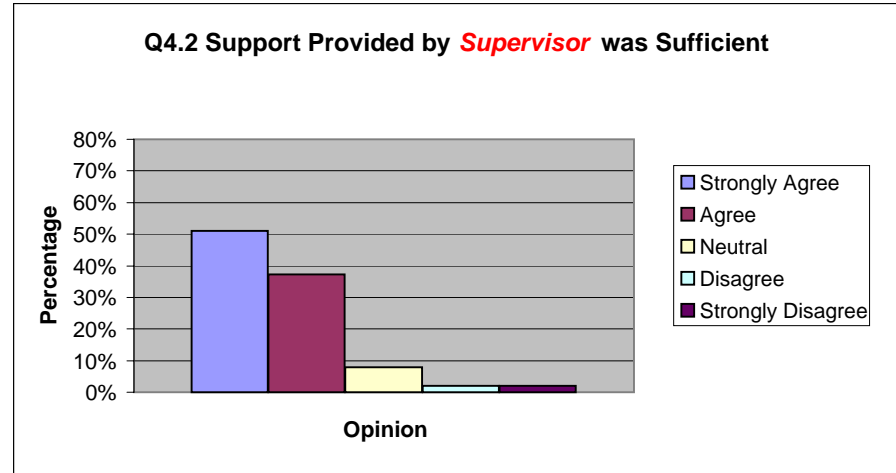
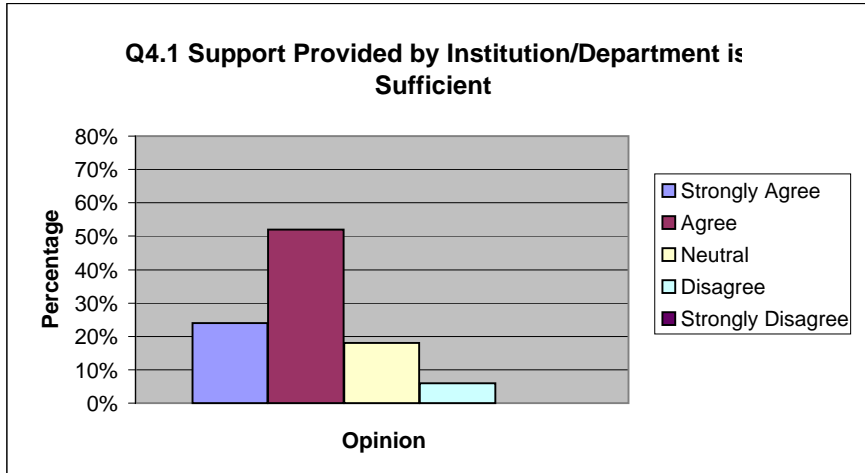


## ALL STUDENTS - Q3 - Level of Interdisciplinarity

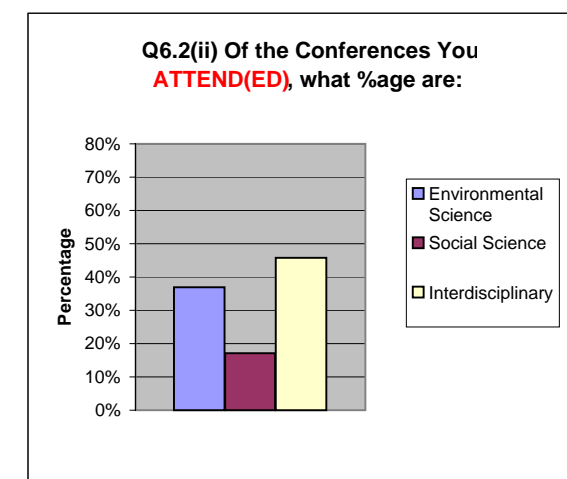
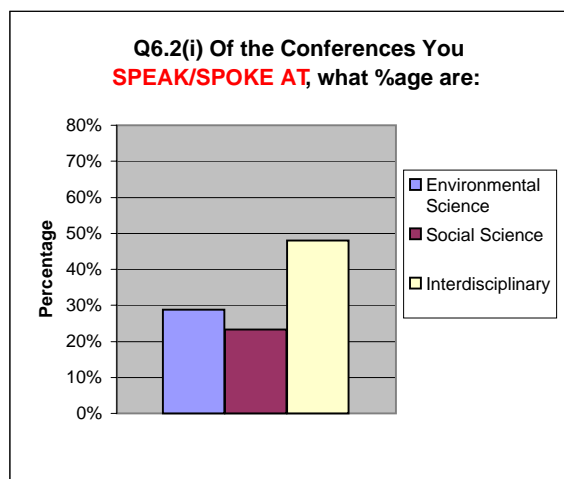
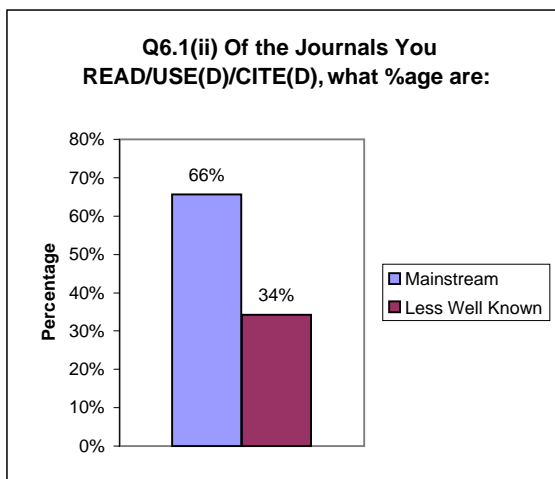
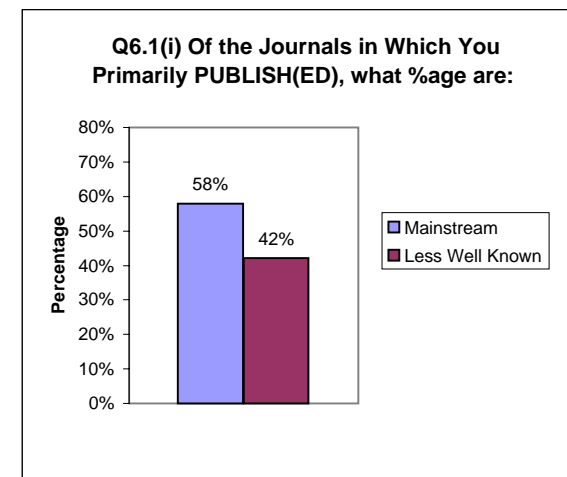
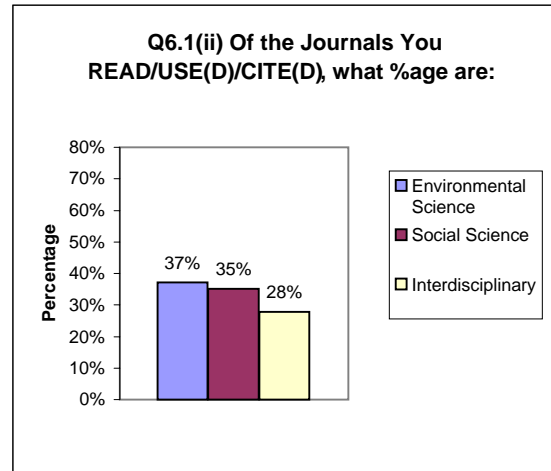
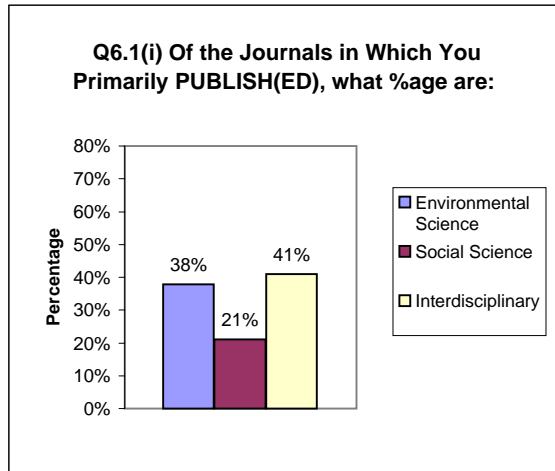




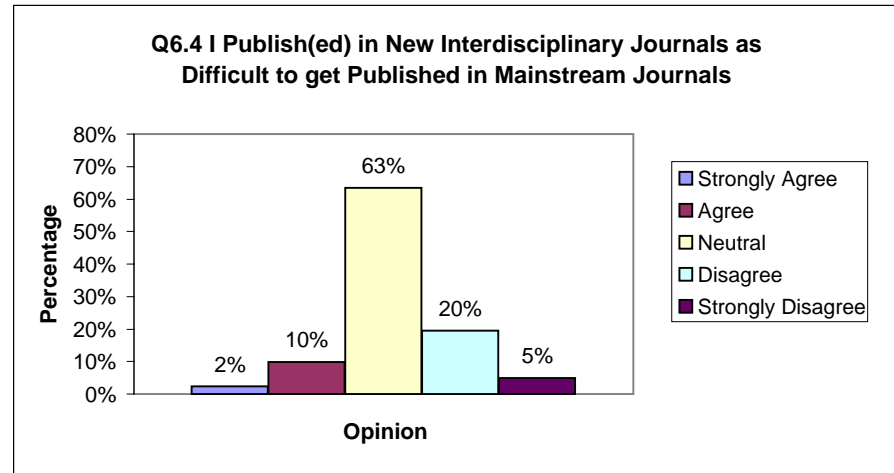
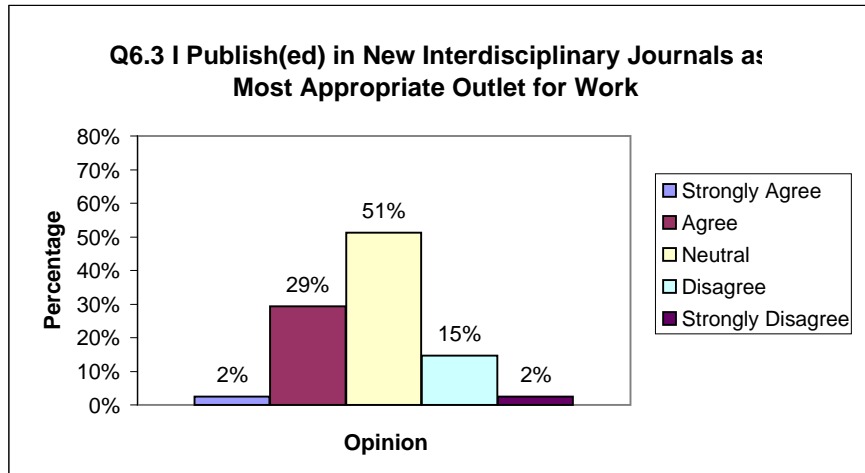
## ALL STUDENTS Q4 - Institutional Support & Q5 - Innovative Approaches and Methods



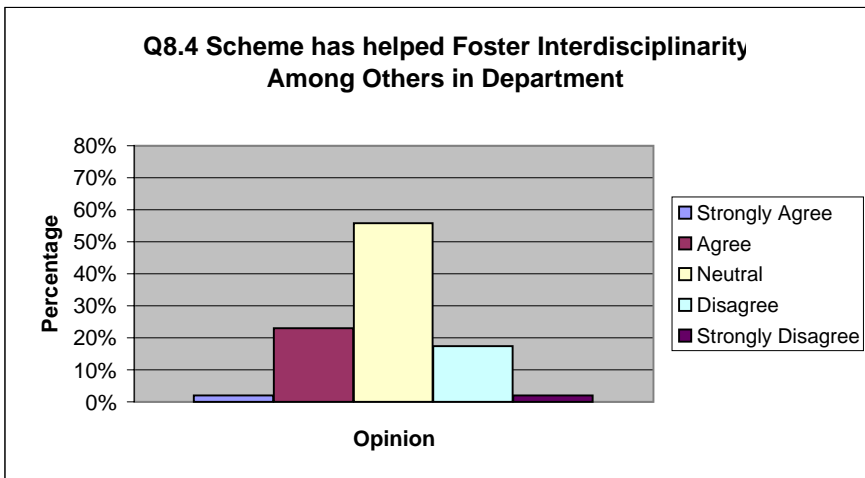
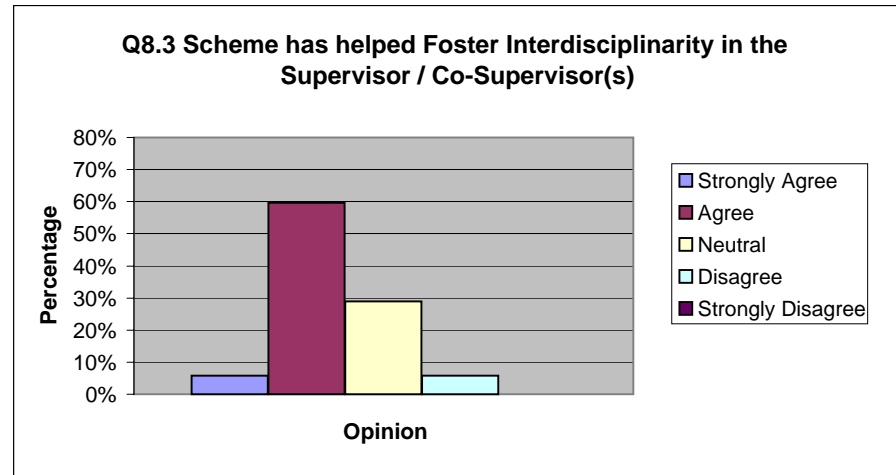
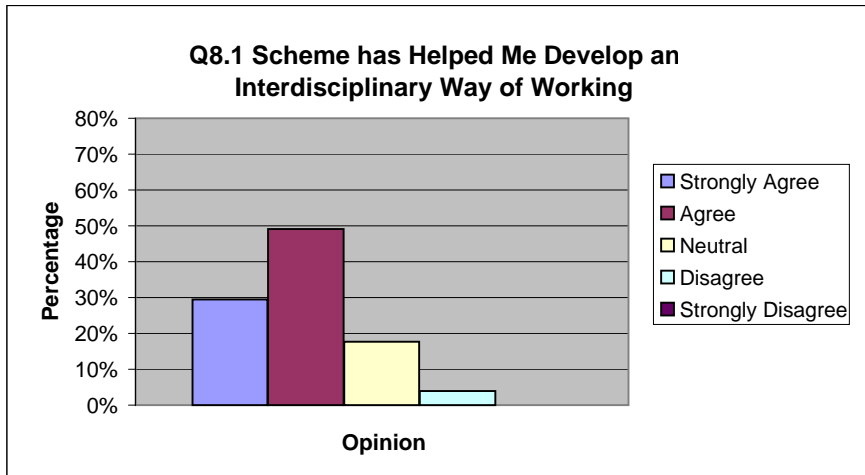
## ALL STUDENTS - Q6.1/Q6.2 - Publications and Conferences as Indicators of Interdisciplinarity



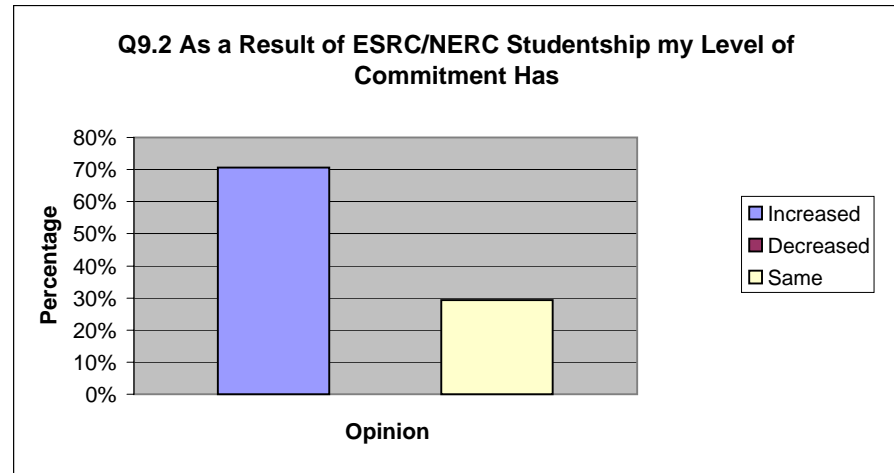
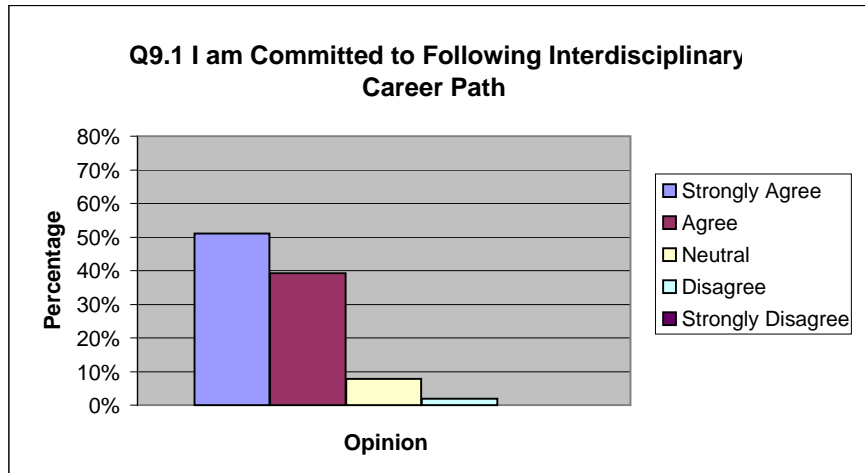
## ALL STUDENTS Q6.3/Q6.4 - Publications and Conferences as Indicators of Interdisciplinarity



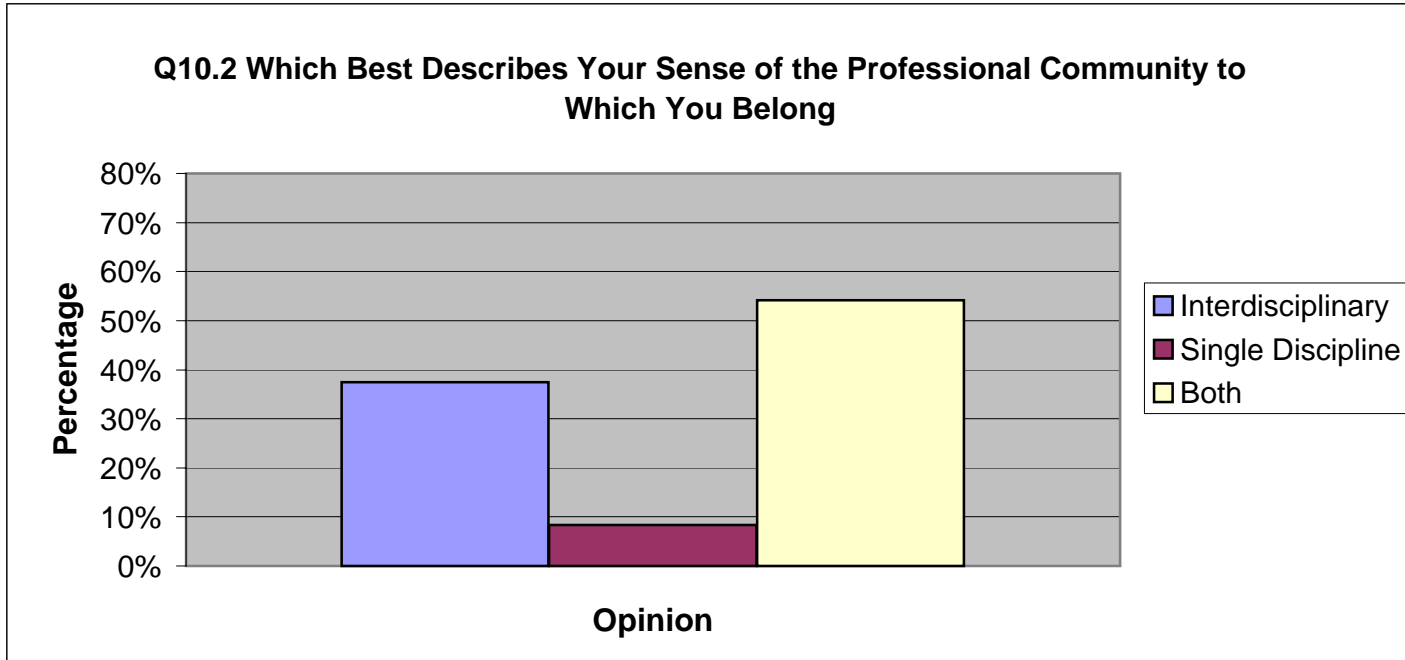
## ALL STUDENTS - Q8 - Fostering Interdisciplinarity



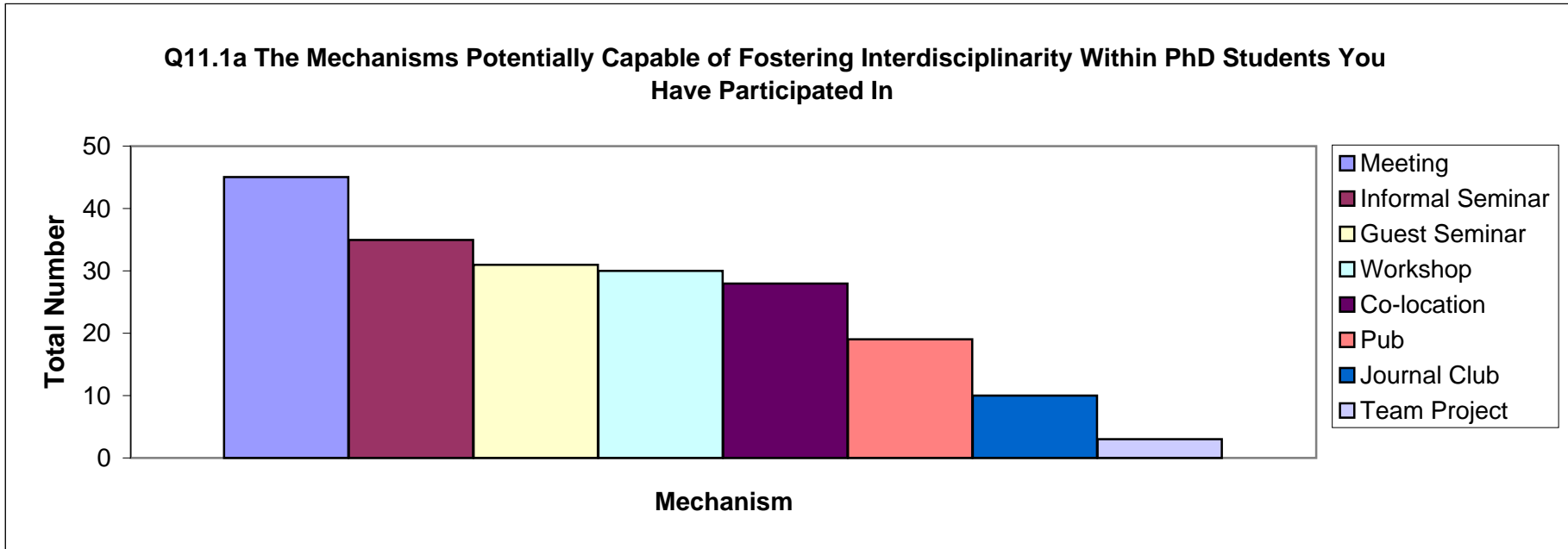
## ALL STUDENTS - Q9.1-Q9.2 - Commitment to an Interdisciplinary Career Path



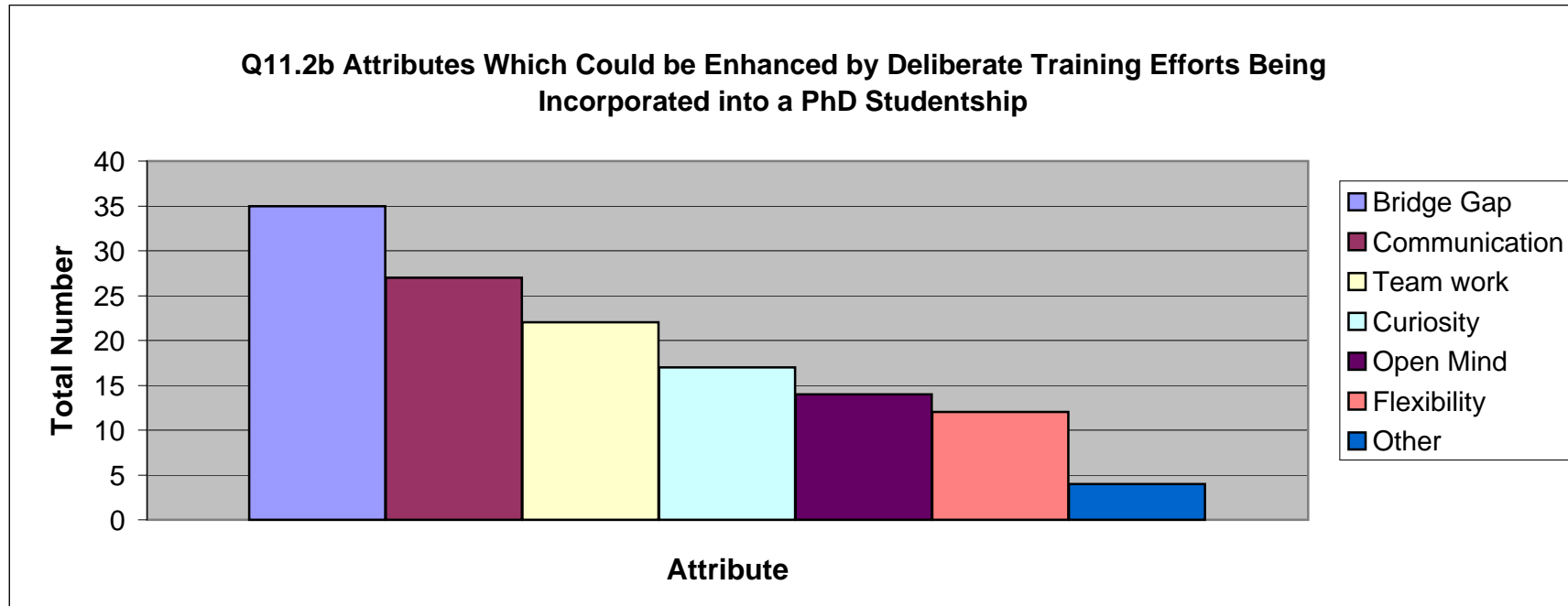
# ALL STUDENTS - Q10 - Emerging Communities



# ALL STUDENTS - Q11.1 - Interdisciplinarity - Mechanisms & Training

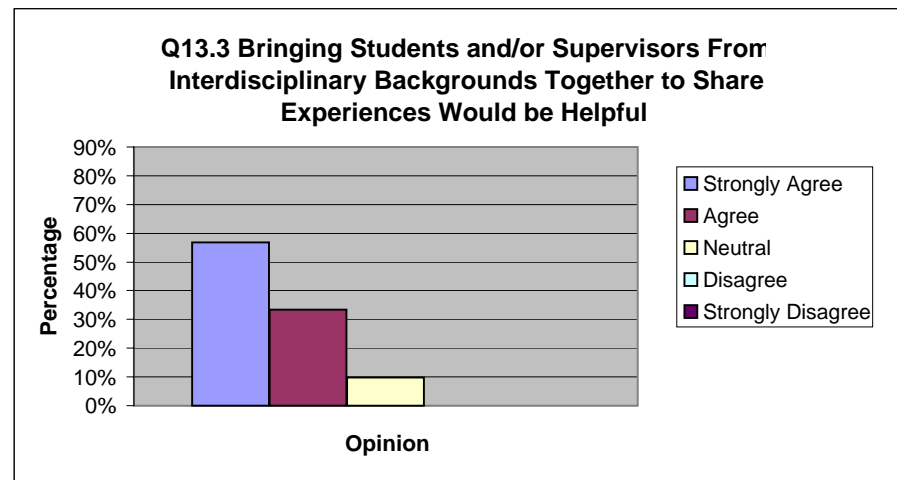
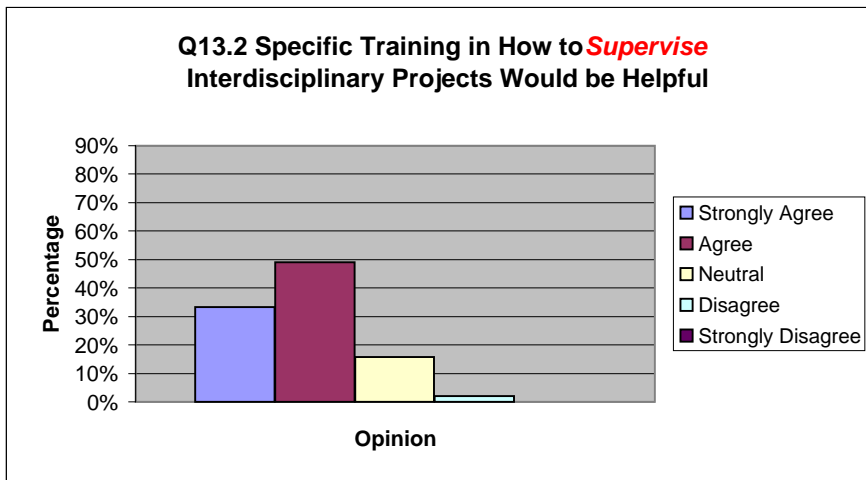
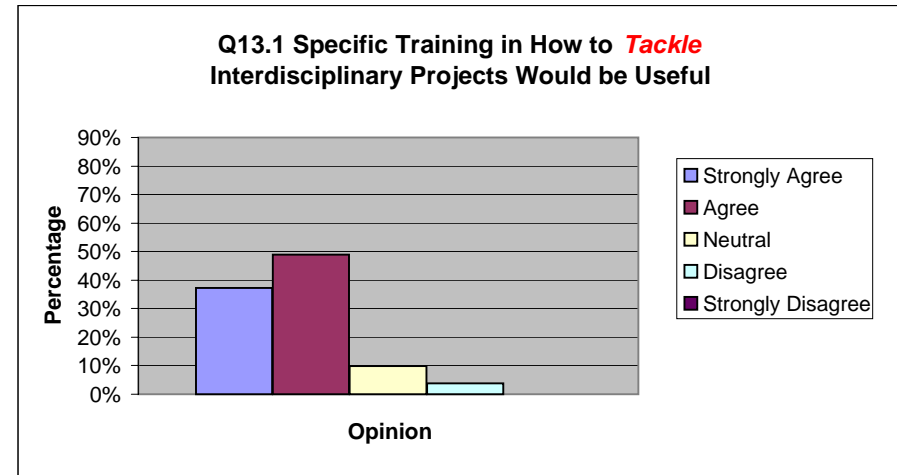
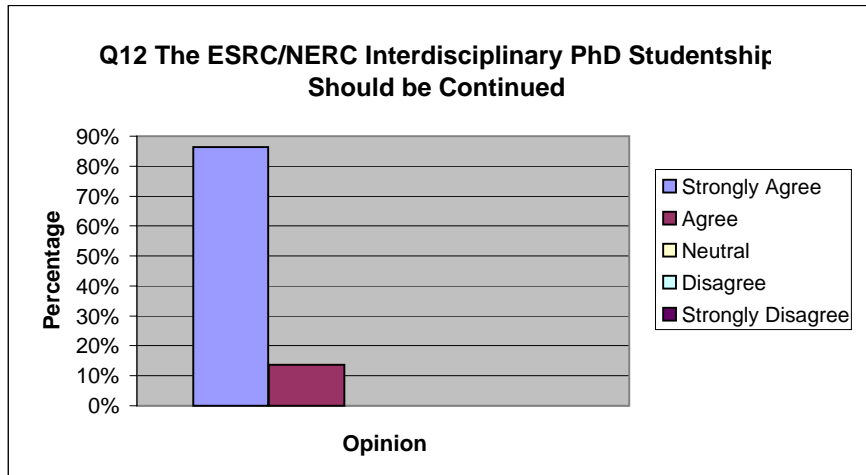


## ALL STUDENTS - Q11.2 - Interdisciplinarity - Personal Skills / Characteristics

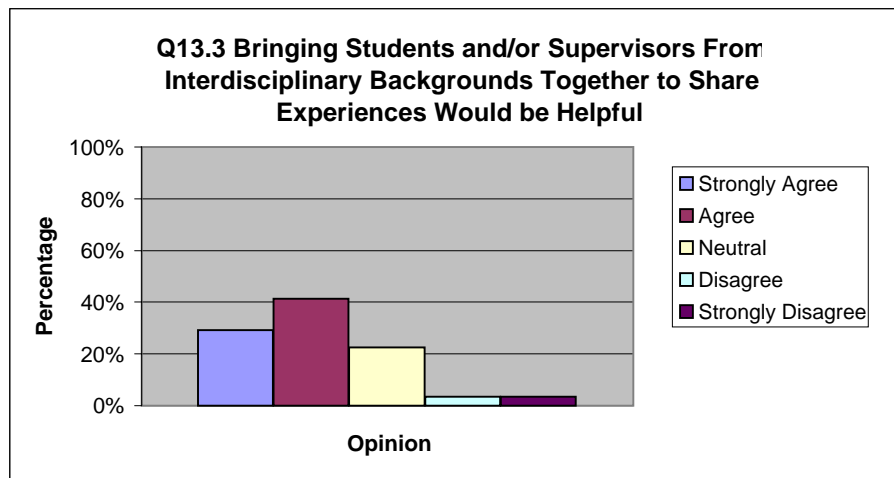
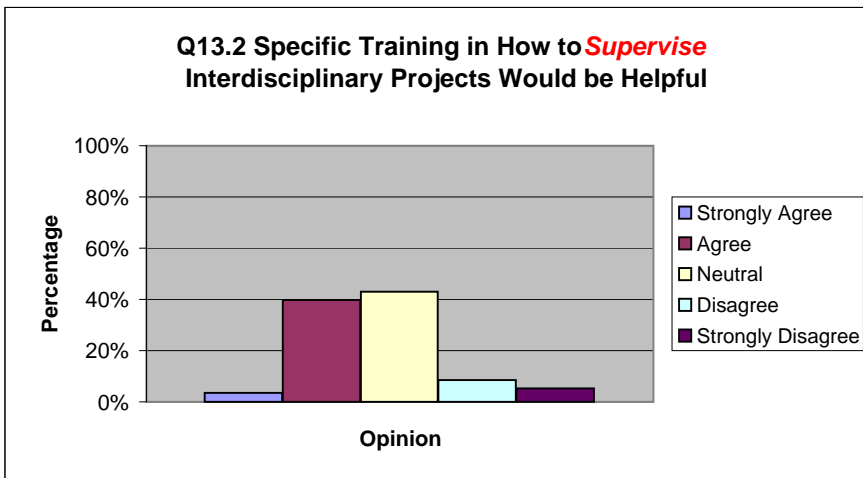
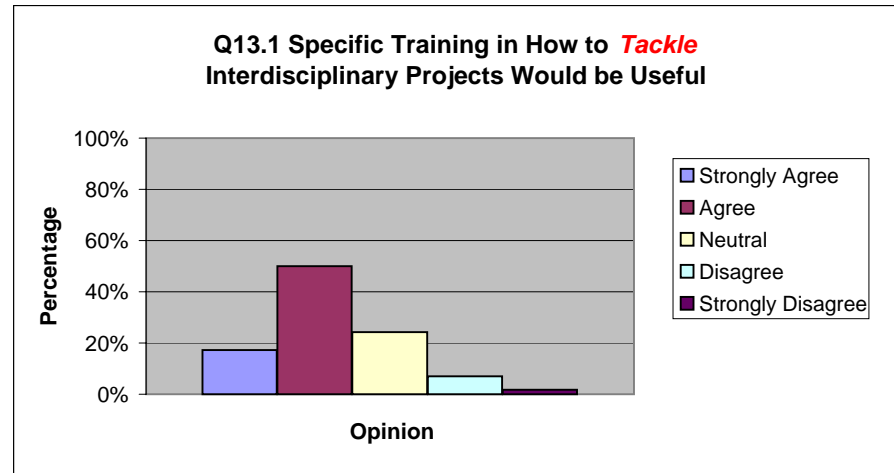
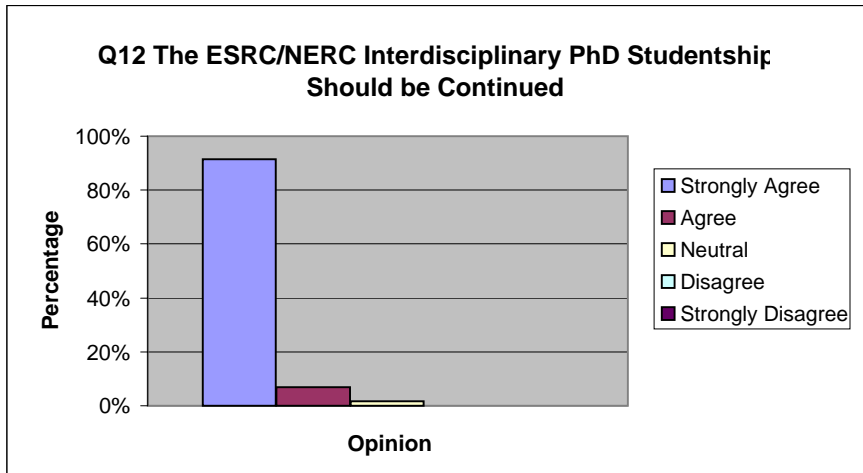




## ALL STUDENTS - Q12 & Q13 - Development / Improving the Scheme



## SUPERVISOR SURVEY - Q12 & Q13 - Development / Improving the Scheme



# ANNEX F

## Focus Group Agendas

### SUPERVISORS

In 15 years, as current/recent student cohorts follow their career paths, will the academic landscape through which they are travelling look different? Should it?

In what ways (if any) will the future career paths of current/recent ESRC/NERC Interdisciplinary PhD Students differ from those of conventional students? What are the main causes underlying those divergences?

Is it a) valid; b) feasible; c) desirable for the Research Councils to catalyse fundamental change in terms of increased emphasis on interdisciplinarity within UK academia? (Just how long-term would such an effort be?)

What steps would you recommend to bring about what you would regard as a healthy balance between interdisciplinarity and conventional discipline-orientation in future PhD training, research, academic structures? (For example, should the Scheme reinforce only existing centres of interdisciplinarity? If not, should Councils in some way network “lone” students involved with emerging nodes of interdisciplinarity? Should a “community” of young interdisciplinary academics be built across the UK or regions thereof?)

### STUDENTS

What are the biggest challenges faced by Interdisciplinary PhD students? (During the PhD Studentship? During subsequent early career years?)

What could ESRC/NERC do to help?

During the PhD Studentship?  
(e.g., conferences, networking, handbook for supervisors)

During subsequent early career years?  
(e.g., interdisciplinary postdoctoral fellowships, research grants?)

Do you feel prepared for a successful career in the current UK academic landscape?

Do you think that in the long-term, British academia will be more conducive to interdisciplinary research and teaching? To tackling multi-faceted real-world problems? What changes would you like to see?

## ANNEX G

### Illustrative Highlights of Messages and Lessons Learned

#### Introduction

This Annex consists of highlights drawn primarily from interviews with some free text comments from surveys. Through this Annex, the “voices” of those knowledgeable about the Scheme can be heard quite directly, with thoughtful comments that flesh out the necessarily abbreviated text of the Report itself. Free text comments are quoted and interview comments are provided from note-taking as “near-quotes”. While nearly 200 pages of transcripts were generated during the evaluation, the relatively few “illustrative” comments here were selected as offering particularly telling or thought-provoking insights for the future, either for the development of this or similar schemes, or for upcoming cohorts of students and supervisors.

#### Exploration of Interdisciplinarity and the Scheme

Real **challenges** exist. *It was very hard to go beyond a multi-disciplinary project into a truly interdisciplinary one.*

Some wonder if the goal of total interdisciplinarity is valid. *Can there be such a thing as an interdisciplinary project?...For research projects you do need a discipline, a craft skill. An orchestra would not do well if everybody was capable of barely playing every instrument. You do need an oboist who is different from a cellist and so on. So practically in some sense with a project you can't develop a student who is totally interdisciplinary, but you can help them to listen to colleagues in other fields and pick things up.*

Genuinely **listening** to others came up again and again, as illustrated by one supervisor's comments here. *If you are training students to function in an interdisciplinary environment more than being interdisciplinary themselves, the most important skill is to listen critically and respect the possibility of alternative approaches. You can listen respectfully to what other people are saying and learn from them without thinking you have to do what they do. He has seen real intolerance amongst disciplines, very exclusionary language and even people who are openly contemptuous of, say, the naiveté of natural scientists on the part of social scientists, and this really gets in the way of interdisciplinary working.*

#### Benefits

Interdisciplinarity generally is seen as **positive**, as expressed here by a supervisor: *The main problem is that generally people are learning more and more about less and less. There is ever increasing specialisation, just keeping up with a narrow field is difficult. So it is more and more difficult to put what you know in the context of*

*other things. The main benefit of interdisciplinarity in contrast is that it helps people put what they are doing into context of what others are doing, this really means converting information into knowledge. Bringing together all of the little things into a more general picture. Interdisciplinarity can help you establish connections to various disciplines and their findings and to think synthetically.*

This **Scheme is seen as positive** in its facilitation of interdisciplinarity. *This sort of project allows students to develop synergies, it means that they are tackling something that has both a greater breadth and a greater depth of work.*

**Motivations** among students varied, but the strong commitment to pursuing an interdisciplinary path is illustrated by one student: *To identify a problem of significance, and design a path through it without disciplinary blinkering, baggage and limitation of explanation.*

### **Disincentives, Problems and Barriers**

Interdisciplinarity is **hard**, as noted here 1) by a student: *One of the disadvantages is that you are fractured into a thousand pieces. Interdisciplinary work is much harder; you need to multi task and you need to be able to understand many subjects. It is like doing two PhDs at the same time* and 2) by a supervisor: *interdisciplinary work takes more time and it is difficult to learn about a new discipline. This is reflected in interdisciplinary PhDs which are harder to do because students have to integrate two sets of views from two different supervisors and may need to learn two different sets of techniques.*

**Barriers** do exist. *There are barriers between departments that are quite strong; although there is lip service to interdisciplinarity, when you actually get down to it there is a lot of “interdisciplinary myopia”. As just one example, a student commented with feeling about running against a brick wall with the scientists who say they are interested in social sciences but are really interested in only social factors and not true social sciences with different methods.*

**Isolation** can be a real problem. One student noted, for example: *A problem is that it does get lonely, other than the supervisors I don't feel particularly that I can relate to others in the department, especially not the other students in the research group. For many, a sense of **connection** somewhere was important. It is important to feel that you have some place you can feel comfortable and with people you can talk to, who don't think you are mad for being interdisciplinary. **Institutional promotion** of interdisciplinarity is not automatically effective. [The department] is trying to be interdisciplinary ... but in many ways some people are skeptical, it seems that people are still staying in their own groups. It may take effort on the part of an individual student to find or develop an interdisciplinary context, as did one student described by his supervisor: [the student] probably felt that he had an interdisciplinary context in part because he actively sought it out and pushed for it and participated in as many interdisciplinary activities as he could, so the interdisciplinary context that he worked in was really of his own making and he had to work quite hard to get it.*

**Supervisors do not always “mesh” well**, which can pose real problems for students. *To handle both supervisors who have very different views, and don't work well together, I have had to negotiate my relationship with each of them. One key part of that was chopping up the thesis ... So I am ping-ponging back and forth because they have very different visions on how things should work. They are pulling in different directions, so I had to design chapters that could be split up, so I could work with them individually on different chapters.*

## Development

### Selection

The Scheme was **viewed very positively**. *Definitely continue --- I could not have done this in any other framework. It is very important as a way of bringing things together, we need to do it, we need broad understanding as well as specialised understanding.*

Research Councils were encouraged to look hard at proposed projects and **select for genuine interdisciplinarity**. For example, one supervisor exhorted, *If their (Councils') aim is to generate genuine interdisciplinarity then they need to develop a greater ability to spot genuine interdisciplinarity earlier. One clue is to look at student backgrounds, selecting, for example: students who have demonstrated an interest in crossing disciplines to achieve certain goals. This does not need to be demonstrated in an academic sense but perhaps through involvement in interdisciplinary projects, volunteer work, attending certain meetings/conferences. Another criterion is passion for interdisciplinary research but with an obvious understanding for its implications and the difficulties that it entails. Research Councils are encouraged to ensure that students show a keenness to learn about new subject areas outside their 'zone of comfort' and perhaps include personal statement from students as to why they want to carry out an interdisciplinary study.*

Naturally enough, the key to the success of the project is usually seen as **the individual**. One student reflected upon this in survey free text: *I believe interdisciplinarity is created individually i.e. it is not a team result. This is why the ESRC-NERC scheme is so important; it creates interdisciplinary individuals, rather than gathering together a team to work on a problem, who then at the close of the project quickly disperse back to the safety of their own disciplines.*

With the individual as the focus, there is a general sense that **not all studentships should be concentrated in a few institutions**, despite challenges in those universities with a smaller critical mass. *You need to have a mixture of different types of receiving departments if the scheme is really to promote interdisciplinarity. It could be wasteful, there will be casualties but you do need to have students in place in different areas.*

### Guidance

While most **student/supervisor/co-supervisor relationships** appeared to work, many students did encounter problems. Frequent meetings and related

communication were often advised; at least one student felt *The Research Councils should look at the structure of the student's supervisor relationship*. The idea of a **handbook** on supervision of interdisciplinary students was widely viewed as very positive – particularly by students but also often by supervisors. *Before the supervisors start, they should be made more aware of what it is going to involve, what to expect, what the constraints and problems are going to be. Supervisors need to be better informed and more prepared for these problems. They need someone like me, who understands interdisciplinary research and conflict management because there need to be dialogues on how to deal with students and how to structure interdisciplinary PhDs. There are two issues, one is psychology, the ability of supervisors to move out of their box, and the other issue is how to manage students so that you retain the interdisciplinarity of it, so that you don't feel that it all has to go into your own area. This is really quite difficult. There could be an ESRCNERC pamphlet or manual maybe that they get early on, maybe before they agree to take on interdisciplinary students, where some of the problems are set out and some of the solutions.*

One supervisor pointed out that normal best institutional practice is not miles away from the role institutions need to play in resolving problems such as disjuncts between supervisors and co-supervisors. *When problems become more acute because students are interdisciplinary, they highlight what institutional management needs to be done regarding supervision generally.*

Suggestions for improvement of the management of the Scheme, with which most people were quite satisfied, included providing a **handbook for students as well as for supervisors**: *It would be helpful to have an interdisciplinary hand book, even at the start; as you mature you may not need to turn to it very much but it would help you to focus more on what you are doing and how you are going to go about doing an interdisciplinary PhD and what you are likely to face and how you might handle it ... but remember that different disciplines, different supervisors and different students all approach PhDs and supervision slightly differently. So having some different suggestions would be useful.*

### **Research Council involvement**

An often repeated regret was the appearance of a limited role (and perhaps interest) displayed by **NERC**. *It would have been nice to have had more contact with NERC, there would have been intangible benefits and it might have boosted the feeling of being involved with both Research Councils. ... I question how committed NERC is to interdisciplinarity.*

Research Councils were encouraged to facilitate **community-building** across students. *This is particularly true because interdisciplinary students are very much out on their own and can often be misunderstood by those working within a single discipline.* An annual conference or forum, involving students from different years (and alumni) was widely and enthusiastically promoted, with the following student's sentiment a typical one. *An annual get together would be a very good idea; it would bring together a diverse group of people who would not necessarily understand each other's research but who would be able to compare experiences and approaches; students could learn from other universities.* Electronic networking of various sorts

could help keep communication alive as students wrestle with their projects and career strategies.

Beyond this, the Research Councils could gain more return on investment in the Scheme by more deliberate **engagement of supervisors** through, for example, interdisciplinary research projects. *As a supervisor with success in this area, I would benefit by being kept informed of new opportunities to develop such (interdisciplinary research) projects. From the Councils' perspective, it seems to me that these projects represent a significant investment in the supervisors, because with each success comes crucial experience in making these projects work.*

## Career Paths

Research Councils are encouraged repeatedly to address the relative **absence of career paths for interdisciplinary researchers**. Advice on possible career paths, perhaps conveyed at community-building conferences, would be welcome. *it might be quite useful to pass along information and perhaps even have former students come in and talk or somehow provide the information. ... When you are so immersed at the end of writing up your PhD, it is sometimes difficult to remember that there is something afterwards, so it would be useful to be helped through that process of thinking things through.* Beyond advice, career path options appear to many to be blocked off, with **the absence of interdisciplinary postdoctoral fellowships** frequently cited as critical. As one supervisor said quite frankly, *put some money in for postdocs, under a similar scheme. That is the single best thing that the Councils could do.*

One student wrote a very thoughtful short essay on **barriers to an interdisciplinary academic career and the difference the Research Councils could make.**

*The opportunity to conduct inter-disciplinary research as part of the ESRC-NERC PhD studentship has greatly fuelled my enthusiasm for interdisciplinary research. It has improved my ability to effectively work across disciplines and instilled a better understanding of the demands of and barriers to interdisciplinary research. However, I am also aware that in reality, outside of the NERC-ESRC studentship, an interdisciplinary scientist is in a difficult and often lonely position. The current infrastructure of academic institutions is still highly sectoral and the funding possibilities available from almost all UK funding organisations for interdisciplinary research is still minimal and as a result, it is difficult to find employment as a truly 'interdisciplinary scientist' within academia. For example, on applying for lecturing posts – the first question one is asked is 'what discipline would you teach', and on applying for funding that is peer reviewed by sectoral academics – the interdisciplinary researcher is also at a disadvantage – since their proposals usually involve some part of research outside the reviewer's own field. It seems that after 3 years training in interdisciplinary research, the student is almost forced to adopt a traditional sectoral approach to remain within academia – which is a loss to the future advancement of an interdisciplinary discourse. The development of 'inter-disciplinary researchers' during the early (PhD) stages of an academic career runs the risk of developing academics who are 'Jack of all trades, master of none' – a fear which has been echoed by many*



*interdisciplinary students with whom I have spoken. On the other hand – if the ideas and benefits that come through interdisciplinary research are not fostered at PhD level, will interdisciplinary research ever be truly achieved by an academic community still highly segregated within their own disciplines? ... I would hope that the ESRC-NERC could follow through with their commitment to interdisciplinary research by establishing not only more interdisciplinary studentships and better support for those students through investment in building an interdisciplinary community, but also through an investment in the infrastructure and funding opportunities needed to actually conduct interdisciplinary research once qualified. For example, a joint call for proposals between NERC and ESRC would be effective in moving the academic community into engaging with the benefits and wide scale demands of interdisciplinary research that involves both social and natural sciences.*

While no one is so naïve as to think that academia will change rapidly, some do hold out hope, particularly if interdisciplinary research grant programmes become more common and give interdisciplinary researchers more of a chance at a career path. *If they (young interdisciplinary people) do get to move on in academia they will be a force for good.*

## **Generic Lessons for Supervisors**

### **Learning to supervise interdisciplinary studentships**

The central message: *try to make sure your students are not disadvantaged.*

Supervisors can learn to become better at interdisciplinary supervision, it was suggested, by participating in mixed advisory committee meetings for interdisciplinary students. *This really lays bare the nature of supervision and can be helpful training for the Supervisors.* A practical recommendation from one experienced interdisciplinary supervisor regards the extra work involved: *It is almost impossible to do enough reading to be an effective interdisciplinary supervisor, it is good to exploit some of the new approaches to help researchers get through papers without reading them all, perhaps Pubmed, where certain key academics comment on papers and make recommendations and so on; this can be a very useful shorthand way to handle a huge literature base.*

### **Roles**

Supervisors play a vital role in helping students maintain focus. *There is, especially with interdisciplinary projects, a real danger of going off on tangents and plodding along; a key role of the supervisor is to stop people going off on tangents and to keep them on track and on focus.*

At the same time, supervisors need to facilitate their students' innovativeness, even risk-taking. *You need to think outside of the box with your students.*

Also at the same time, supervisors *need to work hard to encourage real integration in the student's mind* and realise that they *will have various comfort zones that need*

*to be “broken through” in order to gain experience in other methodologies that lie outside their preferred discipline.*

*Supervisors must be realistic about their students: if you have somebody who is a perfectly good natural scientist and you know that in their heart they are happiest doing natural sciences, don't try to push them into something interdisciplinary.*

*Just as interdisciplinary students need to be open-minded, so too do supervisors. Make sure you really are open to other disciplines before taking on students wanting a interdisciplinary approach...the student may be open to new ideas, but the supervisor isn't always.*

### **Supervisory functions**

*To ensure adequate guidance, supervisors may wish to: use a range of approaches, both formal and informal; provide good feedback; help students develop good writing skills early and guide their reading in the early stages. A student unfamiliar with one of the disciplines needs very focused guided reading early on and may face conceptual problems with the general approaches of the unfamiliar discipline which the supervisors have not experienced even when reading one another's disciplinary literature. Some of the learning required may be at a surprisingly basic level. The student may become frustrated if such problems are not overcome, and the tendency then is to focus on the parts of the project that they feel they can cope with. Yet, at the same time, supervisors are warned to not allow the student to spend too much time (i.e. months) in the early stages reading only a certain type of literature, or focusing in on one issue too much. Launching an interdisciplinary project might take advantage of the fact that there are often key texts which identify the need for interdisciplinarity ... Helping the student to identify these might get them into a multidisciplinary approach from the beginning.*

*Guidance can include getting students off to a good start, for example, ensuring initial support from, and discussion with, those with experience in different disciplines to be able to identify links between different disciplines and to formulate the theoretical components of the thesis. Planning and good communication are key, so that everyone has the same expectations. Figuring out part way through that you both want the project to go in different direction is tricky for your student.*

*At some institutions, even **training in conventional PhD supervision** can come up with useful suggestions as to good practice. As one fairly new supervisor observed, the university encourages the use of log books and targets so that the student and the supervisor record together what they have agreed to do and by when. This can be very good, you have to discuss with the supervisor, the co-supervisor and the student and you come to an agreement and you capture it, so this may be especially important for an interdisciplinary student with a co-supervisor in a different area. There may be an agreement for example on the format of the ultimate thesis.*

**Teaching of interdisciplinary research methods** to PhD students was not often cited, but one supervisor described a research methods course which includes helping students *work on some methodologies like mixing qualitative and quantitative methodologies, research design and perhaps some interdisciplinary*

*issues and questions ... Learning how to evaluate research design, each student looks at a previous PhD which is usually interdisciplinary and mixed methodologies, so at the end of the course they can put what they have learned into their academic research design.*

Holding **regular meetings** throughout the project was recommended very widely as a lesson learned. *This helps to develop a good relationship, and problems don't fester; if students see their supervisors regularly, they are better able to bring up problems or questions early.* In addition, the supervisor can help to facilitate *regular informal contact with other students and staff, such as in shared office space, encouragement of departmental socialising.* Another mechanism found to be useful was to have the student give a talk simultaneously to both related research groups, which also *spreads the impact of the student around.*

### **Relationships between supervisors and co-supervisors**

Interdisciplinary students need **input from both supervisor and co-supervisor**; if this input is not aligned, things can become very difficult. A typical student observation, made with feeling, was: *Communication between supervisors and with their students is VERY important. Regular meetings and group emails are a good way of making sure the student is happy and confident with how their work is progressing.* Many lessons learned were offered on this topic; the following few examples come from survey free text entered by supervisors.

- *Keep in contact with the other supervisors. Make sure that you know about each others' limitations, rules and regulations (written and unwritten) so that the student does not get stuck between apparently conflicting ideas and thoughts.*
- *remember to work with your co-supervisor – maximises the learning experience for your student*
- *Supervisors need to be prepared to devote a lot of time, patience and energy to understanding each other's approaches to their subject. The need to develop a strong bond of team working.*
- *Start an interdisciplinary collaboration before jointly supervising students so that you are on the same wavelength.*

### **Building an interdisciplinary culture**

In a similar vein, supervisors may help students benefit from access to some level of an interdisciplinary culture. A student suggested in survey text, for example, that a supervisor has a responsibility: *To ensure an interdisciplinary student is adequately supported by an interdisciplinary network within the department or across departments, which should include cross-discipline seminars, meetings and informal debate. To ensure that the student has access to research groups, or established academics within the institution who have previous experience of interdisciplinary work – or at least an interest in pursuing interdisciplinary research ideas.*

Supervisor agreement with this thought was captured succinctly by one individual: *Getting people to talk to each other and getting them together seems to be a good lesson learned.* A number of mechanisms can be employed. One supervisor notes that in his group *they have weekly meetings every Friday, a student presents work or an outsider comes in and makes a presentation. They have lunch before the*

*seminar session and presentation and discussion and then they have tea where there is informal talking over tea. So people are rubbing up against each other and exchanging ideas which helps to foster interdisciplinarity.*

Supervisors may need to help students contend with institutional structures designed for monodisciplinary work, perhaps even trying to live up to a full array of requirements from both departments. *Some discipline-based departments have procedures for upgrade, indicators of progress and staff on assessment panels that remain discipline-based, making students feel they have to reorient their first year progress reports towards departmental criteria.* One supervisor describes working with the registrar to lay down rules as to which discipline's research committee the student will go through and so on. Research degrees are few enough in number that tailoring a bit for an interdisciplinary student should not be too difficult. *Set up something for each student, and really 90% will be just the same as other students and only 10% you have to watch out for duplication. ... The university is trying to do more to promote interdisciplinarity so they are working on different features like this. Talk to the registrar earlier rather than later, build a relationship, talk informally in case there are things that otherwise will have to be addressed later.*

## **Generic Lessons for Students**

### **Dealing with Supervisors**

Perhaps not surprisingly, in free text and in interviews, many lessons offered by students have to do with "managing" one's supervisor and co-supervisor. **Regular meetings** are recommended very strongly indeed. One student, for example, recommends a combination of individual meetings between the student and one or the other supervisor and meetings of all three. *It can be tricky when you meet with all of them because they will have different ideas towards prioritisation, and ... what is important, different angles to study – but it is important to work through that.* Even differences between the two supervisors can be illuminating. *Meet with both supervisors and try to reconcile both views, as you can learn a lot from how they interact.*

A strong message on this subject from supervisors is that, at least sometimes, the student needs to meet regularly with both supervisors simultaneously. *This allows supervisors to appreciate both/all three perspectives rather than confuse the student with advice given separately and independently. The student should request this approach.* A student gives firm advice in this regard *Make sure you set up a schedule of regular meetings with both supervisors so that you maintain a 'team' approach rather than allowing one supervisor to effectively 'opt out'. This is the student's responsibility as much as the supervisor's.*

**Planning** is strongly recommended, both for communication with supervisors and for logistics. *Help supervisors by getting your thoughts and material down on paper as early as possible so that they can make valid comments. Plan carefully – arranging field work yourself in developing countries can take time. Interdisciplinary may also be more politically unacceptable to host countries as social and policy aspects consider matters of electoral concern, unlike, for example, a straight scientific study*

*on the burrowing habits of a ten-eared lugworm. A similar student recommendation is You need to develop a strong sense of what the research is to achieve in order to bring supervisors from two disciplines together and gain consensus about the direction and methods of study. There needs to be a lot of communication of ideas and meticulous planning of work in the early stages. Joint supervisory meetings with clear agendas are very beneficial.*

Even while making the most of what supervisors have to offer, students are reminded of their **ownership**, that the thesis is theirs: *you need to be quite strong minded about what you see as the main issue perhaps more than with a regular mono- disciplinary research project, you need that strong mindedness. Don't be pushed away from what you see as important.* Another student commented *Listen to your supervisors, but then think for yourself! Your supervisor(s) may be (or think they are) interdisciplinary researchers, but invariably their own backgrounds and interests will revolve around a specific topic/subject. Ask yourself – "is what they are saying really relevant to the particular juxtaposition of problems/issues I am facing?"* A certain independence of approach may be necessary particularly when the two supervisors do not agree. *Often the two supervisors will be from different disciplines which can make it impossible to follow either path. This is an opportunity to develop your own path and integrate the two. It means taking advice from both in their area of expertise and using this to form your own decisions.* But, students are warned, *don't be tempted to play them off against each other—that's not very profitable either for you or for them.*

Choice of supervisors, and of home department, will obviously be important. *Future students should think carefully about their choice of supervisor and the supervisor's commitment to interdisciplinarity.* Another suggestion is to *Select supervisors very carefully- you want them to cover a range of disciplines. Also decide carefully which department it would be most useful to be based in – I went for the discipline I was weakest and need the most support for – this has both costs and benefits.*

Strategies for publication will be important, and can benefit from perspectives of both supervisors. *Take advantage of the opportunity to publish in some quite different journals, where you can write things up from different view points.*

## **Approach**

A frequently voiced lesson learned is that interdisciplinary students *need to be **open-minded** and prepared to work in different areas.* As a student comments, *Be open to all potential sources of information or assistance; do not limit yourself to your designated supervisors. Be flexible in all areas of preparation and persist in getting what you need.* Another student recommends, *don't be too afraid to try new approaches... even if they don't work the first time you'll have learnt a valuable lesson.* And another student suggests, *Keep an open mind to all disciplines, mix & match and try out as much as possible in the beginning. Develop your own methods. Then focus on what works best for you.*

The studentship will of necessity entail learning about the less familiar discipline. As one supervisor recommends, quite typically, *concentrate first on acquiring skills and background knowledge in the discipline you are least familiar with. Listen to your*

*supervisors and exploit their experience of interdisciplinary working to improve your skills in this area. Your supervisors may have forgotten how difficult it is to learn the research culture of another discipline.*

Students are, after all, supposed to be learning during this process. *Don't be scared of admitting ignorance (the whole point of being an interdisciplinary student is LEARNING new skills, not being expected to have them all already), and make sure you ask your supervisors for help if you need it.*

Although open-mindedness is seen as important, so too is **focus**. *The danger of taking your PhD in too many directions and wasting a lot of time drifting between many different research questions is even more apparent with an interdisciplinary PhD.*

**Interdisciplinarity is not the easy road.** One supervisor advises interdisciplinary students to be aware that they *will have to do a bit extra. It is like the gender issues, they will have to not just do as well as the people in the core disciplines but better.*

There is frequent agreement that interdisciplinary PhD studentships require **more work, and perhaps more time**, than conventional studentships. As one student noted from experience, *it takes more time to do this, you have to work across a whole pile of different kinds of data, and it takes more time to understand it.* However, students are warned not to try to do too much. *It can be very tempting to try to become an expert in a particular field of those you need to look at – but you really can't do that. It is difficult because you want to be a specialist but you can't do it, you need not to feel like you are failing because you are not a specialist.*

Another student's encouragement is to *allow yourself to have lots of contact with interdisciplinary people without losing focus on your own work. Take on board points from other disciplines without losing your own focus and without letting approaches of other disciplines or attitudes of people in other disciplines dishearten you. Remind yourself that your work is valid and remember to see benefits in your own methodologies and approaches.*

## **Generic Lessons for Research Councils**

### **Selection of Students**

In addition to conventional studentship criteria such as a well-designed project, good testimonials and an appropriate research environment, several selection criteria for interdisciplinary students in particular are recommended, including *commitment and keenness. The quality of students is key, academically they need to be very good but they also need to be flexible regarding how they will approach things, they need to be willing to learn new techniques and skills and this is key.* A practical suggestion in this regard is to look for *references from referees that note creativity, openness and imagination.* Research Councils are also urged to look for previous *interest and/or genuine background* in interdisciplinarity (*including work experience and life experience of the individual*). In addition, the selection process can *focus more on the proposed project, and whether it genuinely demands the use of inter-disciplinary methods.*

## **Supervisors**

Not surprisingly, some students have concerns about supervisors and would like to see the Research Councils improve supervisor capacity. *Supervisors need to be better informed about the problems they will face moving out of their discipline going out of their box. It is more difficult than they might realise; this is a recommendation to the Research Councils to help supervisors to do this. And also to help them with student management so that students don't feel so uncomfortable. I have seen students that are very upset and really don't know what to do.* As noted above, the idea of providing a handbook or guidance for supervisors of interdisciplinary studentships met with widespread agreement among students in particular, but also among supervisors.

## **Community-building**

A very clear message was sent that conferences bringing together interdisciplinary students would be welcome and helpful. *We desperately need a forum for interdisciplinary students.* It has been suggested that interdisciplinary students from various schemes or programmes be brought together, both nationally and regionally.

In addition to conferences/events, it would be regarded as *useful if the Research Council could circulate information about other award holders as a way of network building.* This sort of networking would also be useful after the PhD studentships are finished. *The Research Councils should consider what they do with students once they finish these PhDs. Building a network for dialogue and contacts within the UK between people who work on interdisciplinary research, for example, Research Council web pages devoted to interdisciplinarity, particularly those projects that cross the natural and social sciences, as there are not many of these.*

## **Potential Impact on the Academic Landscape**

Research Councils are seen as, sometimes, reinforcing barriers. One supervisor, for example, who described himself as “incandescent” when reading inadequate comments by referees, stated firmly: *Research Councils are not good at interdisciplinary research; they don't understand it and may not have a sufficient pool of interdisciplinary referees.*

Others look at the cup as half full, or more. *Cross-Research Council initiatives do help, they set a good example and actually encourage crossing over of disciplines. You would hope for instance that the ESRC and AHRC would come up with cross disciplinary initiatives. Cross-Research Council initiatives really really help to change the way people do things and their ideas of who should be talking to whom.*

Similarly, a student articulated the view of many: *overall the profile of interdisciplinarity needs raising and being made more acceptable, instead of being looked at as neither one thing or the other and therefore something that can't be good, it needs to be demonstrated by the Research Councils. If there are more activities across Research Councils, then this sends a message that this is a good*

*thing to do. Any encouragement of journals to start accepting broader papers and true interdisciplinary papers would certainly be useful.*

These messages are consistent with concern over academic careers. Immediate next steps are a concern. *This type of scheme offers excellent opportunities to develop exciting new research at the interfaces of disciplines. Similar schemes are required between all the Research Councils. There is a lack of career path for the graduates of this Scheme. Their research focus may well fall between the Research Councils and thus it is difficult to obtain post-doc projects for them.* There is a widely voiced recommendation to address this difficulty with a *post-doc scheme, acknowledging the potential difficulties for inter-disciplinary students wishing to enter academia, and giving them 1-2 years post-PhD to consolidate their publication record and hone their research skills.* Beyond this stage are additional career considerations, such as ability to win research grants and thus publish on interdisciplinary subjects. *The Councils do need to think about what they are going to do for meaningful career trajectories for these people who have been trained in interdisciplinary ways. There needs to be some rethinking of how research grants are allocated.* There exists widespread sentiment that if the Research Councils were to address the continuity of a career path for interdisciplinary PhD students, interdisciplinarity would stand a better chance of thriving in UK academia.



## ANNEX H

### Bibliography

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