



IOP Institute of Physics

Institute of Physics: Tracking the careers of UK
physics students

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1. Introduction

1.1 Background

The Institute of Physics (the Institute) has recognised a gap in knowledge regarding the aspirations and future careers of UK physics graduates. Such information is vital when planning projects aimed at encouraging participation in physics from a wider, more diverse community, as well as informing potential physics students of the opportunities available to them.

In 2005, the Institute embarked on a five year longitudinal tracking project to investigate the backgrounds and aspirations of final year physics undergraduates and track the development of their careers over the coming years. In particular:

- To investigate the profiles of final year physics undergraduates in terms of gender, ethnicity, disability, age and socio-economic backgrounds
- To determine the career aspirations of final year physics undergraduate students
- To determine what careers physics graduates embark upon
- To explore how these dimensions vary across specific demographics, with particular focus upon minority groups such as women, Black and Minority Ethnic (BME) groups and lower occupational groups

The first report from this study was published in 2006, and this report presents the findings from the second year of research: statistics on the 2007 graduating cohort and a follow-up survey conducted by the 2006 graduating cohort.

1.2 Methodology

The project as a whole is made up of two distinct phases.

In the first phase, questionnaires (both in online and paper format, see Appendix 1) were sent to university physics departments in England, Scotland, Wales and Ireland (the 2007 cohort for this study). Institutions distributed these to their final year physics undergraduates. Approximately 2,800 students were sent the questionnaires. Initially, the online survey was distributed by email to final year students studying physics modules. A paper survey was used to boost the response from some institutions that elicited a small response to the initial online distribution method.

In the second phase, an electronic database was developed for distribution to physics graduates who had previously taken part in the study (in this case, the 2006 cohort). The database was only accessible using a unique ID distributed to the cohort together with an email invitation. Within the database, respondents were able to update and amend their details accordingly, and provide further information about their current activities.

2. 2007 graduating cohort

2.1 Demographic profile of respondents

A total of 1,396 students responded to the questionnaire; this comprised 391 paper questionnaires and 1,005 completions using the online version. This section will present the top line demographic profile of the sample.

The sample constituted a larger proportion of male respondents (69% n=948) (see Figure 1), and the large majority classified themselves as White British (75% n=1035) (see Figure 2). As such, there were noticeably small proportions of ethnic minorities within the sample. The largest age group was 22 to 25 year olds (56% n=757), followed by those aged 21 year olds and under (41% n=562) (see Figure 3). In terms of nationality, 84% (n=1157) were coded as British, 5% (n=72) Irish, 6% (n=80) elsewhere in Europe (not UK or Ireland), and 2% (n=33) from Asia (see Figure 4). Exploring the area from which they originated (based on home address) the largest proportion were from the South East (16% n=218), followed by the South West (10% n=139) and the West Midlands (10% n=130) (see Figure 5).

As a means of identifying socio-economic background the respondents were asked to state their parent or guardian's occupation, or in the case of mature students the occupation of the main income holder in the household, be it themselves or a partner. Using the Office for National Statistics Standard Occupational Classification (2000) it was then possible to categorise these occupations into one of nine occupational classifications. Figure 6 presents the proportion of the sample classified within each classification, from major group 1 (managers and senior officials) through to major group 9 (elementary occupations). The largest proportion of respondents was

classified within major group 2 (45% n=602), followed by major group 1 (19% n=261). For a full description of each category see Appendix 2.

A small proportion of respondents had responsibility for dependents. 1.3% (n=18) were either the main carer or shared the caring responsibility for a dependent child and 1% (n=17) had either sole or shared responsibility for a parent (see Figure 7). 5% (n=64) of the sample self defined themselves as disabled (see Figure 8), 57% (n=36) of which were categorised as dyslexic and 7.9% (n=5) were categorised as having a mental health disability (see Table1).

Appendix 3 lists the response rate by institution. The response rate varied from approximately 10% (Royal Holloway, University of London) to over 90% (University of Leicester and University of Nottingham).

Figure 1: The gender distribution amongst the sample

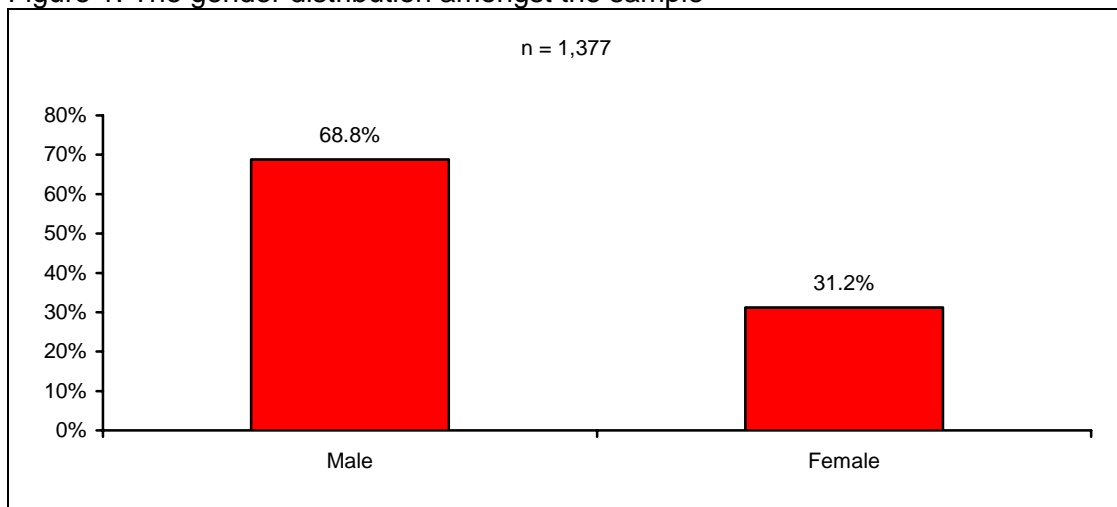


Figure 2: The spread of ethnicity amongst the sample¹

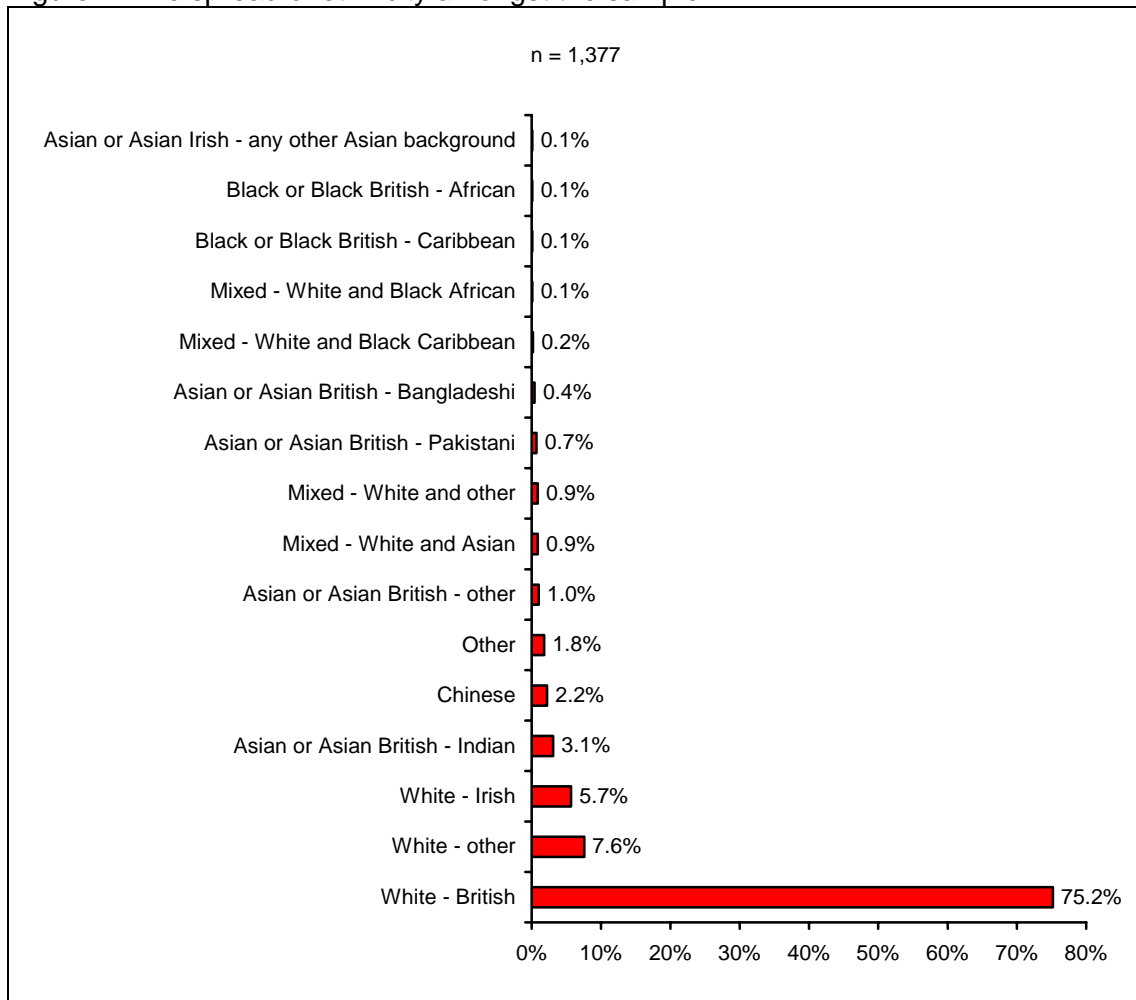
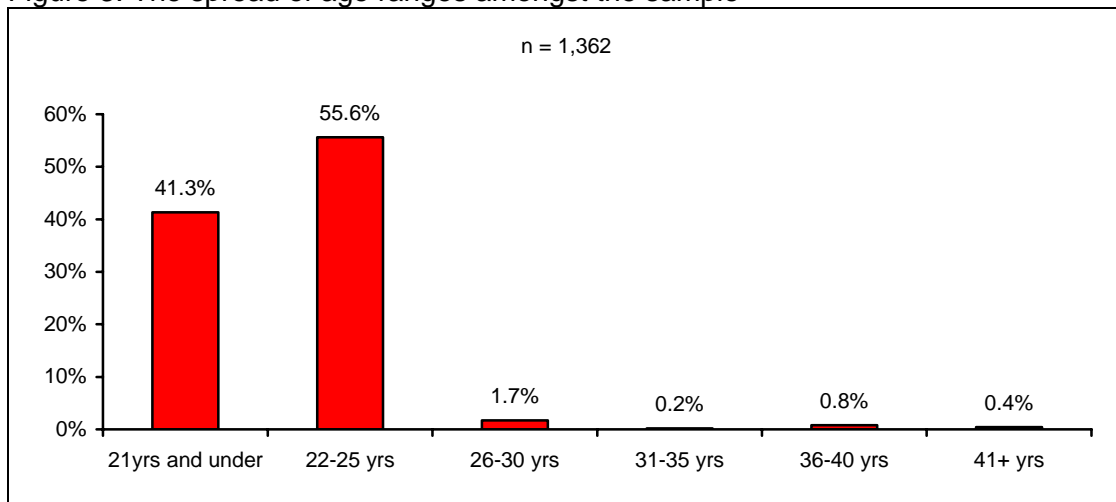


Figure 3: The spread of age ranges amongst the sample



¹ No responses were received from respondents of 'Black or Black British – Other Black Background'. In other figures throughout the report, this ethnic group has been removed, as it would report as 0%.

Figure 4: The spread of nationalities amongst the sample

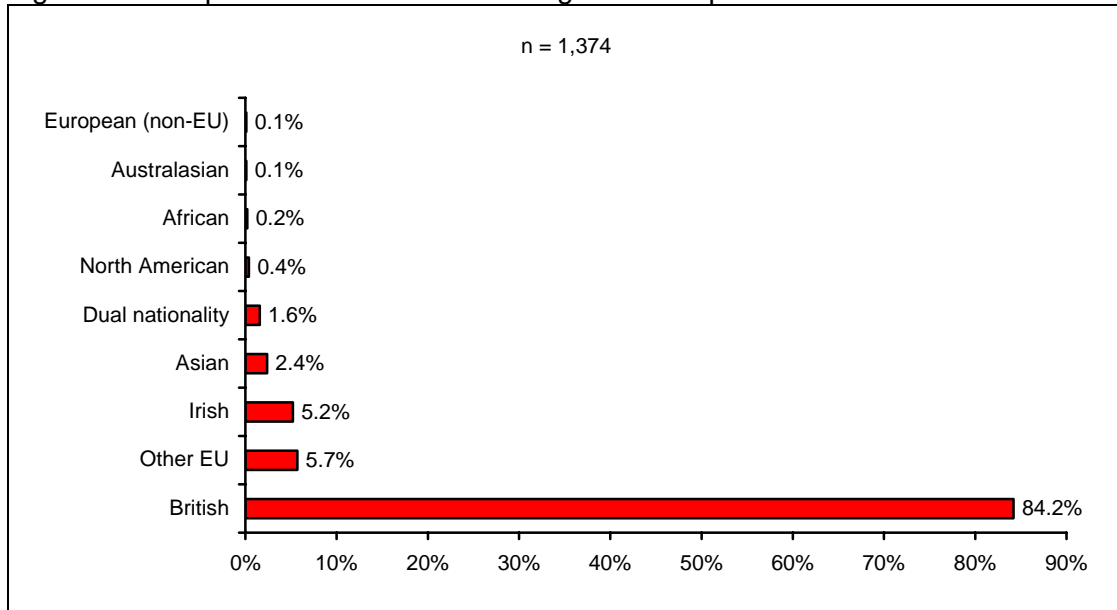


Figure 5: The proportion of respondents originating from each region of the UK / world

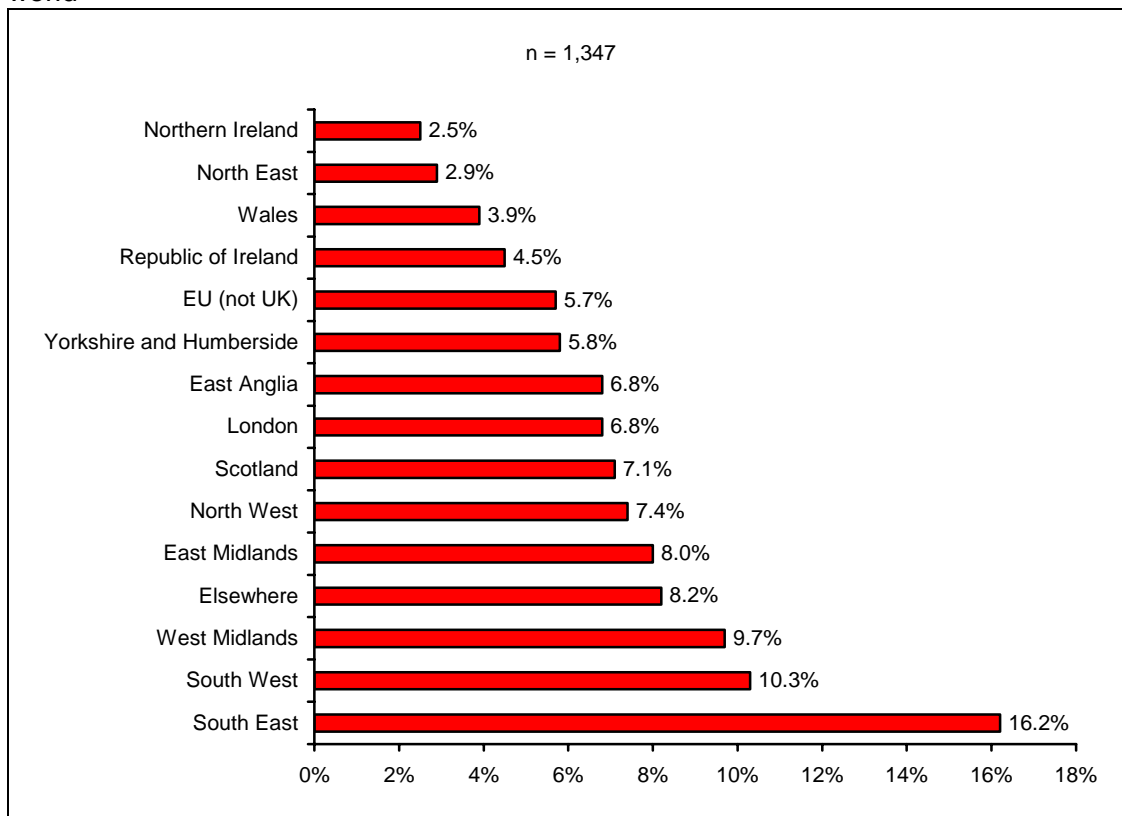
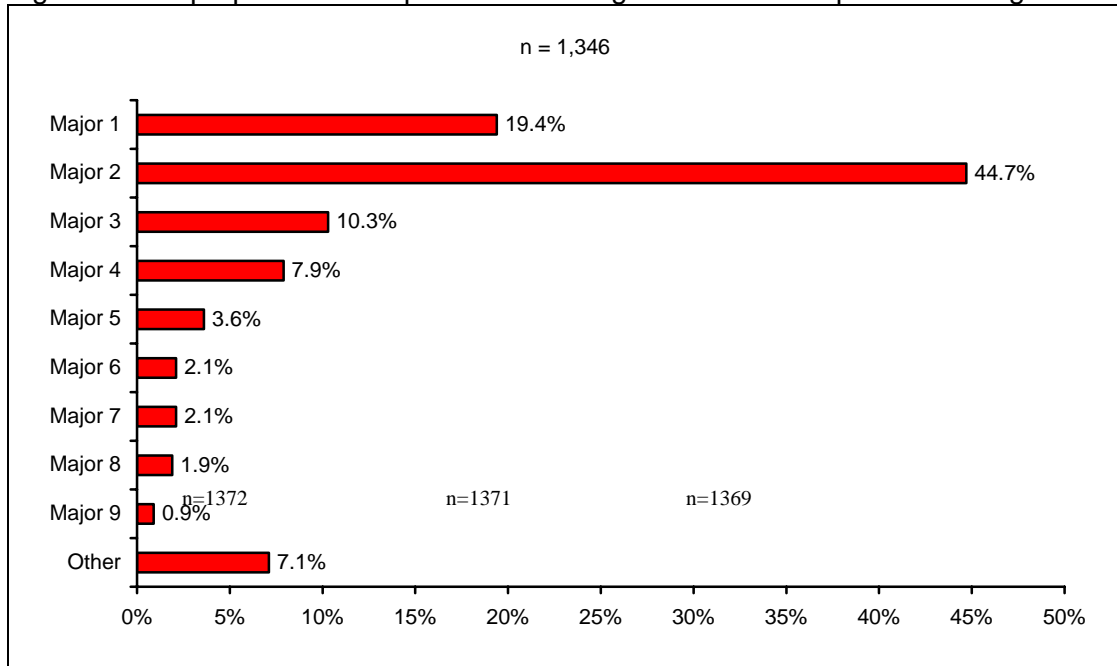


Figure 6: The proportion of respondents coming from each occupational background*



* See Appendix 2 for description of major groups

Figure 7: The proportion of respondents with responsibilities for a child, parent or partner

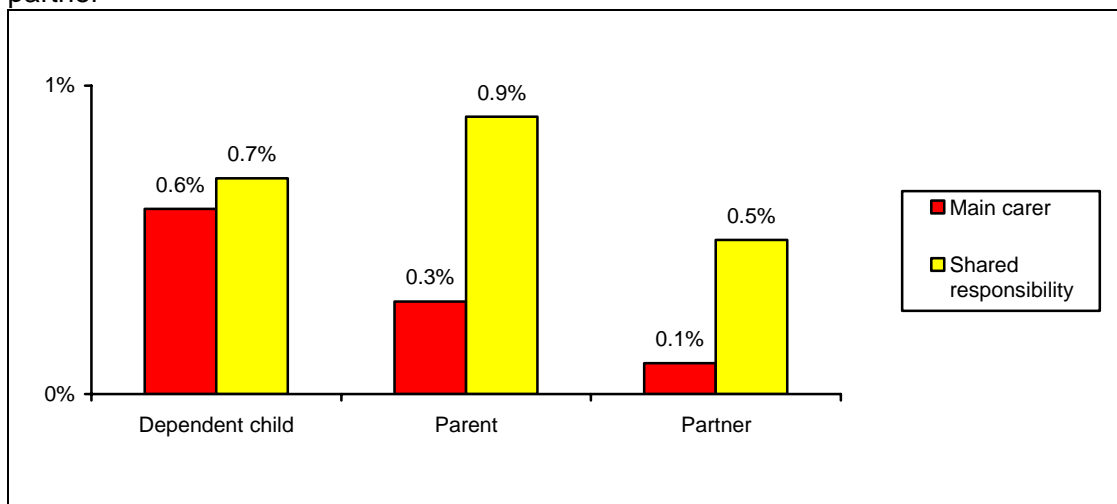


Figure 8: The proportion of respondents with a disability

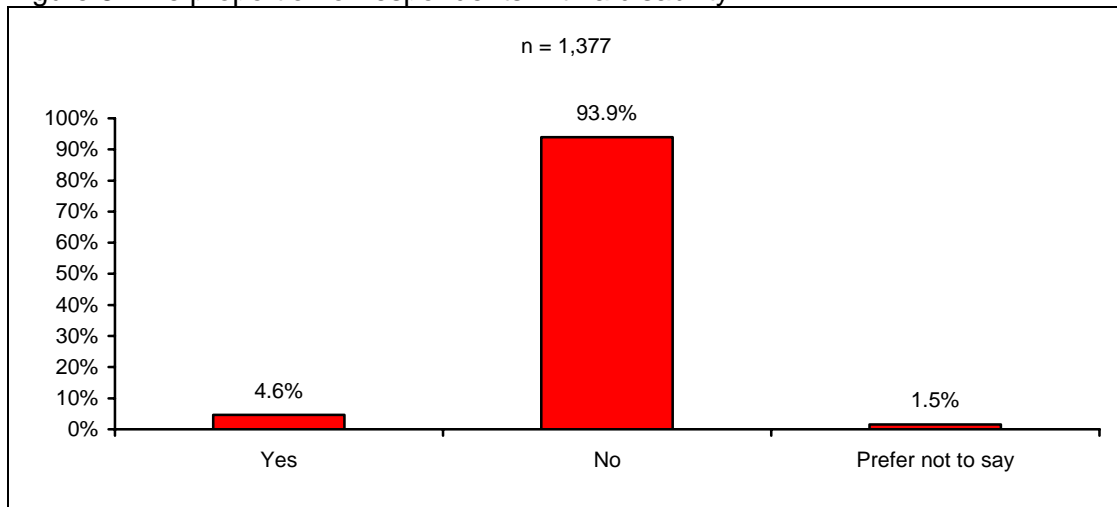


Table 1: The spread of disability type within the sample

Disability	Frequency (n=63)	Proportion (%)
Dyslexia	36	57.1%
Other disability	10	15.9%
Multiple disability	5	7.9%
Mental health disability	5	7.9%
Unseen disability	4	6.3%
Blind / partially sighted	2	3.2%
Deaf / hearing impaired	1	1.6%

2.2 Intentions after graduation

This section will explore what final year physics students intended to do after graduating from University by looking at a number of demographic factors.

Figure 9 shows the breakdown of intentions after graduation by gender and by the total sample. Overall, 37% (n=502) of the sample intended to go into work after graduation. A further 27% intended to study for a PhD (n=377). It is immediately noticeable that intentions did not seem to vary considerably by gender: the large proportion of both males and females intended to go into work following graduation (37% (n=351) and 35% (n=151) respectively). A further 28% (n=265) of males and 26% (n=112) of females intended to conduct further study in the form of a PhD.

Figure 9: Intentions after graduation by the total sample and by gender

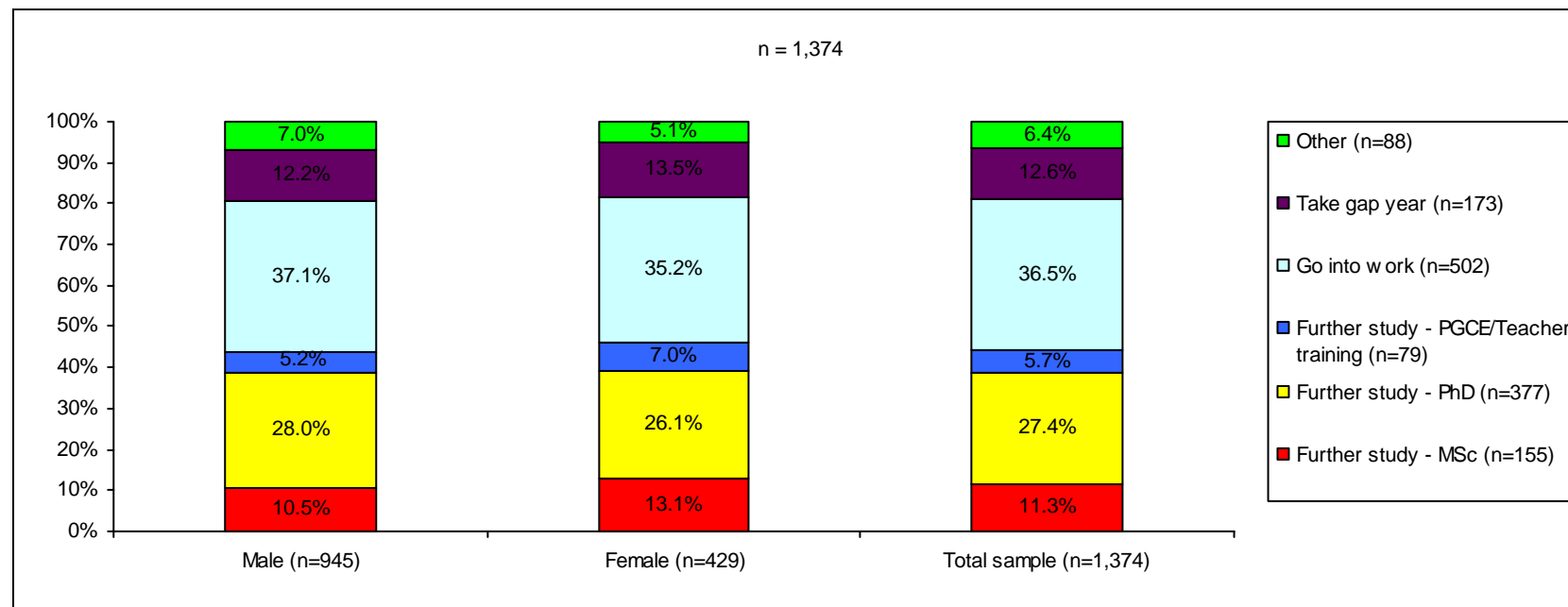
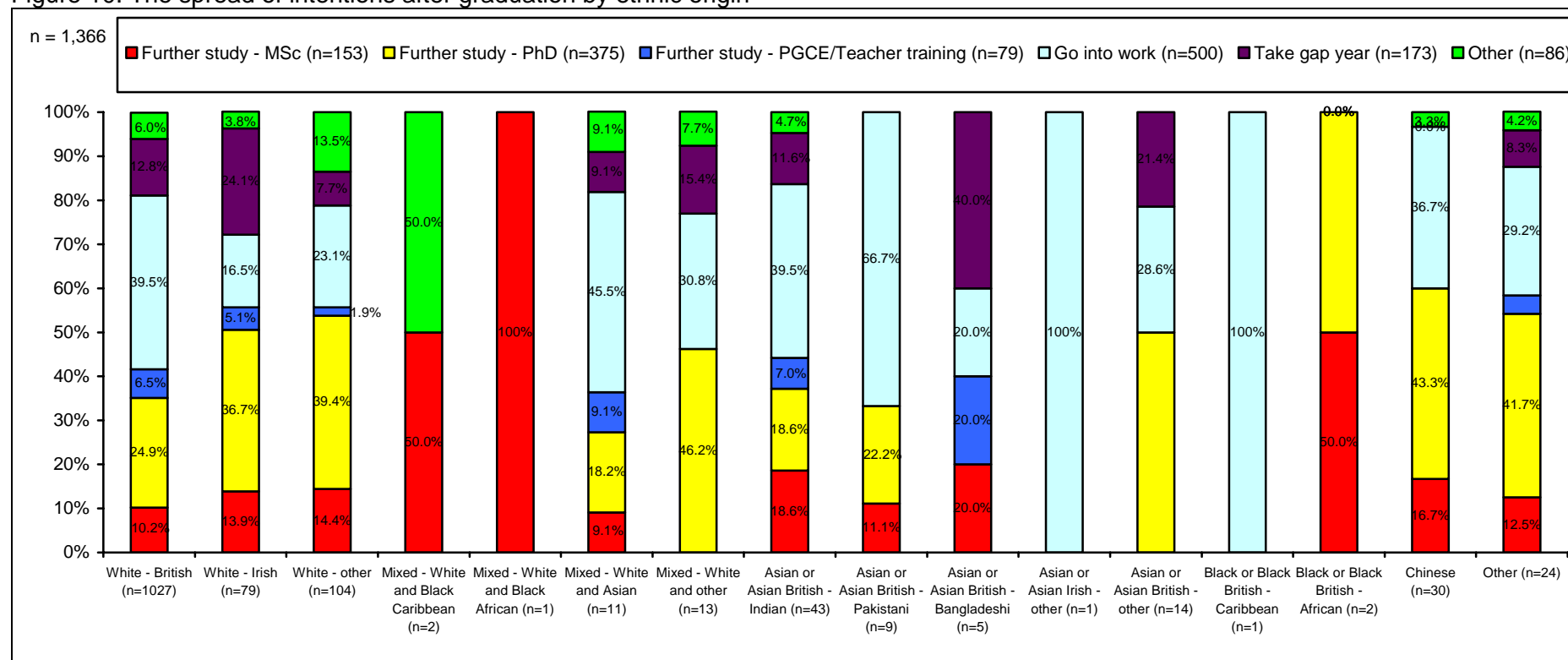


Figure 10 explores intentions after graduation by ethnic background. Exercise caution when considering these results, as the respondent numbers in many of the ethnic groups was low. 40% (n=406) of White British graduates intended to go into work after graduation and a further 25% (n=256) intended to conduct a PhD. The largest proportion of graduates from a White other background intended to conduct a PhD (39% n=41).

Figure 10: The spread of intentions after graduation by ethnic origin



2.3 Employment during term time

Respondents were asked if they had undertaken any paid employment during term time, how many hours they worked on average, the type of work they had done, and their reasons for doing this work.

Figure 11 shows that 46.9% (n=638) had worked during term time. The most popular type of work (Figure 12) was retail / customer service (19.9% n=278), followed by bar work (12.6% n=176). Respondents had undertaken a variety of jobs other than those listed, the most popular being teaching or tutoring of some description (n=30). The most popular reason for taking on work during term time (Figure 13) was for money (41.7% n=582), followed by for personal development (14.8% n=206). Figure 14 shows that most respondents who worked did so for 10 hours or less per week (5.1% n=316), with most of the remainder working between 11 and 20 hours per week (37.7% n=231).

Figure 11: Undertaken paid employment during term time

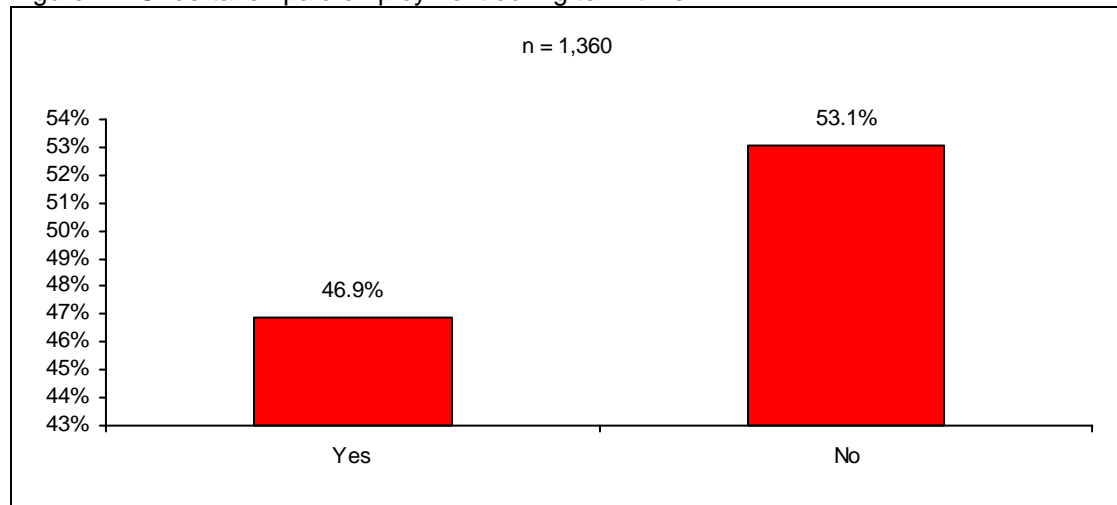
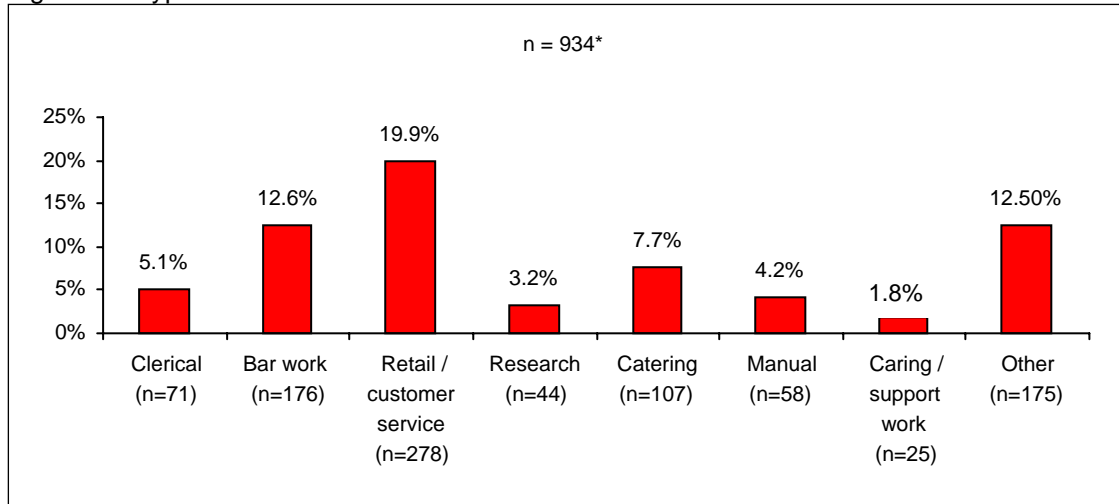
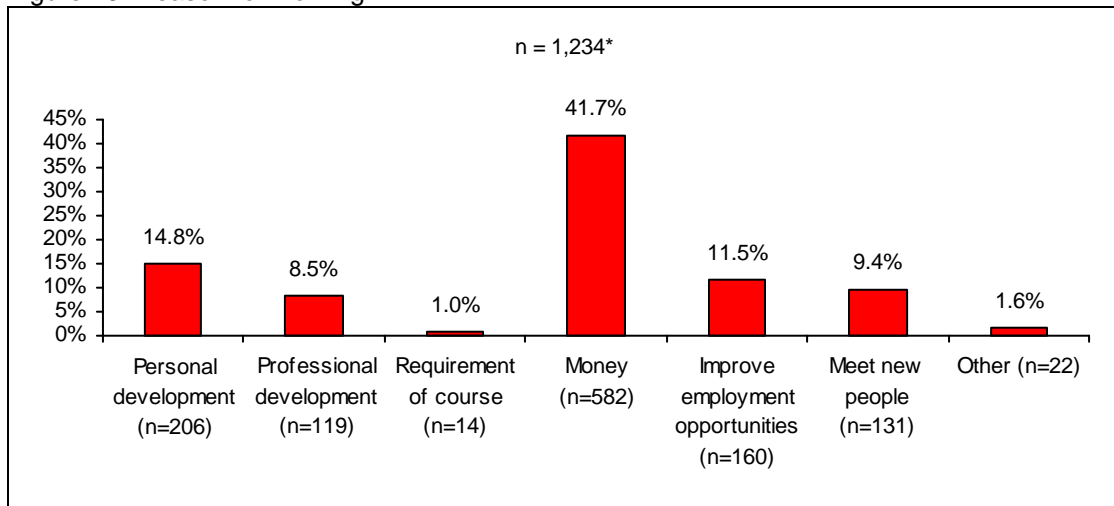


Figure 12: Type of work undertaken



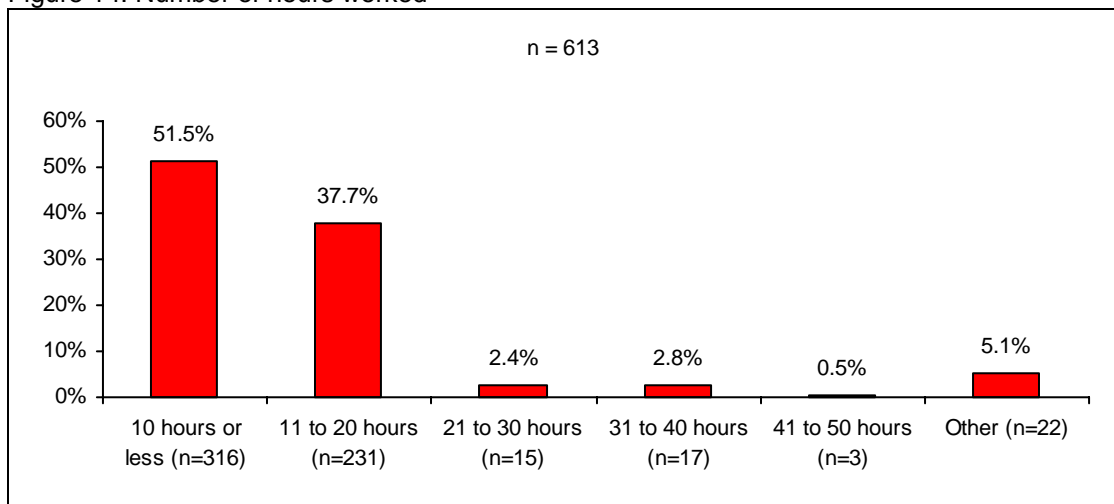
*NB Respondents could choose more than one type of work

Figure 13: Reason for working



*NB Respondents could chose more than one type of work

Figure 14: Number of hours worked



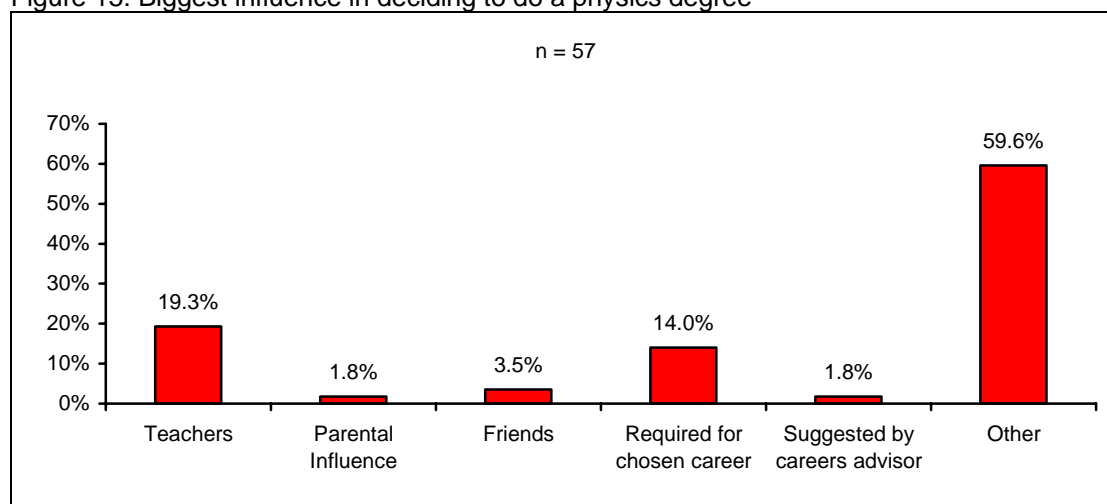
3. Additional qualitative data from survey sent to Irish respondents

Additional questionnaires were sent out to Irish respondents to the survey later on in the year, after contacts in these institutions had been approached. The research team took the opportunity to include some additional qualitative questions in this questionnaire. The analysis of these is presented here.

3.1 Influence to undertake a physics degree

Irish respondents were asked what their biggest influence in deciding to do a physics degree was (Figure 15); 19.3% (n=11) stated that their teachers had influenced them most and 14% that they felt it was a requirement of their chosen career. However, 59.6% (n=34) of these respondents stated that the biggest influence was something other than the options listed. Of the further reasons provided, the majority (69.7%, n=23) stated that they choose to do a physics degree as they were interested in / loved the subject. A further 21.2% (n=7) respondents stated that they chose the subject when at school.

Figure 15: Biggest influence in deciding to do a physics degree



3.2 Most valuable element of physics course

Respondents were asked what they considered to be the most valuable element of the course they had studied. Many respondents (38.5%, n=20) stated that the lab work and practical work had been most valuable to them. 19.2% (n=10) of respondents stated that the problem solving abilities they had gained had been most

valuable to them. Some respondents stated the knowledge / ways of thinking the degree had provided them with was of most value to them.

Seven other respondents stated that the mathematical ability and skills they had obtained were of highest value to them. A further four respondents stated that the range of modules and the scope of the degree was most valuable to them:

“All aspects of the course have been valuable. We have been given the opportunities to study various modules which have given us a grounding in the basic principles of physics and in current developments”

3.3 Most interesting elements of physics course

Respondents were asked to state which elements of the course they had found most interesting. Two thirds (60.0%, n=30) stated that they found a specific subject / module most interesting, below are a few example comments:

In addition nine respondents (18.0%) stated they found the knowledge / intellectual skills most interesting:

“Understanding complicated processes using simple models and assumptions and also learning how people through history discovered new physics “laws” by serendipity or otherwise!”

Seven respondents stated that they found the lab / practical work involved in the degree most interesting and four respondents stated that they found the academic / peer environment most interesting.

Appendix 1: Questionnaire

Institute of Physics

The Institute of Physics (IoP) undergraduate survey is the first step in trying to understand what physics graduates end up doing with their physics degrees. Very little is known about the career paths of physics graduates who take up careers outside of physics, and there are currently very little data regarding ethnicity and disability, as well as more general information regarding careers.

In order to do this, the IoP is conducting a longitudinal study of physics graduates: all final year undergraduate students of physics will be asked to fill in this questionnaire, and the participants will then be subsequently contacted at yearly intervals via email, to build up a picture of their earnings and careers over that period.

The responses will remain confidential and will be handled by an external organisation, **QUAD research**: no information concerning a specific individual will be held at your University or at the IoP, and information regarding disability and ethnicity will not be used to identify specific groups or individuals (Privacy Statement).

All participants who complete the questionnaire and enter their contact details at the end of the questionnaire will be automatically entered into a prize draw with the chance of winning the following:

- 4 x cash prizes of £500

We would like to thank you in advance for helping us with this study: the findings of the research will be pivotal in planning future projects aimed at encouraging participation in physics to a wider, more diverse community, as well as informing potential physics undergraduates of the opportunities available to them. For further enquiries contact Saher Ahmed at the Institute of Physics on 020 7470 4800 or saher.ahmed@iop.org.

The survey will take **just a few minutes to complete**.

Contact details

The following section asks you to provide a number of contact details. This information will be used to contact you for the subsequent phases of research and will not be used to identify you or your responses.

Q1 Full name

Q2 Permanent address (i.e. family home, not term time address)

Q3 Personal Email Address (please supply an email address that will be valid in a year's time)

Q4 Home telephone number (if possible, please supply a contact telephone number that will be valid in a year's time)

Q5 **Mobile phone number**

Background information

Q6 **Gender**

- Male*
 Female

Q7 **Date of Birth**

Q8 **Nationality**

Q9 **Ethnicity (please tick one only)**

- | | |
|--|---|
| <input type="checkbox"/> <i>White - British</i> | <input type="checkbox"/> <i>Asian or Asian British - Pakistani</i> |
| <input type="checkbox"/> <i>White - Irish</i> | <input type="checkbox"/> <i>Asian or Asian British - Bangladeshi</i> |
| <input type="checkbox"/> <i>White - other white background</i> | <input type="checkbox"/> <i>Asian or Asian British - other Asian background</i> |
| <input type="checkbox"/> <i>Mixed - White and Black Caribbean</i> | <input type="checkbox"/> <i>Black or Black British - Caribbean</i> |
| <input type="checkbox"/> <i>Mixed - White and Black African</i> | <input type="checkbox"/> <i>Black or Black British - African</i> |
| <input type="checkbox"/> <i>Mixed - White and Asian</i> | <input type="checkbox"/> <i>Black or Black British - Other Black background</i> |
| <input type="checkbox"/> <i>Mixed - White and other background</i> | <input type="checkbox"/> <i>Chinese</i> |
| <input type="checkbox"/> <i>Asian or Asian British - Indian</i> | <input type="checkbox"/> <i>Other (please specify below)</i> |

Q10 **Parent or guardian's occupation, or in the case of mature students, current / most recent occupation**

Q11 **Additional parent or guardian's occupation, or in the case of mature students, partner's occupation (if applicable)**

Q12 **At which institution are you currently studying?**

Q13 **Please specify your full degree title**

Q14 Do you consider yourself to have a disability?

- Yes
- No
- Prefer not to say

Q15 If you answered yes to Question 14, please specify from the list below.

- | | |
|--|--|
| <input type="checkbox"/> Dyslexia | <input type="checkbox"/> Mental health disability |
| <input type="checkbox"/> Blind / partially sighted | <input type="checkbox"/> Unseen disability |
| <input type="checkbox"/> Deaf / hearing impaired | <input type="checkbox"/> Multiple disability |
| <input type="checkbox"/> Wheelchair user / mobility impaired | <input type="checkbox"/> Other disability (please specify below) |
| <input type="checkbox"/> Personal care support | |

Care responsibilities

The following section asks you about your current care responsibilities. Please read the questions carefully and specify your care responsibilities under each section as appropriate.

Q16 Do you have any care responsibilities for a dependent child?

- Yes, I am the main carer
- Yes, I share the caring responsibilities
- No

Q17 Do you have any care responsibilities for a parent?

- Yes, I am the main carer
- Yes, I share the caring responsibilities
- No

Q18 Do you have any care responsibilities for a partner?

- Yes, I am the main carer
- Yes, I share the caring responsibilities
- No

Employment

Q19 Have you ever undertaken paid employment during term time?

- Yes
- No

Q20 Please categorise the type(s) of work (Tick all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Clerical | <input type="checkbox"/> Catering |
| <input type="checkbox"/> Bar work | <input type="checkbox"/> Manual |
| <input type="checkbox"/> Retail / customer service | <input type="checkbox"/> Caring / support work |
| <input type="checkbox"/> Research | <input type="checkbox"/> Other (please specify below) |

Q21 For what reason(s)? (Tick all that apply)

- | | |
|---|---|
| <input type="checkbox"/> Personal development | <input type="checkbox"/> Improve employment opportunities |
| <input type="checkbox"/> Professional development | <input type="checkbox"/> Meet new people |
| <input type="checkbox"/> Requirement of course | <input type="checkbox"/> Other (please specify below) |
| <input type="checkbox"/> Money | |

Q22 Can you give an estimate as to the number of hours in paid employment per week?

Your future career

The following section asks you about your future career. As before, please read each question carefully and tick the box that is most appropriate to you.

Q23 What do you intend to do after your degree?

- Further study - MSc
- Further study - PhD
- Further study - PGCE/Teacher training
- Go into work
- Take a gap year
- Other (please specify below)

Contact details for prize draw

Thank you very much for your time. If you wish to be placed into the prize draw, please provide the following contact details. The details provided will be held separately to the survey responses.

Name.....

Mobile number.....

Email address.....

Year of Study.....

Thank you for your time

Appendix 2: Occupational classifications

Source: Office for National Statistics (ONS): Standard Occupational Classifications 2000

Major group 1: Managers and senior officials

Corporate managers

Managers and proprietors in agriculture and services

Major group 2: Professional occupations

Science and technology professionals

Health professionals

Teaching and research professionals

Business and public service professionals

Major group 3: Associate professional and technical occupations

Science and technology associate professionals

Health and social welfare associate professionals

Protective service occupations

Culture, media and sports occupations

Business and public service associate professionals

Major group 4: Administrative and secretarial occupations

Administrative occupations

Secretarial and related

Major group 5: Skilled trades occupations

Skilled agriculture trades

Skilled metal and electrical trades

Skilled construction and building trades

Textiles, printing and other skilled trades

Major group 6: Personal service occupations

Caring personal service occupations

Leisure and other personal service occupations

Major group 7: Sales and customer service occupations

Sales occupations

Customer service occupations

Major group 8: Process, plant and machine operatives

Process, plant and machine operatives

Transport and mobile machine drivers and operatives

Major group 9: Elementary occupations

Elementary trades, plant and storage related occupations

Elementary administration and service occupations

Appendix 3: Participant institutions

Response rate by institution (n=1381)

	Total final year student cohort	Frequency of responses	Proportion of total sample (%)	Proportion of institution's cohort (%)
Aberdeen	11	5	0.36%	45.5%
Aberystwyth	33	12	0.87%	36.4%
Bath	61	44	3.19%	72.1%
Birmingham	130	42	3.04%	32.35
Bristol	125	73	5.29%	58.4%
Cambridge	111	33	2.39%	29.7%
Cardiff	74	21	1.52%	28.4%
Cork	20	16	1.16%	80%
DIT	?	10	0.72%	-
Dublin City	?	3	0.22%	-
Dundee	7	6	0.43%	85.7%
Durham	158	91	6.59%	57.6%
Edinburgh	107	38	2.76%	35.5%
Exeter	69	33	2.39%	47.8%
Galway	?	4	0.29%	-
Glasgow	45	16	1.16%	35.6%

Heriot Watt	43	15	1.09%	34.9%
Hertfordshire	28	16	1.16%	57.1%
Hull	16	10	0.72%	62.5%
Imperial	200	71	5.14%	35.5%
Keele	23	9	0.65%	39.1%
KCL	43	5	0.36%	11.6%
Kent	21	12	0.87%	57.1%
Lancaster	51	20	1.45%	39.2%
Leeds	70	20	1.45%	28.6%
Leicester	76	70	5.07%	92.1%
Limerick	?	5	0.36%	-
Liverpool	48	25	1.81%	52.1%
Loughborough	37	23	1.67%	62.1%
Manchester	?	51	3.69%	-
Nottingham	120	92	6.67%	76.7%
Nottingham Trent	24	7	0.51%	29.2%
Open	?	7	0.51%	-
Oxford	160	87	6.30%	54.4%
Paisley	9	6	0.43%	66.7%
QMUL	20	17	1.23%	85%
QUB	?	26	1.89%	-

Reading	44	8	0.58%	18.2%
Royal Holloway	133	13	0.94%	9.8%
Salford	25	17	1.23%	68%
Sheffield	31	21	1.52%	67.8%
Southampton	43	13	0.94%	30.2%
St Andrews	43	21	1.52%	48.9%
Strathclyde	25	12	0.87%	48%
Surrey	46	19	1.38%	41.3%
Sussex	33	14	1.01%	42.4%
Swansea	24	6	0.43%	25%
Trinity	?	14	1.01%	-
UCL	200	39	2.82%	19.5%
UCLAN	13	4	0.29%	30.8%
UCD	?	9	0.65%	-
Warwick	130	85	6.15%	65.4%
York	83	41	2.97%	49.4%
Other	29	4	0.29%	13.8%
Total	242	1381		

N.B. 15 respondents did not provide institution information and therefore do not appear in this table. '?' indicates that there is no total number of students data for this institution. '-' indicates that the figures cannot be calculated due to missing data about total number of students.

