

Evaluation of a programme of transferable skills development within the PhD: views of late stage students.

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Abstract

Recent years have seen an increasing emphasis placed upon the development of transferable skills within PhD degree programmes. This paper reports on steps taken to evaluate a programme of transferable skills development at a research intensive university in the UK, focussing on the views of late stage PhD students in the science, engineering and medical disciplines. It shows that most students report a positive impact from having taken part in transferable skills initiatives and that they have a positive attitude towards them. Participants report an enduring positive impact on their behaviour and consider that the training meets their perceived needs as they progress as researchers. However, amongst the population as a whole, there were differences in views. For example, it was found that females, overseas students and those mainly motivated to do the PhD by career-related reasons attach the greatest importance to such opportunities to develop transferable skills.

Introduction

Transferable skills training in the PhD

Training in transferable skills is now a familiar element of research degree programmes in many countries (Gilbert et al, 2004). There is also much debate about the future of the PhD and the role of skills within it in the UK (Park, 2005) in Germany (Enders, 2005) and in Europe as whole (Borrell-Damian, 2009). A main driver has been the realisation that, of the increasing numbers of PhD graduates (for England see Higher Education Funding Council for England, 2009 and for the US in STEM subjects see Falkenheim, 2007) only a small proportion will find employment long term in the university sector (Haynes et al, 2009). In the UK a government commissioned review of the supply of scientists and engineers (Roberts, 2002) led to a step change in activity in postgraduate research education, since it resulted in ring-fenced funding, (the so-called "Roberts funding") from 2004/05 onwards. This money was to be used to fund programmes of training in transferable skills for research students and post-doctoral staff. Another objective of the Roberts review was to make research careers more attractive to those who were qualified for them.

In the UK at least, we find ourselves approaching a turning point, where the further provision of Roberts funding is in question beyond 2010/2011. There is also an increasing emphasis on establishing the return on investment of research funds following the Warry report (2006). This in turn creates a growing pressure to change the focus of training initiatives for PhD students more towards entrepreneurial skills and knowledge transfer (Research Councils UK, 2007). Given this background it is instructive to examine the evidence for how transferable skills development activities are perceived by PhD students themselves.

Evaluation

The question of how to evaluate the impact of skills training has been much discussed. Not least among the difficulties is the absence of any baseline measure. This is missing for two reasons. Firstly there is a history of limited generic skills training taking place before the Roberts review. This means that there is not a specific point of transition in the amount of training a typical PhD student receives. Secondly very little data exist about skills levels of incoming PhD students, although some institutions have taken steps to gather this (Bromley et al, 2007). Attempts to evaluate the training developments have been led in the UK by a cross-sector body, the “Rugby team”, which published an “Impact framework” (Rugby Team, 2008). This is “an evaluation model for training and development activity specifically tailored to the context of training and development of researchers in higher education”. The core of its message is a “pathway”, drawing on Kirkpatrick (2006) representing the projected benefits of training at different impact levels. These are summarised briefly below.

Level 0 Foundations	Level 1 Reaction	Level 2 Learning	Level 3 Behaviour	Level 4 Outcomes
Developed programmes, Increased capacity	Participant reaction to activity	Attitude change, e.g. improved knowledge, increased skill level	Behaviour change, e.g. reflective, self-aware, confident	“External” impact e.g. better research, improved qualification rates

The Rugby team have recently issued an update (Rugby team, 2009) which gives a comprehensive summary of evidence gathered to date in the UK on the impact of Roberts inspired transferable skills training for early career researchers (i.e. PhD students and post-doctoral staff).

Description of our programme and local evaluations

It will be helpful to explain a little more about the transferable skills development programme at this university which is large and centrally managed. It consists of about 80 different courses, typically of half a day to one day’s duration (although the residential course lasts 3 days). The content of the skills training programme is designed to cover the Joint Skills Statement categories C to G (Research Councils UK, 2001) i.e. research management, personal effectiveness, communication skills, team working and networking

skills and career management. Students have a choice of courses to attend and there is no maximum number of courses they can take. However, it is important to note that it is compulsory for all research students to engage with the programme. The PhD process at this institution involves a confirmation of candidacy stage, termed “upgrade”, after around 12 to 15 months of candidature. Students must participate in 4 courses as part of the requirement to upgrade (the residential course counts as 3 courses).

As early as 2004, we considered it important to evaluate the impact of training initiatives, to ensure a return on the investment and in order to highlight where improvements needed to be made. A distinguishing feature of our skills programme is a 3-day residential course designed for first year PhD students, the “Research Skills Development Course” which just over half of our students attend. During the academic year 2004-05, an extensive assessment of this course was undertaken using a bespoke skills perception inventory (SKIPI) (Alpay & Walsh, 2008). This work demonstrated that the course had a positive and statistically significant impact on students’ perceptions of their skill levels in four key areas. The course was also shown to make attitudes to skills training more positive. These outcomes are at level 2 on the Rugby team Impact Framework (RTIF). Having established evidence of the value of this key element, we now wish to consider evidence for the impact of the programme as a whole.

This paper will focus on the perceptions of late-stage PhD students who have had most experience of the training programme and most time to reflect upon its value in the light of their experience as researchers (and sometimes as job-seekers). During their candidature, the skills training programme has developed greatly in terms of content and applicability. The environment within which it operates has also changed. The existence of transferable skills development programmes, running alongside the more traditional apprenticeship model of development for PhD students, is not without controversy and is not universally supported. Some take issue with the concept of transferable skills (Bennett et al, 1999). Another more pragmatic objection is that PhD students commonly experience significant time pressures. These have increased in England since the Higher Education Funding Council for England (HEFCE) announced plans to monitor time to qualification for PhD students as part of the quality assurance of programmes (HEFCE, 2004) leading to increased institutional emphasis upon prompt completions. If training in transferable skills is perceived as an “extra”, rather than something complementary to core activities, then it may be seen as adding further pressure. At this institution, much anecdotal evidence tells us that the “hearts and minds” of our academic staff have been won over to a great extent, partly by student informal feedback and partly by the SKIPI research (Alpay & Walsh, 2008). To continue to progress, we wanted to formally establish that most students did perceive a value from taking part in the skills programme. From the results of the current evaluation, we intend to build on the successes of the programme, and to ensure we protect what is of value during the approaching uncertain times.

When evaluating a programme, there is a danger of relying on a single source of evidence to draw conclusions about its value (Bromley, 2008). Therefore this work draws upon a number of sources including a questionnaire developed from the original SKIPI and designed specifically for this project. This paper thus examines evidence, both quantitative and qualitative, for the perceptions that PhD students towards or at the end of their research degrees at a research intensive UK university have about a programme of transferable skills training in which they have taken part. In particular, we will explore the impact of the training, attitudes towards it, levels of attendance on the programme, perceptions of its importance and satisfaction with the availability of training opportunities.

Method

A questionnaire was designed to capture late stage PhD students' perceptions about the extent to which engagement with an institutional skills development programme had impacted upon their skills development. Another section in the questionnaire asked about their attitudes towards transferable skills development activities. The questionnaire was dubbed SKIPIED (**SK**ills **P**erception **I**nventory of **E**nd-stage **D**octoral students) and was a development from the SKIPI (**SK**ills **P**erception **I**nventory) which was reported by Alpay & Walsh (2008).

The questionnaire also included demographic questions and a section for free text comments. It was administered during May and June of 2008 via email and participants had the option to complete electronically or by hand and return by post. Three reminders were sent out during this period. All those invited to participate were PhD students who had registered for their degrees in the academic period October 2004 to December 2005. All student quotes included in the discussion are taken from responses to this questionnaire, unless otherwise stated.

Approximately 1000 Students were contacted. All respondents were PhD students in the final stages of completing their research, writing up their thesis or having recently completed their degree. For this data, where participants had entered more than one choice of answer to a question, these responses were removed. The data were anonymised.

In parallel with the SKIPIED activity, this institution opted to take part in the 2008 Postgraduate Research Experience Survey (PRES) (Higher Education Academy, 2008) which asked a number of questions relevant to the skills training programme. We also inserted an institutional question to find out whether or not subjects had attended the three day residential skills development course for first year PhD students. There was also the opportunity for students to submit free text comments in PRES. All currently registered students were invited to take part via email and the questionnaire was completed anonymously and on-line.

All statistical analysis was carried out using SPSS 17 (IBM, UK) and all tests performed were non-parametric (Binomial and Mann-Whitney) because of the use of data based on Likert scales rather than continuous variables. In addition, these tests are suitable because they require no assumptions to be made about the distribution of the data.

Finally, to complement these main sources of data, we looked at the course attendance database, as it stood at November 2008.

Results

1 Evidence of positive impact of skills training workshop attendance from SKIPIED.

End-stage doctoral students were asked to what extent both non-residential and residential workshop attendance had impacted upon their skills development. The responses showed that the majority of students 63.6% and 74.1% (table 1) reported a positive impact in both cases. Of the 141 students who responded to this question, 38% had attended the residential workshop whilst all had attended non-residential workshops.

Table 1: Impact of non-residential and residential workshop attendance on end-stage doctoral students.

Responses were on the Likert scale from -8, “marked negative impact” to +8, “marked positive impact”. The proportion of students reporting positive, no impact or negative impact is shown. Positive population distribution was demonstrated by binomial significance ($p < 0.001$).

Reported Impact	Non- residential workshop attendance	Residential workshop attendance
Positive impact	63.6%	74.1%
No impact	32.2%	22.2%
Negative impact	4.2%	3.7%
Statistical significance (binomial test)	$p < 0.0001$	$p < 0.0001$
<i>n</i>	141	54

2 Evidence of positive attitudes to skills training from SKIPIED.

The SKIPIED questionnaire asked students to identify with several attitude items relating to skills development. Table 2 shows the distribution of responses. Three of the items were phrased negatively regarding the value of skills development, as in the original SKIPI questionnaire. The response choices were “1=strongly disagree”, “2=disagree”, “3=agree” and “4 = strongly agree” with no possible neutral response. Most students reported positive attitudes about skills training and disagreed with the negative statements about skills.

Table 2 Attitude items and identification of proportion of students with positive attitude.

Positive population distribution was demonstrated by binomial significance ($n = 141$).

Attitude Item	Population who agree with statement	p value (Binomial test)
I can understand the benefits of transferable skills training	91.5%	<0.0001
At the end of the day, my academic performance will be the only thing that's important to my employment and career progression	15.5%	<0.0001
Most skills training is obvious and can be more effectively covered by reading a book	23.1%	<0.0001
Attending skills workshops is / was distracting to my research	30.5%	<0.0001

3 Student attendance above the compulsory requirements

The course records database was examined for evidence of voluntary attendance at transferable skills training above the compulsory requirement. In November 2008 there were 2443 students who had passed the upgrade point of the PhD (i.e. had been confirmed in their candidacy for the PhD degree). By this point, regulations state that students must have attended 4 courses, as described earlier. It was found that 1779 students, i.e. 73% had exceeded the minimum attendance requirement. The average number of extra courses attended was 3.4, translating to anything from an extra day and a half to four or five days of extra time invested. The figures are given below by faculty in table 3.

Table 3 Faculty variability in engagement with transferable skills courses above compulsory requirements.

Faculty	Number of Post upgrade students in database	Students exceeding the requirement	Average number of extra courses (for those exceeding requirement)
Engineering	999	80%	3.8
Science	773	64%	3.2
Medicine	630	73%	3.0
Business School	41	71%	2.7
Average	N.A.	73%	3.4

4 Importance of and satisfaction with opportunities to develop a range of transferable skills.

Responses to two questions from PRES were examined for students in years 3 and 4 (and thus comparable to the SKIPIED sample) and the results are shown in table 4. The questions are: “for ‘opportunities to develop a range of transferable skills’, please rate how important, in terms of successfully completing your research degree programme, you consider them to be (1 = “Not at all important” and 5 = “Very important”) and how satisfied you are with them (1 = “Not satisfied at all” and 5 = “Very satisfied”). In each case, responses 1 and 2 were termed “Low”, 3 “Moderate”, and 4 and 5 “High”.

Table 4 Importance of and satisfaction with opportunities for transferable skill training.

Positive population distribution was demonstrated by binomial significance ($n = 317 / 321$).

Importance and Satisfaction rating	Years 3 and 4 only	
	Importance of training opportunities	Satisfaction with training opportunities
High	63.4%	57.3%
Moderate	25.4%	31.3%
	11.2%	11.5%
Low		
Statistical significance (binomial test)	$p < 0.0001$	$p < 0.0001$
Numbers ($n =$)	317	321

5 Differences within the population - importance of and satisfaction with opportunities to develop a range of transferable skills.

Demographic information from PRES student responses was used to examine the data reported in section 4 and the results are shown in tables 5a and 5b. More females than males saw transferable skills training as important. Both overseas and EU non-UK students were more likely to see transferable skills training as important compared to UK students.

Examination of satisfaction with opportunities for transferable skills training by gender showed no significant difference between males and females. However examination by domicile revealed lower satisfaction with the opportunities amongst non EU / overseas students compared to others.

Table 5a Importance of transferable skills training opportunities by gender and domicile

Statistical analysis was performed using the Mann-Whitney test to examine differences between the populations.

	Gender		Domicile		
	Male	Female	UK	Other EU	Non EU/ overseas
High Importance	53.0%	74.5%	56.0%	71.5%	76.3%
Statistical Significance (Mann-Whitney Test)	p < 0.001		p = 0.078		

Table 5b Satisfaction with training opportunities by gender and domicile
Statistical analysis was performed using the Mann-Whitney test to examine differences between the populations.

	Gender		Domicile		
	Male	Female	UK	Other EU	Non EU/ overseas
High Importance	56.2%	58.2%	61.1%	58.5%	44.3%
Statistical Significance (Mann-Whitney Test)	n.s.		p = 0.007		

n.s. = not statistically significant.

6 Examination of SKIPIED student populations for variability in reported impact of transferable skills training by gender and domicile.

Further inspection of the SKIPIED data reported in section 1 showed little difference between males and females in their perceived impact of non-residential courses. Examination by domicile showed that Non-EU domicile students reported the most positive impact of such training (table 6a). There were only small differences in reported impact of the residential training (table 6b).

Table 6a Gender and domicile variation in Impact of non-residential training.

The percentage of each group reporting a positive impact of training is shown and total numbers in each group. Analysis of variability between domicile populations by Mann-Whitney test failed to reach statistical significance perhaps because of the relatively small sample sizes.

Impact	Gender		UK	Domicile	
	Male	Female		Other EU	Non-EU / overseas
Positive response within group	62.5%	64.8%	64.6%	54.5%	71.4%
Numbers (n =)	72	71	82	33	28

Table 6b Gender and domicile variation in Impact of residential training.

Using SKIPIED data, responses from students who had done the residential training course were examined for variability in reported impact of training by gender or domicile. The percentage of each group reporting a positive impact of training is shown and total numbers in each group.

Impact	Gender		UK	Domicile	
	Male	Female		Other EU	Non-EU / overseas
Positive response within group	75.9%	72.0%	71.4%	78.6%	75.0%
Numbers (<i>n</i> =)	29	25	28	14	12

7 Motivation for the PhD and differences in importance and satisfaction

PRES asked the students what was their main motivation for pursuing a research degree programme. The four most popular options stated were: “my interest in the subject”; “improving my career prospects for an academic / research career”; “improving my career prospects outside of an academic / research career” and “it felt like a natural step for me”. The data indicate that a greater proportion of those whose motivation is connected to a career plan report high importance of training opportunities (table 7a).

Table 7b shows that those with career related motivations are most likely to report high satisfaction with opportunities for transferable skills training.

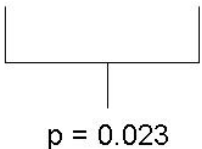
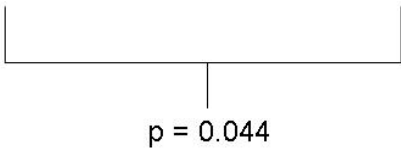
Table 7a Main motivation for starting a PhD and importance of opportunities to develop a range of transferable skills

Differences between motivations were analysed by Mann-Whitney test, comparing proportions attributing high importance to training.

Motivation for doing a PhD				
Importance of training	Interest in Subject	Academic / research career	Non-Academic research career	Natural step
High	55.4%	70.7%	65.2%	60.4%
Moderate	30.4%	24.2%	21.7%	26.4%
Low	14.1%	5.1%	13.0%	13.2%
<i>Respondents (n =)</i>	92	99	46	53
p value (Mann-Whitney test)	 p = 0.016			

Table 7b Main motivation for starting a PhD and satisfaction with opportunities to develop a range of transferable skills

Differences between motivations were analysed by Mann-Whitney test, comparing proportions reporting high satisfaction.

Motivation for doing a PhD				
Satisfaction with opportunities for training	Interest in Subject	Academic / research career	Non-Academic research career	Natural step
High	47.3%	65.3%	60.9%	49.1%
Moderate	36.3%	26.7%	28.3%	38.2%
Low	16.5%	7.9%	10.9%	12.7%
<i>Respondents (n =)</i>	91	101	46	55
p value (Mann-Whitney test)	 p = 0.023		 p = 0.044	

8 Age distribution of participants (for information)

PRES demographic data is presented here, which shows little difference in age for males compared to females. There is, however, a tendency for international students (EU and non-EU) to be older than home students.

Table 8a and b **Age distribution of 3rd and 4th Year students PRES population: Variation by Gender and domicile.**

Age groups were examined within gender (table 8a) and within domicile (table 8b). Proportions of students within each age range are shown for each population.

a)

Gender	Age at time of Survey		
	25 or younger	26-30	over 30
Male	40.2%	40.2%	19.5%
Female	43.2%	37.3%	19.5%

b)

Domicile	Age at time of Survey		
	25 or younger	26-30	over 30
UK	49.6%	30.8%	19.5%
Other EU	34.5%	53.6%	11.9%
Non EU	27.9%	45.8%	26.4%

9 **Motivation for the PhD by gender and domicile (for information)**

The four most popular motivations for doing the PhD account for 88.5% of male students and 94.2% of female responses. The data are presented here by gender and by domicile (tables 9a and b). Females are somewhat more likely to report a career related motivation. The striking feature of table 9b is the high proportion of overseas students citing the motivation of an academic / research career as the reason for doing their PhD.

Table 9a and b **Main motivation of 3rd and 4th Year students PRES population: Variation by Gender and domicile.**

a)

Gender	Motivation for doing a PhD			
	Interest in subject	Academic / research career	Non-academic / research career	Natural step
Male	30.7%	30.0%	11.8%	16.0%
Female	25.6%	33.9%	16.7%	18.0%

b)

Domicile	Motivation for doing a PhD			
	Interest in subject	Academic / research career	Non-academic / research career	Natural step
Home	30.8%	28.2%	14.9%	15.9%
Other EU	33.3%	31.8%	13.6%	13.6%
Non EU	14.8%	42.6%	11.4%	22.9%

Discussion

Overall impact

The SKIPIED results (Table 1) show that the majority of late stage PhD students hold positive views about the impact of the training in transferable skills, in both its residential and non-residential forms. We already had a large body of evidence from immediate post-course evaluations indicating satisfaction with courses (and representing a level 1 effect on the RTIF). For example, over 95% of participants on the residential course state that they would recommend it for others. The evidence presented here is more persuasive because it is based upon the views of researchers near the end of their PhD degrees, looking back on the training they have taken part in. They have been able to reflect on the value of such activities in the light of their own experience as researchers. For example, in the case of the residential course, the participants would typically have attended about two years before completing the questionnaire. It is encouraging to see that the positive impression participants have immediately after the course largely persists. Other studies on the impact of transferable skills development programmes have often been based on immediate post-course feedback (see for example Cooper & Juniper, 2002, p140) or have consisted largely of qualitative data (Pritchard et al, 2009). The present study is useful in providing quantitative evidence for persistent benefits deriving from such programmes.

Attitudes

The results on student attitudes (Table 2) present a more nuanced picture. There are apparent conflicts. For example, while 91.5% understand the benefits of transferable skills training, 30.5% report that attending skills workshops was distracting to their research. This result may be indicative of severe time pressures perceived by students, and could be partly explained by the recently increased emphasis placed upon timely submission of the thesis. Cargill (2004) found that when training was in a task essential to the research process (in her example, it was writing a research paper) the perception of competing priorities was not an issue. It may be that the relevance of elements of the training programme to current or future needs is not established clearly enough for some. It should also be noted that in the last couple of years, in response to student feedback, considerable efforts have been made to contextualise much of the training more directly in research activities. For example, we do not offer training in “writing skills”, but in “writing your thesis”, “writing for publication”, etc.

Another factor which influences student attitudes is that of the supervisor. If the supervisor views the transferable skills programme as an “extra”, as something competing with the primary purposes of the student, “conflicting priorities” (Pearson & Brew, 2002) result for the student. Sometimes this conflict is resolved by the supervisor’s adoption of an obstructive attitude to skills training opportunities as illustrated by this SKIPIED quote: “My supervisor would not allow me to attend the research skill development (residential) course because I had too much work to do”. As graduate schools and other concerned parties become more effective in informing supervisors about the value and impact of skills training, supervisors’ views are becoming

more positive. The use of a new instrument (STaRSS) designed to assess supervisors' current knowledge and views of skills development activities (Vitae, 2008) may also help matters.

Anecdotal evidence suggests that some students have initially negative attitudes to the programme overturned once they attend and see the value of the provision, as illustrated here:

"I think that like most students, I initially went to transferable skills courses as they were a requirement before I could transfer. However, I quickly realised their value when I started going to them and ended up attending a large number of courses."

Student attendance

Table 3 shows that almost three quarters (73%) of post upgrade students had exceeded the compulsory attendance requirement, indicating that students do value the courses. It also demonstrates that the compulsory engagement does not deter most from doing more courses. The large variation by faculty is worthy of note. This concurs with previous work (Alpay & Walsh, 2008) which found that students in the faculties of engineering and medicine believed that the value of skills training was higher when compared with those from the faculty of science ($p < 0.01$). This suggests that skills training is more highly valued in disciplines where the associated professional identity is more defined.

The post-upgrade population represented in Table 3 is larger than just the end stage students that this study focuses upon, as it includes second year students onwards. Some would have only recently upgraded. Many courses are specifically designed for students towards the end of their PhD and so it is natural that those who had only just upgraded would not have attended them. The real rate of over-attendance will therefore be considerably higher.

Again, the views of supervisors have an impact upon attendance levels. See, for example, this comment from a faculty of science student: "Unfortunately this (transferable skills training) is not taken seriously in the department". This agrees with Crasswell (2007) that "supervisors are vital in developing students' awareness of the importance of skills development". Some supervisors appear to have little knowledge of the provision (or have out-dated knowledge) which may act as a block to students fully accessing the programme, because of the implicit message this sends about its value. See, for example, the following PRES comment: "The courses have been excellent and I did benefit from them. However they were not encouraged by supervisors, I don't even think they know what they are, so I haven't done many."

Views on the importance of the programme

Table 4 shows that 63.4% of completing students considered opportunities to develop a range of transferable skills to have high importance. Table 5a shows that females and international students, both strategically important groups to ensure the future healthy supply of researchers in the STEM disciplines taught here, consider opportunities for training in transferable skills

to be more important than male or home students do. There are several possible factors at play here including:

- The motivation for doing the PhD. Table 7a shows that those whose motivation for doing the PhD is career related regard the training as more important. Tables 9a and 9b show that both females and overseas (non-EU based fee-paying) students are more likely to state a career related motivation as the main reason for doing the PhD.
- Perceptions of what constitutes an academic career. Previous studies have found that women tend to perceive the academic role more broadly than men. For example, it has been reported that, compared to men, women academics are often more positively oriented towards teaching (Poole et al, 1997), may spend more time on administration (Davis & Astin, 1990), work harder at being “good department citizens” (Acker & Feuerverger, 1996) and view research as less important overall (Todd et al, 2008 and Deem & Lucas, 2007). Whilst some of these gender differences may be explained by disciplinary differences, an Australian study (Asmar, 1999) found that many differences still remained once discipline was accounted for. The question then is to what extent such differences manifest themselves at the PhD stage. Our PRES data shows that female end stage PhD students are less likely to agree with the statement “I have had adequate opportunity to gain experience of teaching whilst doing my research degree programme” than their male peers (Mann-Whitney test, $p = 0.013$, data not shown). This implies females want to do more teaching than males during their PhD and could be indicative of a broader perception of role. If women PhD students do indeed conceive of a future academic role in a broader way, then the opportunity to develop transferable skills may be more highly valued as a useful broadening activity. When we looked at the responses to this same PRES question (about opportunities to gain experience of teaching) by domicile, no significant differences were found.
- The impact of the research group environment. Some studies have found that women find the research environment harder than men. For example, women may feel they are not part of academic networks (Todd et al, 2008), receive less informal mentoring (Etzkowitz et al) and are less satisfied with their supervisors and their course overall (Harman, 2003). A report on PhD students in UK Chemistry departments found that many students were shocked at the low success rates of experiments, but whereas men viewed these difficulties as a “rite of passage”, women felt the poor success rates reflected badly on them personally (Newsome, 2008). Given this, then the potential affective benefits of attending the transferable skills training courses and the opportunities to compare experiences with others may be more important for women. Similarly, there is considerable evidence of international students experiencing particular difficulties in doing PhD degrees which may include “language problems, cultural adjustment problems and the structure of supervisory arrangements” (Harman, 2003). Isolation may be an issue in less cohesive research groups, because of a combination of language and cultural difficulties (Walsh, 2010). These

students may also perceive a greater benefit from the affective aspects of the training courses.

- The age of the researcher. Table 8b shows that international students are likely to be older than home students. The concept of “career maturity” is pertinent here, i.e. an individual’s readiness to make age-appropriate career decisions which correlates with age (Savickas, 1984). This factor does not appear to play a part in gender differences where the age distributions are very similar (see Table 8a).

Views on satisfaction with the opportunities to develop a range of transferable skills

Table 4 shows that more students regard the training opportunities as important (63.4%) than are satisfied with them (57.3%). This difference is also shown in the PRES 2008 national data (Higher Education Academy, 2008) which gives the corresponding national average figures as 74.3% for importance and 54.1% for satisfaction. Some possible reasons for the difference between importance and satisfaction observed here include:

- Not enough training opportunities available
- An external factor prevents or limits take up of training opportunities
- The quality of training elements offered is unsatisfactory
- Topics in which training is offered do not meet perceived needs.

Given that most students report a positive impact of the training programme overall (table 1) and that many students attend beyond the compulsory requirement (table 3), it is arguable that the first two factors given above are more important than the last two.

Table 5b shows that overseas (non-EU and fee paying) students are less satisfied than others. Individual course feedback and anecdotal evidence consistently shows that overseas students value training courses at least as highly as others. We have also seen that these students consider the training to be much more important than other groups. Table 6a also shows that overseas students are more likely to report a positive impact for non-residential training workshops compared to home students. The implication is therefore that their lower satisfaction is due to a desire for more training rather than a problem with its quality or content. This suggests that an expansion of the training programme would improve the satisfaction of overseas students, provided steps are taken to ensure that any new provision meets their needs as appropriately as possible.

Career motivation

Table 7 shows that roughly half of the students report career related reasons (whether research or non-research) as the main motivation for doing their PhD (the middle two columns). These students view the training opportunities as more important and are more satisfied with them than others.

One of the key drivers for skills development initiatives in universities has been to improve the employability of PhD graduates (Roberts, 2002 and Nyquist, 2002).

Those who declare their main motivation for doing the PhD to be career related may have greater career maturity (as discussed previously) and thus be more positive about training which will support them in making career transitions. The data here suggest that the programme is indeed supporting researchers in their career plans within and beyond research.

It is perhaps surprising that those who wish to pursue a research or academic career attach the greatest importance and are most satisfied with the provision of transferable skills training compared to others. This may be evidence that the research contextualisation of the training referred to earlier yields the most benefits for those seeking research careers. It implies that the training helps to achieve one of the stated aims of the Roberts review (ibid), that is, by better supporting potential career researchers, to increase retention rates in research careers.

Those whose main motivation for doing the PhD is not career-related consider training to be less important and are less satisfied with the opportunities. This may be because these students have not yet given much active consideration to their future career plans and prospects and may regard such training as a distraction. We could argue that these students have a subject oriented or present-facing focus, whereas those with a career related motivation have a career oriented or future-facing focus, which again is likely to correspond with greater career maturity and hence a better understanding of their own employability needs.

Consideration of how to meet the needs of all students leads to a consideration of career decision making styles. These were examined in a longitudinal study of adults (Bimrose et al, 2008). They identified “opportunistic” careerists as those individuals who “exploit available opportunities rather than make conscious choices”. This term may well apply to many who viewed the PhD as a “natural step” and to a lesser extent to those who were motivated by their “interest in the subject” (table 7b). Bimrose et al. (2008) found that these individuals often displayed resistance to career planning and responded better to more flexible approaches. Further investigation is warranted to discover more appropriate ways to support this sub-group.

Views on why the programme succeeds

The quantitative data demonstrate positive student views about the programme but without giving much insight into the reasons why. Examination of anecdotal, qualitative evidence from informal focus groups and course evaluation questionnaires suggests the following reasons for the success of the programme. Firstly students report that the training has an enduring impact on their behaviour, a level 3 outcome on the RTIF. Secondly the programme appears to meet their evolving needs, as they transition from novice researcher to completing PhD candidate and job seeker. We receive many comments about the high quality of tutors on courses (a mixture of internal and external staff of academic and non-academic background) and also about the breadth and flexibility of the programme, which includes more advanced options for some topics. Finally, much feedback suggests that

students reap important affective benefits from course attendance, meeting and sharing problems with others, reducing any feelings of isolation and increasing confidence in their abilities to succeed.

Implications of this study

The efforts made to gather this evidence have proved to be worthwhile. By using quantitative data from more than one source, we are able to influence relevant future policy and developments within the institution. The evidence presented here has clearly demonstrated that the transferable skills training programme makes a positive contribution to the development of PhD students at this institution. In addition, there is evidence that students view the provision as important for the reputation of the institution as a whole, as illustrated by the two focus group quotes given below. One student stated that the training is “very distinct to [institution name], other universities do not provide these opportunities so they help with the development of the career”. Another said “Students choose [institution name] based on its reputation, and to maintain it [institution name] wants to ensure its graduates are perfect. The courses are the marker of difference to employers.” In times of increasing “consumerism” amongst students, all institutions’ reputations should be enhanced by continuing and developing such support programmes for their research students.

There is always room for improvement. In particular, the evidence suggests that more could be done to raise awareness of career planning and employability issues amongst PhD populations at an earlier stage. In this way, researchers might engage more purposefully and fruitfully with transferable skills training programmes. There is evidence that some researchers realise too late that they are not well prepared for the next stage of their career. One participant, now in employment outside academia, made the following comment: “I found that if anything we should have been given more training ... I have now moved on to a job where the importance of transferable skills is paramount.” The use of PhD alumni in explaining and exemplifying realistic PhD career paths should be invaluable, particularly in reaching the subset of current students who are purely focused on their research, without thinking about where their career will lead them.

Future developments

Three factors affect the future of this provision in the UK. Firstly the funding that was provided since the Roberts review is unlikely to be ring-fenced beyond 2010/2011. Secondly the current economic downturn is adding to the pressure on all university funding. Thirdly, there are increasing calls for a change in focus of future training activities, i.e. that there should be more emphasis on the economic impact of research. A key publication was the “Warry” Report (2006) on economic impact, which called for the research councils to deliver a major increase in the economic impact of their research investments. “Excellence with Impact” (Research Councils UK, 2007) followed, with a heavy emphasis on commercialising research and enterprise training. This gives us pause, because training programmes must meet the needs and interests of the whole population of research students. It would be

a mistake to shift the provision too sharply in this “impact” direction. As Crasswell (2007) has written, in pressurised environments, “students are strategic about *value adding* in terms of skills training ...they prioritise skills needed for candidature”. Enterprise training may not be perceived to fit into this category for most students.

Gilbert et al (2004) proposes two alternative views of research, i.e. “research as disciplinary stewardship” and “research as instrumental and entrepreneurial application”. Universities are currently experiencing a firm push towards the second view, whereas, at least in research-intensive universities, the former view is perhaps more commonly held. The way in which this issue is resolved will have a major influence on the content and therefore the success of future development programmes for researchers.

Conclusion

This study has provided a wealth of evidence that late stage PhD students have positive views about taking part in a programme of transferable skills development. Students report the programme having a positive impact on their development, they understand its benefits and they choose to attend well beyond the compulsory requirement. The programme is accorded the greatest importance by the strategically important groups for STEM subjects of women and overseas students. There is evidence that those seeking both research and non-research careers reap benefits from taking part in the programme and that its quality contributes to maintaining the high reputation of this institution.

This study suggests that the training programme should continue to develop, with particular attention being paid to improving communication with supervisors and students about the provision and its relevance to employability. Further investigation of the particular needs of overseas students is warranted, in order to increase their satisfaction levels. Changes in the curriculum of the programme to match current government priorities towards entrepreneurial applications should be implemented with caution, to ensure actual student needs continue to be met.

Note

This work was based on end stage students who began their PhD programmes during 2004-05. It is likely that if we repeated the study now, the results would be more positive, given the on-going refinements being made in the programme.

References

Acker, S., & Feuerverger, G. (1996). Doing Good and Feeling Bad: the work of women university teachers. *Cambridge Journal of Education*, 26(3), 401-422.

Alpay, E., & Walsh, E. (2008). A skills perception inventory for evaluating postgraduate transferable skills development. *Assessment and Evaluation in Higher Education*, 33(6), 581-598.

Asmar, C. (1999). Is there a gendered agenda in academia? The research experience of female and male PhD graduates in Australian universities. *Higher Education*, 38, 255-273.

Astin, H. S., & Davis, D. E. (1990). *Research Productivity Across the Life and Career Cycles: Facilitators and Barriers for Women*. Paper presented at the Women in higher education: a feminist perspective, Portland; OR.

Bennett, N., Dunne, E., & Carré, C. (1999). Patterns of core and generic skill provision in higher education. *Higher Education*, 37(1), 71.

Bimrose, J., Barnes, S. & Hughes, D. (2008). *Adult career progression & advancement: A five year study of the effectiveness of guidance*. Institute of Employment Research

Borrell-Damian, L. (2009). Collaborative Doctoral Education: University-Industry Partnerships for Enhancing Knowledge Exchange.
<http://www.eua.be/publications/> [accessed October 19th 2009]

Bromley, A. P., Boran, J. R., & Myddelton, W. A. (2007). Investigating the baseline skills of research students using a competency-based self-assessment method. *Active learning in higher education*, 8(2), 117-138.

Bromley, A. (2008). *Evaluating Training and development programmes for postgraduate and newer researchers*. Series 2(7) SRHE.

Cargill, M. (2004). Transferable skills within research degrees: a collaborative genre-based approach to developing publication skills and its implications for research education. *Teaching in Higher Education*, 9(1), 83-98.

Cooper, G. & Juniper, S. (2002). A postgraduate research training programme in generic skills and strategies: Description and evaluation, in *Quality Conversations, Proceedings of the 25th HERDSA Annual Conference, Perth, Western Australia, 7-10 July 2002: p136*

Crasswell, G. (2007). Deconstructing the skills training debate in doctoral education. *Higher Education Research and Development*, 26(4).

Deem, R., & Lucas, L. (2007). Research and teaching cultures in two contrasting UK policy contexts: Academic life in Education Departments in five English and Scottish universities. *Higher Education*, 54(1), 115-133.

Enders, J. (2005). Border crossings: Research training, knowledge dissemination and the transformation of academic work. *Higher Education*, 49(1), 119-133.

Etzkowitz, H., Kemelgor, C., & Uzzi, B. (2000). *Athena unbound: the advancement of women in science and technology*. Cambridge: Cambridge University Press.

Falkenheim, J. C. (2007). U.S. Doctoral Awards in Science and Engineering Continue Upward Trend in 2006, Arlington, VA: National Science Foundation. www.nsf.gov/statistics/infbrief/nsf08301/ (accessed November 2009).

Gilbert, R., Balatti, J., Turner, P., & Whitehouse, H. (2004). The generic skills debate in research higher degrees. *Higher Education Research and Development*, 23(3), 375-388.

Harman, G. (2003). PhD student satisfaction with course experience and supervision in two Australian Research-intensive Universities. *Prometheus*, 21(3), 312 - 333.

Harman, G. (2003). International PhD students in Australian universities: financial support, course experience and career plans. *International Journal of Educational Development*, 23(3), 339-351.

Haynes, K., Metcalfe, J. & Videler, T. (2009). "What do researchers do? First destinations of doctoral graduates by subject". The Careers Research and Advisory Centre (CRAC) Limited.

Higher Education Academy (2008). Research Experience Survey 2008: Final report. (Kulej, M. & Park, C.) <http://www.heacademy.ac.uk/assets/York/documents/ourwork/research/surveys/pres/PRES2008.pdf> [Accessed 1 November 2009]

Higher Education Funding Council for England (2004). Circular letter, 18/2004. http://www.hefce.ac.uk/pubs/circlets/2004/cl18_04/ [Accessed November 2009]

Higher Education Funding Council for England (2009), *PhD Study. Trends and Profiles 1996-7 to 2004-5*, February 2009/04.

Kirkpatrick, D. L., & Kirkpatrick, J. D. (2006). *Evaluating Training Programmes* (3rd ed.). San Francisco: Berrett-Koehler

Newsome, J. L. (2008). *The chemistry PhD: the impact on women's retention*. UK Resource Centre for Women in SET and the Royal Society of Chemistry

Nyquist, J. D. (2002). THE PHD A Tapestry of Change for the 21st Century. *Change*, 34(6), 12-21.

Park, C. (2005). New Variant PhD: The changing nature of the doctorate in the UK. *Journal of Higher Education Policy and Management*, 27, 189-208.

Pearson, M., & Brew, A. (2002). Research Training and Supervision Development. *Studies in Higher Education*, 27(2), 135 - 150.

Poole, M., Bornholt, L., & Summers, F. (1997). An international study of the gendered nature of academic work: Some cross-cultural explorations. *Higher Education*, 34(3), 373-396.

Pritchard, J., MacKenzie, J., & Cusack, M. (2009). The response of Physical Science post-graduates to training courses and the connection to their PhD studies. *International Journal for Researcher Development*. 1(1), 29-44.

Research Councils UK (2001). "Joint Statement of Skills Training Requirements of Research Postgraduates".
<http://www.vitae.ac.uk/policy-practice/1690/Joint-Skills-Statement.html>
[Accessed November 09]

Research Councils UK (2007). "Excellence with Impact: progress in implementing the recommendations of the Warry Report on the economic impact of the Research Councils".
<http://www.rcuk.ac.uk/innovation/impact/default.htm> [accessed 1 Nov 2009]

Roberts, G. (2002). SET for Success: the supply of people with science, technology, engineering and mathematics skills. HM Treasury. http://www.hm-treasury.gov.uk/ent_res_roberts.htm [accessed 19th October 2009]

Rugby Team (2008). *The Rugby Team Impact Framework*.
http://www.vitae.ac.uk/CMS/files/1.Rugby%20Impact%20Framework_33.pdf
[accessed 19th October 2009]

Rugby Team (2009). *The Rugby Team Impact Framework: One year on*.
http://www.vitae.ac.uk/CMS/files/upload/RTIF_update_Sept09.pdf
[accessed 19th October 2009]

Savickas, M. L. (1984). Career maturity: The construct and its appraisal. *Vocational Guidance Quarterly*, 32, 222-231.

Todd, Z. M., A & Shaw, N & Bown, N (2008). Faculty members' perceptions of how academic work is evaluated: similarities and differences by gender. *Sex Roles*, 59, 765-775.

Vitae (2008).
<http://www.vitae.ac.uk/researchers/1271-14213/Refined-STaRSS-now-available-to-local-institutions.html> [Accessed November 2009]

Walsh, E. (2010). A model of research group microclimate: environmental and cultural factors affecting the experiences of overseas research students in the UK. *Studies in Higher Education*, 35(5) in press.

Warry, P. (2006), *Increasing the economic impact of research councils*, 06/1678, Research Councils UK, UK.