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## Summary

This student-led project has constructed a picture of the skills and graduate attributes that former Postgraduate Research (PGRs) students perceive as valued by employers.  The project has explored previous students' perceptions of the strengths and skills gained during their PGR experience that helped them to secure employment, as well as the support they accessed during their studies when preparing for their transition beyond academia.  Recommendations following this study include further training and support for students in areas where there are perceived skills gaps, and training for supervisors in supporting the personal development of PGR students.

## Rationale

Many PGR students embark on a PhD with the specific intension of pursuing an academic career in HE (Mellors-Bourne et al., 2012, Sauermann and Roach, 2012).  However, the majority of PhD candidates will now find themselves employed outside of academia after graduating.  Figures published by Vitae suggest that three and a half years after graduation, 17% of doctoral graduates will work in HE research, 21% will teach in HE, 12% will work in research out with HE and the remaining 49% will work in other occupations where often a significant proportion of the workforce has a PhD (Mellors-Bourne et al., 2013).

Additionally, the supply of PhD graduates far outweighs the demand for PhD graduates in the UK HE labour market.  The Careers in Research Online Survey (CROS) data has indicated many research staff (those employed to primarily perform research under the supervision of a principal investigator) hold unrealistic ambitions; around 80% aspire to an academic career in a HE institution (Mellors-Bourne and Metcalfe, 2017) but only 10 -15 % will achieve this (The Royal Society, 2010).  This highlights the need for institutions to make researchers aware of a wider range of career opportunities beyond academia, particularly through development conversations and appraisal with their line manager (Mellors-Bourne and Metcalfe, 2017).  The same applies to

the PhD candidate, who is in the earliest stage of pursing a research career and who will often look to their supervisor for advice.

As a result, it is increasingly important that PGR graduates are well prepared for non-academic careers. Recent research has shown that doctoral training provides PGRs with a number of transferable skills for both research intensive and non-research intensive careers, with similar levels of job satisfaction for graduates, demonstrating that PhD training prepares graduates well for a broad range of careers (Sinche et al., 2017). PGR students will often seek careers advice from their supervisors, who play an influential role in the development of PGR skills and the success of graduates. However, research from the US by Sauermann and Roach (2012) indicates that PhD candidates within the sciences are strongly encouraged by their supervisors to pursue academic careers over other careers options, largely because supervisors have substantial experience in academic careers and are less experienced in other career options. Furthermore, only a quarter of research leaders feel confident providing careers advice to staff, and so there is a need for institutions to develop these skills amongst their supervising staff (Mellors-Bourne and Metcalfe, 2017). This indicates that there is also a training need for supervisors, to enable them to advise PGRs on a wider range of careers options.

Recognising the development needs of PGRs, the University of Strathclyde implemented the post graduate certificate in researcher professional development (PG Cert RPD) in 2015, to support students in their personal development and prepare students for careers both in and out with academia. The certificate is closely mapped to the Researcher Development Framework (RDF), a framework which outlines the skills required for a research career. However, it is not currently known what skills and attributes are valued by employers when recruiting and employing PGRs. An investigation of this will help to identify where PGR graduates may have development needs, and will also help to inform institutional graduate attributes. Previous graduates are arguably well placed to identify the employability skills valued by employers and the skills gaps that exist in graduates, given that they will have had recent exposure to both education and the labour market (Messum et al., 2016).

The following research questions were developed to answer some of the knowledge gaps identified in the rationale:

1. What skills and attributes do previous PGRs perceive as valued in their current employment roles?
2. How well are PGRs prepared for the transition into employment, in careers both within and outside of academia?

## Methodology

An online survey was developed based on the skills and attributes outlined in the RDF and distributed via an online platform.  Participants in this study comprised of alumni who had completed a PhD and who indicated that they would be willing to participate in a research project, as well as recent PGR graduates who had completed the PG Cert RPD during their PhD.  32 fully completed responses were collected.  Respondents had studied a range of disciplines, including Science, Engineering, Humanities, Social Science, and Business.

The survey asked the participants about the value of the skills outlined in the four domains of the RDF.  For each area of the RDF, the participants were asked: "To what extent would you agree that the following skills and attributes are valued by your current employer?"  The participants were asked to rate each skill using a five point Likert scale, with the options of strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree.  Participants were then asked to identify which skills they felt that their PGR experience most and least equipped them with.  Free text comments were also collected from the respondents about what skills they felt were most valued.  Participants were also asked about the different services and activities they had engaged in during their PGR time and what they felt could have been improved.  Based on the results of the survey, follow up questions were sent by e-mail to clarify findings.

The survey results and analysis have been split into four areas within this section:

**1. Graduate attributes and skills valued by PGR graduates**

The respondents were asked to what extent they would agree that the skills and attributes outlined in the RDF are valued by their current employer.

Overall, table one shows that the majority of skills in the RDF were perceived by the PGR graduates as valued by employers, and this was the case for respondents in both academic positions and non-academic positions.  A number of skills showed little variation in the extent to which they were valued by the respondents, including **Collegiality, Team Working & Collaboration, Supervision, Subject Knowledge, Responsibility, Appropriate Practice** and **Research Strategy**, to name a few.  These results reinforce the validity of the RDF with regards to academic jobs, but also demonstrate that the RDF is also applicable to research jobs out with academia.  Furthermore, these results demonstrate that the RDF is reflective of PGR graduate attributes and a valid tool for PGR students to use in planning their development.

Table one also highlights the differences between the skills perceived as valued when comparing academic positions with other positions.  Respondents in academic positions were more likely than other respondents to agree that **Publication, Practical Research Methods, Argument Construction, Integrity** and **Self-reflection** were valued by employers.  Conversely, respondents in other positions were more likely than academic respondents to agree that **Society and Culture, Policy, Project Planning and Delivery, Risk Management, Financial Management, Infrastructure, Time Management** and **Responsiveness to Change** were valued by employers.  So while the RDF remains applicable to academic and non-academic jobs, there is some variation in the skills perceived by the respondents as valued by employers.

**Table one:** Percentage of respondents who agreed or strongly agreed that the skill or attribute is valued by their employer, comparing academic roles with other roles.

| Engagement, influence and impact | Academic | Other | Knowledge and intellectual abilities | Academic | Other |
|---|---|---|---|---|---|
| Collegiality, team working & collaboration | 89% | 93% | Subject knowledge | 100% | 100% |
| Supervision | 83% | 79% | Research methods - practical application | 100% | 71% |
| Mentoring | 83% | 71% | Academic literacy and numeracy | 100% | 86% |
| Publication | 83% | 64% | Analysing | 100% | 93% |
| Influence and leadership | 72% | 86% | Critical thinking | 100% | 93% |
| Equality and diversity | 72% | 64% | Evaluating | 100% | 93% |
| Teaching | 72% | 64% | Problem solving | 100% | 93% |
| Public engagement | 67% | 79% | Intellectual insight | 94% | 100% |
| People management | 67% | 71% | Research methods -theoretical knowledge | 94% | 86% |
| Communication methods & media | 67% | 79% | Synthesising | 94% | 86% |
| Enterprise | 56% | 57% | Inquiring mind | 89% | 100% |
| Global citizenship | 50% | 57% | Information seeking, literacy & management | 88% | 93% |
| Society and culture | 44% | 64% | Innovation | 83% | 93% |
| Policy | 39% | 57% | Argument construction | 83% | 64% |
| | | | Languages | 50% | 50% |
| | | | Intellectual risk | 47% | 50% |

| Research governance and organisation | Academic | Other | Personal effectiveness | Academic | Other |
|---|---|---|---|---|---|
| Appropriate practice | 83% | 79% | Integrity | 100% | 79% |
| Research strategy | 83% | 79% | Responsibility | 100% | 100% |
| Respect and confidentiality | 83% | 93% | Preparation and prioritisation | 94% | 100% |
| Project planning and delivery | 82% | 100% | Enthusiasm | 94% | 93% |
| Legal requirements | 76% | 71% | Perseverance | 94% | 93% |
| Attribution and co-authorship | 76% | 64% | Self-reflection | 88% | 71% |
| Ethics, principles and sustainability | 72% | 86% | Time management | 83% | 100% |
| Health and safety | 67% | 71% | Responsiveness to opportunities | 83% | 86% |
| Intellectual property rights & copyright | 65% | 64% | Reputation and esteem | 83% | 71% |
| Risk management | 59% | 79% | Commitment to research | 83% | 79% |
| Income and funding generation | 59% | 69% | Continuing professional development | 78% | 64% |
| Financial management | 59% | 79% | Networking | 76% | 86% |
| Infrastructure and resources | 47% | 71% | Self confidence | 72% | 71% |
| | | | Responsiveness to change | 67% | 86% |
| | | | Career management | 47% | 43% |
| | | | Work life balance | 41% | 43% |

The respondents also highlighted communication skills, and the ability to demonstrate the transferability of skills, as key skills which helped them to secure employment:

"*My employer came to our department looking for someone with a PhD who had transferable skills to work on a new project. Those skills included design, accommodating multiple stakeholder requirements and technical communication, all of which were demonstrated in my PhD.*"

(Participant A, graduated 2017, employed in an academic role)

"*My PhD focused on participant recruitment to public health programmes. I've developed this into a public engagement model and now apply it to businesses as well as continuing to work with public health agencies.*"

(Participant B, graduated 2013, employed in a non-academic role)

## 2. Key skills of PGR Graduates

The respondents were also asked which skills and attributes that they felt most equipped with by their PGR experience. These skills were then mapped to the RDF. The results are shown in figure one.

**Figure 1:** Percentage of respondents who felt most equipped with a skill or attribute, mapped to the RDF:
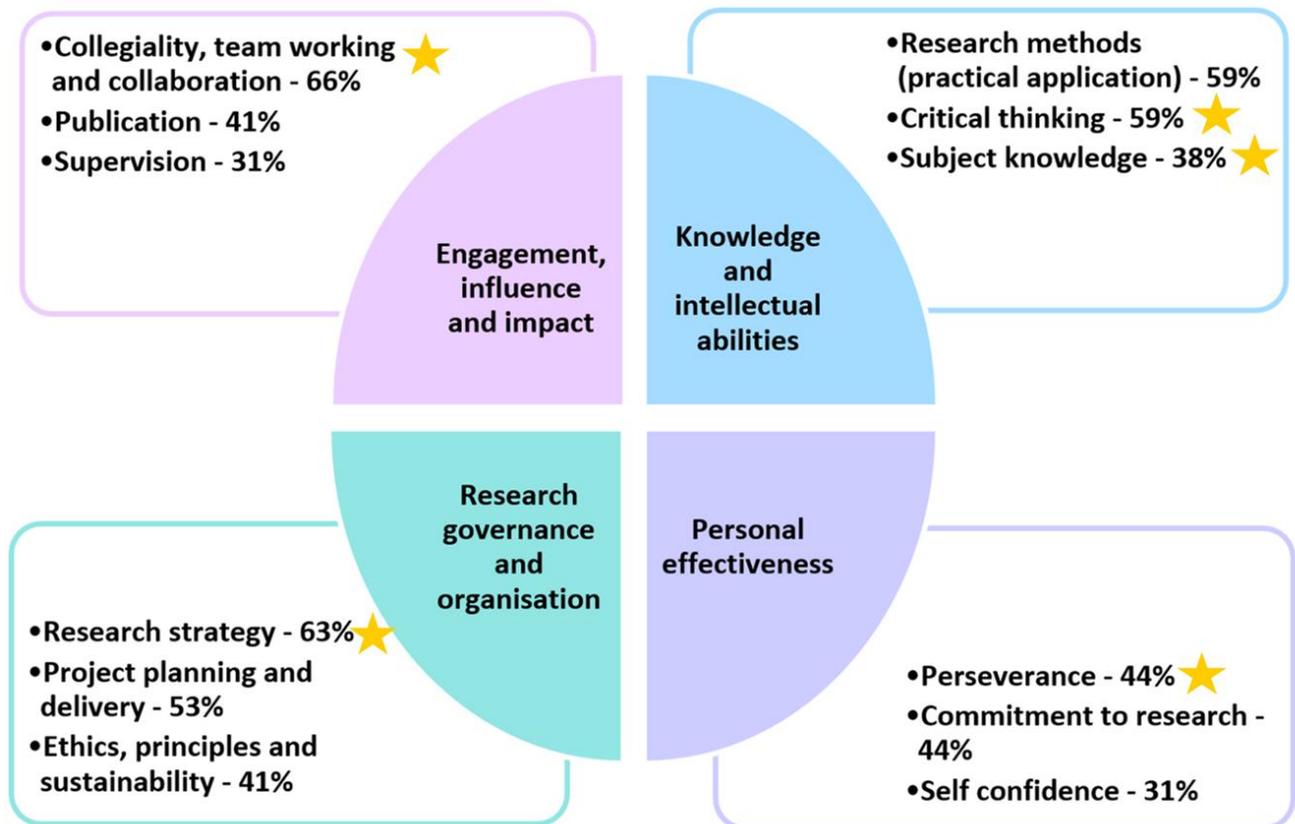


⭐ = Over 90% of respondents agreed or strongly agreed that this skill is valued by their employer

These results are encouraging, given that each of the skills that the respondents felt most equipped with were also perceived by the majority of respondents as valued by their employers. This indicates that there is a good match between the skills developed during a PhD and the skills needed in employment.

### 3. Employability support needs

The respondents were also asked about the skills and attributes which they felt least equipped with. These skills were then prioritised in terms of the skills which graduates also perceived to be of most value to their employers. This analysis has identified areas of employability which could be improved to support graduate transitions beyond HE. The responses from participants who felt least equipped in the skills identified as employability support needs were then analysed in further detail.

Figure two: Skills perceived as most valued, which previous PGR also felt least equipped with by their experience
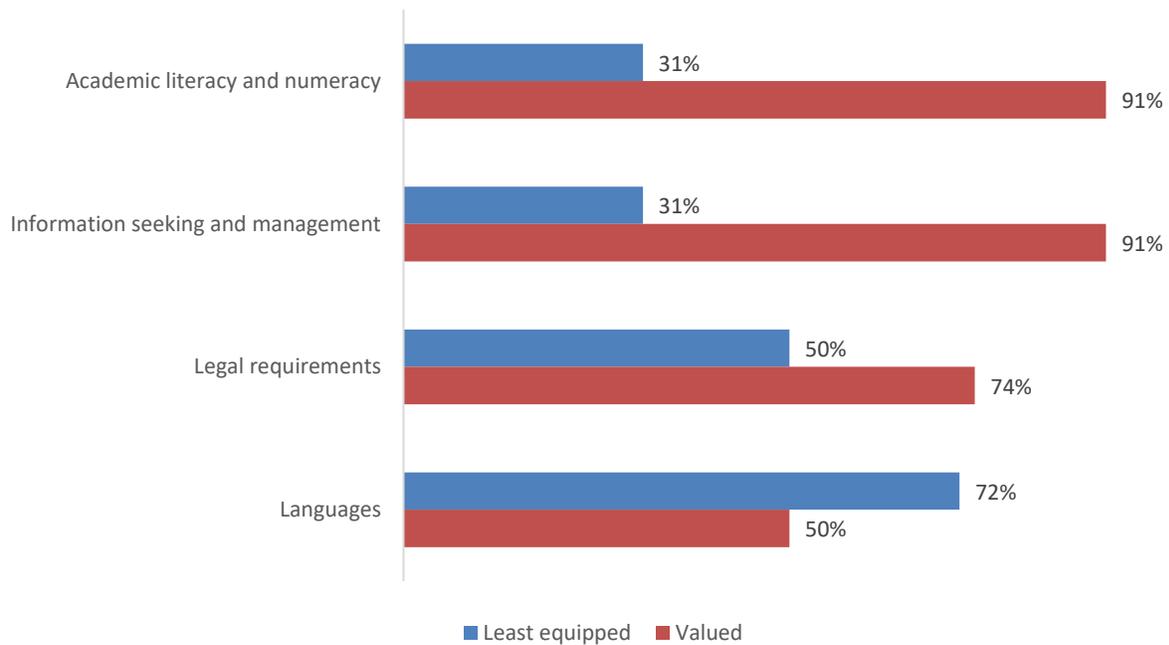


Academic literacy and numeracy, information seeking and management, and legal requirements were skills that were perceived by the respondents as most valued, but which the respondents also felt least equipped in. Additionally, languages was selected by 72% of the respondents as a skill that they were least equipped with. While figure two indicated that only 50% of the total respondents perceived this skill as valued by their employer, the perceptions of EU and international students differed considerably from home students.

## 4. Employability support accessed

The respondents were asked during the survey about the kinds of employability support that they accessed during their doctoral studies. Figure three shows a reasonably high engagement from respondents in public output, external engagement and international experiences; however, very few respondents indicated that they had undertaken a work placement or internship during their PhD. This is perhaps unsurprising given that the almost all respondents had studied on a full-time basis, where time constraints and/or funding arrangements may prohibit additional employment.

Figure three: Employability activities engaged in by PGR graduates
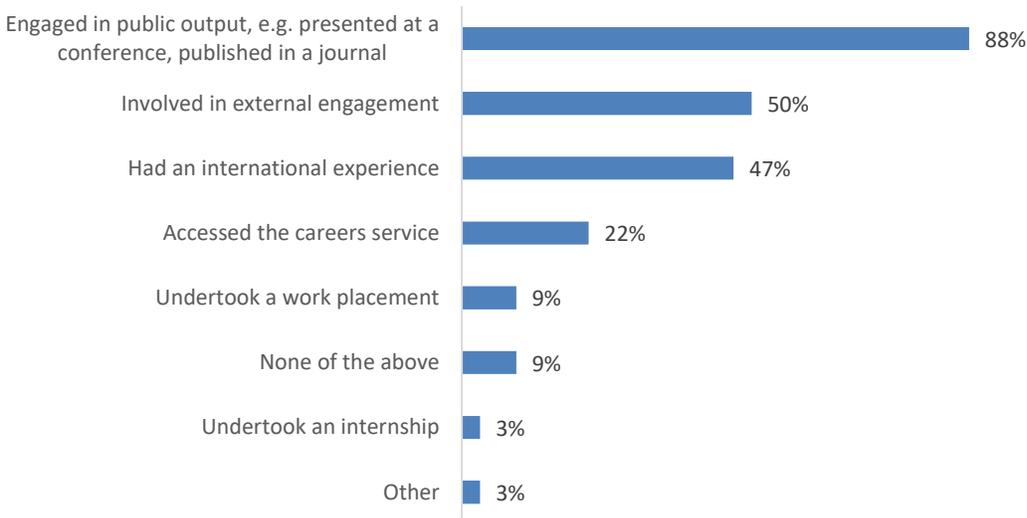


However, figure three also shows that only 22% of respondents indicated that they had used the careers service. When asked about the skill 'career management', 47% of the respondents identified this as a skill that they felt they were least equipped with by their PGR experience. This is an area of particular concern, given that this skill will be crucial in the transition into employment.

## Recommendations

Based on the findings of this study, the following recommendations have been made:

**Recommendations to current PGR students**

- Given the close match between the skills perceived by PGR graduates as valued by employers and the majority of skills in the RDF, the main recommendation to current PGR students is that they fully engage with and make use of the RDF as a tool for their development. Current PGR students may struggle to identify where they might have development needs that would hinder their employability. Therefore, the RDF provides an invaluable tool for guiding PGRs in their development and preparing them for careers both in and out with academia.

- PGR students should aim to develop a wide range of skills during their PhD, bearing in mind that the results of this study indicate that many of the skills in the RDF are highly applicable to both academic and non-academic jobs. Additionally, PGRs should be mindful of the areas of the RDF highlighted were there appears to be some variation as to the skills valued by employers when comparing academic and non-academic roles. Developing a wide range of skills, suited to both academic and non-academic roles, will help students in their transition beyond HE.

- Crucially, current students should also ensure that they not only develop these skills, but that they are able to show how they can transfer these skills in to a number of different jobs and environments. Outside of academia, being able to present a succinct business case is perceived as a highly valuable skill.

**Recommendations for academic and researcher development**

- Overall this report has demonstrated that there is a good match between the skills that previous PGRs have gained during their doctorate and the skills perceived as valued by employers. However, there were some areas where previous PGR students felt that their skills were lacking. These skills gaps could be addressed through the courses offered under the researcher development programmes.

- Two key skill areas that were highlighted in this area were academic literacy & numeracy skills, and information seeking, literacy & management. Respondents particularly felt that they struggled to articulate the business case when communicating technical information, and so it is recommended that there should not only be a focus on equipping PGRs with these skills, but also enabling them to transfer these skills into a different context.

- The results also indicated that students would also benefit from further training in the legal requirements specific to their industry.

- International and EU graduates particularly highlighted languages as a skill valued by their employers, which they felt least equipped with by their experience. Therefore, it is recommended that ways in which language support could be improved for international and EU students be considered. For example, this could include courses in Business English.

- The findings of this report have highlighted that career management is a skill that previous PGRs felt least equipped in. As identified in the rationale, supervisors are well placed to assist PGR students in developing career management skills that will see them throughout their careers. Therefore, it is recommended that CPD and personal development planning (PDP) into is integrated into the PhD supervision process. The aim here is not to turn supervisors into careers counsellors; rather the aim is to support and encourage students in planning their development through supervision, so that when students transition out of HE, they are better equipped with the necessary skills to manage their careers.

- Training would be required for PhD supervisors to enable them to support PGR students in PDP. Therefore, it is recommended that PhD supervisors are trained in coaching conversations.

- Furthermore, it is recommend that supervisors promote the support available to their PGR students through careers services, both during and after their research degree.

**Recommendations regarding employability support**

- This report indicated that a large majority of previous PGR students did not access a careers service. It is unclear from the results why uptake of careers services was not higher, however there is a clear need for better engagement from students with the careers service, to support students in their transition from their doctorate into employment.

- Regular and targeted promotion of the careers service to current PGRs and recent alumni is recommended. Using various channels to reach PGR students is recommended, such as promotion via supervisors and course representatives. The careers service could provide unique and invaluable support to PGR students in their transition beyond HE.

# Bibliography

Mellors-Bourne, R., Jackson, C. and Hodge, V. (2012) *What do researchers want to do? The career intentions of doctoral researchers*, Cambridge: Vitae.

Mellors-Bourne, R. and Metcalfe, J. (2017) *Five Steps Forward*, Cambridge: Vitae.

Mellors-Bourne, R., Metcalfe, J. and Pollard, E. (2013) *What do researchers do? Early career progression of doctoral graduates,* Cambridge: Vitae.

Messum, D. G., Wilkes, L. M., Jackson, D. and Peters, K. (2016) 'Employability skills in health services management: Perceptions of recent graduates'. *Asia Pacific Journal of Health Management*, 11(1), pp. 25-32.

Sauermann, H. and Roach, M. (2012) 'Science PhD Career Preferences: Levels, Changes, and Advisor Encouragement (Science PhD Career Preferences)'. *PLoS One*, 7(5), e36307.

Sinche, M., Layton, R. L., Brandt, P. D., O'Connell, A. B., Hall, J. D., Freeman, A. M., Harrell, J. R., Cook, J. G. and Brennwald, P. J. (2017) 'An evidence-based evaluation of transferrable skills and job satisfaction for science PhDs'. *PloS One*, 12(9), e0185023.

The Royal Society (2010) *The Scientific Century: securing our future prosperity*, London: The Royal Society.