

Vitae Occasional Papers Volume 2

Researcher careers and culture

A collection of papers based on workshops at the Vitae Researcher Development International Conference, 9-10 September 2014, Manchester, UK

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Foreword

Welcome to the second in a series of Vitae occasional papers. This volume draws together papers based upon workshops at the Vitae Researcher Development International Conference of 2014 and builds upon the success of the first volume published following the 2013 conference. It has again been a pleasure to have the opportunity to edit the seven papers presented here covering wide ranging topics thematically in the areas of researcher careers and culture.

We open with three papers relating to aspects of doctoral careers. Davina Whitnall takes an innovative approach to needs analysis considering the difference between 'competence' and 'confidence' in skills. As researcher developers it is common that we consider competence in our needs analysis however, as Davina explores, it can be confidence in the skill that is crucial. Building upon this idea the paper presents a Confidence Needs Analysis (CNA) concept and reports upon the implementation of the CNA.

Our second and third papers look at skills development in the context of the diversity of career opportunities open to researchers. Anne Boulton and Jayne Sharples consider the differing perspectives of an academic and a careers consultant researcher developer in running a professional development scheme. They explore the strengths and weaknesses of each perspective and consider possible solutions. Anne Boulton, Jacqueline Taylor and Sian Vaughan then report on a peer mentoring initiative in an Art and Design setting. They look at peer mentoring as a more personal approach to that of a career development programme and also, 'reflect on the challenges and lessons learned in trialling different social and virtual mechanisms to support and facilitate peer mentoring'.

Our second group of four papers broadly consider different aspects of culture in research. We open the discussion with a paper by Janet De Wilde and Rui Pires Martins, who look at increasing understanding of the contributors to and drivers of, research culture in higher education institutions with a view to facilitating enhancement approaches. Their research, 'aims to develop a knowledge of and an awareness of the relationship between culture and the postgraduate researcher and staff research experience'.

Sandrine Soubes explores interdisciplinarity in research and particularly the associated issues for early career researchers (ECR). Sandrine, 'describes the experience of initiating, developing and managing [] a professional development programme aimed at fostering interdisciplinary collaborations between ECRs and building interdisciplinary competencies more systematically in an ECR community'.

Continuing on cultural themes, Shailesh Appukuttan looks at how e-infrastructure is adopted in the research setting, proposing 'a model for a strategic researcher development approach for institutions to enhance researchers' technology adoption'.

Finally, Emma Rowlett, poses and then explores the question, 'Why do fewer postgraduates disclose a disability and how can we work to change this?' Emma looks at the legislation in place, the resources available to support postgraduate researchers and researcher developers and makes recommendations for better support.

This is again a terrific collection of papers which I'm sure will be valuable for practitioners, researchers and stakeholders interested in the development of researchers.

Dr Tony Bromley

Senior Training and Development Officer, University of Leeds

Associate Editor, International Journal for Researcher Development

2014 Conference workshops

The occasional papers presented here are based on the following workshops or special interest sessions at the Vitae Researcher Development International Conference 2014¹.

Workshop D9 – Realising researcher potential - Introducing the CNA Confidence Need Analysis!

Davina Whitnall, Postgraduate Skills Training Manager, Faculty of Life Sciences, University of Manchester

SIS A4 - Careering past the doctorate: supporting the career progression of doctoral researchers

Dr Anne Boulton, Reader in the Psychology of Fashion, Birmingham City University, Jayne Sharples, Postgraduate Careers Consultant, University of Birmingham

Workshop C8 – Peer supported learning for researcher development

Dr Anne Boulton, Reader in the Psychology of Fashion, Birmingham City University, Parmjit Dhugga, Head of Researcher Development, University of Nottingham, Jo Garrad, Funding Development Manager, Bournemouth University, Jennifer Roddis, Research Facilitator, Bournemouth University, Emily Cieciora, Research Facilitator, Bournemouth University, Dr Sian Vaughan, Senior Research Fellow and Keeper of Archives, Birmingham City University, Dr Jacqueline Taylor, Postdoctoral Research Fellow, Birmingham City University, Dr Victoria Sedman, Researcher Training and Development Manager, Graduate School, University of Nottingham

Workshop D1 – Diagnosing and enhancing the research culture to maximise the potential of researchers

Dr Janet De Wilde, Head of Research Development, Queen Mary, University of London, Dr Rui Pires Martins, Postdoctoral Researcher Development Advisor, Queen Mary, University of London

Workshop D5 – Cultivating cross-disciplinary researchers communities: the Crucible effect

Dr Sandrine Soubes, Researcher Development Manager, University of Sheffield, Samantha Aspinall, Senior Researcher Training and Development Officer, University of Leeds

Workshop A7 – Developing experienced researchers' use of technology: examining some critical issues

Shailesh Appukuttan, Technical Development Manager, University of Huddersfield

Workshop A4 – Embedding support for disabled students into postgraduate researcher provision

Dr Emma Rowlett, Disability Adviser for Postgraduate Students, University of Nottingham, Emma Day, Project Manager, Vitae.

¹A full list of all the workshops at the conference is available at www.vitae.ac.uk/events/conference-downloads/workshop-outlines.pdf and a full list of all special interest sessions is at www.vitae.ac.uk/events/conference-downloads/special-interest-sessions-2014.pdf

Realising researcher potential: Introducing the Confidence Need Analysis (CNA)

Davina Whitnall University of Manchester, UK

Introduction

Recognising the difference between competence and confidence is crucial to enabling researchers to reach their potential and make powerful career choices.

Feedback from researchers certainly suggests this to be true and educational psychology theories support how important confidence is in learning and career development. Our experiences influence how confident or competent we feel and impact on our capability to make decisions. An example of this is 'Self-efficacy' which is the theory that an individual's belief system influences behaviour and response in different situations. The Self-efficacy theory was developed by Albert Bandura who concluded that:

"People with high assurance in their capabilities approach difficult tasks as challenges to be mastered rather than as threats to be avoided."

Albert Bandura [Bandura, 1994]

Bandura considered how perception and confidence not only affected how we approach a task but how it influenced the outcome. If we are confident in approach then the outcome will tend to be positive. This is an important factor to consider as confidence could influence how training is designed to make the greatest impact for participants. Confidence may also play a significant part in career choices. Frank Pajares of Emory University commented on 'Self-efficacy' in the paper 'Current Directions in Self-efficacy Research' [1996] and discusses this idea in the context of decision making:

Perceptions of capability play a prominent role in most theories of motivation.... Clearly, knowledge, competence, and various forms of self-knowledge and self-belief act in concert to provide adequate explanations of behaviour []. Such explanations cannot be had without considering the role that each may play in human decision-making and functioning in a given context."

Frank Pajares [Pajares, 1996]

Pajares theorised that our perceived success and decision making was not just attributed to competence and skills but that other factors such as self-efficacy and confidence influence our approach. Furthermore he considered how our positive or negative experiences can influence performance. Part of this research was focussed on further education students in an academic learning situation.

"Students who lack confidence in their academic skills envision a low grade even before they begin an exam or enrol in a course. The expected results of these imagined performances will be differently envisioned: social success or greater career options for the former, social isolation or curtailed academic possibilities for the latter."

Frank Pajares [Pajares, 2009]

If we consider these theories in a researcher development context: how can we include opportunities to increase 'confidence' in the training design and enable researchers to recognise the difference between competence and confidence and utilise their experiences positively?

In 2008 a learning and educational needs analysis was conducted for tasks and skills of Australasian emergency physicians [Paltridge et al, 2008]. The study identified the procedures that physicians most felt confidence in performing. This provided useful information for developing future training interventions.

If similar information could be obtained for early career researchers then this could help inform Postgraduate Researcher training development and better support students in building confidence and their personal development.

Measuring it!

How can we accurately measure confidence? There are recognised mechanisms in place to identify skills gaps and assess competence but not to assess confidence. Many researchers have the skills necessary for their research but need something 'extra' to help them realise their full potential. Furthermore, through working closely with postgraduates, many researchers report that they find it challenging to identify opportunities to build confidence and even more difficult to evidence this in an employability situation.

Following on from the Postgraduate Researcher Experience Survey (PRES) survey analysis comparing the 2013 and 2011 data for University of Manchester Life Sciences postgraduates, there were several reoccurring themes relating to confidence and opportunity. These themes included:

- opportunities for teaching
- developing professional networks
- agreeing personal training & development plans
- managing own professional development
- writing support.

This led to a series of focus groups at a local faculty level to establish what these issues were and how we may address them. The focus groups were informal with 2-4 students being canvassed at a time, 25 students in total attended. Participants were asked to comment on the above areas – if they agreed or disagreed that there was no or limited opportunities and what they felt we could do to help.

It is important to mention that the focus groups were intended to explore the PRES responses rather than exclusively training needs, however they provided an open forum that identified other areas of development including the reoccurring theme of 'confidence' which featured at least once in all individual group discussions. Focus groups were an effective way to gauge the feelings of the PGR community, encourage open dialogue and provide insight into the PRES response. However, there are limitations to this approach for gaining more in-depth, personal viewpoints on development. This initial feedback formed a basis to explore the theme of confidence in more detail.

Based on the initial round of focus group feedback, an online survey (Focus Group Survey) was developed that could be completed in the students own time. This was established to gain a more personal insight. The focus group participants were invited to complete this and eleven of the 25 did. The questions included 'do you believe that lack of confidence has been mis-diagnosed as a training need by you or your supervisor during your PhD?' Students could select if they agreed or disagreed with this statement.

The feedback from the focus group survey provided further insight and surprisingly identified that 82% of the researchers felt that at some point during their PhD, either they or their supervisor has misdiagnosed a confidence need as a training need.

Although the feedback represents a small percentage of the PGR community in this study, it provided a starting point for further exploration in the future and insight into an issue that had not been recognised before. The feedback has significant impact on:

- how we make sure we accurately address training needs
- the researcher development strategy
- resources and support we put in place
- how we accurately identify confidence issues – to avoid mis-diagnoses and provide researchers with the support they need.

'It's good to talk!'

Focus groups and having a healthy dialogue with the researcher community has been invaluable in providing insight into the responses provided in national and local surveys and has begun to reshape researcher development. Discovering 'what researchers want?' helps us, as skills trainers, provide focussed and targeted training support. Rather than waste resource on what 'we think' is needed or looking back, the dialog helps us, particularly in times of limited resource, make 'a little go a long way'.

"Talking to other people was invaluable. Sometimes you can feel alone in your problems and in a bit of a rut but talking to others having the same problems and them finding your work interesting is a really good boost and motivates you"

Focus group participant comment²

The theme of talking doesn't stop there. The focus groups revealed that all researchers interviewed believed talking to others about their confidence issues and experiences builds confidence, this message was echoed in the online survey also. The focus groups provided an opportunity for reflection and enabled the researchers to identify occasions where training was not the issue but confidence was in fact a barrier. So, how can we identify this early on? We have Training Needs Analysis (TNA); can this be adapted to capture confidence needs as well? Exploring this theme; how to accurately identify confidence issues and ensure that it isn't mistaken for training needs, the CNA (Confidence Needs Analysis) was developed. The starting point for the CNA was to explore the type of activities which build confidence and how training providers can further support this.

² Feedback from focus group sessions with University of Manchester Life sciences postgraduate researchers (April 2014).

Shaping confidence: Three ways to build confidence

There is evidence to suggest that confidence may directly enhance performance [Compte and Postlewaite, 2004]. In their paper 'Confidence-Enhanced Performance' Compte and Postlewaite [2004] discuss the factors that influence performance these are emotions, biases and how experience impacts on confidence.

"...the likelihood of an individual's succeeding at a task may not be independent of his or her beliefs about the likelihood of success."

A person's perception of their own capability seems to be important. Other factors based on experience or training of similar tasks completed in the past also effect performance.

Another consideration is how much can be influenced by training and development compared to personal experience? Considering the research in this area and the PGR training remit, three main areas were identified to address confidence within a researcher development context:

- competency
- training
- capability.

Considering that a lack of confidence has been misdiagnosed as a training need, it was important to explore why this was. Firstly, how was training identified within current processes within the University of Manchester, Faculty of Life Sciences?

1. Although there is a forum to discuss training needs, there is a lack of detail such as how much training is needed, time commitment and when it is needed in relation to the research project. For example, data management software training may be required for analysing the data. However, if there isn't any data to analyse for another twelve months, should the training happen straight away or closer to the time?
2. Training is generally viewed as a separate activity, not as a way of ensuring competence. The only exceptions seem to be compliance training e.g. Health & Safety, where the training is a mandatory prerequisite.
3. There are milestones in place to assess competence, this works well because they are clearly defined, have detailed guidance and a set procedure. Looking at the frequency and timing of email enquiries, there is also a greater demand for training around the time of these milestones to support researchers to complete the task or afterwards, prompted by feedback on the activity by the supervisor.
4. At no point within current processes is there a discussion about confidence (although we do prompt discussions about training), yet building confidence seemed so important to the postgraduate researchers canvassed in the focus group.

Examining current practice, it became clear that competence, training and confidence need to be addressed within the current provision. Further more, how can we accurately identify competence, true training needs, confidence gaps and build confidence moving forward? This is particularly important to avoid confidence needs being mistaken as training needs and ensure the 'right' questions are being asked at the 'right' time. In considering these aims, it was identified that:

- a competence framework was required, but it needed to be general and flexible so it could be applied successfully to cover the diversity of different research projects
- awareness was needed of where researchers were in terms of training needs, not just identifying that there is a need but the timing of the training was also important
- opportunities needed to be provided to build confidence and reflect on current ability, because this was important to researchers and could impact on how we resource the current training provision.

Using the three starting points, a visual way to illustrate these requirements was developed called the 'Confidence Shape Framework (CSF)'. The illustrations and shapes help prompt discussion with researchers in a training setting and enable them to consider more deeply, the training needs and ways they can build confidence. The framework also illustrates how researcher developers can support this activity and provides a reflective tool for researchers.

The Confidence Shape Framework (Figure 1) demonstrates how we can:

- accurately identify the training need and competence required (Cube)
- address the training need with appropriate training, considering how the activities will be accessed, supported or directed (Triangle)
- provide an opportunity to develop, practice, build capability and confidence (Cycle)

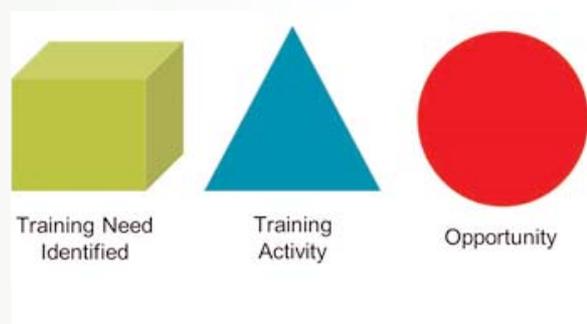


Figure 1 The Confidence Shape Framework

The Competency Cube

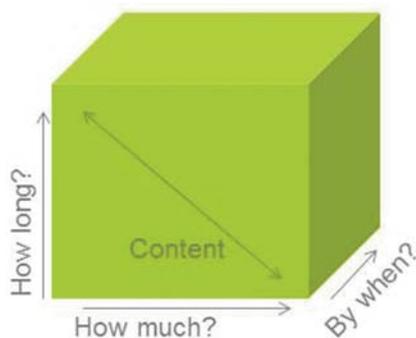


Figure 2 The Competency Cube

Features of the Competency Cube.

- Identifies the training required. The cube model helps set out the competency required and what level is needed.
- The cube helps users to visualise what is needed to measure competency – think of it in terms of ‘what we put in is what we get out’. The more detail, the better.
- Provides clarity on what needs to be achieved – what, when, how long and how much?
- The Cube helps us to focus on ‘what the content should be’ – what does ‘good’ look like?
- Supports consideration of all of the limitations and restraints, some may be outside influences but it is important to acknowledge these as a factor that could impede confidence.
- Asking the ‘right’ questions helps to accurately identify training needs which could be part of a Training Needs Analysis (TNA).
- There are ‘measurable’ points to evaluate the output. In a similar way that milestones help support reaching goals.

The Training Triangle



Figure 3 The Training Triangle

Features of the Training Triangle.

- The Training Triangle provides a framework to build confidence through training and knowledge of the subject area.
- The Triangle supports the idea that different people will access training at different points.
- Confidence grows as the training becomes more self-directed and less supported.
- The awareness of becoming more independent and self-directing training helps the user to ‘feel’ more confident with time.
- Training helps focus the behaviour and provides a ‘time and space’ to consider own training needs and confidence

The Capability Cycle

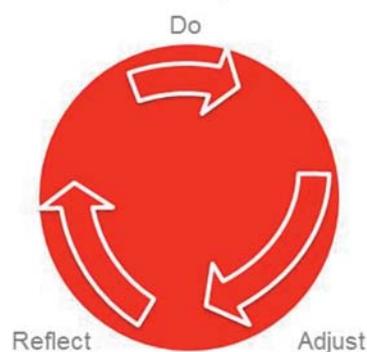


Figure 4 The Capability Cycle

Features of the Capability Cycle

- Whilst the Triangle provided a framework to build confidence through the training environment, the Capability Cycle enables confidence to grow outside of the training through ‘doing’.
- The Cycle is made up of three stages ‘Do’, ‘Adjust’ and ‘Reflect’. The stages do not necessarily have to follow the same order but provide the opportunity to change behaviour as a result of the ‘doing’.
- Reflective practice is a core feature but whereas the Triangle provided the space and time through training, the whole Cycle is based on the reflective component.
- The mantra ‘learn from experience’ is central to the Cycle approach and allows confidence to grow.

“I think having opportunities to present my work was the most useful thing because not only does it help build confidence but also makes you think more about your work.”

Focus Group participant comment

This quote from a PhD researcher sums up the Confidence Shape Framework perfectly, in particular the

So how does the Confidence Shape Framework work in practice?

Interestingly, the same question (Do you believe confidence was misdiagnosed as a training need?) was asked again in a different setting, this time as part of a career development workshop to encourage thinking about career development. The question was presented to a room of ~50 students who voted if they agreed or disagreed with the statement. The results seem to echo those of the original focus group survey with approximately 80% of the room in agreement and 20% who disagreed. Although there are not enough controls to count this poll as an experiment, it was a useful exercise to test the 'temperature' on a larger audience to see if their feelings were similar to the focus group. The outcome was reassuringly similar which led to focus on mechanisms that could enhance researcher confidence with a view to piloting new approaches.

The CSF as a pilot approach has been embedded into training practice in life sciences at the University of Manchester and initial feedback is positive, although further on-going assessment is needed. The way this has been embedded is threefold:

- incorporating a CNA as well as a TNA at the appropriate point
- encouraging reflection on behaviour and competence using the CSF principles
- providing more opportunities for researchers to practice and build confidence.

So what does this look like in practice?

Incorporating a CNA as well as a TNA at the appropriate point

The CNA has been applied to writing skills³ in a questionnaire which emails the researcher their responses for reflection. The questions focus on behaviour and output to help put this in context for users. Questions are deliberately randomised and are presented with different perspectives to encourage deeper reflection and to prevent simply ticking the same response to each. Applying the CNA to individual strands of training provides focus, reflection and is easier for users to utilise as it is presented in context and in smaller 'bite-sized' chunks.

Encouraging reflection on behaviour and competence using the CSF principles

Competency Cube

The cube principles of accurately measuring the training need have been applied through updating the current process including an online TNA. Starting with more aspirational aims, then identifying what the end result should be and working back. This has in turn helped researchers consider the depth of training needed and timing as well as the training needs itself. Utilising processes which already exist minimises change and also encourages open dialogue about training between the student and supervisory team.

Training Triangle

Presenting researchers with the illustration of the training triangle at the start of a training session allows them to focus on where they are in both competency and confidence. This has been implemented by asking participants to spend a few minutes reflecting on the training triangle illustration at the beginning of a training session

Capability Cycle

Presenting researchers with the illustration of the capability cycle at the end of a training session, enables researchers to consider how they will apply, grow or practice their skills; putting the training in context and taking it forward with them.

Providing more opportunities for researchers to practice and build confidence:

The most important element is providing the opportunity to build confidence. This can take many different forms but some opportunities that have been facilitated include enabling researchers to organise their own events. These range from lectures to study groups, socials to public engagement activities. As a researcher developer, this approach now means being flexible with the training offered and acting as promoter of opportunities as well as the coordinator.

The reality of the CSF in practice presents its own issues such as:

1. How do we identify confidence?
2. How to measure it?
3. How do we build it – in a 'reality setting'?
4. How do we recognise success – when has confidence been achieved?

Introducing the CNA: Confidence Needs Analysis

To address the questions of identifying, measuring, building and recognising confidence, the CNA was developed. It works in a similar way to a TNA in so much it is a questionnaire and an opportunity to reflect on development. However, a CNA doesn't just have to be a questionnaire, it can exist as part of other development activities and a link to an example of what the CNA could look like has been provided in this document. The most important point of the CNA is that the questions focus on 'behaviour' rather than skills. Pulling the behaviours together was quite a challenge but by focussing on the end point first – identifying what confidence and success would look like was a good starting point. In the context of early career researchers this meant:

- independence,
- self-directed study
- seeking opportunities
- supporting others

³ An example of the questionnaire used in the Faculty of Life Sciences at the University of Manchester can be found at: <https://survey.ls.manchester.ac.uk/TakeSurvey.aspx?SurveyID=n4K169m3> (Note: some links leading from the questionnaire have been disabled) An example of the questionnaire used in the Faculty of Life Sciences at the University of Manchester can be found at: <https://survey.ls.manchester.ac.uk/TakeSurvey.aspx?SurveyID=n4K169m3> (Note: some links leading from the questionnaire have been disabled)

Case studies of successful, confident researchers, 'what do they do and how did they get there?' were also considered. Some of their qualities were:

- they accepted their mistakes – they were resilient and moved on quickly
- they learnt from experience
- they had a clear plan and often revisited the plan. Interestingly, they do not seem afraid to change their plan; in fact they actively adapt it as they go.

So how can we build these behaviours and examples into a CNA?

- Consider what it is like 'not to be confident'.
- Help researchers accept their mistakes – give permission to do this. It may be in a 'safe' training environment, learning from their peers or just seeing others make them too.
- Ask them to rate their confidence on a scale – it helps them consider confidence rather than competence and provides a personal method of evaluation.
- Encourage stepping out of the 'comfort zone'. This is more difficult than it sounds, but one approach is to provide opportunities to practice or 'do' and support this with encouragement.

"Demonstrating with undergraduate students to push our communication, conversational and teaching skills"

Focus group participant comment on stepping out of the 'comfort zone'

Confidence vs. Competence: What does a CNA look like?

Confidence vs. Competence – how can we identify if someone lacks skills or has the skills but doesn't feel confident? It is easier to measure competence through setting clear SMART (Specific, Measureable, Achievable, Realistic and Time-bound) objectives or using the competency cube. Confidence is subjective and not everyone develops confidence in the same way and at the same time. Pajares discusses the issues of measuring 'confidence' in 'Current Directions in Self-efficacy Research' [Pajares, 1996] such as the limitations in identifying and measuring this. So what types of development opportunities can we implement to support researchers and how can we identify, measure, build and recognise confidence? In the paper 'What Do People Think They're Doing? Action Identification and Human Behavior' the authors examine the ideas of self-concept on behaviour and identity [Vallacher and Wegner, 1987]. In particular, 'contextual clues' and identifying when others impact on our behaviour and how we then evaluate ourselves. We compare our behaviour to others to 'fit in' to a community or to aspire to achieve the status of another individual. How could this approach be applied to researcher development? Figure 4 presents examples implemented as integrated training activity with particular

Confidence opportunities	How to identify?	How to measure?	How to build?	How to recognise success?
Training Needs assessment	Ratings - focus on 'feel' rather than fact	Revisit & reflect	Include aspirational milestones	Reflection against aspirational milestones
Training Activities	Group and team discussions	Participation & attendance	Immediate follow-up opportunities to practice	Seeking own development opportunities
Researcher-led	Level of participation	Repeat activity	Self-directed	Recruiting others

Figure 4 Examples of integrated activity

These examples present the idea in formats which may already exist. It is possible to build the CNA as a questionnaire, the advantages to this are that specific confidence related questions can be asked in a targeted way rather than rely on confidence to be built organically or have the practicality of measuring it in other ways. The example CNA questionnaire⁴ provided was built to help researchers (particularly non native English speakers) to focus on their language skills and sign-post them to the training or development opportunities that are right for them.

The emphasis of the questionnaire is on how often they conduct an activity and how confident they are (by rating) in doing an activity. The order of questions and rating scale has been deliberately altered between questions to avoid becoming a 'tick box' exercise and to encourage deeper reflection for each question.

Life after the Confidence Needs Analysis....

The CNA helps focus on confidence, rather than objective skills, but there is certainly an overlap. It is most effective if used in conjunction with a Training Needs Assessment, the training itself and an opportunity to practice/experience as illustrated in the CSF. Researchers also emphasise 'training' and 'experience' as important factors for building confidence.

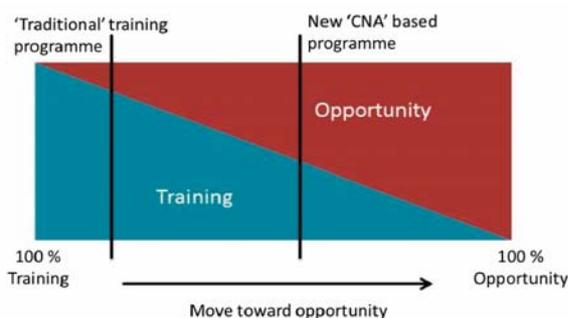
"89% of researchers believe training does improve confidence and all researchers surveyed believe that experience builds confidence"

Focus group survey

Opportunities to experience and practice (the doing of the Capability Cycle) are just as important as the training. Looking back at the training & development programme in life sciences at the University of Manchester, there has been a significant shift in the balance between training and opportunity/experience. More opportunities than training are now offered as in Figure 5. This requirement has largely been driven by the researcher community but also the current climate of funding and sustainability has influenced this shift.

⁴ An example of the questionnaire used in the Faculty of Life Sciences at the University of Manchester can be found at: <https://survey.ls.manchester.ac.uk/TakeSurvey.aspx?SurveyID=n4K169m3> (Note: some links leading from the questionnaire have been disabled)

Figure 5 Illustration to depict the shift change of the Training vs. Opportunities and experience [Whitnall, 2015]



The shift is in-line with what our researchers are telling us and it is important to keep listening to what researchers want so that they continue to engage with the training and development provision.

“I think more emphasis could be put on public engagement opportunities so that people know when and where they are and can get involved”

Focus group participant comment

Evaluation = Evolution⁵

Evaluation is important and the CNA is actually another method of measuring and evaluating the training and development provision on offer. Through the use of the CSF and CNA we can establish the type of opportunities the researcher community would like to engage with to build confidence. Utilising the CNA as an evaluation mechanism will help inform future training provision and allocation of resource. There is now greater emphasis on providing opportunities not just the training activities themselves.

Through exploring the theme of confidence, we have learnt that assessing confidence is not easy and unlike training where an evaluation form may provide insight into the value of the training provided. Confidence is much more subjective, depended on personal experience, positioning, self-concept and behaviour. It may be that the way we evaluate training and training needs may undergo revision to consider the other ‘environmental’ factors. These environmental factors are often outside of the control of skills training developers but it is possible to work with these factors to forge a way to address issues such as confidence.

What do the researchers think? Speaking anecdotally with PGRs in life sciences at the University of Manchester, confidence is still really important particularly in high pressure situations such as the thesis viva-voce. One student said that they would like to have a life coach available to help support them through it. It may not be possible to provide this service for postgraduate researchers but it highlights the need for support which isn’t directly training and further supports how the landscape is changing for researcher development. A flexible approach is needed to evolve and adjust to the researchers training needs. Furthermore if we can build in the assessment of confidence into our evaluation mechanism as well as processes, the building of confidence could provide an important measure of the effectiveness of the training provision moving forward.

⁵ Evaluation = Evolution: title and themes taken from E.R. Stories by Davina Whitnall (2015) Whitnall, D., 2015 E.R. Stories Whammy Press, April 2015

Summary: Realising researcher potential – what’s next?

Using the CSF and CNA can help improve the approach to researcher confidence issues, but how can we embed this approach moving forward? Here are some suggestions to make confidence an integral part of researcher development.

- Integrate reflection – within training, progress meeting forms as well as within the Personal Development Plan.
- Create ‘confidence building’ opportunities - or these can be just a matter of directing ‘sign-posting’ and encouraging researcher-led initiatives.
- Keep it open – encourage dialog with the Principle Investigator/Supervisor and the researcher community.
- Language, language, language – particularly when trying to devise a CNA, think about how to bring out the ‘behaviour’ through language
- Consider what it’s like not to have confidence? How this feels and how to recognise it?
- It’s OK to fail and not be perfect – let researchers know this and back up it up with case studies and examples of those who are successful but failed first!
- Embed it – use existing mechanisms so that the act of completing a CNA or embedding the CSF doesn’t seem arduous and is part of another activity such as attending training.

In conclusion many researchers see confidence as the obstacle they need to overcome to reach their goals. As discussed in this paper there are several issues - identifying it, measuring it, building it and then recognising it. Using mechanisms such as the Confidence Shape Framework and the Confidence Needs Analysis provides approaches that can be embedded into researcher development. Further work to fully understand the impact of confidence could be an area for future research. Confidence as a contributor to the student experience is an important factor to the researcher community. The CSF and CNA have been devised to help address the issues and ultimately support and build confidence – enabling researchers to realise their potential!

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Careering past the doctorate: supporting the career progression of doctoral students

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Introduction

As the focus of researcher development shifts from the production of new knowledge to that of training to become a researcher, with more emphasis on the development of professional skills, the need to see the doctorate in a broader perspective has become apparent. Research students must now address these skills more explicitly, with more emphasis on career development, possibly outside the academy. Doctoral training has become more complex, requiring input from a range of professionals. Roles have inevitably become more differentiated, resulting in tensions between academics and professional researcher developers that at times impacts on students' experience. This paper will discuss the professional development needs of doctoral students from the perspectives of an academic with responsibility for developing researchers and a careers consultant specialising in researcher development. We will discuss our joint experience of running a professional development scheme, the challenges we encountered, and the issues we identified. The strengths and weaknesses of each perspective will be explored, and some possible solutions considered. Doctoral education in the UK is changing, with more emphasis on professional development and more attention on career opportunities outside the academy. The reasons for this are well understood: numbers of doctoral students have doubled over the past ten years [Lee and Danby, 2012], the number of academic posts is shrinking [Gabrys and Beltechi, 2012], and the doctorate is becoming increasingly valued in the non-academic professional world [Barnacle and Dall'Alba, 2010]. While doctoral education must still focus on the traditional aspects of research training, it must now widen its perspective to address the range of skills and abilities associated with effective professionalism. However, while the academy recognises the need for support for professional development, it has not been particularly good at implementing it, with a tendency to adopt a somewhat informal approach [Raddon, 2011].

² PhD candidates should not be viewed as students in the traditional sense, and we would normally refer to them by the more professional term of researchers. However, in this paper, it is necessary to make a distinction between students and researchers, and we will therefore use 'students' to mean doctoral students.

Students⁶ themselves seem to be aware of the need to address issues of employability, but are less good at identifying the skills they need, as well as their own level of ability [Golovushkina and Milligan, 2012]. The academy too is unclear on this. Anecdotally, PhDs perform at a high level in non-academic careers. However, while employers can identify the qualities they value [National Centre for Universities and Business, 2010], there is little published data on the specific skills developed in a PhD, or how effectively they are translated to other contexts [Yachnin and Yetter, 2014]. Nevertheless, the need for explicit professional development is apparent. In order to address the issue, it has become increasingly clear that a more precise, formal approach is necessary. Institutions have responded by the introduction of researcher development programmes designed to address this broader spectrum. These have taken various forms, from university-wide graduate schools, largely run by professionals with a taught curriculum, to more informal faculty or department based provision, or in some cases, a mixture of the two. A recent development from funders of UK research that has been adopted by all UK Research Councils is the Doctoral Training Partnership (DTP) in which a consortium of research institutions collaborate to provide best practice. The intention is to provide a breadth of professional development training, including opportunities for internships that might not be feasible on an institutional level. As these programmes have become established, however, there has tended to develop a division between research development, supported by academic supervisors, and professional development delivered by dedicated researcher developers, including careers advisors. That each group should take the lead in their own area of expertise is, of course, appropriate, but the separation has led to distinct paths of delivery. This paper will consider the nature of this separation, examine the reasons for it, and explore possible alternative approaches. We will discuss a specific example of collaboration between an academic and a researcher developer, and will attempt to distil some general principles from our particular experience.

Approaches to professional development

Changes in researcher development have come about as a result of the evolution from the original Humboldtian model, focused on the production of new knowledge and designed to make provision for the development of new researchers, to the modern doctorate considered as preparation for employment in the new knowledge economy [Taylor, 2012 p130]. This requires the development of a wider range of skills. The imperative towards an original contribution remains the standard of a PhD, and students must still develop expertise in research, together with the related professional skills that constitute an excellent researcher. However, these are now supplemented by more generic, transferable skills. Whereas it used to be accepted that these were implicit in the process of becoming a researcher, they are now articulated explicitly. The most notable version of this is the Vitae RDF . It identifies a set of generic descriptors, organised into four domains, each with a number of sub-domains in which specific skills are ranked in five phases of development. Researcher development programmes use this or similar frameworks as a means of matching individual needs to institutional provision

For PhD students, supervisors still provide the primary support. Academic supervisors generally have well-established research careers themselves, and are therefore highly qualified to guide their students' academic progress, both in terms of developing their own research and progressing in the world of academia. Traditionally, they have adopted the master-apprentice model of delivery, in which the supervisor-student relationship is central. Here, the supervisor's role is to direct the student's research towards the production of a thesis and the emergence of new knowledge. The student, by emulating the supervisor, gradually acquires the professional skills of an effective researcher. As the nature of the doctorate has changed, however, so has the role of the supervisor. To some extent, this is caused by the increased numbers of doctoral students, while supervisory capacity has remained almost static. Supervisors have to supervise more students, often at the periphery of their subject expertise, and group supervision is increasingly prevalent. More significantly, the new doctorate, with its increased emphasis on professional development, demands an expanded set of skills. Many supervisors do not see this as part of their role, and are not prepared to extend their own development to include these new aspects. Of those who do, many are, nevertheless, reluctant to become actively involved [Walsh et al., 2010]. While there may be good reasons for this, for example, time constraints, or demands of other commitments, the challenge for researcher development is to change the culture of the academy to adopt the notion of the PhD as preparation for a multiplicity of possible careers [Yachnin and Yetter, 2014].

Researcher developers have expertise in delivering professional skills and career development programmes. Careers specialists supporting PhD students have knowledge of career opportunities outside the academy. They often have a broad network of professional contacts to draw on, through employer and alumni relationships. Researcher developers generally work in a separate environment to the academic situation, and tend to perceive their role as parallel to that of the supervisor. They also have a different view and experience as to how professional development occurs, with an emphasis on participation in short courses that generally focus on the acquisition of specific skills that accumulate towards an overall competency.

The difference between the two is partly due to the nature of their different specialisms, but also to their different methods and approaches, and a focus on different outcomes. The focus for supervisors is the production of a thesis that incorporates the knowledge contribution. Researcher development occurs through the one to one relationship with their students. They act as guide rather than teacher, making suggestions, offering feedback, raising questions and when appropriate, providing answers. In addition, they support the student's professional development by suggesting conferences and publications, assisting with networking, and arranging opportunities for their students to engage with their audience, for example through seminars [Walker and Thomson, 2010]. This approach is one in which learning occurs as a result of specific activities.

The balance of learning shifts, during the course of the PhD, such that the student relies heavily on the supervisor in the early stages, but gradually takes the lead, becoming autonomous towards the end. A significant aspect of this relationship is the influence of the supervisor, who acts, not so much as a role model, but as an exemplar of research expertise. As a result, the student views the various activities as within an appropriate context, and leading towards a coherent goal [Collins et al., 1991].

In the past, this practice has been successful. Unfortunately, it has become less so since the advent of the changes outlined above [Taylor and Beasley, 2005]. With more students to supervise, there is less time to provide such intensive support. In addition, whereas previously a PhD could, and often did, take several years, there is now an expectation that it (if full time) will be completed in three to four years, giving far less time for the gradual gestation of abilities. Perhaps of more significance, however, is the relatively narrow focus of the PhD itself. To maximize students' employability, the skills acquired as part of gaining competence in research, for example, skills of analysis, interpretation and communication must be transferable to wider professional possibilities. The supervisory relationship is possibly not the best vehicle for achieving this transfer, and most PhD programmes today recognise the need to supplement it with other, more relevant support.

Researcher developers and careers professionals, on the other hand, have expertise in delivering professional development, and where institutions have dedicated resources to provide specialist individual careers guidance for researchers, the focus is on the provision of tailored careers guidance support, enabling the researcher to plan for careers outside the academy. More broadly, researcher developers focus on transferable skills, for example, presentation skills, team work and leadership development. The aim is to support the researchers to adopt a positive and effective approach to their personal and professional development, building the confidence, adaptability and resilience to carve a fulfilling career path. Development opportunities are designed and delivered to broaden the experience of the researcher, enabling them through a combination of classroom teaching and experience in environments outside the academy to develop a rounded set of skills.

One drawback to this approach is that the skills acquired on individual courses are often not perceived by students as part of a coherent whole [Collins et al., 1991]. Speaking at a conference has relevance for a PhD student, in a way that attending a course on presentations does not. This is particularly the case if the researchers themselves do not see the value in developing a broader skill set in preparation for a potential career route outside the academy. Possibly a more significant difficulty is the generic nature of these courses. Courses that are discipline specific are more attractive to students [Crossouard, 2013], and apparently more effective [Saunders, 2009], particularly if situated within the social and cultural context of the research community [Crossouard, 2013]. While researcher developers are rightly concerned that research students gain some perspective on the world outside academia, this needs to be integrated into the students' own world view.

⁷ Further information at: www.vitae.ac.uk/rdf (accessed 27/07/15)

Both modes have strengths in terms of perspective and delivery. On the one hand, the supervisory approach is rooted in the research discipline, provides models of excellence, and student involvement is through active engagement. On the other, the researcher developer has a clearer understanding of the needs of professional development, is better qualified to deliver transferable skills, and can deal with larger numbers. Currently, they operate in parallel. However, there are convincing arguments for a more integrated approach in which the strengths of both contribute to the whole.

Integrated approach

The Knowledge Exchange in Design (KED) scheme, run by Birmingham City University, is an example of a successful integration of academic and researcher developer expertise. The pilot programme, initially funded by the UK Arts and Humanities Research Council (AHRC)⁸, was run jointly by the authors, each bringing different qualities and experience. The scheme was designed to enhance the career development of doctoral students⁹ through engagement with external organisations. While it operated around aspects of design research, the primary focus was on the application and development of professional skills in a wider context. Over a two year period some 26 researchers were paired with an individual from a partner organisation to work on a discrete project. Our primary aim was to provide an opportunity for them to gain practical experience of utilising their knowledge and experience at an early stage in their career. Specifically, the scheme was designed to promote skills in collaborative working, project management, communicating to non-academic audiences, and applying research skills, such as problem-solving, analysis and synthesis, to novel situations.

Collaboration took the form of residencies: partnerships between students and individuals from host organisations to address a specific issue. These residencies should be seen as fundamentally different from placements, in which a student works for an organisation, sometimes on a specific project, but more typically integrated into the organisation's ongoing work. While this allows students to experience many aspects of professional work, it does not address the spectrum of skills involved in running an autonomous project. KED residencies involved short, focused projects, with an identified outcome and tangible outputs. The duration was 3-5 days, whether as a continuous period or individual days spread over a lengthier period, depending on the nature of the project. The project itself was developed through a process of negotiation between the student and the organisation. Students then worked directly with their partners, from initial design to implementation, managing the project to completion. At the conclusion of the project, students produced some form of tangible output, for example, a report, presentation or set of recommendations, for the organisation. The opportunity to develop and manage a small project such as this, allowed them to develop a broader perspective on their own area of work in a

⁸ Further information in respect of the UK Arts and Humanities Research Council can be found at www.ahrc.ac.uk

⁹ The scheme also involved early career researchers, but for the purposes of this discussion, we focus only on the experience of doctoral students.

Evaluation of the pilot included analysis of data gathered from the students. In addition to the report or other output provided to partners, they provided a report to the KED scheme on the residency itself – how the project brief was addressed, the approach adopted and how it was implemented, together with specific outcomes. They were also asked to identify the skills involved in the project. Clearly, there is a difference between the application of an acquired skill and the development of a new one. In this instance, we were not concerned with teasing apart these differences, nor with specifying the level of development. Our concern was more to provide an opportunity where these would be brought into play, explicitly and identifiably. The most significant outcome for researchers was the opportunity to engage as equals, in a meaningful way, with external organisations, while bringing their own project to a successful conclusion. The specific skills that were most identified were: communication in various forms and to a range of audiences, project management, problem-solving, and collaborating with others.

From the outset, our concern was to encourage students to see the wider potential of their research expertise, and to reflect on the relevance of their own developing skills. The integration of our different strengths supported this process: the academic perspective ensured that research skills were brought to bear in a different context, while the professional perspective provided insight into the needs of the organisation and enabled the researchers to see the benefit of the experience for their professional development. This combination of professional careers expertise and academic knowledge allowed us to address the professional development aims of the programme within the academic context. Specific training was tailored to the needs of the project, and was achieved through individual interaction as well as taught sessions. Finally, it provided a framework in which students could progress from guidance to autonomy.

There were inevitably a number of challenges to be addressed. These included the development of appropriate training, providing individual support to researchers, and evaluating their progress. Perhaps the most significant, particularly in the present context, was that of student engagement. Students gave a number of reasons for this. For some, taking part in the scheme seemed a time-consuming exercise that would potentially slow down their completion. They did not see the benefits to their own development, nor the possibility of enhancing their research. For others, the absence of a direct link to their research topic was a barrier. Even though the external partners came from mainly cultural organisations, such as museums and galleries, and their initial briefs were based broadly within the discipline of art and design, these students did not see the value of their research expertise as separate from their research knowledge, and were unable to translate it to this novel situation. This may have stemmed from a lack of confidence, a finding that resonates with other research. PhD students see confidence as the most important quality they need to develop as researchers and believe it should be developed before other qualities [Åkerlind, 2008], and clearly this is an issue that researcher development should address. In the main, however, their reluctance seemed to be rooted in the notion that activities outside the specific focus of their research would be a distraction.

Closer examination revealed that this lack of engagement could in some instances be traced back to a certain amount of disinterest by research staff, and specifically by some supervisors. While many academics were enthusiastic about the scheme and saw the benefits of networking with external organisations, students' own supervisors were sometimes less keen to get involved. There was a tendency to see the scheme as something additional to students' primary goal of completing their doctoral research. In some cases, students were actively discouraged from taking part. Embedding schemes such as KED into the recognised structure of the PhD experience is a possible way of overcoming this issue.

One of the authors is involved in the delivery of the Talent Pool programme at the University of Birmingham and has investigated how this well-established professional development scheme has succeeded, and where it has faced similar issues to KED. The Talent Pool scheme has been running for five years through EPSRC¹⁰ funding and is now an embedded part of the Doctoral Training Partnership (DTP) strategy at the institution. It benefits from being part of a structured provision in line with strategic priorities, and has grown a reputation as a valued, established part of the University Graduate School suite of transferable skills provision. It is also well-regarded in the sector as an innovative and forward-thinking programme. Over a five year period 480 researchers have attended.

The Talent Pool includes five days of transferable skills training designed to develop doctoral researchers as consultants and more broadly, to provide them with a foundation in knowledge and expertise in enterprise skills. On successful completion of the training, researchers are encouraged to source opportunities to put their skills into practice through work on short term consultancy projects. Sustainability of the programme beyond the EPSRC funding period is being addressed in part by involving academics, employers and alumni in the design and delivery of the programme. Collaboration and community are seen as key to its success. The positive career outcomes of the Talent Pool skills training is evidenced in a bank of case studies demonstrating benefits to the career progression of researchers in and outside academia. The following excerpts illustrate this:

"The course has given me vital business experience and consultancy skills that fall outside the scope of normal PhD studentships. It helped me secure my new job with Johnson and Johnson"

Shankar, PhD Liver Research

"Talent Pool is a fantastic opportunity to learn about other options than just staying in research. I learnt how to put forward a consultancy proposal, fundamental to my business start-up, Bluevine Consultants."

Amrit, PhD Hydrogen Fuel Cells

"The production of grant applications is a similar process to the production of consultancy proposals, and I think that that experience of consultancy tendering has helped my recent award of an international research grant, allowing me to spend 6 months working in Japan."

Alex, Research Fellow, Nanotechnology

While the success of this approach is apparent, it can also be faced with similar hurdles. A small number of semi-structured interviews, undertaken to gain insight into students' beliefs and experience, revealed some of the underlying issues. Many supervisors perceive the benefit, and are supportive, for example, the supervisor who suggested "that I get involved with the departmental journal ... As a result I have [joined] the editorial board of the departmental journal as articles editor..." (Researcher 2). Others, however, are apparently less so, and in some cases, have actively discouraged participation. For some, the difficulty is one of accessing information.

"There are opportunities out there for postgraduate researchers – I found that once I got involved with one scheme, this led to other things. The first thing I got involved with was Talent Pool, but this wasn't an obvious opportunity, I found out about it from a friend."

Researcher 4

For others, the difficulty is in taking part.

"The main issue is at the supervisor level; often the approach can be 'if you're not in the lab, you're not committed to your PhD.'"

While researchers may see the value in taking part in a scheme like (for example) Talent Pool, their supervisors are less keen for them to take time away from their research. It would be useful to have more communication between academic supervisors and careers professionals – because of the power relationship, it is difficult for researchers to convince their supervisors to let them take part in career development activities, but some communication from higher up (i.e. from people in Careers) to highlight the benefits of schemes such as Talent Pool might work.

"I wouldn't write off a career in academia, but am more interested in developing entrepreneurial skills and becoming a leader in industry – it would be nice to see more focus on non-academic career paths."

Researcher 3

This comment is particularly telling, since it emphasises the nature of the power relationship that exists between supervisor and student. The influence of one on the other is subtle, but none the less real for that. As a result, students miss the opportunity to gain a new perspective on their academic progress, and those who aspire to a career outside the academy are not supported in exploring this potential route.

Both KED and Talent Pool illustrate that there are excellent initiatives now available to postgraduate researchers to support their career development and to gain experience outside the academy. Where students take advantage of the opportunities, positive outcomes result, and they are prepared for multiple career options. There is, however, an inconsistency in the experience of the student. They need to perceive the value of taking part in professional development opportunities, but for this to take place, their supervisors must also see the benefit. Researcher developers also have a role to play by working with, rather than alongside, the academic support network.

¹⁰ EPSRC, UK Engineering and Physical Sciences Research Council www.epsrc.ac.uk

There remains a distance between the academic viewpoint and the focus of professional development, leading to a tension between the demands of successful, timely completion of the PhD and the perspective that a researcher will benefit from an investment in their professional development. This is further exacerbated by the preconception of many academics that careers other than academic are somehow second best, and only to be contemplated by those who are unlikely to be successful in an academic role. The traditional doctorate was designed for a very small, elite group, and its main purpose was to make provision for the development of future researchers. The modern doctorate has a broader purpose, and for many it will lay the foundation for the future in a range of careers. Giving attention to the broader needs of professional development enhances all career progression, including that of the academic.

Emerging Themes

The difficulty then seems to be twofold: how do we enable wider conversations between student, supervisor and researcher developer, but more significantly, how do we jointly support the professional development of students in an environment that is relevant to their experience and conducive to both academic and professional approaches. From our experience, we can identify three key themes that should be addressed: collaboration, culture and community.

Collaboration

The strength of the KED project lay in its collaborative spirit. The scheme was underpinned by our very different perspectives, truly integrated into a form of Gestalt, in which our combined whole transcended our joint contributions. Collaboration between the two strands of support appears to be the most effective approach. A number of researcher development programmes have addressed this in different ways. Costello and Shaw [2013] adopted what they described as a blended approach, in which students were involved in a variety of learning communities, drawing what was most appropriate from each. These included membership of research communities, in which they had an active role, as well as attendance at research skills training, and wider professional development courses. They also engaged with communities beyond their institution, such as discipline-based networks and local student research networks. A similar approach is that of both Austin [2009] and Gabrys and Beltechi [2012]; in different ways, they applied Collins Cognitive Apprenticeship theory [Collins et al., 1991] to their doctoral education programmes. While Austin focused on adapting specific aspects to the needs of the PhD, Gabrys and Beltechi devised a collaborative programme based on its principles. As well as working with their supervisors, students developed research-related skills through interaction with other researchers, in the form of seminars and workshops. The more general, transferable skills were addressed by a range of courses, at both departmental level and University level, through a dedicated doctoral centre.

While this represents a coherent programme that embraces the different perspectives and approaches, it is not truly integrated. The different strands may work in harmony, but they still operate separately.

Culture

Today's research students need to begin planning their future career path at an early stage, and in order to do that they should have the opportunity to explore options outside the academy. More importantly, they must address the development of their abilities in a wider context than just the academic. The research culture is founded on a different set of principles, in which knowledge is paramount and the purpose of doctoral education is to incubate the researchers of tomorrow. While these are primary concerns, the research culture must adapt to accommodate not only the new role of the PhD, but the more public aspect of research generally. One way of achieving this is through public engagement projects, such as KED, that raise awareness of the needs and opportunities of the world outside the academy. Similarly, programmes such as Talent Pool can inform the nature of this changing culture.

Community

Research communities are all the same, yet all are different. They operate within the same research culture, but each discipline area has its distinctive understanding and practice. While the growth of interdisciplinary research will inevitably have some impact on this, and may eventually lead to broader research communities, the need for students to embed their learning within that community will always be significant. To be successful, researcher development should attend to these distinctive aspects, tailoring its delivery to specific interests. Researcher developers can still work within the scope of skills development, but with the help of academics, the skills can be integrated into a contextualised project. By acknowledging the strengths of each, researcher developers and academics can together establish their own community of best practice.

Conclusion

In this discussion, we have considered the nature of the separation of academic support and that of researcher development, and its impact on the professional development of research students. We have explored ways in which this separation can be overcome, and as a result of our own experience, have identified three key themes to be addressed. These themes will benefit from further exploration. They provide a starting point for moving the conversation forward, so that we may together address the opportunities and challenges faced by the academics, researcher developers and most importantly, the PhD students themselves.

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¹¹ The UK Concordat to Support the Career Development of Researchers (Research Councils UK 2008) is an agreement between funders and employers of research staff to improve the employment and support for researchers and research careers in UK higher education. It sets out clear standards that research staff can expect from the institution that employs them, as well as their responsibilities as researchers. Principle 3 states, 'Researchers are equipped and supported to be adaptable and flexible in an increasingly diverse, mobile, global research environment'.

¹² 'Investigating and increasing the employability of research students in art & design: understanding the student experience' was a funded qualitative research project undertaken in the 2012/13 academic year at Birmingham Institute of Art & Design (BIAD), now part of the Faculty of Arts, Design and Media, Birmingham City University. It examined both the experience of current students and those completing between 2000 and 2011 [Taylor & Vaughan, 2015].

¹³ The Peer Mentoring Forum was initially set up as part of the Knowledge Exchange in Design scheme, a collaborative public engagement project involving four institutions, in which researchers worked with individuals from an external organisation on a short, focused project.

The importance of coffee: Peer mentoring to support PGRs and ECRs in art & design

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Introduction

The Art and Design Research Mentoring Initiative was a pilot project for doctoral students at Birmingham City University, addressing Principle 3 of the Concordat to Support the Career Development of Researchers¹¹ by enabling researchers to explore professional development in a supportive environment. As the research environment becomes more diverse and complex, researchers must become more adaptable to career opportunities and challenges. This paper examines the benefits of the peer mentoring relationship for both mentees and mentors as mutual knowledge exchange and skills development, situated in relation to the supervisory relationship¹² as focused on research and career development programmes that tend to be less personal in approach. We also reflect on the challenges and lessons learned in trialling different social and virtual mechanisms to support and facilitate peer mentoring.

The Research Mentoring Initiative (RMI) is a peer mentoring scheme designed to support the personal and professional development of doctoral students (PGRs) in an art and design faculty. This paper discusses the initial pilot, its impact on researchers' development, and the benefits and challenges we encountered, together with our thoughts on its continuance. The scheme involved pairing students with others more advanced in their research careers, both fellow students and early career researchers (ECRs). It was developed in response to feedback received from two previous collaborative research projects. The first was an earlier examination of the motivations and aspirations of our students in relation to the doctoral experience, which had highlighted support needs additional to the supervisory relationship. The second, an online Peer Mentoring Forum¹³, designed to facilitate supportive dialogue for those taking part in a previous professional development programme, had limited success being used largely to share information rather than discuss concerns. We recognised a perceived need for some form of professional support and that students' preference was for a face-to-face experience, an approach that has in fact been shown to be more effective [Colvin & Ashman, 2010].

The need for this kind of support becomes increasingly important as the wider research culture changes. In recent years, the research environment has become more diverse and complex, and researchers must become more adaptable to career opportunities and challenges [Mottram, Rust & Till, 2007]. This is particularly the case in the field of art and design, where many researchers are also practitioners, and already have to navigate a career path that incorporates both identities. Traditionally, doctoral students have looked to supervisors for guidance in their academic career, and more recently, this has been supplemented in most institutions by a separate career development programme focusing on the development of transferable and employability skills. While each has its role to play, they tend to be perceived as separate rather than complementary. Peer mentoring allows students to explore these various aspects within a supportive relationship [Driscoll et al, 2009], bringing together the two and contributing to a more holistic, and thus more effectual, experience [Costello & Shaw, 2013].

The RMI scheme was piloted over the course of an academic year (from October 2013 to July 2014). The University supported it through their Student Engagement funding, which encourages collaborative projects between staff and students. In our case, while two members of the team were established academics and experienced supervisors, the third was, at the outset of the project, a PGR herself, and thus had more recent and direct experience of the issues our current students have to address.

The primary aim of the project was to provide support for PGRs beyond that offered by both supervisors and existing career development initiatives in the Faculty. Specifically, the scheme was intended to enhance researchers' employability by providing the opportunity to explore options, share ideas, and consider professional development as a progression of research possibilities. Within that overall framework, the scheme addressed Principle 3 of the Concordat by providing an opportunity to practise a range of professional skills, in particular, the opportunity to develop mentoring skills. Finally, with its emphasis on cross-disciplinary dialogue, a significant aspect of the scheme was its role in fostering collaborative exchange across a diverse research community.

Project Description

The central principle of the scheme was the establishment of mentoring partnerships. Participants to the scheme were recruited through an open call, and once accepted, were paired with a suitable mentor/mentee. Since the emphasis was on professional development, we made the decision at the outset to match pairs on the basis of shared goals and aspirations rather than subject alignment. Inevitably, some partnerships¹⁴ did have some subject overlap, but we were clear that this should not form the primary focus of discussion. Nineteen researchers took part, making a total of ten partnerships. They ranged from those embarking on a PhD through to ECRs who had recently completed; it also included two people who aspired to, but had not yet begun, a PhD.

One of the essential characteristics for the success of a scheme such as this is that it should be structured, not an ad hoc arrangement, and that it should be explicit [Boud & Lee, 2005]. At the same time, mentoring relationships flourish in a context of trust, understanding and friendship [Bruffee, 1994], and as such, need to operate within a relaxed setting. Our aim, therefore, was to establish a flexible framework, within which the partnerships could thrive. Thus, we did not impose a formal structure on the partnerships, but rather provided a set of guidelines on how they should be run. There were two reasons for this: firstly, it allowed partnerships to grow organically and creatively, and secondly, we hoped that allowing different styles of relationships would give us more insight into the process and what works within those parameters. Partners were given the freedom to develop their partnerships in whatever way suited them. Similarly, while they were asked to document the progress of the partnership and to provide an evaluation at the end, they were free to present this in whatever way they chose.

We asked that partners aim to meet at least once a month, though they were free to meet as often as they wished, and to supplement this with other forms of communication, such as email or Skype. Mentors were given an honorarium of £100, and each partnership was given £20 worth of coffee vouchers to spend at a local coffee shop. We felt this would be an important part of the scheme: it could provide a neutral venue for the meetings and a means of easing the initial conversations. On a practical level, it would facilitate meetings between partners based at different campuses, as the coffee shop chosen was fairly equidistant from all sites.

The RMI was launched at an initial training event that introduced the scheme and provided guidance on the nature and practicalities of mentoring. Since ethical conduct is crucial in any mentoring relationship, emphasis was placed on this aspect. Partnerships were also announced at this event. This was one of a number of events we ran over the course of the year as part of our wider professional development programme (<http://biadpdn.com/>). These included Curate Your Career, which explored the motivations and experiences that underpin career choices, and Celebrating Professional Development, designed to facilitate debate between researchers, supervisors and senior staff, together with our external partners. Finally, High Fives: spaces for doctorateness was a cross-University event, involving contributions, not only from those involved in our professional development programme, but also from other faculties.

This, together with other initiatives, was supported by the Professional Development Network, which included a blog, to which all researchers were encouraged to contribute. One of the advantages of the original peer mentoring forum was that it provided a focus for the sharing of experiences, and this was an aspect that we wanted to retain. The blog was set up with this in mind, so that researchers could share news and discuss their projects. It acted as a forum for debate, and provided a repository for information, including researcher profiles, resources and links to useful sites.

¹⁴ As discussed below, we initially had 18 researchers forming nine partnerships. One mentee left the scheme and a nineteenth researcher was paired with the mentor forming the tenth partnership.

We aimed to engage our participants as co-researchers in the RMI as a pilot and action research project that would test the potential of mentoring for PGRs and could inform the development of an on-going and embedded scheme. We discussed with participants the nature of evaluation and documentation and explained our rationale for not imposing a questionnaire or structured evaluation. Instead we suggested that they document their partnership in whichever way made sense to them, as a reflective and formative process, which could then be reviewed to inform their summative evaluation. We also facilitated evaluative and iterative discussions for participants at each of our events as to the progress and development of the RMI.

Matching processes

One of the challenges for the project as a pilot was in deciding how to match the partnerships. We joked as a project team that it felt like running a dating service, a clichéd metaphor perhaps but not without its merits. It highlights the variety of considerations and serves as a reminder that success cannot be guaranteed as it depends on a certain chemistry, or spark. We used an application process that asked both what prospective mentors felt that they could offer and what mentees felt that they needed. However, we found that we were drawing on our own knowledge of the individuals above and beyond the information provided on the application forms, particularly in terms of their age, culture and personality, to decide which partnerships might have productive chemistry. This undoubtedly is more resource-intensive in terms of staff time and knowledge requirements, so will be a challenge for scaling-up our pilot and if extending it across more disciplines.

As we intended mentoring to be complementary to and not compete with supervisory relationships, we tried to avoid too closely matching partnerships in terms of subject or disciplinary background, placing more emphasis on career and development aspirations. We hoped that cross-disciplinary ground would prove fertile, although recognised that some commonality is needed and this is where our insider knowledge of the individuals came into play. This common ground was unique to each partnership. One partnership reported back to us that they felt the catalyst for the success of their mentoring relationship was shared experiences of combining doctoral study with parenthood.

Managing expectations became a key issue from the beginning. The aims of the RMI were explicitly stated in the advertising and application material, and reinforced at the events. It was clearly stated that the RMI would provide peer-support for professional development and the research experience, and not subject specific or academic direction. Yet one mentee dropped out because she desired training in a specific technical and professional skill from her mentor, although from her comments we suspect there were also cross-cultural issues around age and gender. This highlights a need for even clearer communication, and close consideration of cultural issues in forming partnerships for research mentoring. In this instance, the role of the student-partner in the project team was crucial in facilitating honest discussion as to the misalignment of expectations and negotiating an appropriate solution in which the original mentee re-evaluated whether or not the RMI was relevant to her and was sign-posted to more appropriate sources

of technical support and a new mentee was recruited. We found that whilst the chemistry and synergy between mentor and mentee was partly due to the initial matching, the more effort mutually invested by participants, the more rewarding the partnership. Whilst this can perhaps be expected and can be encouraged, it cannot be imposed or guaranteed. Interestingly this effort and success also correlated with increasingly creative approaches adopted by mentoring partnerships. One partnership used drawing and writing to inform their dialogue as it progressed. Another particularly successful partnership used the city “as a backdrop to discussions and conversations, letting its opportunities and streets guide us and develop ideas” in which a useful framework of ‘communicative action’ emerged [Habermas, 1987]. In this case, the mentee commented that the partnership allowed them to develop a necessary ‘connectedness’ to their research. Two mentees submitted mixed media work encompassing drawing and text to evaluate their experience, which has proved valuable as feedback to the project and at the same time encouraged their individual creativity. In cases where such energy has been invested it seems that the distinct mentor and mentee roles have become more fluid and non-hierarchical and that this has in turn facilitated the growth of the partnership.

Mentoring and well-being

Initially, we anticipated that the primary benefits and impact of the initiative would be in supporting researchers’ professional development in terms of their employability. However, unexpectedly we received a significant amount of feedback about the psychosocial benefits of their participation. The impact of psychosocial support seemed to emerge on two interrelated levels: through an enhanced sense of wellbeing and also increased confidence for both mentors and mentees.

With the focus of the supervisory relationship on research, and career development programmes often being less personal in approach, wellbeing is not often prioritised when developing and facilitating provision for PGRs and ECRs. However, the isolation that both often encounter as part of the research journey [Ali & Kohun, 2007:36] and the shock of undertaking a PhD for those new to research has been highlighted. Indeed, one of our mentees commented:

“When you start a PhD you must be told ‘Don’t try and do this by yourself’. It’s a highly isolating process (personally and intellectually).”

For mentees, having a ‘critical friend’ in both an informal yet institutionally official capacity in addition to the supervisory relationship provided much needed reassurance. In fact, for one mentee, just the knowledge that they had a mentor provided reassurance in itself. Mentoring and the supervisory relationship are indeed different, but seem to provide extremely complementary modes of support for researchers. As one mentee pointed out:

“The supervisor provides guidance of research at the macro level while the mentors can help with the detailed but crucial problems.”

The psychosocial benefits of mentoring are clear for mentees in having a peer to share experiences, gain knowledge and advice.

Mentors also benefitted by experiencing a sense of reward and self-confidence through their own self-reflection and by helping others at doctoral level – something normally undertaken by senior academic staff. Partnerships reflected on their mentoring experience by highlighting the positive mental and emotional impact of mentoring on the self. Indeed, one partnership said it helped them feel that together they were like ‘academic ninjas’ who could take on anything that the PhD threw at them. Psychosocial support is crucial not just for PGRs but also has wider implications on an institutional level, as increased social support is able to not just reduce isolation, but has the potential to increase retention and completion.

As well as a sense of self accepted within the mentoring partnership, the importance of the wider research community also proved equally important in supporting researchers. We received positive feedback that the events that we ran as part of the Professional Development Network cultivated a really enriched sense of community whereby researchers said that they experienced acceptance and belonging within the wider research community. Importantly, these events increased the visibility of the community. Attendance by senior management and research staff as well as PGRs and ECRs involved in the RMI, alongside positive comments about a ‘buzz’ in the atmosphere, highlighted the importance of such a platform. For ECRs in particular, they provided a lifeline by maintaining a connection to University and enabling them to remain part of this community. The events encouraged and opened up positive cross-disciplinary spaces for conversation across Faculty Research Centres and Schools within and beyond the Faculty itself that shared and celebrated good practice but also discussed issues faced by researchers. This is important because, as Wenger notes, belonging is crucial to building successful communities of practice, which provide homes for growing identities (1999). In addition to the conventional dyadic mentoring relationship, for us community also functioned on the level of being a developmental network: a knowledge-based social structure where researchers shared information, insight, advice and experience [Higgins & Kram, 2001]. On a perhaps a more tacit level than expected, individual partnerships also facilitated knowledge exchange where researchers were able to gain experience and skills such as networking, coaching, communication and self-reflection beyond the thesis and thus supporting their employability.

Justifying resources

The RMI has undoubtedly been a successful pilot, both in its impact on participants and informing the development of research mentoring for PGRs in our institution. Inevitably though, there are institutional challenges in looking to sustain and build upon our initial pilot as arguments need to be made to justify future resource allocation. Our PGRs have access to dedicated PGR space (rooms in two of the Faculty’s three campuses), so it might be assumed that this type of peer-support is happening already and organically. However, discussion with our PGRs revealed that this was rarely the case, and that differing work patterns and campus locations meant that regular contact with other PGRs could be scarce.

We believe and our experience has testified, that there are benefits in research mentoring being explicit, encouraged and validated by an officially supported scheme.

As a pilot, the RMI has required resources in terms of knowledge and project team time, and in a relatively small budget for honorariums, catering events and the coffee vouchers. In particular, the coffee vouchers emerged as an important element of the initiative. In fact, in feedback discussion some mentors said that if the scheme were to be continued, they would be happy to receive the vouchers and not the honorarium payment. By encouraging meetings at an independent coffee shop, as well as overcoming the geographic spread of our PGRs, the voucher scheme provided a valuable informal and neutral off-campus space, in which one partnership noted that:

“The atmosphere of a café encouraged us to share our doubts and advice ... as the environment is relaxed and the coffee/tea/cakes are so delightful, we can get rid of any hesitation to confess any anxiety.”

The partnership also commented that a change of environment beyond the University was able to boost creativity. This reinforces other comments made by participants of feeling personally and academically at a stasis by working in the same PGR room every day. The café environment seems to have encouraged a positive shift from an institutional and perhaps results-focused mind-set to a more relaxed, reflective and productive one. Other feedback shows that the vouchers maintained non-hierarchical relationships by removing any potential awkwardness of who should pay for what. They also enabled the RMI to be perceived as more professional and by promoting the time and space for mentoring partnerships to grow with a perceived additional indulgence of coffee and cake, participants said that it made them feel valued by the University.

The largest proportion of our budget paid for the student-partner’s participation. Undertaking the RMI through the framework of a staff-student partnership has been crucial to its success. We are fortunate that our institution embeds and funds a partnership approach to working with students to enhance provision [Millard et al, 2013]. We expressly aimed for the mentoring partnerships to be mutually beneficial to both mentee and mentor. Whilst there needed to be a difference in stage and experience of research study, we did not want these partnerships to be hierarchical, as we wanted to encourage a “community of research practice” amongst peers [Wilson, 2014]. For this reason it was important that as a peer support project the RMI was seen to also be peer-led in terms both having a student partner as part of the project team and in that the staff and student partners visibly worked non-hierarchically as peers. Our non-hierarchical practice was important to engage participants and also in assisting with what might be termed the acculturation of PGRs and ECRs as members of the academe, which arguably undergraduate and masters students are neither perceived, nor perceive themselves, to be.

Conclusions

At the end of the pilot, we received eleven evaluations from the nineteen participants and whilst we did not receive evaluations from all the participants, they do cover all of the partnerships. Participant evaluations have been overwhelmingly positive, with all expressing support for the RMI and a desire to continue in some way, whether through maintaining the initial partnership or with a new partnership. Significantly mentees for this pilot have articulated a desire to become mentors to future students, to pass on the benefits they have experienced. The feedback on the group events was extremely positive and in particular a desire was expressed for more opportunities for facilitated group reflection in future iterations of the scheme. In thematic terms, the evaluations provide a mix of evidence for reflection and impact on: participants' personal sense of transformation and well-being; the process of a PhD in particular the registration and proposal process and managing supervisor relationships; and the project management of the RMI.

In discussing peer relationships between doctoral students, Boud and Lee [2005] describe them as active spaces, in which students collaborate to respond to opportunities in a variety of ways. While they were specifically concerned with relationships as vehicles for learning, it is interesting that in our study, one of the most significant outcomes has been this sense of collaborative activity. To this extent, it seems appropriate to reframe mentoring, not so much as mentor to mentee guidance, but rather as a collaboration, in which there are mutual benefits and a sense of creative, shared endeavour. This approach presents some challenges, of course. The partnership that broke down, for example, highlighted for us some of the interpersonal and ethical implications: the need for clarity about the nature of the relationship [Boud & Lee, 2005], the alignment of expectations [Colvin, 2010], and the benefits of mutual regard [Reid, 2008]. Nevertheless, the success of other partnerships demonstrates that, when facilitated within a flexible framework, relationships have the potential to grow in a creative and organic way that is beneficial to both participants. Viewed in this way, we can begin to see the practice of mentoring as part of the overall research experience, one that can be integral to research progress and when successful, supportive of creative development – qualities that are apparent in the feedback we received. This comment by one of our mentees summarises it well.

“This scheme has allowed me to crystallise how important mentoring is ... as I find that I really appreciate the opportunity to share experiences with somebody that is just a little further down the track than me. I think it leads to discussions that are quite holistic ... and this really chimes with my approach generally. Probably out of sheer necessity, I tend to resent anything that requires me to compartmentalise unnecessarily: I prefer to meld life, work, art into a messy whole, and I often find myself teasing out knots in theory while folding washing or cycling to work. Talking through some of the issues associated with this messy approach has been really valuable. I suppose I'm now looking out for people that I can adopt as unofficial mentors, so that I have people to go to if I need support on specific issues later.”

We are currently in the process of a detailed evaluation of the scheme as a whole, synthesising our own findings and observations with the participants' assessment.

Concurrently, our Faculty is undergoing major changes involving a merger of discipline areas to form a single, much larger Faculty of the Arts, Design and Media. This will clearly have an impact on future sustainability of the scheme, both in terms a much larger PGR cohort and the need for the resources to support it. As we have seen, resources such as the coffee vouchers have facilitated much of the success of the RMI, and would be central to its continuation. Plans are also currently underway in the new Faculty for the development of a mentoring scheme for research active staff. We hope that there is potential for the two schemes to be merged, providing a cohesive approach that retains sufficient flexibility to respond to the needs of researchers at different levels, while at the same time offering a single, seamless framework of support.

In addressing relevant aspects of Principle 3 of the Concordat, the RMI scheme has had significant impact on the professional, educational and personal experience of individual participants, as well as impacting on the research community and the institution as a whole. Key impacts include:

- enhanced employability through development of professional, transferable skills
- increased self-confidence for participants
- reduced sense of isolation associated with PhD research
- enhanced sense of community and wellbeing for participants
- promotion of collaborative, cross-disciplinary conversations through PDN events
- increased visibility of research activity to senior management.

For those considering developing similar schemes, these are what we consider to be key ingredients for success:

- make it an explicit activity, encouraged and validated by an official recognition
- enable flexibility to encourage organic and personalised journeys
- promote non-hierarchical and non-institutional spaces (i.e. our use of coffee vouchers)
- embed mentoring within a wider research community and programme of events
- aim for areas of commonality in matching mentors and mentees based on life experience and career aspirations not necessarily subject discipline
- develop mentoring schemes in partnership with PGRs.

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¹⁵ PRES is a biennial national UK survey voluntarily undertaken by respective UK Higher Education Institutions. Further details at www.heacademy.ac.uk/consultancy-services/surveys/pres (accessed 27/07/15)

Diagnosing and enhancing research cultures to maximise the potential of researchers

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Introduction

This paper presents the initial work to develop a greater understanding of the contributors to and drivers of institutional research culture in higher education. This research aims to develop a knowledge of and an awareness of the relationship between culture and the student and staff research experience. It is proposed that by strengthening knowledge and understanding in this area, it would facilitate enhancement approaches for the research culture in higher education institutions (HEI).

Understanding Research Culture

In 2013 the Higher Education Academy [Bennett and Turner, 2013] published the outcomes of the 2013 Postgraduate Research Student Experience Survey (PRES)¹⁵. Analysing the outcome it was identified that 'research culture' was the least positive aspect of the Postgraduate Research (PGR) student experience. The research culture as experienced by students is queried in the PRES survey by four statements:

- my department provides a good seminar programme
- I have frequent opportunities to discuss my research with other research students
- the research ambience in my department or faculty stimulates my work
- I have opportunities to become involved in the wider research community, beyond my department.

This leads to the question of how well understood is institutional research culture. This study extends the analysis of what contributes to and drives institutional research culture and includes the perceptions of staff. The following can be seen as components of and drivers for the research culture in an individual HEI:

- institutional organisational structure
- institutional research processes
- institutional research power structures
- institutional research rewards systems
- researchers' routines and rituals.

This can be extended with the description by Robin Hill, 1999, [Hill, 1999] who described 'research culture' in the following terms:

- observed behavioural regularities when people engage in research, such as the language and the rituals used

- the norms that evolve in research groups or research environment
- the dominant research related values espoused by an organisation
- the philosophy that guides an organisation's policy towards research
- the rules of the game for getting along with research in the organisation
- the feeling or climate about research that is conveyed in an organisation by the physical and administrative facilities as well as the way in which researchers in the organisation interact with others

Examining the components of potential drivers critically includes examining everyday routines and rituals that occur in a research institution. Exploring the social and interactive side of research culture is important as it has the potential to transform everyday practice into an atmosphere that develops and enhances the professional research environment for both students and staff. The range of people that contribute to the research culture is extensive; academic staff, senior management, technical staff, postdocs, research students, research services, research managers, research administrators.

The Nuffield Council of Bioethics [Nuffield Council on Bioethics, 2014] recently published a report on the culture of scientific research in the UK. This looked at the external drivers which set the culture and questioned concerns about the high level of competition for funding awards and to publish in top journals. It summarizes the pressures that cause a culture that may not be in the best interest of scientific research.

There are several authors who have explored the other pressures that affect research culture. They examine the pressure created by the need to teach and to undertake clinical duties and the effect that this has on the resulting research culture [Lancet editorial, 1997, Jones, et. al. 2019; Lewis and Simmons, 2010].

Lewis and Simmons [2010] and Lodhi [2012] explore establishing research cultures from a country wide perspective, one examining the research culture in Caribbean universities and the other in Pakistan. The extent of discussion around the systems and processes needed to establish and embed a research culture described by these authors underlines the fundamental role that these aspects have to play in the resulting research culture.

Method

To initiate this work, a small pilot survey was undertaken in the summer of 2014. The aim of this small survey was to explore the efficacy of the main questions which were:

- briefly describe what comes to mind when you hear the term "research culture". (text answer)
- are there additional statements to the four PRES statements that you would add to describe research culture as you understand it? (text answer)
- who drives the research culture in your organisation (multi-choice answer)

- describe the frequency with which and with whom you discuss your research (multi-choice answer)
- what in your opinion would enhance the research culture in your organisation (text answer)
- do you feel that your research community is inclusive and represents the diversity in your local community (text answer)
- do you feel that your research culture you are in enables you to develop to achieve your full potential? (text answer).

Research Culture Survey pilot result

Responses were received from academic researchers at a number of HEIs in the UK and one US institution.

Following the initial question which surveyed the respondents' unbiased perception of the term 'research culture', the questions that followed diagnosed research culture within the context provided by the Postgraduate Research Experience Survey (PRES). Prior to reading the four PRES statements, the respondents (N=20; 56% research staff; 33% faculty, senior faculty or executive; 5% postgraduate researchers; 5% staff) defined research culture using words that suggested an overarching atmosphere or environment created by an HEI to support, facilitate and promote research.

After reading the statements, the responses were slightly more guided in terms of providing specific examples of how research culture may (or in some cases, may not) be driven by their individual academic units. These included seminar series, mentoring programmes, conferences and (external) collaborations.

In some instances, responses pointed to situations where some academic units were falling short of expectations when it came to creating a research culture that allowed students and postdocs to develop as they would have hoped. Interestingly, both questions also engendered responses that made reference to the competitive "publish or perish" nature of the environment where researchers are encouraged to strive to maximise the impact of the research outputs.

When examining the drivers of research culture (Figure 1), some variation was evident in the responses based on what level of focus was considered within an institution. Faculty Members were seen as the most consistent drivers of research culture, with postgrads and postdocs following along in second place. It is notable that technicians, research assistants (RAs) and research support staff were not seen as major drivers of research culture. This may point to a marginalisation that is evident when it comes inclusion of some people in the wider research culture. Technicians in science labs, for example, do not always participate in activities such as journal clubs and seminar series. Not surprisingly, higher levels of academic (e.g. Pro-vice chancellors) only contributed significantly when examining research culture at the institution level.

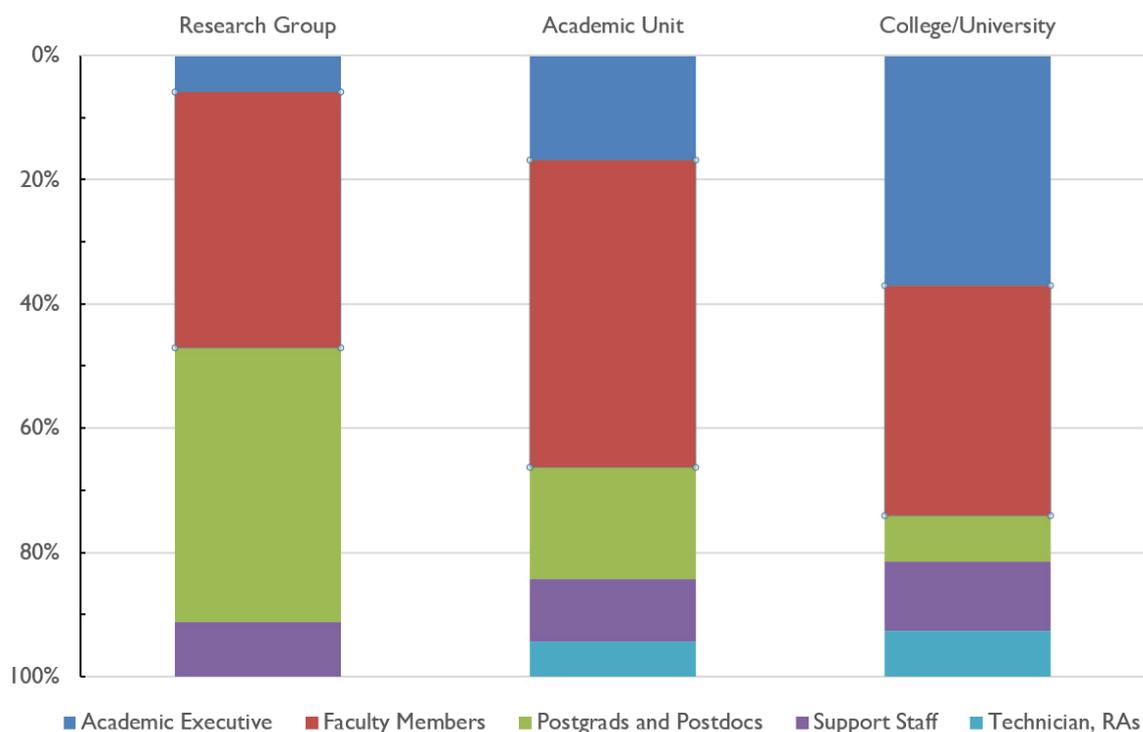


Figure 1: The drivers of Research Culture at different levels of academia

Table 1 With whom and how frequently do you discuss your research?

	Daily	Fortnightly	Monthly	Quarterly	Never	N/A
Academic executive		7%	7%	20%	64%	
External collaborator		13%	33%	47%	7%	
Faculty member	12%	38%	19%	25%	6%	
Postdoctorate/ fellow/ECR	50%	21%	7%	7%	7%	8%
Postgrad researcher	44%	30%	13%	13%		
Staff		20%		20%	40%	20%
Technician, research assistant	21%	7%		50%		22%

At a fundamental level, even casual conversation can play a crucial role in research culture. When we asked academic researchers with whom and with what sort of frequency they discussed their research, the answers (Table 1) revealed an interesting pattern. Members of a typical scientific research group (postdocs, postgrads and technicians) were consulted with regularity about research. On the other hand, academic executives, at the pro-vice chancellor level, for example, were rarely engaged with in discussion about an individual's research. The level at which someone would speak with a colleague (faculty) fell roughly somewhere between the two. These results also point to a healthy amount of discussion between collaborating research groups.

When asked whether their research environment was inclusive and diverse, the answers were only slightly positive with, 56% answering positively and 44% answering negatively.

Most respondents suggested that more had to be done at the institutional or departmental level to address these issues. Some suggested that more outreach to secondary schools was needed for promoting women in STEM programmes.

When asked if their current research culture supported them to achieve their full potential, two-thirds (66%) answered positively; that they were indeed supported, and one third (33%) stated that they were not. Those that did not feel adequately supported mentioned issues in their line (research) management, as well as changes to the teaching loads. Some of the general comments made to this question suggested that institutions could consider maintaining a supportive climate including separating research supervision from staff management and maintaining university infrastructure.

Conclusions and Future Work

As to the general efficacy of the questions, some feedback came through our pilot survey that will inform the next version of the survey. Most of these changes were minor and only really resulted in minor changes to the structure of individual questions.

These preliminary results were presented at a workshop at the Vitae Conference in September 2014. There we invited discussion on our question set, breaking the workshop up in to three main themes: 'Diagnosing the Context of Research Culture', 'Examining the Rituals and Routines that contribute to a research culture', and 'How do we Enhance Research Culture'. Many of the workshop participants worked as researcher developers throughout the UK and abroad. Some of the feedback from the discussion on routines helped to inform one additional question that will examine how researchers perceive the relative contribution of the sorts of research rituals; conferences, journal clubs, research skills training, for example, to a 'healthy' research culture.

This is the beginning of the exploration of the term "research culture". This work will go on to undertake a much wider survey, in terms of number of responses, across several countries in Europe and internationally. It should be noted that this research was inspired by the outcome of the PRES survey on the research student experience, there is the ambition to extend those results to explore and add the staff experience and how staff development has a fundamental role to play in research culture. During discussions on this presentation at the Vitae workshop, it was stressed to ensure the link back to the student experience should be remembered. Finally, this work will examine the relationship between the research culture and enabling all researchers to develop their potential, and the role of researcher development in supporting this process.

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Cultivating interdisciplinary researcher communities: The Crucible effect

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Introduction

Early career researchers¹⁶ (ECRs) battle with conflicting messages about progressing their careers in academia. While developing a track record within a defined, focused and disciplinary based research niche, they are also faced with the competitiveness of accessing funding. Funders in the UK¹⁷ and other western funding systems are focusing investments in large consortia bringing together academics from different institutions, countries and disciplinary backgrounds. Accessing funding and answering challenging questions is demanding more than ever interdisciplinary collaborative approaches [Taylor, 2013]. However, the experience of carrying out research in early career stages is still mostly anchored within individual disciplines. For ECRs, engagement in disciplinary crossings and transition towards interdisciplinary research practices remains ad hoc, tends to be limited to disciplines close to their own, is ill-supported or is attempted just because the funders ask for it. Experiences of interdisciplinarity by ECRs can also be problematic, challenging and isolating [Lyall et al., 2011; Lyall & Meagher, 2012]. One discipline may invite another under false premises and the lack of understanding of what other disciplines can bring to a research problem can make the interaction uncomfortable (eg. scientists misunderstanding the contribution of social scientists). The project described here, The Sheffield Crucible¹⁸ has enabled researchers to experience the power of interdisciplinary approaches early on in their careers. It intended to promote an approach where interdisciplinarity is not just an add-on, but a default position systematically considered by ECRs when developing projects.

This article describes the experience of initiating, developing and managing at the University of Sheffield a professional development programme aimed at fostering interdisciplinary collaborations between ECRs and building interdisciplinary competencies more systematically in an ECR community. It will describe how the programme was set up and experienced, the seed projects that emerged and finally, the impact the programme has had so far. This article aims to inspire researcher developers in other institutions to identify spaces within their researcher professional development programmes, where such an explorative approach could be afforded to ECRs.

¹⁶ Early Career Researchers: in this context, we will be referring to researchers with a PhD working as postdoctoral research associates, research fellows and early career lecturers.

¹⁷ www.rcuk.ac.uk/funding/principles/

¹⁸ The Sheffield Crucible programme is not related in any way to the Sheffield Theatres. The name Crucible for the programme came from NESTA, which is a challenge in Sheffield as we host a famous theatre with the same name.

The Sheffield Crucible programme was established in order to respond to a number of developmental gaps and challenges faced by ECRs when developing research independence such as:

- isolation within own department
- being expected to know how to collaborate
- limited understanding of what it means to collaborate across disciplines
- difficulties in accessing seed funding to explore new project ideas independently from principle investigators (in the case of postdoctoral researchers)
- limited opportunities to take risky projects at the start of one's research career
- dilemmas in framing research interests in the context of narrow research funding calls and difficulties in decrypting what the funders really want.

Developing the programme

The Sheffield Crucible ambition

The inspiration to remediate missing steps in fostering interdisciplinary practice within ECR communities came from the Crucible programme originally developed by NESTA (National Endowment for Science, Technology and the Arts). The NESTA Crucible¹⁹ aspired to create the “outward-facing researcher” and “introduce the researchers to new ways of thinking and working, with the ultimate goal of creating long-term shifts in attitude towards collaboration” [NESTA, p.5]. In developing the Sheffield Crucible programme, I was also influenced by the aspiration for interdisciplinary research described by the National Academy of Sciences [2004].

“Interdisciplinary research can be one of the most productive and inspiring of human pursuit-one that provides a format for conversations and connections that lead to new knowledge. As a mode of discovery and education, it has delivered much already and promises more ... at the heart of interdisciplinarity is communication-the conversations, connections and combinations that bring new insights to virtually every kind of scientists and engineers.” (p1 & p19)

Programme aims

The ethos for the programme was “Imagine what you could achieve if you put your heads together”; although ambitious, the scope of such a programme was to give researchers time to think beyond their everyday practice and consider their broad engagement as scholars within their academic environment and beyond.

The programme aimed to:

- provide an environment rich in opportunities to nurture new and unexpected interdisciplinary collaborations between researchers who may not normally meet and interact
- form a local network of peers among talented and ambitious early career academics and researchers

- to consider all aspects of knowledge exchange and the social and economic implications of research, and to develop a wider view of the world of research
- to make researchers more aware of the skills and attitudes of innovators
- to enhance grant-capture opportunities.

Programme structure

The Crucible programme (Table 1) was organised as a combination of three two-day retreats called Labs over a period of five months. This was followed by access to seed funding for interdisciplinary projects, a project delivery period of around eleven months and a fourth retreat for all original participants, whether successful or not with the seed funding. We were supported in the delivery of the programme by an experience facilitator Samantha Aspinall who had previous experiences in the NESTA Crucible. We have now run two programmes in 2012 (Crucible I) and 2014 (Crucible II). The cycle for a single programme covers a period of two academic years.

Content of the Labs

A critical element in constructing the content of the programme was to bring a diverse and eclectic range of inputs from within and outside the university and to make the programme of interest to all disciplines. As the largest contingent of participants were from scientific disciplines, making the non-scientist participants feel at ease and valued meant paying particular attention to disciplinary balance in the types of contributors invited on the programme. Also, briefing the contributors in advance of the Lab about the diversity of the audience proved perceptible in their ability to engage all participants. Although not all contributions could be received similarly by such diverse ECRs' group of researchers, they all attempted to provoke ECRs' thinking towards unusual or unexpected directions.

The narrative of the programme was about getting researchers to consider how they could engage more broadly with other stakeholders (media, public, policy, industry) as a process to consider their engagement with each other across disciplinary boundaries. Each of the residential Labs had a particular focus (Table 2) and the input and activities were based around core themes (see bullet points in Table 2).

¹⁹ Further details at: <http://crucibleinbox.nesta.org.uk> (accessed 27/07/15)

Year 1	
September - October	Launch, recruitment, information session and application process.
November - December	Selection of participants.
March - July	Participation to three residential Crucible Labs.
August - October	Development of seed funding proposals, presentation of proposals during public event at the Festival of the Mind, contribution of the public in providing feedback on proposals and voting on which projects should be funded.
Year 2	
November	Committee review of proposals and announcement of successful seed funded Crucible projects.
November - September	Delivery of Crucible seed projects.
September	Lab 4 with presentations of seed projects and meeting of all previous Crucible participants.

Table 1 Timeline of the cycle for a Crucible programme.

<p>Lab 1 – Looking outwards</p> <ul style="list-style-type: none"> • What role does academic research play in society? • How and why should we engage ‘the public’? • What is the relationship between the media and research? • How does the interface between researchers, policy and government work? • How can my work have a social and/or economic impact? <p>Lab 2 - Your research community and networks</p> <ul style="list-style-type: none"> • How can we foster more creativity, innovation and interdisciplinary research? • How can we bridge the cultural gap between different disciplines? • What are the challenges in the infrastructure and culture of your institutions/companies that impede collaboration and innovation? <p>Lab 3 - Yourself</p> <ul style="list-style-type: none"> • Examining some of the individual skills and attributes that are characteristic of innovators such as: self-awareness, ability to collaborate, creativity, risk-taking <p>Lab 4- Reviewing the experience of interdisciplinary projects</p> <ul style="list-style-type: none"> • Presentations of Crucible seed projects • Sharing of the experiences in transitioning to new approaches in collaborative practices • Considering “next steps” in interdisciplinary workings beyond Crucible

Table 2: Contents of residential labs

Senior academics presented inspirational talks, shared their own experiences, the rewards and tribulations of getting involved in collaborations and interdisciplinary projects, in engaging with media, the public, policy and industry. These contributions reinforced the notion that broad engagement outside of academia and interdisciplinary collaborative practices are real strategic commitments of the institution. Senior academics contributors (among them several pro-vice chancellors, heads of departments, head of public engagement, head of civic university and other professors) as well as academics from the Crucible advisory group were invited to attend lunches and dinners with the participants. For some participants, having senior academics from the institution take the time to discuss and share a meal with them was particularly significant as it made them feel that their role mattered.

Including playful activities was also important in the process of building this community. We aimed for these researchers to have fun with each other in order to move towards the desire to want to work together. The playfulness was brought in through the use of quiz and games, input and performance from a storyteller, recording of the Labs by a visual artist, and challenging participants in a talent show (Lab 4).

Building a community

We chose to run a residential programme to anchor the ethos of ‘taking time out’. By taking researchers off campus, away from the city, we were offering them a reserved space, a protected time to think and reflect away from their busy academic commitments. The atmosphere of comfort and conviviality of a hotel (usually used for weddings), helped researchers focus on engaging with each other and making the most of this precious time.

Although the hotel used is only 30 min away from the University, it provided a level of separation and allowed participants to give themselves the permission to focus on developing interactions with other Crucible participants. Providing a very comfortable and inspiring environment gave researchers a sense that the institution was investing in them and was committed to foster their professional development.

Managing the programme

Recruitment of participants

We were aware that the time commitment for the programme (six days plus overnight stay) was substantial and that participants needed to gain additional and tangible benefits in addition to the intrinsic motivation regarding their professional development. Highlighting the availability of the seed funding, within a context where access to research funding for ECRs is limited and extremely competitive, may have helped researchers and young academics leverage their access to the programme during negotiation with line managers.

Aware that many young researchers may be employed on various types of contracts, we advertised the scheme broadly via emails using postdoc, academic and general university mailing lists, as open to: 'ECRs and junior academics as well as early career university teachers'.

We hosted an information session and invited Crucible 'allies' in the form of previous Crucible participants: for the first programme, two researchers who had taken part in the national NESTA Crucible and for the second programme some of our Crucible I participants.

To apply for the programme researchers were required to write a formal application, where they were asked to say why they should be invited to participate and how they thought the programme could contribute to their career aspirations.

They also had to write a general summary about their scholarly work and interests, as well as work-focused activities outside research, such as public, media, industry engagement, or involvement with learned societies, researchers' societies or subject groups. In addition, we asked applicants whether they had previous experience of interdisciplinary collaborations and the types of collaborations they would envisage to develop during their participation to Crucible.

We based our selection criteria on the recommendations made by NESTA (eg. Excellence in research, demonstration of an interest and/or experience in interdisciplinary research, interest in creative thinking and breadth of collaboration, commitment to the broader role of research in society). The selection focused on establishing a mixed and balanced cohort of peers with diverse experiences, interests and disciplinary backgrounds. Some of the participants had substantial previous experience of collaboration (but not necessarily at interdisciplinary level) while for others the programme was the first venture in exploring such practice. We could not predict whether the Crucible programme would attract a diverse cohort of researchers from across our 5 faculties.

To boost recruitment, we contacted heads of department across the University and invited them to encourage the participation of ECRs and newly appointed academics, who they considered would best benefit from the programme. Because of the large financial investment in establishing such programme, the application document also required applicants to formally commit to attend the entire programme.

The applications were reviewed and selected by a cross faculty advisory group. We recruited 30 participants from 24 departments in Crucible I and 28 participants from 25 different departments during Crucible II. All faculties were represented among the participants (Figure 1). We had a low participation from the Faculty of Arts and Humanities, which may be explained by the low number of postdoctoral researchers and the intense teaching commitments of many young academics in this Faculty.

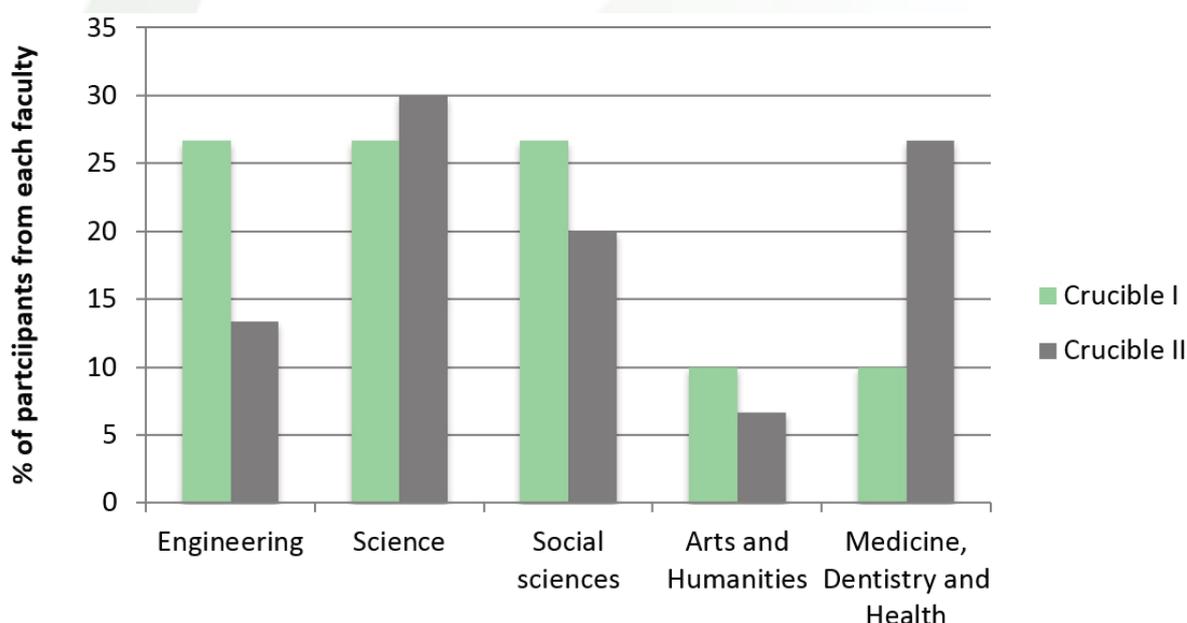


Figure 1 Percentage of participants from each faculty.

Diversity of recruited participants

We paid attention to the cultural and gender diversity of our recruited participants. Between 33-39% of our participants were from a non-British background with participants from seven different countries in Crucible II. Within the British contingent on the programme, ethnic origins were also diverse. There was no significant gender gap in the recruitment of participants, with 53% male and 47% female participants during Crucible I. Interestingly, the proportion of women increased during the second programme with 66% female participants. The shift in the gender of the applicants was influenced by a number of elements. As I deliver the Springboard for women programme²⁰ to researchers at the University and work as a coach with alumni from this programme, I had many opportunities during the period of Crucible recruitment, to discuss with women about the uptake of such opportunity. I personally invited during face-to-face encounters a number of women who I thought could make interesting participants, or who I felt could benefit greatly from the experience.

A number of women were reticent to join the programme because of concerns related to childcare during the two days away. During Crucible II recruitment, a potential applicant expressed concerns that the programme was “not very Athena Swan²¹ friendly”, meaning that the residential stay would put individuals with caring responsibilities at a disadvantage to participate. I was particularly committed to personally attend to such concerns. Engaging in individual discussions with potential participants and identifying flexible solutions to become enablers of participation was particularly important in setting the ethos of a supportive, diverse and welcoming environment. I made quite clear that my objective was to provide a programme that would be available for all and that I wanted to listen to specific needs and concerns. As programme manager, I was open to the flexibility needed to facilitate the participation of researchers with caring responsibilities. But I also shared with the potential applicants the perception that the residential was critical for full engagement. I felt that the residential time was needed to develop relationships between participants and to start building a community of researchers prepared to engage fully in interdisciplinary working. These discussions allowed some applicants to identify solutions for their participations and gave them confidence that we would endeavour to be flexible to facilitate their partaking.

The diversity in experiences and stages in research careers of our participants is also illustrated by the demography across research careers. The largest cohort of participants came from the postdoctoral community (40-46% between Crucible I and II), 7-14% of research fellows, 47% of lecturers in Crucible I and 29% in Crucible II, and 7-11% of researchers with other job titles (e.g. engineers, university teachers). The recruitment of research associates and fellows increased between the two Crucibles while the recruitment of lecturers diminished.

²⁰ Springboard for Women is a personal and professional development programme licenced by the Springboard consultancy. This programme is offered to all researchers in Sheffield. www.sheffield.ac.uk/faculty/science/researchers/springboard

²¹ The Athena SWAN Charter is an external accreditation process for departments/ institutions to demonstrate commitments to advancing women's careers in science, technology, engineering, mathematics and medicine careers in academia. Departments will review data, processes, policies, good practice and culture, and develop an action plan to improve the promotion of women in research careers. www.athenaswan.org.uk

²² EPSRC are the UK funding research council for Engineering and Physical Sciences and run a number of funding schemes. www.epsrc.ac.uk

²³ Roberts funding' refers to a former UK research council funding stream for the personal and professional development of researchers.

²⁴ Further information on the Wellcome Trust is available at <http://www.wellcome.ac.uk> (accessed 27/07/15)

Challenges of running the programme

Operational challenges

Assembling a budget and building the business case to run such programme in their institutions might be one of the biggest challenges researcher developers may face. My success in accessing a diversity of internal funding to run the Sheffield Crucible programme was the result of many conversations and negotiations with colleagues across the University and working with colleagues from different sections of the University Research and Innovation Services. Being able to frame the project as addressing and delivering on multiple strategic university agenda (eg. external engagement, impact agenda, knowledge exchange, enterprise, innovation, interdisciplinarity) was a likely element in successfully accessing funding.

In the case of the Sheffield Crucible programmes, the funding came from a diversity of sources; EPSRC²² Knowledge Transfer Account then later on the EPSRC Impact acceleration funds, the Research Councils Roberts' fund²³, and the Wellcome Trust²⁴ Institutional Strategic Support fund. Because of the timelines in accessing funding and deadlines for funding expenditures, it does not always offer a large window of time, between knowing that you have gained sufficient funds to run a programme and putting it in place. This had implications on our ability to provide enough notice that the programme was going to take place. Academics involved in teaching will need to negotiate their teaching commitments some time in advance. For such academics, the timeline between announcing the programme and recruiting participants may not be sufficient to rearrange teaching commitments.

Running an institutional Crucible represents a risk in terms of attracting a sufficiently diverse cohort of researchers, having researchers who are formally committed to attend and do not drop out at the last minute because they are too busy. As researcher developers, we know that maintaining a high level of attendance on programmes over a long period of time can be extremely challenging for programmes run in-house. We were fortunate that retention on the programme was excellent and we only lost three participants due to personal circumstances over the two Crucibles.

Challenges for participants

The limited length of postdoctoral researchers' contract is an issue in recruiting participants. Because the scheme represents a significant financial investment, we needed to ensure that someone joining the programme would be able to attend all the retreats and have enough time on their research contract in order to apply for the seed funding. This means in practice that you will need to have researchers who have a minimum of one year still available on their contract. If researchers are coming to the end of their contract by the time the seed project starts, then the seed funding may be able to cover their salary. In our experience, the challenges with end of contracts and potential moves between departments for the seed projects can add layers of complexities for the project manager. However, flexibility and support by the project manager can maximise the ability of some participants to take these projects forward, when contractual circumstances are not straightforward. As programme manager, being prepared to take some risks in enabling these projects to go ahead is worth considering.

Another challenge related to the recruitment of research associates is that of the time commitment they will be entitled to take towards their professional development. Taking six days over a five-month period is a significant period of time to reserve for professional development. Many researchers may find it challenging to negotiate access to such programmes with their line manager or may feel that because their contract is running out in a few months, they should focus their attention on data gathering for the project they are employed to deliver. During the first programme, we were concerned that postdoctoral researchers may find it difficult to access a programme requiring a six day commitment. To alleviate the possible challenges negotiating participation, we made the decision to strike a compromise and run one of the Labs over a weekend. In this case, only four days from the programme would be taken from their research project. It was interesting to see that the feedback from the first cohort of participants suggested that we run the programme during the week. This gave us confidence in the planning of Crucible II to 'dare' to set the 6 days of the programme during the week and acknowledge that committing to professional development as part of work commitment was a fair request.

Experiencing the programme

Researchers joined the Crucible programme for multiple reasons, with diverse objectives and different preliminary experiences of interdisciplinary research. These quotes, taken from their applications to maintain the integrity of researchers' voices, offers insights into the objectives of a handful of participants.

"In archaeology, multidisciplinary collaboration is generally practised ... however, in many cases their activities/ studies are simply juxtaposed. I found such collaborations always very fruitful and challenging, and I learned how to see things from a number of other points of view. What I would like to do, however, is to build up a project that sees all these and others specialisations together since the very beginning, actually working together and integrating each other."

"Meet new collaborators, develop new approaches to research and gain a sense of how others in the University are dealing with the challenges of the changing environment in higher education."

"Taking the first steps in building my own independent research group. To be successful in this arena requires a network of collaborations to diversify the research you can perform. Most successful academics have established long term collaborations, which produce a long list of fruitful papers and grants. The Sheffield Crucible would provide valuable evidence to funding bodies that I can develop collaborations and form a network of useful contacts and expertise."

"The Crucible provides an opportunity to collaborate with researchers interested in issues surrounding aging and mental health, from a legal, scientific and ethical position...will increase my ability to successful apply for research funding as it will improve not only my track record of interdisciplinary research...but also my ability to communicate my science to non-experts...will enable me to make my work more relevant to the real world and to build collaborations and network that I can continue to use throughout my career"

Participants greatly valued the opportunity to meet peers that they would otherwise never encounter and discover areas of research they were not aware of.

"The opportunity to hear about the wide range of work taking place across the university was great! There is never enough opportunities for this. The only time you get to hear things is when it's the big projects mostly done by very senior academics with huge research teams. The opportunity to be with enthusiastic ECRs was great- I felt there was little or no hierarchy that often becomes apparent in professional gatherings. It was great to be part of something where everyone was there as they were passionate about research and working with other people! Also, this made me feel like belonging to a community of researchers-sometimes research/ academic life can be very isolating and this helps to alleviate some of this."

Participants described their experience of having built and increased their academic confidence, of feeling energised by the experience, but also reflected on having expanded their academic horizon. They were aware that some of these interactions could change the potential direction of their research and careers.

The seed projects

We incorporated into the programme the opportunity for participants to apply for seed funding (awards of £5K and £10K) for new collaborative interdisciplinary projects with other Crucible collaborators.

The projects were framed as 'a chance to develop unexpected collaborations that would not be possible within the boundary of a single discipline.' A description of the project assessment criteria is presented in Table 3.

Interdisciplinarity	Projects must involve work utilising the expertise of two disciplines or more. We are particularly interested in unusual collaborations between disciplines that do not often work together.
Innovation	We are looking for new, original, innovative ideas or research methodologies. We are interested in experimental and/or risky projects that could lead to transformative research or new and original applications of research.
Sustainability	We intend to support projects that are not stand-alone but from which partners can extend collaborations. Projects should mark the start of new research directions that could have the potential to form substantial new research programmes.

Table 3 Crucible seed funding assessment criteria

From our point of view, the Labs with all the inputs, talks, and activities were about offering the seeds for exploration, and the funding about substantiating this new community of researchers prepared to experiment and explore interdisciplinary practices. Discussing new research ideas, exploring collaborations across disciplines, writing of a collaborative bid and then for the successful funded projects, the act of putting into practice, making these collaborations a reality enabled an opportunity for integrations of the principles of interdisciplinary collaborative practices. The experience of gaining research funding varied among participants, therefore the writing of these collaborative bids were an excellent site of peer learning [Boud, 1999]. For some ECRs who may have experienced the process of writing research proposal as a task done in isolation, the Crucible collaborative funding bids enabled feedback and collaboration. As all participants came from the same institution, the Labs provided time and space to initiate new ideas and collaborations, but some participants started to meet on campus in between Labs as soon as Lab 1 had taken place as well as during the process of writing the seed projects. The projects enabled Crucible participants to move from idea generation and a willingness of engaging in interdisciplinary practice towards a lived experience of the process of being involved in such projects.

We embedded the concept of public engagement at the core of the development of the new research projects. When the first Crucible programme took place in 2012, a large festival was being established in Sheffield: The Festival of the Mind²⁵. This festival was the brainchild of Professor Vanessa Toulmin who had been appointed during the same period as Head of Engagement at the University of Sheffield. The Festival intended to offer opportunities for academics to engage in collaboration with creative professionals and deliver inspiring and unusual public engagement projects. We took advantage of the festival and the delivery of a public engagement became an element of the funding application process. Crucible seed-funding applicants were tasked with presenting their project proposals to members of the public in an event following the style of a 'Science fair with a twist'. The public event was called Minds Investors²⁶, and the public in attendance was given the opportunity to vote on which project the University should invest in. We ran this public engagement element during both of the Crucible programmes.

It took place in the unusual setting of a Spiegel tent installed as part of the festival the Sheffield City Centre. In 2012 and 2014, the public event took place on busy Saturday afternoons bringing Sheffielders to encounter research in the making. For many of the Crucible participants, presenting at the Minds Investors was the first experience of public engagement. Members of the public could vote for their 5 preferred projects and provided written feedback (later shared with the applicants) to the projects they supported. In 2014, around 170 votes were cast by a visiting audience of around 400. The public vote was incorporated into the panel decision in choosing which project to fund. Projects applicants were asked to reflect on the experience of the public engagement event within the funding application document:

"The spectators present at the festival were very interested in our proposal and asked us questions or made observations that proved of paramount importance in the clarification of our final proposal for funding. Although the majority of the discussions we had with the audience were positive, there were some members of the public who questioned the concept of our project and the artistic reasoning at the basis of it. These questions proved to be extremely useful not only because by responding to them we clarified even more the conceptual framework of our project but also by providing constructive feedback they alerted us to issues that we had not considered before."

An additional element in the Crucible programme and funding scheme, was the desire to introduce researchers to the potentials of considering entrepreneurial activities. The inclusion of activities around concepts of entrepreneurship is not always well perceived in an academic community. We chose activities where researchers' interests and values were the starting point. During Crucible I, participants brainstormed concepts for the development of a mobile device 'App', which would be useful for researchers' data collection as well as for a process for public engagement. The concepts were judged by members of a local software company. The judging panel chose a concept, which was then further developed in collaboration between researchers and the company with support from Crucible funding. Furthermore, during Crucible II, participants were challenged with developing concepts for a social enterprise.

²⁵ <http://festivalofthemind.group.shef.ac.uk>

²⁶ Minds Investors 2014: www.youtube.com/watch?v=da0iBL84byE&feature=youtu.be Minds Investors 2012: <https://vimeo.com/51054323>

This enabled early career researchers to explore notions about innovation and enterprise under a value framework, which might have been more compatible with their academic values. We targeted some of the seed funding for these entrepreneurial activities. I am not reporting in this article the impact for these researchers of being involved in these specific projects. I feel that considering the introduction of entrepreneurship in a context where researchers are not put off and where their individual values are maintained, made the delivery of these activities an appropriate mode of engagement.

One of the aims of the Sheffield Crucible programme was to inspire ECRs to collaborate across disciplines. Over the course of two programmes involving 58 participants, we received 38 applications for seed funding, of which we funded 18 projects. These were all new projects between researchers who had never met before taking part in the programme. The projects put forward involved between two and nine Crucible collaborators with an average of three Crucible collaborators per project.

Some projects also involved additional collaborators within and outside the University, and in one case a Crucible participant from the previous cohort. All the projects submitted, except three, involved Crucible collaborators from different faculties. For the three projects involving researchers from the same faculty, two of them were with researchers from different departments and only one project with researchers from the same department. From these three projects only one got funded with researchers from physics and psychology. Interestingly the two researchers who came from the same department had never interacted with each other before joining Crucible. This demonstrates that the programme can stimulate collaborations not only across faculties and departments, but in addition even within departments.

Impacts of the Crucible programme

We are still at an early stage in the evaluation of the impact of the Crucible programme²⁷, particularly in respect of those longer-term impacts commonly termed as 'Level 4' in the Impact and Evaluation Framework. [Bromley and Metcalfe, 2012]. However, clear and significant impacts are emerging.

Table 4

	Examples provided by participants
Impact on research	<ul style="list-style-type: none"> • Applied or applying for larger bids based on Crucible seed projects or ideas originating from interactions • Taking the leadership of highlighting importance • of interdisciplinarity during consultation on directions and priorities of study group
Impact on career	<ul style="list-style-type: none"> • Successful transfers to fellowships in same or other faculties and departments. • (eg. Vice-Chancellor fellowships, Thomas Berry & Simpson Research fellowship, British Heart Foundation Advanced Training fellowship). • Successful transitions to lectureships. • Feeling better prepared for interviews. • Track record of successfully applying for funding perceived as contributing factor for success with fellowships and other positions.
Impact on teaching and supervision	<ul style="list-style-type: none"> • Aspects of Crucible project incorporated into teaching modules: eg. law for engineers. • Creating additional links within the University: eg. commercialisation team, Think Ahead team²⁸, Inkforge²⁹, University of Sheffield Enterprise • Gaining PhD/ Master students as co-supervisors to follow-up Crucible projects. • Additional funding for student summer projects based on pilot data gained with seed funding.
Impact for the University	<ul style="list-style-type: none"> • Involvement of participants in the BBSRC Excellence with impact competition³⁰. • Researcher gained confidence to undertake substantial media work for BBC series (eg. The Welsh body). • Contribution of one of the seed project to the development of expert knowledge on Intellectual Property, commercialisation skills & awareness of researchers- development of activities and online resources, and collaboration with researcher developers and commercialisation teams. • Further contributions to public engagement activities (eg. Café Scientifique). Participation to these events also leading to broader contacts with other researchers and positively contributing to further job opportunities. • Gaining funding for artist in residence for the Faculty of Engineering following a seed project based on collaboration with artists. • Several seed projects with collaborative partners from local companies, organisations and free-lance artists.
Impact on integration within the University research community	<ul style="list-style-type: none"> • Feelings of being better connected within the university. • Initiating the development of a cross-faculty social science writing network for ECRs.

²⁷ Short interviews of previous participants about their experience of the programme are available at: www.youtube.com/watch?v=Y9ldFOf-IBQ

²⁸ Think Ahead team is the team responsible for the Researcher Development Programme at The University of Sheffield: www.sheffield.ac.uk/ris/ecd/mission

²⁹ Inkforge is a programme aimed at embedding the development industrial knowledge into researcher development: www.sheffield.ac.uk/faculty/medicine-dentistry-health/thinkahead/inkforge

³⁰ www.sheffield.ac.uk/bbsrc-ewi

So far, we have collected evaluation data in a number of ways; ethnographic notes based on observations and conversations during the Labs, presentations done by Crucible participants about taking part in the programme or informal meetings and discussions with participants, formal feedback forms at the end of the programme, visual representations created by participants about the impact of the programme and end of seed-project reports. The second round of seed projects are currently underway and the final Lab 4 for Crucible II will take place in September 2015.

In terms of the personal and professional development of researchers, it is clear the programme had a number of beneficial impacts:

- young researchers were able to take steps towards research independence by gaining research funding independently from their principal investigator
- the programme supported the engagement of researchers with external partners
- impacts at an individual level e.g. career progression
- impacts at an institutional level e.g. development of institutional networks.

The Crucible programme had several levels of impacts; some examples are summarised in Table 4 (above)

The programme has inspired not just a minority of scholars but the majority of the programme participants to explore interdisciplinary projects. Over the two Crucible programmes, 88% of participants were involved in submitting seed projects. Researchers were involved in multiple submitted projects either as principle investigator, co-investigator or collaborator. Although not all projects were successfully funded, the majority of Crucible participants were able to experience the process of developing a new and interdisciplinary seed funded project and in some cases were involved in several successfully funded seed-projects (maximum of four successful projects for one individual). Only nine researchers (17.6%) among those who had submitted seed projects were not involved in a successful seed-funding project. Although this was a shame for the individuals concerned, it was important that the selection of funded projects reflected the realities of the competitiveness of accessing research funding. The cross-faculty Crucible advisory board, who selected the seed projects emphasised the need to maintain a high level of competitiveness to access the Crucible funding.

Conclusion

As a professional development model aimed at building interdisciplinary communities of ECRs across campus, the Crucible has demonstrated great strength in creating a structure, where researchers are enabled to take some time out to consider their research interests within a broader context, and the research interests and methodologies of other researchers and disciplines. It has succeeded in building a community of scholars daring to start working across disciplinary boundaries, beyond their current experience and comfort zone.

The Crucible programme has enabled researchers to understand what engagement beyond the research community could mean and to decipher some of the new demands placed on academics to demonstrate the impact of research. The positive attitude fostered during the programme in cultivating engagement with other communities whether other disciplines, public, media, policy and multiple other stakeholders could help researchers at the start of their academic careers feel empowered to respond to the many demands placed on them.

The Crucible has helped break some of the isolation experienced by young academics and it has demonstrated that you can foster the desire to work across disciplinary boundaries, bringing a multitude of impacts for the individuals and the university. There remains to address whether the programme is able to impact in the longer term upon interdisciplinary practices. We will need to identify the challenges faced by researchers in continuing such an approach. Although funders promote interdisciplinary approaches, the perception and assessments made by departments and recruitment panels of researchers exploring these approaches might be more problematic. The study of these longer term impacts will help us build a better understanding of successful approaches to foster interdisciplinary working.

One of the great advantages of having run the Crucible as an institutional programme was that the Crucible network was able to gain momentum and build itself over a period of seven months between the first Lab and the funding applications. Participants met across the campus in between Labs to carry on some of the discussions. They particularly valued this institutional network. It also offered a sufficient amount of time for new research ideas to develop and crystallise. Because of the open nature of the seed funding with no pre-defined thematic, in contrast with the IDEA factory of the EPSRC³¹, researchers needed sufficient time to develop ideas and find common grounds and territories, such that projects could mature and not just be patched up together just for the sake of available funding. That's what you may call 'slow cooking'.

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Adoption of e-Infrastructure: frontline experiences of researchers, and a model for researcher development

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Introduction

Drawing on a recent study, this paper discusses technology adoption among a group of 26 experienced researchers from eight higher and two further education institutions. It develops the contents of a workshop delivered by the author at the Vitae Researcher Development International Conference in 2014, and highlights the relevance of individual and institutional contexts in terms of technology use. This paper proposes a model for a strategic researcher development approach for institutions to enhance researchers' technology adoption. It also recommends further dialogue and research around effective use of e-Infrastructure for research activities.

The development of a sustainable and cutting edge e-Infrastructure eco-system is vital to support excellent and innovative research across a wide range of disciplines and industrial sectors [Morrell, 2014]. Research Councils UK (RCUK) defines e-Infrastructure as the combination and interworking of digitally-based technology (hardware and software); resources (data, services, digital libraries); communications (protocols, access rights and networks); and the people and organisational structures needed to support modern, internationally leading collaborative research, be it in the arts and humanities or the sciences [RCUK, 2010]. The Research Councils, the Funding Councils, the Technology Strategy Board and Department for Business, Innovation & Skills (BIS) play a key role in developing the strategy as well as delivering the funding to support e-Infrastructure in the UK [Morrell, 2014]. Adoption of e-Infrastructure into mainstream use by a majority of researchers with support from the research funding agencies is one of the strategic action areas of the UK Research Council [RCUK, 2010].

The European Commission encourages wider collaboration as part of its funding. "Horizon 2020 is the biggest EU Research and Innovation programme ever with nearly €80 billion" [European Commission, 2015b]. Higher Education Institutions will be collaborating as well as competing with other research organisations, non-governmental organisations, companies, etc. to get a slice of such funding. The European Commission plan includes investment in e-Infrastructures for research and ambitiously envisages that "by making every European researcher digital, e-Infrastructures increase creativity and efficiency of research and bridge the divide between developed and less developed communities and regions" [European Commission, 2015a]. This suggests that the use of technology will have an increased role to play in facilitating collaborative research. Research Institutions and Universities need to understand the implications of engaging with such e-Infrastructure, and address issues such as technology adoption for the institution as well as its individual researchers. They need to develop and prepare researchers' capacity to make the best use of the e-Infrastructure and related technological innovations.

Researcher development is a collaborative and complementing endeavour for institutions and individual researchers alike to maintain research excellence. Researcher development can be defined as "the process whereby people's capacity and willingness to carry out the research components of their work or studies may be considered to be enhanced, with a degree of permanence that exceeds transitoriness" [Evans, 2011]. This paper focuses on enhancing the capacity and willingness of researchers in terms of making the best use of technologies and e-Infrastructure.

The Vitae Researcher Development Framework (RDF) [Vitae, 2011] recognises the importance of technology use. It expects researchers to have an advanced level of skills in areas such as interactive communication technologies, multimedia, and web tools for networking, information/data sharing and promoting research presence. Resources and frameworks such as the Seven Pillars of Information Literacy lens on the Vitae Researcher Development Framework (contributions from Society of College, National and University Libraries, and the Research Information Network) focus on various stages of dealing with information [Bent & Stubbings, 2011] and help researchers to prepare for the technology era. The Vitae RDF [Vitae, 2011] acknowledges the challenges in adopting these innovations however, it calls researchers to learn and develop additional skills and capabilities in information technology and digital technology, as appropriate.

Emphases on e-Infrastructure and digital literacy raise a number of questions around technology usage: How does the technology adoption and diffusion take place in the context of research activities for both individual researchers and institutions? What are the experiences and issues faced? How can these be addressed? Are research institutions and their researchers ready to use the new e-Infrastructure effectively? Answers to these questions could be sought through exploring the current technology adoption and diffusion among experienced researchers.

Technology adoption is a “complex, inherently social, developmental process”; it can vary depending on the individual and their “cognitive, emotional, and contextual concerns” [Straub, 2009 p645]. Drawing on the notions of Everett Rogers’ Diffusion of innovations [Rogers, 2003], effective and sustainable take-up of technology can be seen broadly from two perspectives: the adoption of it by individuals; and its diffusion across the population. Adoption theory is a micro-perspective that “examines the individual and the choices an individual makes to accept or reject a particular innovation” whereas the Diffusion theory takes a macro-perspective and describes “how an innovation spreads through a population” across time [Straub, 2009 p626].

The UK e-Infrastructure Advisory Group sees the decline in research grade e-literacy among UK researchers as a concern and recognises that the one size fits all approach of training might not be amenable [e-Infrastructure Advisory Group, 2011]. Another possible approach would be to analyse researchers’ experiences of technology use and understand the various characteristics and issues of technology adoption, and use that to inform researcher development activities. This paper, therefore, draws the findings from a recent study (referred as ‘the study’ hereafter) that focused on educational researchers’ use of technology by understanding their experiences, conceptions and strategies [Appukuttan, 2014]. The study makes an assumption that technology use in science, technology, engineering, maths and medicine (STEMM) disciplines are more embedded and specialised compared to non-STEMM disciplines, and thus it focuses on technology use by researchers from non-STEMM disciplines. However, readers from all disciplines are encouraged to compare the findings with their own experiences and consider how far they reflect an international perspective especially in terms of interdisciplinary research. It will also enable readers to gain insight into the issues of technology use and recognise individual and institutional challenges around policy and practice.

The following sections will consider some of the experiences of researchers in terms of their technology use for research activities through three thematically-developed vignettes. It will then examine the issues using a set of common characteristics of various adoption and diffusion theories. A discussion of researchers’ technology use in the context of researcher development would then lead to proposing a researcher development model for technology adoption. It finishes with some closing thoughts and scope for further study.

Researchers’ experiences of technology use

The range of experiences of researchers’ technology use can be examined through various theories of technology adoption and diffusion. Such experiences can be sets of issues around individual researchers’ technology adoption or technology diffusion across the population [Fichman, 1992]. Diffusion across a population, such as researchers across an institution, is informed by individual’s adoption [Straub, 2009].

Thus, to examine the diffusion, or in other words how the investments in e-Infrastructure are going to get adopted widely, we need to look at the technology use of individual researchers. This is where we need to consider the current experiences and practices among researchers.

This paper draws on a study that was interested in educational researchers (referred as just researchers hereafter) and how they used technology for their research activities. For the study, technology was broadly defined as tools and resources that enabled and supported research activity. The sampling for the study was done from eight Higher, and two Further Education institutions in the UK. It included 16 female and 10 male researchers. The main data collection was done through semi-structured interviews on two separate occasions and included some short paper-based surveys as part of the interview.

Findings from the study (Figures 1 and 2) showed a consensus that technology does help, or at least it doesn’t hinder their research. 70% of the researchers also thought their choice, skills, and use of technology could influence their research in some way. In terms of its usage, the conceptions of technology were varied among researchers. They also had varied levels of access and use of technologies at different stages of research. Based on the ‘E-research across Phases’ [Dutton & Meyer, 2010], the participants were asked at which stages of research they were likely to use technology. The general answer was ‘all stages’, from setting an agenda to archiving all research resources, with the exception of some researchers mentioning that they may not use technology when they are thinking and making decisions

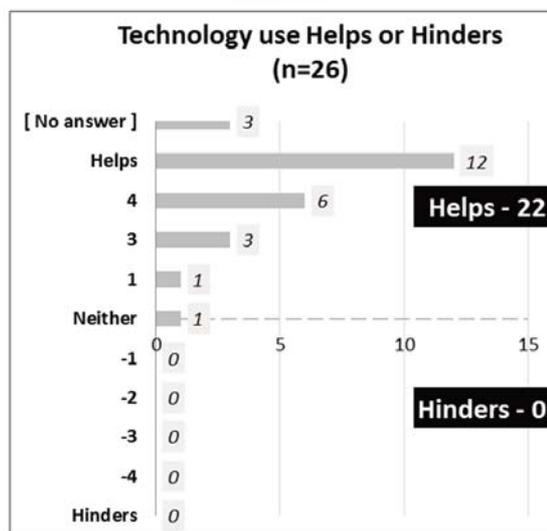


Figure 1 Technology use Helps or Hinders

(for example, defining the research problem and questions, or doing ethical reviews).

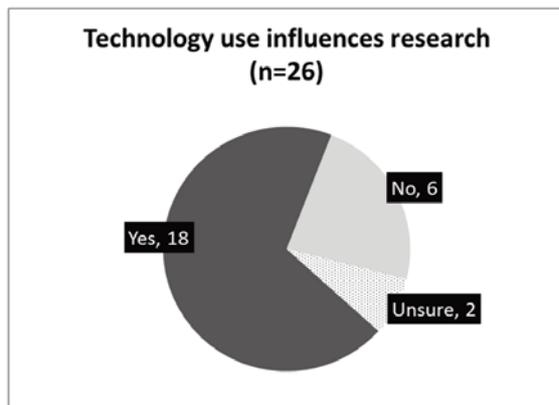


Figure 2 Technology use influences research

Some of the findings relevant to technology adoption and diffusion are presented below using vignettes to highlight the experiences and issues raised by the researchers. Use of vignettes is a valuable technique “that can elicit perceptions, opinions, beliefs and attitudes from responses or comments to stories depicting scenarios and situations” [Barter & Renold, 1999]. Miles and Huberman define vignettes as:

“...a focused description of a series of events taken to be representative, typical, or emblematic in the case you are doing. It has a narrative, storylike structure that preserves chronological flow and that normally is limited to a brief time span, to one or a few key actors, to a bounded space, or to all three”

[Miles & Huberman 1994, p81]

Vignettes offer a way to mine “pockets of especially representative, meaningful data... that can be pulled together in a focused way for interim understanding” [Miles & Huberman, 1994]. They are used mostly as a data generation technique [Barter & Renold, 1999; Miles & Huberman, 1994; Spalding & Phillips, 2007]. However, vignettes are used here as a way to present and discuss some of the findings and provide “sufficient context for (readers) to have an understanding about the situation being depicted” [Barter & Renold, 1999]. The vignettes were constructed based on experiences of participants, the author’s own experiences of working with researchers, and relevant literature to ensure validity. From a broad range of issues around adoption and use of technologies, three scenarios are presented that highlight some of the experiences of researchers: 1) the use of technology from an individual’s perspective; 2) access issues from the institutional perspective, and 3) conceptions from both the individual and institutional perspectives.

Vignette 1: Changes in technology and learning curve

It is Sunday 9.00 p.m. Linda decided to indulge herself with half a glass of wine. It takes about 7 minutes for the laptop to start and be ready for use. The laptop had come with a lot of software that she has no use for whatsoever; all they do is slow the machine down. Not to mention the millions of windows that keep popping up which she has to close down one by one before she can start her work. So she had plenty of time to enjoy a sip or two. She wanted to make a start on analysing the large amount of data collected for a research project and is under pressure to finish the analysis quite soon. She thought it would be useful to do it electronically as it will be easy to share and collaborate with two other researchers in the team. She loaded the qualitative data analysis software that was installed on her laptop and started reading the notes on the exercise file she had from a training session. However, the software looked nothing like the training she had 6 months ago. Linda felt very confused. She had a look at the wine glass and then the bottle; and wondered “it’s not the wine, is it?” She looked at the help options within the software. After an hour she had reached nowhere. Disheartened, finally she gets her scissors and envelopes out. She starts reading and cutting the printed data and sorts them into groups before putting them in labelled envelopes as she has always done; she knows that it will work. She doesn’t bother about the laptop that had gone dark because the battery was dead. She doubts whether she will ever bother with that software again.

Vignette 1 highlights some adoption issues of individuals. Analysis is one of the very intensive research tasks and often needs a clear space and mind. Some researchers, like many other professionals, do some of their core work at evenings and away from their office. This could also mean that the research tools and technologies have to be set up mostly by themselves. Computers are sometimes overloaded with unwanted software that slows the researcher down even before they start research. In addition, many respectable web software companies tactfully or covertly install all sorts of cluttering software making people’s computers even slower. It is important to note that the researchers’ patience and time is already spent even before they start any research activity. This often puts them off from using technology altogether and has a direct impact on its adoption. However, the study showed that some researchers take it as a norm and patiently wait for it to be ready. Linda here, for example, uses that time to enjoy her drink. Once she gets to the software it seems to be a different version to what she had training on. She is lucky that it opened her file; often vendors make it impossible for older versions of software to even open files saved in their new format.

Along with the technology usage issues, this vignette also points out to the increasing time pressure put on researchers by the funding bodies to complete research within shorter deadlines. In fact this could be an impetus to the adoption of technology routes because of its perceived efficiency gains.

However, the vignettes illustrates what could actually happen when it comes to engaging with technology, and why researchers might end up resorting to traditional ways of conducting research knowing it works, despite having less time than they used to have. Sometimes, researchers use technology as a replacement for traditional ways of doing things. Having access to a tool doesn't necessarily mean that researchers would want to use it. Some researchers see technology as a disruption to the demanding and intense cognitive research tasks. Simultaneously they value it as useful and efficient in more mechanical and laborious tasks such as content editing and formatting. Many researchers in the study used various tools and technologies that are highly useful for data management, communication and networking. However, many researchers agreed on the lack of value in comprehensive training before they have an actual need for its application because either they forget the training, or the technology becomes obsolete or changes considerably. Eventually, for some researchers, bad experiences can put them off from using these technologies. The vignette here shows that, in practice, the individual researcher's adoption of technology is much more complex and contextual than we might assume, and could slow down the technology diffusion across the population.

Institutional access to technology and information

Vignette 2: Research information and infrastructure

Sheila picked up her shiny new iPad and started walking back to her office after a meeting with the Head of Research Information. She had just moved to this university and as a new Professor she is expected to start bringing projects and funding straight-away. However, it has been three months and she still doesn't know what are the key research projects that have already been funded at the university; who are the experts; how much funding has been received so far; what project management support she has access to; or what is the technological infrastructure, software and technical assistance she has access to support her research activities. At the meeting, she highlighted the need to improve the access to information and resources for researchers. She boasted how her previous research-led University has a well-established CRIS (Current Research Information System) that gave her a clear picture in terms of access to information, resources, skills and technology that is relevant for the research project in hand. After the meeting she found that there are challenges to streamlining access to research systems such as buy-in from senior management in terms of huge financial investment and support for such systems. More importantly she recognised the need for engagement from all researchers in terms of providing the relevant information at least once, and updating it periodically. Sheila initially thought it will be straightforward to have access to all the relevant tools and resources she needed. However, she now sees that they are disparate, less supported and not well integrated, resulting in much avoidable duplication of effort. She is now wondering whether it is her responsibility to worry beyond her own immediate access to systems and tools.

Access to technologies and systems can vary considerably among institutions and this can be a factor in its adoption and diffusion. Sheila, in the vignette 2 above, experiences this when she moves from a research-led university with a well-established CRIS to one without such integrated systems.

However, the vignette mentions a "shiny new iPad" to indicate that availability of funding for popular generic tools is not uncommon. Research processes and resources at many institutions are managed and supported by different departments, people and systems. This results in a huge amount of time-consuming administrative and management effort to identify the right resources and tools and then use them effectively. Researchers in the study that this paper is based on talked about not having access to relevant information, tools, technologies, support and skills development, or even not knowing how to go about finding them.

Systems such as CRIS can provide researchers with "easy access to relevant information and associated software, processor power, storage systems and ... [helps] ... to collect more data to overcome incomplete or inconsistent information" [Jeffery, 2008]. The latter part of this assertion shows that it can help to improve visibility of information and resources leading to fixing any deficits. Setting up CRIS would also contribute to researchers' CVs and profiles (as considered in vignette 3) and saves duplication and administration time as well as contributing to diffusion among researchers due to its attractive efficiency gains.

However, buy-in and active involvement from stakeholders such as senior management team, researchers and research administrators are critical for such adoption and diffusion endeavours to take-off. Sometimes individuals or a group of researchers' autonomous enthusiastic efforts can overcome the many access barriers. However, the study showed that having to repeat the effort for each project can lead to frustration, as Sheila feels towards the end of this vignette.

Individuals may not have complete autonomy on the adoption and use of technologies within an institutional context [Fichman, 1992]. Researchers' use of technology depends a lot on what tools and technologies are available to them although it is often not a choice they can make. The institutional access to tools and technologies, and how the researchers are exposed to them (for example, through contextual development events, and enforced policy) contributes to the usage; if any of it comes across as useful, researchers might adopt it. The study showed that money is not seen as an issue for institutions and they often have the funding to make basic or common tools and technologies available for researchers, even to work from home. However, more advanced, specific, or custom use of technologies are advised to be included in the project funding bid itself as such technologies mostly only apply to that particular project. So access supported by the institutional funding and technology usage strategies contributes to researchers' exposure to technologies, and thus leads to its adoption and diffusion.

Individual and institutional conceptions of technology

Vignette 3: Online profile and social media impact

Alex is an experienced researcher in Music and is well known among his vast social circle for his critical ear for a range of music genres. He has been asked by his institution to keep his University profile and the institutional digital repository up-to-date. Although he doesn't see the value of it, he makes a good effort when he gets time. Many colleagues have encouraged him to join Facebook and Twitter but he says "I am not a techie and I am too busy to know what people ate for breakfast". Recently, an international university contacted him via his University profile page and invited him to work together on an exciting new research project. This made him think about the value and power of online profiles in a professional context. They requested him to submit some evidences of impact of his research work for the joint research bid. Alex contacted his publishers to get some download rates, etc. and eventually submitted an evidence of 72 downloads of five of his relevant papers. Elsewhere on the internet some of his papers were being mentioned and re-tweeted by hundreds of social media users making them reach and be read by thousands of researchers. Many of them wanted to network and follow his research to inform their own research. This popularity was noted by the international university and they alerted Alex that his papers are much more popular than he thinks. Alex is now pondering whether to join social media.

Many researchers acknowledge that technology in general is a useful thing (Figure 1) yet they may not fully understand how to use it effectively in their own context. This largely depends on their conception of technology. In vignette 3 above, Alex is a passive user of technology and somewhat unsure of its benefits. The institution, however, sees technology mainly as a means to improve efficiency and communication. They ask researchers to keep their online profiles up-to-date to promote their research but are often less effective in convincing the individual researchers of the benefits in their own context. In this scenario, Alex happily complies with the request to keep his University profile updated and eventually gets a positive experience to realise some of its value. He is now even wondering whether to reconsider his social media usage for professional purposes.

The conceptions of technology uses can inform the researchers' technology adoption. The study drawn in this paper showed that some researchers may limit technology to basic usage while others recognise its affordances and use where appropriate. Research data showed that, increasingly, institutions now promote the adoption of digital technologies as a capacity and impact builder.

Alex, in the vignette here, normally limits technology use and sees it as an external phenomenon to his research activities. Although he is still not fully convinced, he now recognises that it could have some value in his research context such as dissemination and networking. A closer examination of this vignette shows that individual and institutional conceptions align with each other when the contextual needs are clarified. It could then enable a meaningful adoption of technology that leads to diffusion across all researchers over time.

All three vignettes above highlight that institutions and researchers want to explore how technology can be useful in saving time and improving efficiency without compromising the rigour and quality. Various types and stages of research activities are now heavily reliant on information and communication technology. However, there are numerous factors and challenges to address if we are to reap the perceived benefits of e-Infrastructure through technology adoption and diffusion. The next section examines some of the factors and challenges using three common characteristics of technology adoption and diffusion theories.

Researchers' technology adoption

In terms of technology use, the vignettes above conceptually consider the current experiences and practices among researchers from three different angles - actual usage, access to it, and conceptions of technology - from individual as well as institutional perspectives. This section will be examining the technology use among researchers using three common characteristics of technology adoption. It will then briefly consider the implications for researcher development.

Individuals' adoptions of technology can be explored from various perspectives such as Rogers five stages of adoption [Rogers, 2003], the Concerns-Based Adoption Model (CBAM) [Hall & Hord, 2006], and Moore's Technology Adoption Cycle [Moore, 1999], whilst institutional adoption can be studied using models such as Technology Acceptance Model or Technology Acceptance Model and the United Theory of Acceptance and Use of Technology [Viswanath Venkatesh, Michael G. Morris, Gordon B. Davis, 2003], etc. Although these theories have various scopes and different perspectives, Straub identifies that "most theories share three categories of characteristics that influence the adoption and/or diffusion of an innovation" [Straub, 2009 p628]. Within the scope of this paper, researchers' experiences of technology use are examined through these three categories of characteristics of adoption – individual, technology, and context.

Straub's first category of characteristic focuses on individuals and their differences – "state- or trait-based characteristics that predispose a person to seek out or shun change" [Straub, 2009 p628]. It is interesting to note the characteristics of the researchers in the vignettes. Vignette 1 presents Linda's experiences of working on her research at home. She generally follows traditional research practices but is very strategic about technology adoption and uses it with discernment. She is patient with technology and seeks training as she is not an autonomous learner.

However, technical challenges make her give up and resort to the traditional ways that she is comfortable with. In addition, she is now probably unlikely to use that particular technology. Vignette 2 shows Sheila's experiences, someone who is very successful, confident, enthusiastic and enterprising. She is interested in research management aspects and actively engages with the e-Infrastructure which she sees as an integral part of research activities. However, the challenges and delays due to institutional business process and complexity is edging her to being despondent. Vignette 3 describes the experience of an established researcher, Alex, who has a good research network. He sees technology as separate phenomenon to research but adheres to policies set by the institution. He is open to change and makes an effort to explore and adopt technologies.

Individual characteristics in these experiences have similarities and differences. Alex's positive experiences lead him to seek the adoption of new technologies while Linda's negative experiences make her shun it. Sheila, however, is still enthusiastic despite the challenges, although her future experiences in the new institution could influence her technology adoption. Such variety of experience, conceptions and characteristics of individual researchers is a factor in their technology adoption.

Straub's second category of characteristic focuses on the specifics of a particular innovation itself – "how easy an innovation is to use, how the use of an innovation is compatible with the lifestyle of an individual" [Straub, 2009 p628]. Looking from a lifestyle angle, researchers use technology that suits their research preferences. Some of the tools discussed in the vignettes are for local usage within individuals' space or computers (offline) while others were through internet (online). Vignette 1 focuses on offline characteristics and specifically on data management and analysis aspects. It also mentions scissors which once was an innovation but has been diffused over time and continues to be stable and reliable. Vignette 2 mentions more personalised tools such as iPads as well as complex centralised information systems such as CRIS. Vignette 3 highlights the impact of using online media which enables the international collaborative working. Thus, Straub's observation of technology's compatibility with lifestyle is valid in the researchers' context as well.

All three vignettes show that technology gets adopted when it matches researchers' needs and preferences. However, ease of use is also a key factor. Fichman classifies technologies based on the level of knowledge burden and user interdependencies to Type 1 and 2 where the Type 2 is distinguished as technologies with high knowledge barriers and significant user interdependencies compared to Type 1 [Fichman, 1992]. Scissors, social media, and iPad arguably fall into Type 1 with perceived ease of use which helps their adoption. The study referred to here confirmed that many research specific tools have fewer user interdependencies but have a high learning curve or knowledge burden issues similar to Type 2. This makes it challenging to master the skills and retain it till the point of application. Thus, compatibility with research styles/approaches and ease of use appears to be important in researchers' adoption of technology.

Straub's final category of common characteristic focusses on the contexts that "make up the environment and surroundings of an individual during the adoption process - frequently this is the work-based organization, but it also may be the mass media or individuals acting as facilitators of change" [Straub, 2009 p628]. The study drawn in this paper sampled from researchers of non-STEMM disciplines. However, 'context' here doesn't mean research areas or topics, but the settings at which researchers use technology and the experiences that trigger their use of technology.

All researchers sampled for the study worked at an educational institutional setting but some researched at work and others outside. In vignette 1, the context is characteristic of a researcher working in isolation. It involves the intense cognitive research data analysis and management task under the time pressure which makes Linda consider using the qualitative analysis software. Although Linda is working at home, it is merely an extension to her organisational context. In vignette 2, it is Sheila as an individual who is trying to bring change, as well as influencing the adoption of CRIS at her new university. New job and research management responsibilities are the context that encourages her to explore technological solutions. Thus, in a broader sense, her context can also include being the facilitator of change, as Straub suggests above. In vignette 3, although Alex is based at the university, it is the mass media (an online audience especially through social media) that has an effect on his possible adoption. His open attitude to trying technology as well as willingness to engage with institutional policies of keeping profiles and the repository up-to-date have contributed to an international exposure. Such exposures, together with the positive environment of encouraging colleagues, also influence his technology adoption. In all three vignettes, elements of the organisational environment are visible. Thus the range of contextual characteristics is an element that contributes to researchers' technology adoption.

The sections above discussed researchers' experiences of technology use through adoption 'characteristics' (individual, technology, and context) and the vignettes presented adoption 'issues' (usage, access, and conceptions). These two adoption factors are discussed with a third factor - adoption 'level' (individual, institutional, and joint). The next section discusses how a researcher development model can be considered based on these three adoption factors and aims to achieve researchers' technology adoption.

Researcher development model for technology adoption

The preceding discussion showed that individual, technological and contextual characteristics of technology adoption [Straub, 2009, p628] are valid factors in researchers' adoption of e-Infrastructure. The vignettes above illustrated the experiences of researchers and showed that researchers' conceptions of what technology is and can do for them; having the right exposure and access to relevant technologies, and then the actual challenges they face during the usage are some of the key issues.

Researchers' technology adoption

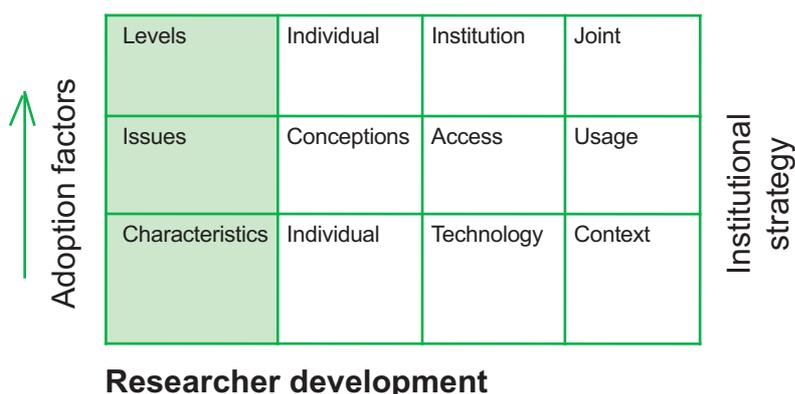


Figure 3 - A researcher development model for researchers' technology adoption

They are relevant from individual and institutional perspectives and work well when they both align with each other.

In terms of technology adoption, researcher development and support could act as a catalyst. The developmental support from initial exposure to on-going usage could address some of the challenges faced by researchers. The RCUK suggests that "e-Infrastructure must be planned to be usable from the onset, actively supported once developed and positively welcomed by researchers" [RCUK 2010, pp17–18]. This planned approach would enhance researchers' capacity, willingness, and best practice of e-Infrastructure use. However, encouragement through policies alone will be inadequate; it needs to consider various factors and that could inform strategic planning.

In vignette 1, Linda wanted some initial refresher type support and a faster computer. In vignette 2, Sheila wanted support in terms of access to information and infrastructure. Alex, in vignette 3, didn't need much technology support but needed contextual support in seeing how it can benefit his research. Based on the illustration of researchers' experiences through the vignettes, and the discussion of the adoption characteristics, this paper proposes a model for a strategic approach to researcher development on technology use. It presents a bottom-up model from researcher development through the adoption factors (characteristics, issues, and levels) to researchers' technology adoption. The institutional strategy would be guiding the decisions and processes.

The model presented in Figure 3 (above), proposes a strategic researcher development approach for institutions to enhance researchers' technology adoption. It focuses on three adoption factors and its sub-categories. Starting from the bottom, the first adoption factor 'characteristics' includes individual, technology and the context. It aims to address individual researchers' attributes and requirements; the characteristics of the technology in consideration; and the context in which it is being introduced and will be applied. The next adoption factor 'issues' include conceptions, access and usage. The issues strand will consider researchers' conceptions of technology, their access to it, and considers possible challenges and how they could be addressed in terms of technology usage.

Finally, the adoption factor 'levels' would be at individual, institutional, and joint levels. This route of researcher development activities to achieve researchers' technology adoption would be guided by the institutional researcher development strategy that addresses technology adoption with a view to enhance the use of e-Infrastructure. This model can be adapted and modified to add or extract various adoption factors and sub-categories to align with institutional researcher development strategies as appropriate.

Let's take an example to evaluate this model. The case here is the use of qualitative data analysis (QDA) software. If a researcher development programme is planning to encourage researchers to use qualitative data analysis software, it needs to be aligned with the institutional researcher development strategy of improving efficiency, rigour, and quality of research outputs. Along with this overarching strategy, the adoption factors proposed in the model can be considered. Starting with the characteristics of the individual, the programme would consider what kind of skills and attitudes the targeted researchers would have towards technology. Then it will examine the characteristics of technology: What kind of QDA software is being considered? How is it different to any other similar tools? What attributes are important to researchers? Next, it would examine the characteristics of context: Is the length of the study worth the effort? Is it a collaborative study? Does the scale and scope of study need consideration? Does the subject area have any traditional knowledge and precedence?

Moving on from characteristics, it could consider the layer above - adoption issues. It starts with conceptions: What do researchers think about qualitative data analysis software? What do they think its benefits are? Then, in terms of access: Do they all have the software where they need it, for example, at home? Do they have the licenses annually or perpetually? And then in terms of usage: How would they actually use it in practice? Do they need help? Is it time-consuming?

Finally, consider the top layer - adoption levels. Most of the factors in the current example may already be at an individual level. Hence, consider whether this aligns with institutional wide technology adoption: Whether different departments and disciplines across the university are using this tool? How can the institutions expectations align with individual researchers requirements?

And so on. This illustration worked through the proposed model to consider the various adoption factors. It demonstrates how a researcher developer could use it to consider relevant adoption factors along with their institutional strategy to plan and enhance researchers' adoption of a chosen element of e-Infrastructure.

Closing thoughts and scope for further study

Higher education institutions in UK are analysing the outcomes of the Research Excellence Framework (REF) 2014 to inform their preparations for the REF2020 which is going to be the next key milestone for many UK research-led universities and research leaders. The pressure is already on to improve efficiency and impact. Effective use of e-Infrastructure investments will be important for universities to benefit from funding such as Horizon 2020 and conduct collaborative international research projects. It is important to note the vision of European Commission to make every European researcher digital [European Commission, 2015a] as well as the e-Infrastructure investments made by Research Councils in Europe and UK to enable collaborative research and reach. For example, adoption of e-Infrastructure is one of the RCUK strategic areas of action [RCUK, 2010 p15].

Researcher development will be key to prepare researchers to make effective use of e-Infrastructure investments. Vitae Researcher Development Framework clearly identifies relevance of technology use and encourages researchers to explore digital tools and enhance their digital skills [Vitae, 2011]. In addition, there are digital literacy frameworks available with specific a 'research lens' [Bent & Stubbings, 2011]. From these efforts and focus it is evident that technology use or adoption among all researchers is becoming an increasingly relevant topic to research further and understand its implications and impacts.

Researchers' technology adoption and diffusion is an understudied area. Although there are many similarities with technology enhanced learning (TEL) skills development models, it may not be transferable to a researcher development context because of the esoteric nature of many research projects compared to learning, teaching and assessment activities.

This paper presented some of the technology adoption experiences and challenges faced by non-STEMM researchers in practice. It asserts that the development of researchers in terms of technology is ever more important due to the changing nature of demands on researchers and funding bodies alike. All researchers in the study had agreed that technology use is helpful for their research and the majority of them thought technology use could influence their research. However, a deeper examination reveals that individual researchers' adoption of technology is much more complex and contextual than it might appear at the outset, and that technology diffusion across the population of researchers can be considerably slow. To achieve an effective use of e-Infrastructure technology diffusion needs to happen across the researcher population, and the rate of individual adoption will decide how quickly it happens.

To address these challenges this paper proposes a flexible model and encourages consideration of its relevant elements to inform and complement institutional researcher development strategies to achieve the adoption of a certain technology or a set of them.

This paper raises further questions. Will the adoption of technology reach an effective diffusion 'in time' to make best use of future e-Infrastructure investments? Diffusion can happen over time but should researchers wait for it? What level of buy-in is required from researcher developers and senior managers? Are there unseen problems with the increasing push and expectations on e-Infrastructure? Is there a danger of its perceived efficiency gain becoming a generalised expectation and funding bodies, adding extra pressure on researchers to finish their project in increasingly shorter time regardless of whether it is appropriate to use e-Infrastructure on a project or not? Or is the adoption of e-Infrastructure still not an issue? The paper recommends further dialogue and research around the topic to address such questions and inform researcher development in preparing researchers for the effective use of e-Infrastructure.

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Why do fewer postgraduates disclose a disability and how can we work to change this?

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Introduction

The proportion of students studying at higher education institutions (HEIs) in the UK who disclosed a disability increased from 5.4% in 2003/4 to 9.5% in 2012/13³⁴; Equality Challenge Unit, 2014]. The proportion of disabled postgraduate students has also grown during this time, but it remains noticeably lower than for undergraduate students: 10.8% of first degree undergraduates (UGs), 6.0% of taught postgraduates (PGTs) and 6.6% of research postgraduates (PGRs) disclosed a disability. Of course, there are likely to be a number of students who are disabled but choose not to disclose, and for comparison government figures suggest a much higher figure, 16% [Office for Disability Issues, 2014] of the working age population is disabled.

This paper will explore why the numbers of disabled students are likely to be higher than the disclosure rates suggest, particularly at postgraduate level. It will outline the legislation relating to disabled students in higher education in the UK. It will give examples of resources that are available to support PGRs and researcher developers working with them through the 'Every Researcher Counts' programme³⁵, share case studies produced as part of the Premia Project³⁶ and explore the support that is offered to disabled PGRs at the University of Nottingham. Finally it will make recommendations as to other ways to better support disabled PGRs and provide links to other useful resources.

Types of disability

People often think of disability in terms of visual, hearing and physical impairments, however these only account for 7.6% of all students who disclose a disability (0.6% of the student population as a whole) and in fact, the two most common categories of disability - Specific Learning Difficulties (SpLDs) and mental health conditions - are both hidden ones. By far the most common category is SpLDs, which includes a range of conditions such as dyslexia, dyspraxia, dyscalculia and Attention Deficit (Hyperactivity) Disorder. These account for 50.0% of UGs, 45.9% of PGTs and 35.3% of PGRs who declare a disability. From these data it appears that disclosure rates for UGs and PGTs with SpLDs are fairly similar, but when the data is presented as a percentage of the overall student population (Table 1) it is clear that this is not the case: 5.4% of the UG population disclosed an SpLD, compared with 2.7% of PGTs and 2.3% of PGRs. The situation is similar for mental health conditions, with the proportional disclosure rates for PG students around half that of the UG student population: 1.3% UG, 0.6% PGT and 0.7% PGR.

³⁴ Unless otherwise stated, all statistics are taken from: Equality Challenge Unit (ECU), 2014, "Equality in higher education: statistical report 2014, Part 2: students" www.ecu.ac.uk/wp-content/uploads/2014/11/ECU_HE-stats-report_student_v19.pdf (accessed 19/02/15)

³⁵ Every Researcher Counts is a Vitae programme for equality and diversity in researcher careers. www.vitae.ac.uk/erc (accessed 28/07/15)

³⁶ Premia was a project for disabled researchers. Further information on the Vitae website www.vitae.ac.uk/doing-research/every-researcher-counts-equality-and-diversity-in-researcher-careers/Premia-project-background

	UG	PGT	PGR
Blind or serious visual impairment	0.1	0.1	0.2
Deaf or serious hearing impairment	0.2	0.2	0.3
Long-standing illness or health condition	1.0	0.8	1.1
Mental health condition	1.3	0.6	0.7
Physical impairment/mobility issues	0.3	0.3	0.4
Social communication or autistic spectrum disorder	0.3	0.1	0.1
Specific learning difficulty	5.4	2.7	2.3
Two or more impairments	1.0	0.4	0.6
Other impairment	1.2	0.7	0.9

Table 1: Profile of disabled students as a percentage of all students by degree level and impairment type 2012/13

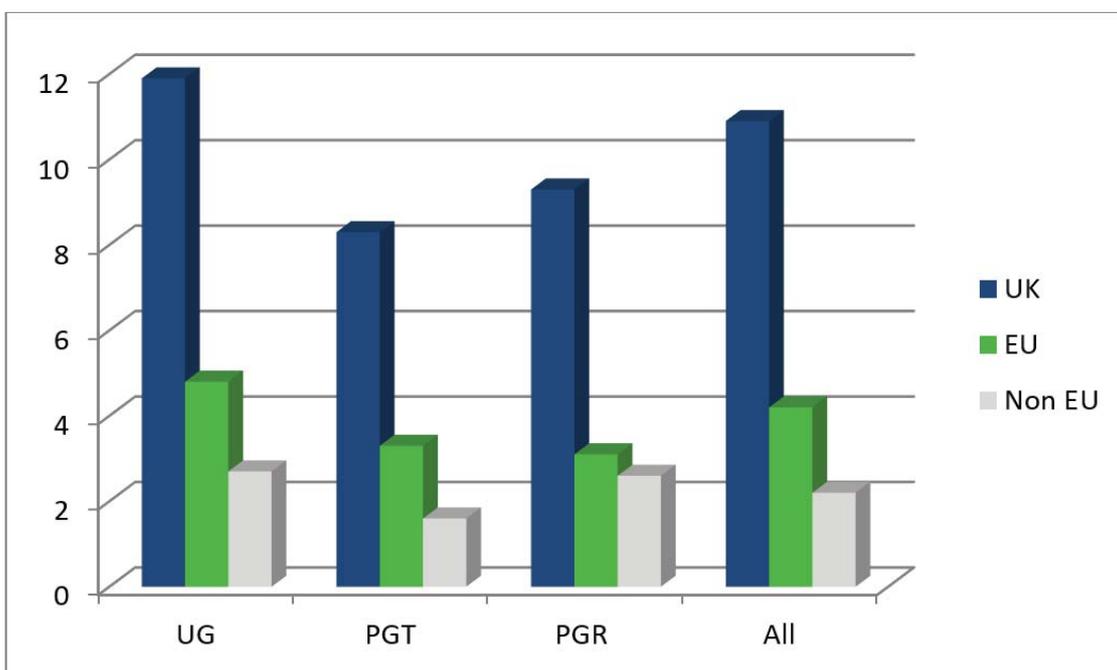


Table 1: Profile of disabled students as a percentage of all students by degree level and impairment type 2012/13

Data from the Destinations of Leavers from Higher Education survey for 2012/13 shows that disabled graduates are slightly more likely to continue their studies than non-disabled ones: 12.2% of disabled graduates go on to further full-time study compared to 11.5% of non-disabled, and for part-time study it is 1.9% versus 1.2%. The survey does not ask what level this study is at, but it is not unreasonable to assume that in the majority of cases it will be at PG level. This suggests that a significant proportion of those who disclose a disability at UG level do go on to PG study, but then choose not to disclose. Potential reasons for this are discussed later in this paper in the section 'A case study of institutional support'.

Reasonable adjustments and Disabled Students' Allowance

Under the Equality Act 2010, a person has a disability if he/she has: "a physical or mental impairment [which] has a substantial and long-term adverse effect on [his or her] ability to carry out normal day-to-day activities" [The Equality Act, 2010].

'Substantial' means "more than minor or trivial" (Equality and Human Rights Commission [EHRC 2011]) and 'long-term' means that it has lasted or is expected to last more than 12 months [EHRC, 2011 p57]. Higher education providers have a duty to make reasonable adjustments to prevent substantial disadvantage for such students in terms of: changing a procedure, criterion or practice; removing, altering, or providing a means of avoiding, a physical feature of a building or premises; and, providing auxiliary aids such as equipment, human assistance and materials in alternative formats [EHRC, 2011 p24].

Perhaps the easiest barriers to identify, and often also to overcome, are physical ones. For example: flights of stairs can be overcome by the provision of lifts and ramps, and doorways can be widened to accommodate wheelchair users. However, as discussed with reference to types of disability previously, the percentage of students for whom these apply is relatively small. However, for many students the barriers they face are due to the way in which learning (including researcher development training) is delivered and evaluated.

PGRs with visual impairments and SpLDs may struggle to read PowerPoint slides and handouts used in workshops, and so might benefit from being provided with these in advance of the session, possibly in an alternative format. This means that copies of these need to be available in an electronic format that is screen-reader accessible and can be edited (to change font size for example) so PDFs are best avoided. Hearing impaired students may find it difficult to engage with the class if they struggle to hear what is being said. Many supplement their hearing with lip reading to some extent, so it is therefore helpful if those speaking (including other students) face the student, do not cover their mouths and ensure their faces are not in shadow when they are speaking. A student with a mental health condition may benefit from adjustments to their viva such as being allowed to request short rests breaks and holding it in a room they are familiar with. Also compared to UGs and PGTs, PGRs are expected to undertake a greater amount of independent study and learning, will have to produce a very lengthy thesis and in most cases will need to orally defend their research at a viva voce examination, something many will not have done before. The discipline and research methods used may also impact on the barriers they face and the adjustments required to overcome them. For example, social sciences research using qualitative methods may present challenges for a student with a social communication difficulty who finds it very difficult to talk to strangers whilst laboratory research may present challenges for a student with a physical disability which affects their fine motor control.

Whilst many adjustments can be made for free or are ones for which the institution must bear the cost, individual students do sometimes incur extra course-related costs as a direct result of their disability. Where this is the case, UK domiciled students are often eligible to apply for Disabled Students' Allowance. This covers four categories: specialist equipment and software (eg. text-to-speech or mind-mapping software), non-medical helpers (e.g. mentors or note takers), extra travel costs, and, in some cases, a general allowance for consumables such as paper and ink, books and photocopying.

In some cases DSA is provided by the PGR's funding body: such as students with a National Health Service (NHS) Bursary³⁸ or NHS Social Work Bursary³⁹ and those who are funded by the Research Councils⁴⁰. PGRs with other types of funding, or who are self-funded, can apply for government administered schemes depending on whether they live in England⁴¹, Wales⁴², Scotland⁴³ or Northern Ireland⁴⁴. The government scheme for students living in England is administered by Student Finance England and it should be noted that significant changes to DSA are being introduced in the 2015/16 academic year, although it is not yet known if, or when, other funding bodies will follow suit.

28.2% of disabled PGR students receive DSA funding of the types mentioned above which is considerably less than the 50.8% of UG and 32.5% of PGT students. The main reason for this is likely to be the fact that (with the exception of Research Council-funded students) only UK domiciled students are eligible for DSA, and as discussed earlier there are fewer UK students at PGT and PGR level. However, given that there is a greater proportion of UK domiciled students at PGR level than PGT, but PGR take up of DSA is lower, this does not fully explain the discrepancy. It is therefore likely that a smaller proportion of eligible PGs are applying for DSA than UGs, and this fits with the suggestion later in this paper regarding institutional support that PGs are often unaware of support or are reluctant to take it up.

For disabled students who are not eligible for DSA, including EU and Non-EU students there are potentially alternative sources of funding, such as the Snowdon Trust⁴⁵ and the Student Health Association Bursary⁴⁶ but it should be noted that no matter their fee status institutions do still have a legal obligation to make adjustments for disabled students even if they do not qualify for external funding.

Vitae Every Researcher Counts project and Premia case studies

Vitae through their Every Researcher Counts project encourage disabled researchers (and others with protected characteristics) and those that supervise them to have open conversations regarding their needs. Understanding of wider needs should be part of a holistic approach to managing every PGR as part of a process and with regard to general wellbeing. It is also important for those supervising and supporting disabled PGRs to understand that needs can change as the research evolves and therefore analysis of needs should be an ongoing process.

Each researcher's needs will be different and should be considered on an individual basis with no one size fits all solution. Equally all institutions will have different support systems in place within which they will need to operate. In order to highlight some of the issues facing disabled individuals and give some context to the statistics we include the following case studies collected as part of the Premia Project⁴⁷.

Establishing a relationship with a disabled researcher

'It's important to ask the disabled student what they need because sometimes people make assumptions, they don't link things together. There's very little bother in the School I'm in; they're tuned in to what I need. I'm very happy about that.'

PGR, multiple disabilities

³⁸ www.nhsbsa.nhs.uk/Students/3949.aspx (accessed 19/02/15)

³⁹ www.nhsbsa.nhs.uk/Students/1198.aspx (accessed 19/02/15)

⁴⁰ www.rcuk.ac.uk/skills/training/ (accessed 10/03/15)

⁴¹ www.gov.uk/disabled-students-allowances-dsas/overview# (accessed 19/02/15)

⁴² www.studentfinancewales.co.uk/new-students/201415-what-financial-support-is-available/extra-support/disabled-students-allowances.aspx (accessed 19/02/15)

⁴³ www.saas.gov.uk/forms_and_guides/dsa.htm (accessed 19/02/15)

⁴⁴ www.studentfinancenl.co.uk/portal/page?_pageid=54,1268430&_dad=portal&_schema=PORTAL (accessed 19/02/15)

⁴⁵ www.snowdontrust.org/grants/apply/ (accessed 19/02/15)

⁴⁶ www.studenthealthassociation.co.uk/bursaries/index.html (accessed 19/02/15)

⁴⁷ Premia: making research accessible. www.vitae.ac.uk/doing-research/every-researcher-counts-equality-and-diversity-in-researcher-careers/Premia-project-background (accessed 19/02/15)

This comment demonstrates the importance of involving the researcher when analysing individual's needs. Each school case will be different and it is important at the start of a relationship to understand what the student perceives as their need.

The challenges of research

“Especially in our first year this (difficulty with research terminology) is something we talked about quite a lot. And again that was nice because five or six of us in the same room were first year students and this is one we all felt completely lost with.”

PGR, dyslexia

“My emotional disability made my PhD experience most unsatisfying and upsetting. My inability to feel comfortable and to interact with people led to me making no friends while at university. This made the rigours of research more hard to bear, when you have no distraction from it, no release.”

PGR, mental health difficulties

Two conflicting experiences here both emphasise the importance of having someone to discuss issues with. The language of research will always be extremely challenging and particularly applicable to some disabilities, being able to share experience is essential in combatting isolation.

Adjustments in helping a researcher with ME/CFS complete their thesis

‘Veronique has low energy levels and gets very tired when writing for long periods of time. Her concentration is poor and she finds many research activities hard to sustain because of her ME (Myalgic Encephalopathy)/CFS (Chronic Fatigue Syndrome).

- Ask Veronique the maximum time she can work on one task.
- Decide together on a plan which mixes reading, analysis, note-taking, writing up.
- Ensure that she has attainable goals.
- Encourage her to spend part of each day writing.
- Develop a plan which ensures she will not store up her writing until the writing up year but will complete chapters each year as she progresses.
- Find out the times of day when she has optimum energy. Build that into the planning process.
- Encourage her to liaise with the Disability Service as they will be able to provide advice and support.’

This case study has been included to provide an idea of the challenges of a hidden disability and to give an idea of some of the ways that these may be addressed. Ongoing consultation with this researcher will be essential in their being successful.

Specific challenges for a PGR with Asperger Syndrome in undertaking the viva

‘Ian has Asperger Syndrome (part of the autistic spectrum) and has social communication difficulties.

People with AS have social communication skills across a wide spectrum. Examiners would expect that candidates understand their language, including imagery, and non-verbal communication.

Ian could be at a substantial disadvantage because figurative language and understanding of non-verbal communication could be very difficult for him to interpret and process.

Ian's requirements in the viva will depend very much on the panel's understanding of his needs. He can be coached in techniques for oral examinations, although it could raise confidence in the process, it is unlikely that practice vivas will achieve substantial gains. The adjustments which may be needed are to do with the language in which examiners frame their questions and their verbal and non-verbal responses to Ian in the viva.’

Similarly to the previous case study, this demonstrates challenges specific to one individual and one disability. It also relates to a specific part of their study, the viva. This individual may have had few challenges generally but this particularly element needs consideration. Again an open conversation and adaptable approach are essential.

Case study of institutional support

In August 2009, the University of Nottingham (UoN) was one of the first institutions in the UK to recruit a dedicated Disability Adviser for Postgraduate Students, whose role is to support students with physical and sensory disabilities, long-term medical conditions and mental health difficulties. This is part of Disability Support⁴⁸, the central disability service, but is located in the Graduate School⁴⁹, which is responsible for researcher training and development, in order to embed support for disabled students into mainstream provision for PGs. Specialist support for students with SpLDs is provided by Dyslexia Support which is part of Academic Support⁵⁰.

Emma Rowlett (author), who is disabled herself, graduated from UoN in 2011 after completing her PhD entitled ‘Disability equality and discrimination in higher education: staff and student perceptions of the ‘reasonable’ adjustments made for print disabled students’ and had previously produced resources for the Higher Education Academy’s⁵¹ former MSOR (Maths, Statistics and Operational Research) subject centre aimed at staff supporting disabled students. Working at first with both PGT and PGR students, as the number of students taking up support grew her role was revised in early 2014 to focus solely on support for PGRs.

During this time she has become aware of a number of reasons why PGs are reluctant to disclose, these include: not realising any support, including DSA or similar funding, is available to PGs; thinking there isn’t any support that could be provided to overcome their particular difficulties; concerns that they will be discriminated against when applying both for courses and for the very limited funding sources available.

⁴⁸ www.nottingham.ac.uk/student-services/support-for-your-studies/disability-support/index.aspx (accessed 19/02/15)

⁴⁹ www.nottingham.ac.uk/graduateschool/index.aspx (accessed 19/02/15)

⁵⁰ www.nottingham.ac.uk/student-services/support-for-your-studies/academic-support/index.aspx (accessed 24/07/15)

⁵¹ UK Higher Education Academy www.heacademy.ac.uk (accessed 28/07/15)

Some students have also said that they feel PG study (especially at PGR level) is more like having a 'real job' and since they mistakenly believe there won't be any support available when they enter paid employment they decide to learn to get by without it. It is worth noting that there is in fact support available to employees in the form of the Access to Work scheme⁵² and employers have legal obligations to make reasonable adjustments for disabled staff under the Equality Act 2010.

Once a PGR student discloses a disability, they are offered an appointment to discuss the impact their disability has (or is likely to have) on all aspects of their study. Areas covered might include: access to taught sessions, workshops and seminars (including those run by the UoN Graduate School); adjustments to examinations, including the viva voce examination; access to reference materials, both online and in the library; suitability of study space both at home and on-campus; arrangements for supervision; and any laboratory work, placements, conference attendance, group work or presentations that are required. Any recommendations made are detailed on a Disability Referral Form which is passed to the Disability Liaison Officer in the student's School who then distributes this to staff involved with teaching, supervising, or otherwise supporting the student.

The student will also be provided with information about DSA and any other funding they may be entitled to, and signposted to other services, e.g. the University Counselling Service, the specialist Mental Health Advisers, or the Disability Sport Officer.

One recent success story relates to a non-EU domiciled student who had not disclosed his hearing impairment when he applied to the university as he had not appreciated the impact it might have. English was not his first language and although he was fluent in it, he was not used to the range of native English accents and also found that people in the UK tended to speak more quietly than he was used to back home. The author was made aware of him by a Researcher Training and Development Manager (RTDM) in the Graduate School who had encountered him on a course she was teaching. It was clear that he was finding it very difficult to hear her and was struggling to engage with the course, so with his permission she passed his details on.

A specialist assessment of his needs was arranged and an FM system and wireless microphone was recommended and provided to him on a loan basis. Those teaching him now wear the microphone in classroom situations and the sound is transmitted to his hearing aids, improving the clarity of speech and cutting out background noise. The RTDM commented that this not only enables him to have "a much more fulfilling learning experience, but it is also making my teaching experience more enjoyable. Of course I am always looking for ways to help students but watching students engage with confidence is so much more rewarding than seeing them struggle. All I had to do was wear that radio mic, which, without the usual trailing wires, was really simple to use." In addition to work with individual students, the author has

worked with the Graduate School to increase awareness of the support that is available for disabled PG students.

For example: prominent links have been added to the Graduate School website to targeted information on support for disabled PGRs⁵³; the benefits of disclosure and an overview of the support available are included in the presentations given at induction events; an opportunity to disclose is included when signing up to Graduate School courses online. She has also worked with the funding team to look at ways of improving disclosure rates, such as including on application forms a statement on the benefits of disclosing, and improving awareness of DSA to those successful in applying for Research Council funding, such as providing details via Facebook and Twitter. Advice on supporting disabled students has also been incorporated into generic training for staff, with a particular emphasis on supervisors, and they are encouraged to signpost students towards appropriate services such as Disability Support.

Recommendations

It is vital that supervisors of disabled PGRs take time to understand their students' specific needs via a two way communication process. They must understand the legal context, whilst also taking time to fully understand the system that they are working with in order to provide the reasonable adjustments to ensure that disabled PGRs are supported to achieve their full potential.

Institutions also need to take steps to encourage disclosure and promote the support that they provide for disabled PGR students and to reach the widest audience, it is not only the central disability service that needs to take responsibility for this. Those providing researcher training and development and other support to PGRs can help by including information:

- on application forms for PGR places and for funding opportunities
- at induction events
- when students sign up for researcher training and development courses
- on websites and social media.

It is also important that staff involved in researcher training and development are aware that support is available, know how to direct students to the central disability service, and that they impart this knowledge to any staff they are training, including supervisors.

Support and additional resources

Utilise the Every Researcher Counts (ERC)⁵⁴ Achieving your best as research staff: preparing for your professional development conversations resource in order to have effective conversations with your PGRs about their wider needs with regard to support and work life balance. This may uncover disabilities or needs that may have been missed and ensure all parties are open and engaged in this process. This discussion should form part of appraisals as individual's needs may continue to

⁵² www.gov.uk/access-to-work/overview (accessed 19/02/15)

⁵³ www.nottingham.ac.uk/graduateschool/support-for-disabled-students/index.aspx (accessed 19/02/15)

⁵⁴ Every Researcher Counts is a Vitae programme for equality and diversity in researcher careers. www.vitae.ac.uk/erc (accessed 28/07/15)

change throughout their working lives. Consult ECU and ERC web pages in how to support disabled PGRs.

Utilise the ERC resources relevant to disability in order to improve training and encourage open discussions within your institution.

References

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Vitae, is an international programme led and managed by CRAC, a not-for-profit registered UK charity dedicated to active career learning and development. Working in the UK since 1968, when we ran our first project to support transitions of doctoral researchers to industry, Vitae has great expertise at enhancing the skills and career impact of researchers locally, within a global context. We work in partnership with UK and international higher education institutions, research organisations, funders, and national bodies to meet society's need for high-level skills and innovation.

Vitae aims:

- Influence effective policy development and implementation relating to researcher development to build g human capital
- Enhance higher education provision to train and develop researchers
- Empower researchers to make an impact in their careers
- Evidence the impact of professional and career development for researchers

Vitae and its membership programme is led and managed by CRAC: The Career Development Organisation.

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