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TITLE: Training needs of Early Career Researchers in Research-Intensive Universities

ABSTRACT

Purpose – The aim of this paper is to explore the training needs of Early Career Researchers in British Research-Intensive universities. This paper presents a new measurement scale constructed based on the Vitae Researcher Development Framework (a national framework in the UK to help researchers plan their training and development pathways) disseminate ECRs' training needs according to the four Vitae Development Domains.
Design/methodology/approach – This paper discusses the result of a survey organised among ECRs who were asked to fill in an online questionnaire, which included a newly developed measurement scale. Training needs are analysed based on 57 respondents, working in British Research-Intensive universities, having obtained their PhDs not more than five years prior to the survey.
Findings – We offer insight in the experiences of ECRs in Research-Intensive universities in relation to their training needs, which are very much centred around the notion of becoming a subject specific expert, able to attract research funding and lead and manage these projects, including the successful supervision of students.
Originality/value – The current academic environment is extremely competitive, and as in other segments of the labour market, it is vital that ECRs recognise the need of continuous training in order to maintain their competitive status in the knowledge-based economy. This paper is original as it disseminates a new measurement scale and provides fresh empirical results on the training needs of ECRs in British Research-Intensive universities.

Keywords – Early Career Researchers, Research-Intensive universities, training needs, survey research, measurement scales, Vitae Researcher Development Framework

Paper type – Academic Research Paper

Introduction

This paper explores the training needs of Early Career Researchers (ECRs) in British research-intensive universities. ECRs are a group of scholars who need to develop themselves in a changing academic workplace, characterised by a strong competitive and 'managerial' culture (Elizabeth & Grant, 2013, p.123), budgetary constraints, a low availability of post-doctoral appointments compared to the increasing number of PhD graduates, and an ever increasing pressure to combine multiple responsibilities under a tight budget (Austin et al., 2007; Gappa et al., 2007; Hughes, 2009). ECRs are the research leaders of the future, and thus need to continuously upskill themselves in order to survive in the academic labour market.

But how do ECRs themselves feel about their own development, and which specific training needs do they recognise as being vital in order to fulfil their career ambitions? Hakala (2008, p.167) pointed out that ECRs' own interest and voices are not well researched, and a review of the literature makes clear that more work in this area will increase knowledge and understanding on how to support ECRs in getting them successfully through the early stages of their careers. This argument has also been supported by McAlpine (2010, p.239): *'... I argue their developmental needs are not well understood and rarely addressed.'*

The study presented in this paper was based on the Vitae Researcher Development Framework (RDF), as it represents four domains of development: (A) knowledge and intellectual abilities, (B) personal effectiveness, (C) research governance and organisation and (D) engagement, influence and impact. The Vitae RDF is a framework to help researchers in the United Kingdom plan, promote and support their development needs (Vitae, 2010). More details on the Vitae RDF and how it was used to construct a new questionnaire for quantitative analysis will be explained below.

Firstly, definitions and training needs of ECRs as recognised in the international literature will be evaluated. Secondly, the Vitae RDF will be explained in detail. Thirdly, the methodological aspects of this study will be explained. Fourthly, results of the study will be presented, to finally critically engage in a discussion, including some recommendations for future research.

Early Career Researchers' Training Needs

Research on ECRs has mainly been published in the English speaking regions of the world. This section on ECRs therefore will focus on research evidence as gathered in the United States of America (USA), Canada, Australia and the United Kingdom (UK).

Early Career Researchers
While the term ECR is frequently used in academic circles, it is hard to find one common definition. Alternative terms like 'new researchers' or 'junior researchers' are often used synonymously with ECRs, especially in the USA context (Gappa et al., 2007). In short, there

are several characteristics with which ECRs have been defined in previous studies, or by academic research councils or boards.

First of all, ECRs are often defined based on their number of years of post-doctoral experience. Five years of experience after the PhD was considered as the upper limit for being an ECR within the UK Research Excellence Framework 2014 (REF, 2012). Secondly, ECRs are sometimes defined based on the specific jobs or tasks they are undertaking. The UK REF 2014 guidelines (REF 2012) refer to both 'teaching and research' as possible tasks to be undertaken by ECRs, while research only posts without teaching duties fit into the ECR category as well. Austin (2002) and Åkerlind (2005) have explored the importance of teaching and other aspects of working in academia in the USA and Australian context, with the aim to make sure that PhD graduates understand academic culture, although perceptions on the purposes of postdoctoral academic work demonstrates *'substantial variation'* (Åkerlind, 2005, p.21). Thirdly, ECRs are sometimes defined based on their non-tenure status. Finkelstein and LaCelle-Peterson (1992) argued that ECRs are those who are not tenured yet, distinguished them from assistant and associate professors. Åkerlind (2005) argued that non-tenured post-doctoral positions are often provided in order to prepare them for a career as a tenured faculty member. Going back to the situation in the UK, the REF 2014 guidelines (REF 2012) focus on experience rather than on tenure, and thus defines ECRs as those in permanent and fixed term positions.

Difficulties Experienced by Early Career Researchers
The Training needs of ECRs are likely to be shaped by the difficulties they encounter in their journeys towards developing a fulfilling career. Not many tenured positions are available and this leads to ECRs feeling unsure about what to expect in the future (Austin, 2010). Many ECRs do not know how to fulfil the expectations, and how to plan and develop their careers. Also, many do not feel knowledgeable about employment opportunities in the non-academic sector (Hakala, 2008). Owing to such uncertainties, self-doubt is common among ECRs, while 'contradictory and vying' emotions like 'anxiety' and 'pleasure' are believed to appear together in the ECRs' career, as found by Elizabeth & Grant (2013, p.133). They (ibid.) concluded from their research that such mixed emotions are experienced by ECRs in a highly competitive environment where they are anxious about successfully competing and take pleasure in their achievements. The unclear expectations on how the career will continue also relates to the competitive and demanding work atmosphere in academia. The 'publish or perish' culture is putting extra pressure on ECRs' shoulders, demanding high quality output in a short period of time. Apart from generating research output, ECRs are also expected to learn how to balance research with other activities such as teaching and administration, facing the pressure to juggle a range of activities (McAlpine & Åkerlind, 2010). Training needs of ECRs can thus be diverse, and relate to specific academic tasks, as well as how to combine and manage them together.

Lifelong Learning for Early Career Researchers
As in other sectors of employment, the knowledge-based economy requires employees to maintain and improve their knowledge and skills on a regular basis in order to remain competitive (European Commission, 2009). In terms of building an academic career, this refers to skills and knowledge related to conducting research, teaching, supervising and mentoring, working with others, referring to the notion of becoming or remaining multi-

skilled and competitive (Bazeley, 2003; Åkerlind, 2005). EURAXESS, the European research body, supported by the European Commission, focusses on the development of transferable skills and the need to support 'sustainable' research careers (Miller-Delaney, 2013). But continuous learning and developing oneself is not always straightforward for everyone and training needs are likely to vary according one's socio-demographical profile. Mason et al. (2009) researched 8,000 academics in California and explored difficulties encountered by women to maintain a good work-life balance, which influences their priorities for setting career goals. McAlpine (2010) strengthened this finding through focussing on the need to view academics as human beings with a personal life, who bring their biographical experience into the career decisions they make, and the opportunities they will receive to learn new skills and develop their academic profiles.

The Vitae Researcher Development Framework

Researcher development has gained a place on the UK agenda since 2001 through the formal 'Joint Skills Statement' written by UK GRAD (now Vitae) and the Research Councils (Reeves et al., 2012). UK GRAD has since evolved into Vitae, managed by the Careers Research and Advisory Centre (CRAC). The main aim of the Vitae programme is to help researchers develop themselves into competitive and employable researchers, aligned with the general notion of lifelong learning in order to survive in the knowledge-based economy (Holford et al., 2012).

One of the concrete actions undertaken by Vitae has been the creation of a Researcher Development Framework (RDF). The framework refers to a range of qualities and attributes needed to succeed in academia, and consists of four broad domains, 12 sub-domains and 63 descriptors (Reeves et al., 2012). The framework is represented in Figure 1. The four broad domains are: Domain A: 'Knowledge and intellectual abilities', Domain B: 'Personal effectiveness', Domain C: 'Research governance and organisation' and Domain D: 'Engagement, influence and impact' (Vitae, 2010).

To help researchers in planning their careers, Vitae has developed an online application that researchers can use to manage their own professional development, which leaves room for personal priorities and aspirations (Vitae, 2013). Research by Bray and Boon (2011) revealed that the RDF was perceived as helpful in planning development for non-research related activities, which are important parts of a classic academic career.

[FIGURE 1 here]

Methodological Aspects of the Research Study

Deductive Approach
This research study followed a deductive approach and used the Vitae RDF as a basis to develop a new questionnaire. Originally, the Vitae RDF was constructed using a phenomenographic approach through focus groups and semi-structured interviews with researchers, thus representing an inductive way of reasoning (Reeves et al., 2012). This new study, however, followed a deductive approach, often grounded in positivism and carried out through the application of quantitative methodologies (Pring, 2004; Robson, 2011). As the

RDF is an existing framework, we wanted to know which development needs were recognised by ECRs, which represents a top-down way of thinking in which we generate insights on whether to accept or reject an existing framework. The specific research question we will be answering in this paper is: *'According to ECRs, do their development needs focus on the descriptors as identified in the Vitae Researcher Development Framework?'*

Online Survey
Data in the study were collected through Bristol Online Survey, a tool available for staff and students in the University. The questionnaire constructed for the study has been designed to represent the Vitae RDF domains and the core part of the questionnaire consists of statements related to the question: '*Based on your career plans and aspirations, please specify the importance of undertaking training in the following areas within the next 12 months*'. Since this section is concerned with measuring ECRs' perceptions training and development needs, a linear-scaling model was used because traditionally such scaling is considered the best for evaluating attitudes (Oppenheim, 1992). A 10-point Likert scale (with 1 being the lowest and 10 the highest) was used to measure the importance of getting trained in the Vitae descriptors within the next year based on their own career plans. Among various linear-scaling models, the Likert scale was used because it fulfils the condition of homogeneity or uni-directionality (Oppenheim, 1992) and is arguably the most popular scale for recording psychological measurements that involve self-reporting (Wakita, Ueshima, & Noguchi, 2012). All items will be presented in the results section of the paper and reflect separate descriptors in the four distinct domains.

The survey was divided into three broad areas:
- The importance of the Vitae descriptors
- Training activities within the last one year
- Personal details

The specific questions on development needs were supported by background questions such as their research experience, whether they had undertaken training in the past 12 months, their knowledge and use of the Vitae Researcher Development Framework and a set of standard socio-economic and socio-demographic questions including age and gender (see Appendix). The section on Vitae descriptors contained four main questions based on the four domains identified by Vitae. Four matrix style questions formed this section where each of the four domains of the Vitae RDF was used as the question stem. The descriptors under each domain were listed and participants were asked to provide a level of importance of getting trained in each descriptor based on their career plans and aspirations. Some descriptors were combined into one based on the similarity in their features – for example, knowledge of theoretical and practical research methods were combined into one category and named Theoretical and practical research methods. This step was taken to minimize the number of items under each question stem. In this way, 63 descriptors were brought down to 37 and saved time to fill out the survey.

The questionnaire was tested in a pilot survey in order to check the clarity of the questionnaire and participants in the pilot were asked to provide feedback on the questions.

The final questionnaire was a revised version of the pilot questionnaire, having integrated feedback.

Sampling
Snowball and convenience sampling techniques were used to recruit ECRs with less than six years of experience post-PhD, carrying out academic jobs in the UK and placed in Russell Group universities. The Russell Group, generally referred to as the UK's system of Research-Intensive universities comparable to the Ivy League in the United States, consists of the 24 most prestigious and thus research intensive universities in the UK, including leading institutions like Oxford, Cambridge, University College London (UCL), Edinburgh, Bristol etcetera (HESA, 2013).

This target group was chosen to have a comprehensible setting, reflecting the situation of the UK REF 2014. Links to the online survey were posted on Twitter several times, including the hashtag #ECRchat. The tweet has been retweeted by several academics and academic developers working at the Universities of Bath, Bath Spa, Bristol, Cambridge, Glasgow, Leeds, Newcastle, Nottingham, Highlands and Islands (UHI) and Worcester. It was also taken up by the UCL, Institute of Education and Open University. In order to be sure about surveying the right target group, a filter question on the number of years of research experience was introduced, which resulted in identifying 84 valid respondents.
One of the questions in the survey asked respondents to indicate the type of university they are working for, offering them the choice between (1) a university within the Russell Group, (2) an older university outside the Russell Group or (3) a new post-1992 university. A majority of 57 respondents indicated that they work for the Russell Group, and 16 percent of all respondents indicated they did not know what type of university they were at. Because of the small number of respondents working for the two other types of universities, we decided to focus the results on the Russell Group only. Suggestions for enlarging the focus will be discussed in the conclusion section of this paper.

Results

In this results section of the paper, we will control to what extent ECRs working in Russell Group universities recognise the development needs as specified in the Vitae RDF, which we will do based on the 57 responses we gathered from Russell Group respondents who matched our criteria for inclusion in the survey, based on the number of years of experience post-PhD. Before we go into detail about specific development needs, we describe our sample, based on a number of background variables.

Survey respondents
In terms of age, the largest group of respondents (77 percent) was found to be between 26 and 35, and only 2 percent was 25 or younger. The remaining group of 21 percent is thus older than 35. Female ECRs represented 56 percent of the sample versus 44 percent males. In terms of areas of specialisation, 45 percent labelled themselves as working in a social sciences field, 18 percent worked in humanities and the remaining group (37 percent) indicated that they work in science-related disciplines such as engineering, medicine and natural sciences.
Ninety one percent referred to themselves as being from 'white' origin, with the remaining

nine percent belonged to Asian/Asian British or mixed ethnicity. Four percent of respondents indicated that they have a disability, while the exact nature of the disability is unknown as this information was not gathered in the survey.

ECRs and their training needs
This section of the paper shows the results of the scales on training needs as identified by ECRs, representing the four domains of the Vitae RDF: Domain A 'Knowledge and Intellectual Abilities', Domain B 'Personal Effectiveness', Domain C 'Research Governance and Organisation' and Domain D 'Engagement, Influence and Impact' (Vitae, 2010). Visual representation of these four domains can be found in Figure 1.

The individual descriptors representing the 12 sub-domains (3 sub-domains for each domain) were represented in 37 statements in the questionnaire, which we will now explore for the four separate domains. All items were measured on a scale from 1 to 10, with an extra option 'not applicable' which was later recoded to zero in order to represent a non-existing training need relating to this specific development indicator.

The internal reliability for each domain of the Vitae RDF – based on the Cronbach's Alpha, which measures the internal consistency of a group of items – was computed to understand whether training needs in the constituent descriptors are consistent measures of assessing the overall training requirement of a particular domain (Field, 2013). The Cronbach's Alphas for domains A, B, C and D are 0.887, 0.884, 0.911 and 0.928 respectively. Following the advice offered by Kline (1999, quoted in Field, 2013, p.668), it can be concluded that since all Cronbach's Alphas are above 0.8, the descriptors within each domain are reliable measures of assessing the importance of getting trained in that domain.

A. Training Needs in Vitae RDF Domain A: Knowledge and Intellectual Abilities

Domain A was measured through 11 items, for which Mean, Standard Deviation, Median and Mode are shown in Table 1. Of all 11 items, *Extending subject knowledge* and *Improving knowledge of research methods* were found to be the highest scoring items. On the contrary, three items were found to have mean scores lower than five: *Seeking relevant bibliographical sources and using information technology to manage references and data, Improving knowledge of language(s) appropriate for research* and *Improving academic literacy and numeracy skills*. The modes for these items are '1', which indicate that this was the answering option which was chosen most, thus representing low priority. In finding these results, we might hypothesize that ECRs in Russell Group universities have already built strong skills in these specific areas through completing their PhD degrees, and that further training in these domains is therefore not prioritised, or that their level of confidence in these domains is already very strong. This might be a plausible explanation as those who manage to find jobs in Russell Group universities are expected to have a strong profile already. However, this research did not focus on the reasons behind the respondents' choice of high or low priority and therefore, the assumption made from this finding is a hypothesis only with an implication for further discussions and research in this area. Interestingly, the item *Thinking critically* had two modes at the other end of the spectrum: '2' and '10', which is also represented by a higher Standard Deviation, indicating a wider spread around the mean. Opinions about training needs in relation to this item thus vary across the sample. Similar

differences in scores were found in relation to the item *Solving problems related to research questions and hypothesis*. Future research will have to find out why these discrepancies exist.

[TABLE 1 here]

B. Training Needs in Vitae RDF Domain B: Personal Effectiveness

Training needs in relation to personal effectiveness are presented in Table 2, and all items have a mean score of nearly six or higher. The modes for all items, expect the *Reflecting on own practice and experiences* and *Becoming responsive to opportunities and change* are '10', representing the strong need for training within the area of personal effectiveness. The top one item for training needs in this set of items is *Managing own career progression*, which is not surprising in an academic environment which is ever increasing in complexity and competitiveness, as explored in previous sections of this paper. However, overall, specific items in this scale are not among the highest scoring items across the four domains.

[TABLE 2 here]

C. Training Needs in Vitae RDF Domain C: Research Governance and Organisation

Domain C reflects on training needs in relation to 'research governance and organisation' and the results are presented in Table 3. Five out of nine items in Domain C have a mean score of around five, implying that ECRs consider training neither unimportant nor very important in these areas which include *Application of appropriate code of ethics*, *Understanding legal requirements, Understanding copyright issues, Understanding concepts of attribution* and *Managing risks like security breaches*. The modes and medians for these items are also low. However, ECRs scored high on items relating to generating research funding and managing projects and their finances, all having a mode of 10, medians of eight and means around seven. In times of high competitiveness and tighter budget, it is not surprising that many ECRs experience frustrations in relation to successfully applying for research funding, and this is also clearly represented in the indications of their training needs (Åkerlind, 2008; Hakala, 2008; Austin, 2010).

[TABLE 3 here]

D. Training Needs in Vitae RDF Domain D: Engagement, Influence and Impact

The last set of training needs measured in the survey refer to items of 'development of 'engagement, influence and impact', presented in Table 4. It is also in this domain that teaching related skills, including the supervision and mentoring of students has been measured.
The mean scores for importance in getting trained in eight out of 10 categories of Domain D are above six, with two items scoring just below six: *Understanding of policies and procedures* and *Working with managers and supervisors*. Medians of items in Domain D scale are high as well. Domain D of the Vitae RDF identifies areas that help improve the researchers' capabilities of influencing and impacting in the academic, social, cultural and

economic context (Vitae, 2010). The necessity to prove the impact of one's own work could be a response to the demands of increased accountability from researchers (Rice et al., 2000). The need to become recognised as leaders, whose work can achieve impact, and whose expertise is translated into high quality teaching, supervision and mentoring and thus these areas are recognised by the ECRs in our research sample.

[TABLE 4 here]

Discussion and conclusions

The results presented above gave an overview of the training needs of 57 ECRs working in British Russell Group universities. ECRs in these institutions have to fulfil high expectations and are employed in 'business-like' universities, rapidly changing in the socio-political and economic climate (Rice et al., 2000; Gappa et al., 2007; Hughes, 2009).
In a knowledge based learning economy, all employees are required to plan and manage their careers, including regular participation in continuous education (Biesta, 2006, p.169). The challenges ECRs are confronted with are tough, as they need to survive in a highly competitive environment in which working under pressure towards high standards is the norm (Austin et al., 2007, Gappa et al., 2007).
The study presented in this paper is clearly situated in this discourse of the competitive knowledge based economy in which continuous training is needed to maintain career ambitions. As discussed earlier, this focus was also found in the existing academic literature on the training and development of ECRs. Concrete examples identified in the literature were learning new skills like teaching and mentoring (Hakala, 2008), coping with anxiety about being effective to show the impact of their work (Åkerlind, 2008), gaining know-how on juggling multiple activities to meet administrative demands (McAlpine & Åkerlind, 2010) and knowing how to survive in a competitive funding environment (Elizabeth & Grant, 2013). Interestingly, the focus is thus not only on specific research-oriented tasks, but also on non-research tasks such as teaching, management and leadership, a range of qualities expected from academics in classic tenured appointments such as lectureships or associate professorships.

The present study has given an overview on the training needs as identified by the ECRs in British Russell Group universities, and looking at the ones that ended with the highest scores with a Mean above seven, we find an overall pattern that the need for becoming a research expert in their chosen field is very important (*Extending subject knowledge, Improving theoretical and practical knowledge on research methods*), as well as the need to *Manage own career progression*. The highest scoring items across all Domains was *Generating funding and income* while *Planning and delivering projects* and *Managing project finances* were the other two high scoring items in Domain C, reflecting the need for ECRs to build their own portfolio of funded research projects for which they are in charge of managing them. Similarly, in Domain D, *Developing leadership qualities, Collaborating with others to maximise research impact* and *Creating impact through publication* indicates the further need of building a strong research portfolio, including leading the project, and disseminating the

results. Having been supervised as PhD students, it is now also important for ECRs to increase skills on *Supervising and mentoring students* themselves.

Interestingly, the previous notions in relation to becoming more self-confident did not feature strongly in the results of this study, which might be explained by the sample consisting of ECRs who managed to get a post in one of Britain's elite universities. Similarly, it is clear that the academic literacy and numeracy and the skills on how to search for literature have been strongly developed during previous post-graduate studies.

As explained before, the Vitae RDF is a comprehensive development framework (Reeves et al., 2012) and presents a holistic picture of career development. One of the contributions to the knowledge base in this specific paper is not only the way in which ECRs identify their training needs, but also the new measurement instrument that has been developed as part of this project. By calculating the Cronbach's Alpha of the four Domain subscales, this study found that the descriptors within each domain are reliable measures of creating development needs within that particular domain. Further validation of this scale among academic developers and academics researching academic development will be encouraged.

Limitations of the Study
While this study adds to the knowledge base through presenting a new measurement scale and through presenting new empirical data on the training needs of ECRs in British Russell Group universities, specific limitations have to be acknowledged.

The first limitation refers to the sample size. The online survey was circulated among researchers and valid respondents were filtered based on a question about the years of post-doctoral research experience. However, with a total of 105 researchers providing responses (including those working at non-Russell group universities and those not matching the criterion for inclusion), the sample can be considered small since the total population of researchers in the UK was 256,000 in 2010, although the specific number of ECRs is unknown (Department of BIS, 2011). A larger sample size will lead to smaller sample errors (Watała, 2007). Moreover, ECRs are not a homogenous group, especially in Britain that has a university system with different types of universities as explained above (Russell Group universities, older universities outside the Russell Group and newer post-1992 universities). A large sample including an adequate number of respondents from all types of universities would be recommended so that the variability in the population is appropriately represented (Robson, 2011).

In addition, it is hard to judge whether our sample is representative of the total population of ECRs working in British Russell Group universities, which indicates we have to be cautious to make grand generalisations (Dörnyei, 2007). It was not possible to conduct a random sampling since a full list of the population is an essential requirement to choose participants at random (Robson, 2011) and there is no database of all ECRs working in British Russell Group universities.

Also, we presented results on ECRs in Russell Group universities only, leaving out the small number of respondents working at other types of universities. However, data on ECRs winning prestigious grants and awards show that a majority of recipients of the grants are working in Russell Group universities (ESRC, 2014; The Leverhulme Trust, 2013), which might suggest a concentration of ECRs in Russell Group universities. At the same time,

ECRs might have had several reasons for not participating in the survey and the characteristics of those who have not responded could not be captured.

However, we would like to reiterate that the findings of our study are useful since they add to the existing studies on career development of ECRs in the UK by providing new empirical data on ECRs' training needs. Additionally, a new scale to measure training needs as captured by the Vitae Researcher Development Framework has been presented.

Apart from formulating limitations, we would also like to present solutions on how to improve work in this area by providing a set of recommendations for future research.

Recommendations for Future Research
Our first recommendation starts from the assumption that it is highly likely that ECRs are a heterogeneous group with diverse training needs, based on a number of factors such as the type of institution they work for and the professional background they have brought with them into the ECR job. Taking a set of predictor variables into account will increase the opportunity to capture variability among ECRs and it is recommended that future research captures experiences of ECRs in other types of universities than Research-Intensive universities.

Secondly, linked to the first recommendation, a larger sample size will increase the opportunities for conducting additional multivariate analyses, e.g. a minimum of 50 cases in each category of the predictor variables, which is an ideal condition for logistic regression as advocated by Burns & Burns (2009).

Thirdly, from a methodological point of view, Oppenheim (1992) argues that using an 'objective', 'scientific' and 'reliable' scale to measure attributes like love and aspiration tends to generate a sense of losing out on the richness of the experience. As a varied set of factors is likely to influence researchers' identity and development needs (Mason et al., 2009; McAlpine, 2010), it is worthwhile to combine quantitative research with qualitative methodologies in order to create a rich and thick description (Robson, 2011) of ECRs' perceptions and attitude regarding training and development. Qualitative accounts of a small group of ECRs will likely increase insight in nuances being present among the sample, which will be more difficult to grasp based on large scale survey research.

Fourthly, in order to consider the implications for practice, it would be recommended that future research captures the voices of academic developers working in academic and/or educational units at the universities, as these services often focus on training of staff members in the university (Gosling, 1996, 2001). As ECRs are concerned about a stable career in the academia (Gappa et al., 2007), units for academic development will be served in helping them to create a robust development plan for ECRs, if their roles are included in future research as well.

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Table 1: Descriptive statistics for importance of getting trained in Vitae Domain A

Training Need	Mean (SD)	Median	Mode
Extending subject knowledge	7.25 (2.42)	8	10
Improving theoretical and practical knowledge on research methods	7.32 (2.12)	8	7
Seeking relevant bibliographical sources and using information technology to manage references and data	4.21 (2.59)	4	1
Improving knowledge of language(s) appropriate for research	4.58 (3.51)	4	1
Improving academic literacy and numeracy skills	3.95 (2.38)	4	1
Analysing own data and synthesising own findings with previous studies	6.25 (2.72)	7	7,8
Thinking critically	5.68 (3.29)	7	2, 10
Summarising work and evaluating progress	5.51 (2.87)	6	8
Solving problems related to research questions and hypothesis	5.68 (3.08)	6	1,9
Understanding the role of innovation in research and being innovative	6.18 (2.87)	7	9
Defending research outcomes by constructing appropriate arguments	5.28 (2.93)	5	3

Table 2: Descriptive statistics for importance of getting trained in Vitae Domain B

Training Need	Mean (SD)	Median	Mode
Becoming self-confident about knowledge and skills	5.88 (2.98)	6	10
Reflecting on own practice and experiences	5.81 (2.60)	6	8
Managing time	6.14(2.75)	6	10
Gaining work-life balance	6.89 (2.74)	7	10
Managing own career progression	7.60 (2.21)	8	10
Becoming responsive to opportunities and changes	6.70 (2.72)	7	7
Networking with all stakeholders of research	6.86 (2.65)	8	10

Table 3: Descriptive statistics for importance of getting trained in Vitae Domain C

Training Need	Mean (SD)	Median	Mode
Applying appropriate codes of ethics	4.91 (2.60)	5	5
Understanding legal requirements of research	5.04 (2.69)	5	3
Understanding Intellectual Property Rights (IPR) and copyright	4.88 (2.57)	5	3
Understanding concepts of attribution and co-authorship	4.84 (2.82)	5	1
Creating a research strategy	6.91 (2.71)	7	10
Planning and delivering projects	7.14 (2.55)	8	10
Managing risks like security breaches in virtual environment	5.02 (2.91)	4	3
Generating funding and income	7.79 (2.30)	8	10
Managing project finances	7.32 (2.35)	8	10

Table 4: Descriptive statistics for importance of getting trained in Vitae Domain D

Training Need	Mean (SD)	Median	Mode
Working with research teams, university staff and students	6.26 (2.61)	7	5
Working with managers and supervisors	5.75 (2.57)	5	5
Supervising and mentoring students	7.19 (2.28)	7	7
Developing leadership qualities	7.21 (2.26)	7	7, 10
Collaborating with others to maximise research impact	7.39 (2.35)	7	10
Improving communication skills in varied media (example: virtual, face-to-face & interactive technologies)	6.53 (2.56)	8	7
Creating an impact through publications	7.14 (2.31)	7	10
Teaching	6.98 (2.43)	7	10
Engaging with the public	6.33 (2.42)	7	8
Understanding relevant policies and procedures	5.56 (2.77)	6	8

Figure 1