Supporting the Learning and Networking Experiences of Doctoral Students

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Abstract

This study explores the impact of a Graduate Virtual Research Environment (GVRE) on the learning and networking experiences of research students. The GVRE was established to support and enhance research skills and employability training across a university. It provides an extensive range of resources including video reflections based on the experiences of students and staff; GVRE members are encouraged to comment and engage in discussions on these resources. Our work is framed using social theories of learning and the role of communities in the support and development of research students. In particular, we are interested in exploring the challenges involved in developing communities and networks for students whose main focus is their individual research. The GVRE was made available to over 600 students and in this research we explore its impact on the experiences of research students. In particular, we investigate four questions: (a) what impact does the students use of the GVRE have on the development of their research skills; (b) what impact does membership of the GVRE have on the networks and communities of research students; (c) how do research students view the relationships between their research skills training programme, their individual research and the GVRE; and (d) how do research students currently use social media. We use an interpretivist approach and our data sources include site statistics, responses to a questionnaire and also feedback from a focus group. Our findings indicate that networking remains an issue and students suggested approaches to facilitating this using the GVRE: (1) A clearer pathway from skills need identification to skills acquisition; (2) Rewards for activities around networking - possibly through credit on the training scheme; (3) Activities that would involve research directly. Feedback on the GVRE indicated that it is valued by research students as it facilitates the development of their research skills. In terms of marketing the GVRE to research students important factors identified were: the ease of access to the site, the overview it gives of the PhD process; and the value of the site to students around the defining moments of their studies when the students felt they needed additional advice and guidance.

Keywords

Research students, doctoral students, Graduate Virtual Research Environment, research skills training, learning communities, research networks

Introduction

In recent years there have been initiatives aimed at developing the skills base and employability of research students. In part, this trend is linked to the expansion of doctoral education and its shift in focus from an experience that enabled entry into an academic community and career, to a qualification for entry into the wider labour market. This puts emphasis on doctoral students gaining a wider set of employability skills (Chiang 2003) and contributing to the knowledge-based economies after graduation. This need was identified by the UK Research Councils who, working in collaboration with Vitae (the graduate student training agency previously known as UK GRAD) and the higher education sector, developed the Joint Statement of Skills Training Requirements of Research Postgraduates in 2001. This initiative identified the competencies that a postgraduate researcher should develop during the course of their doctoral programme.

The UK government commissioned a review to investigate the supply of people with science, technology, engineering and mathematical skills (i.e. the STEM subjects). The outcome of the review was the *SET for Success* (2002) report, often referred to as the Roberts report, and this recommended a number of developments in doctoral education. The report recommended additional training for doctoral students and also postdoctoral

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researchers. One of the outcomes of this influential report was that the UK government provided funding from 2003 for the development of professional and personal skills for doctoral students. This initiative led to the implementation of research skills and professional development programmes for research students. The Roberts' funding is only guaranteed until the 2010-11 academic year, after which there are indications that universities in the UK will have to find funding for these schemes from their existing budgets (Corbyn 2009). We were therefore keen to develop a training resource which would be mostly sustained by encouraging research students to maintain and develop the material themselves. Our proposed solution was an online networked learning environment that encouraged participation and drew on students' experience of social media.

Networked and online learning is now commonly used in undergraduate and postgraduate programmes where it is used to support and deliver taught modules. In contrast, it appears to be less commonly used in the delivery of research degrees though it is possible to find examples of its use in research skills modules and, in some instances, distance taught research degrees. There is evidence that the use of networked learning to support research students in the context of specific modules has led to mixed results perhaps because they were part of a module rather than being fully embedded across a whole programme (Banks, Joyes, & Wellington, 2008) (Joyes & Banks, 2008) (Espionoza-Ramos & Hammond, 2008).

The experience of research students is very different to those on taught programmes. Research students typically belong to a small research group, and in many cases form a strong network within it, although some often only work with their supervisor. In addition, research students may not be members of wider networks across the University which would facilitate sharing of knowledge and practice across disciplines and faculties. The other key difference is in terms of purpose, the research students are focused on their research so why should they engage in a community? What benefits would students gain from participating in a virtual learning community?

This paper presents a study into Graduate Virtual Research Environment (GVRE) which was established with financial support from Roberts Funds to provide research students with an accessible learning resource which they can return to as often as required during their research journeys. In particular, the virtual resource facilitates knowledge transfer from successful students and researchers to those with less experience. The knowledge gained during the PhD journey is often disseminated across a narrow subject field and much of the 'messiness' and complexities involved in the research process is lost as it is written up for publication. The GVRE captures this experience using multi-media resources (video clips) contributed by current and former PhD students and academic staff showing what to expect during the PhD experience. A particular feature of the GVRE is the reflective video narratives of aspects of individual research journeys. All resources are grounded in the experiences of PhD students and early career researchers. In addition, the GVRE provides opportunities for online discussions and social networking to encourage communications between research students across the university.

This study explores the impact of the GVRE on the experiences of research students. In particular, we investigate four questions: (a) what impact does the students' use of the GVRE have on the development of their research skills; (b) what impact does membership of the GVRE have on the networks and communities of research students; (c) how do research students view the relationships between their research skills training programme, their individual research and the GVRE and (d) how do research students currently use social media?

Literature review

Communities and networks

There is a well established literature relating to the importance of learning communities which includes concepts such as 'communities of practice', 'communities of interest' and 'virtual learning communities' e.g. Lave and Wenger (1991), Wenger (2003) and Lewis and Allan (2004). Much of the networked learning research focuses on specific communities and these are often developed as a result of an individual module or course (e.g. Arbaugh & Duray, 2002). In contrast, there is a small and developing research base on the impact on activities designed to promote networking and co-operative working amongst research students.

In order to develop their research and employability skills, doctoral students need experiences outside the specialist research area. Manathunga (2006) promotes the idea that doctoral students from different discipline

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should share ideas and do joint activities like critiquing papers in order to share experiences across disciplines to prepare them for interdisciplinary research. This use of seminars is increasingly used in practice as reported by Malfroy (2005), they report that seminars are becoming an important part of the doctoral student's learning process; mediating the relationship between the student and supervisor. However maintaining such groups is difficult and Parker (2009) identified that it was difficult to keep groups together due to fieldwork pressures and different research time tables.

Banks, Joyes and Wellington (2008) describe an online pedagogy that revolves around video research narratives. Their aim was to create communities of practice within the student body. They found that the video narratives were well received, particularly so when the situations seemed closest to their own. However no communities of practice developed. To be successful, the authors argue, the participants must be willing participate and contribute to the community, and doctoral students with individual goals have little or no motivation in this regard. Furthermore they state that for a student to join multiple communities they face multiple complexities. Another case provided by Espionoza-Ramos and Hammond (2008) highlights similar issues. They developed a support website with a mixture of resources and received positive feedback; they also found that there was little appetite for collaboration between research students. However they noted that students were separately involved in a 'graduate association' that afforded social contact. They noted that a change in the research culture from individualistic to collaborative would not likely be achieved by ICT alone.

In the context of academic research, understanding and engaging in a peer review process is an important activity and this is often associated with wider networks which operate through both physical meetings such as conferences and also virtual communications. In multi-disciplinary and inter-disciplinary research it is more important than ever for doctoral students to form and use networks not just in their own discipline but across disciplines. In the context of this study, we want to explore the impact of the GVRE on the networking activities of research students. This study considers both aspects of a research student's experience and we want to explore the inter-relationships between virtual and face-to-face networking. The important part about these informal learning networks is that they are almost exclusively managed as physical networks, reinforced with regular meet ups at conferences. To expect a community to form virtually around a VLE is therefore unexpected; instead it seems more likely that a virtual space could accelerate the construction of networks in the physical space.

Co-operative and collaborative working

There is an established literature on co-operative and collaborative learning activities e.g. Dillenbourg (1994). McConnell (2005) suggests that student achievement is generally higher in collaborative situations rather than individualistic or competitive ones. Rovai (2002) showed that perceived cognitive learning in a web context is correlated to a sense of community. In the context of research education, this raises issues as completing a research degree is essentially an individual activity and so these students may have less of an impetus to work co-operatively or collaboratively than students on a taught programme where there are group activities including assignments. Collaborative learning can lead to interactions that build a shared view of the available knowledge (Ong & Hawryszkiewycz, 2003).

Community development has been described by a number of authors as involving different phases e.g. access and motivation, online socialisation, information exchange, knowledge development (Salmon 2000) or foundation and induction, incubation, improving performance, implementation, closure or change (Lewis and Allan 2004). At the initial stages, as relevant to the stage of adoption of the GVRE, it involves socialisation which may include sharing of beliefs and assumptions (Goertzen and Kristjansson, 2007) as well as common problems and issues.

Web 2.0

It is proposed by Mason (2007) that this form of informal learning can take place in a Web 2.0 context where participants can engage with a range of tools such as wikis and blogs that enable them to engage in discussions and other interactions. The rapid expansion in social networking in recent years means that for many research students this has become an everyday communication tool. In addition, Terrell (2002) suggests that online learning environments are best suited to students preferring abstract learning experiences, which would include generic skills training. The mixture of Web 2.0 tools and abstract learning may overcome the problems faced in previous research into web based training for doctoral students such as Banks, Joyes and Wellington (2008).

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Sharma and Fiedler (2007) found web publishing tools can be used to aid in self organised learning where students compare reflections. However when undergraduate students maintained a blog and received peer feedback Xie, Ke and Sharma (2007) found that it negatively affected students' reflective thinking skills. They identified two potential problems, the quality of the peer feedback, and the pre-thoughts of the bloggers who would try to make their posts presentable and avoid babbling or contentious issues which their peers may have laughed at. To overcome feeling of inadequacy Parker (2009) recommends grouping students according to ability and they found that although students still found it hard to be reflective on a blog, the group work of similar ability groups did improve their networks, reduce solitude and increase confidence.

Graduate Virtual Research Environment

The Graduate Virtual Research Environment (GVRE) was funded by the Roberts Fund and it was designed to augment and enhance current research methods training across the university and it provides students and researchers with an accessible research skills learning resource which they can return to as often as required during their research journeys. In particular, the virtual resource facilitates knowledge transfer from successful students and researchers to those with less experience. Currently, the knowledge gained from successful students and researchers is often disseminated across a narrow subject field and much of the 'messiness' and complexities involved in their research process is lost as it is written up for publication.

The GVRE enabled students to construct learning journeys or research pathways suited to the needs of different disciplines across the university by scaffolding using the research councils' skills. These resources were enhanced by the addition of subtitles which helped capture main points and also the language used by researchers. The site was established with one main learning journey using the competencies identified in the UK Research Councils Joint Statement (2001). The learning resources are organised using these headings and this provides another tool to help doctoral students develop their research skills. Unique features of the GVRE include:

- Access to discipline specific and also generic research resources
- Access to support in developing transferable skills
- Knowledge transfer from successful researchers via video clips
- Tracking devices to enable members to keep a record of their use of the GVRE
- Members may upload their own videos
- Personal blog tools for members to create and maintain their own blog
- Access to other links e.g. University Postgraduate Society, Careers Service and Facebook site.

In order to enhance usage of the GVRE and to develop a community of interest among doctoral students and experienced researchers, it is actively marketed e.g. at induction and through other events and activities aimed at or organised by research students. In particular, the project team are working with the Graduate School so that the GVRE is embedded in the taught modules provided as part of the research skills training.

Technology

The VLE was constructed within Sakai as a standard worksite using the tools that are normally available. The Sakai blog tool was used to arrange the videos, keywords were set to reflect the published skills categories to enable videos to be found easily. Each video has a title, summary and transcription. On top of Sakai we built a tool in Javascript that allows students to keep a record of the articles that they have read. This script enhances the standard Sakai blog tool by detecting which articles are read by the user, these are then stored in a file on the WebDAV server that is deployed as part of Sakai. The script also keeps a record of all the students who visit the article, and shows those that visited in the last three weeks to any new visitors. This allows groups that are currently interested in a topic to self form. Each article is also presented with some discussion starter questions and some cases activities. These activities encourage the students to find out more about the topic, by for example interviewing a peer, or describing how they go about finding a new research article.

At launch there were 80 videos total, of which 60 were on research skills related topics, and 20 on tutorials for using the site, there are now 107 total, 87 of which are on research skills. Rather than gather complete research journeys from individuals we asked the interviewees to reflect on particular elements of their experience, this built upon comments from the students who indicated that they liked different people to be clearly associated with different ideas as this helped them to remember the content easier. The videos were filmed in an informal

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way, sometimes as part of a seminar but also as pieces to camera in an office. We invited the participants to talk about something that they had first hand knowledge of, either a success or failure, or specialist advice based on experience. Sometimes it was simply a reflection on how their studies were progressing. The videos were then cut into themed 5 minute chunks but minimal editing was applied. The general aim for the videos was to make them feel approachable – it was not intended for the students to feel this was how "research was done" but instead that it was one of a number of alternative methods that the student needed to evaluate. We also hoped that this would encourage other students to volunteer their own videos. A video introduction to the GVRE can be found at the following web address http://bit.ly/1it9vZ.

Methodology

In the research literature on networked learning it is possible to identify distinct methodological approaches e.g. Andrews and Haythornwthwiate (2007). Hodgson and Watland (2004) argue that it is important that the methodology is consistent with the underlying values and beliefs of learning communities if it is to provide useful and helpful insights. Consequently this study, which focuses on the experiences of research students participating in a GVRE takes an interpretivist approach. The current study uses a multi-method approach involving both quantitative and qualitative methods.

This study focused on the experiences of the 600 research students enrolled in the GVRE. Data was collected by a number of means including: tracking data from the GVRE; feedback via a questionnaire; and also feedback from a focus group. Tracking data provided simple usage figures of the number of students visiting the site each day, videos viewed and pages viewed. Terrell's questionnaire was used to measure the student's current level of networks at the introduction of the GVRE (Terrell *et al* 2009). It was distributed using QuestPro and on paper, and we obtained feedback from 9 research students. In addition, 13 students and a staff member from the graduate school attended a focus group and their comments were collected via audio tape and then transcribed and converted into text. Following that group we found that the participants did not as we expected continue to communicate so we organised a second focus group of 10 students and 2 staff members where we focused on their use of social media, and how they might be prepared to use it in research. We present representative comments taken from the discussions in the findings below.

Findings

How do students use the GVRE?

After the first week of general access 25% of registered students had visited the site at least once, 41% had visited after the first month. After four months around 50% of registered students had visited the site, 30% of these had watched one or more videos. The 10 most watched videos (by number of viewings decreasing) were: Problems you may face working on your thesis; an introduction to using the site; Examples of how training modules helped one student's research; techniques; for managing your supervisor; devising a writing plan; what is a PhD; troubleshooting data limitations; typical viva questions, how to access previous theses; an overview of PhD skills.

To find the current level of connectedness we asked students to complete the Terrell *et al* doctoral connectedness survey (2009). This shows that on average the GVRE students had marginally higher scored than Terrell's sample suggesting that our students maybe more willing to engage with networking activities (table 1). However it should be noted that those surveyed are perhaps those most willing to network as we had a low response rate (1.5%). All students surveyed indicated that they had only used the GVRE for a small period of time prior to completing the survey (less than 6 hours over a period of less than a week).

Impact of GVRE on development of research skills

The students gave a clear message throughout the focus group that their primary motivation for using the GVRE was to develop the research skills that they needed to complete their doctorate. Comments varied based on the age and progress of the students, for example a mature student noted that: "When I was at school we did not have computers, so I have shied away from this kind of activity" however it was clear that she attended the group as she wanted to know more about the initiative and pickup ideas from the other students about how it could benefit her. Another student commented that: "I just returned from my field work and I became quite

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anxious about it, and how I was going to write my thesis. I wanted to know more." This resonated with a few other students who made comments such as: "I think that it will be very good when I am unsure of what to do" and "I found it very interesting, particularly the information on giving presentations and how to plan". The students felt that the coverage of content could be improved by covering more research areas and using the GVRE to give more precise details of practices within their specific departments and disciplines. For example, one student asked "I want to know more about how I should structure my thesis and so on", another asked "Could we video an actual viva so that I can prepare better as to the questions that will be asked?".

Table 1: GVRE doctoral connectedness survey from Terrell *et al* (2009) (Figures rounded to 2sf)

	Terrell (2009)			Our data		
Factor one — faculty to student connectedness	**N**	$\bar{x}$	**S.D.**	**N**	$\bar{x}$	**S.D.**
2. I feel that I am encouraged to ask questions to the faculty about the dissertation process.	223	2.85	1.356	9	3	1.1
4. I feel a spirit of community between the faculty and myself while I am working on my dissertation.	223	2.18	1.181	9	2.5	1.3
6. When I ask questions or submit work to my dissertation advisor, I feel like I receive timely feedback.	223	3.31	1.381	9	3.1	1.1
7. I communicate with faculty members about the dissertation process on a regular basis	223	2.69	1.185	9	3.1	1.0
11. I feel that I am receiving adequate support from the faculty while I am working on my dissertation.	223	2.64	1.328	9	2.9	1.2
12. I feel that the feedback I receive from the faculty is valuable.	223	3.5	1.28	9	3.6	0.52
14. I feel confident that the faculty will support me while I am working on my dissertation.	223	2.94	1.349	9	2.8	1.3
16. I feel I can trust faculty while I am working on my dissertation (e.g., rely on faculty members to follow through on commitments, keep confidences, treat people with respect and help me learn).	223	3.22	1.283	9	2.9	1.4
18. I feel like I can easily communicate with faculty about the dissertation.	223	2.91	1.364	9	3.3	0.89
Mean	*223*	*2.92*	*1.3*	*9*	*3.0*	*1.1*
Factor two — student to student connectedness	**N**	$\bar{x}$	**S.D.**	**N**	$\bar{x}$	**S.D.**
1. I feel that students currently working on their dissertation care about each other.	223	2.66	1.302	9	2.4	1.1
3. I feel connected to other students in the program who are working on their dissertation.	223	1.75	0.957	9	2.6	1.2
5. I feel like I can easily communicate with other students about the dissertation.	223	2.31	1.146	9	3	0.54
8. I feel like fellow students who are working on their dissertation are like a family.	223	1.9	1.086	9	1.9	1.2
9. I communicate regularly with other students who are working on their dissertation.	223	1.92	1.098	9	2.5	1.3
10. I feel I can trust other students who are working on their dissertation.	223	2.91	1.168	9	3.1	0.64
13. I feel a spirit of community between other students and myself while working on the dissertation.	223	2.01	1.074	9	2.5	1.2
15. I feel like I can rely on other students who are working on their dissertations for their support.	223	2.21	1.108	9	2.5	0.93
17. I feel like I can easily communicate with other students who are working on their dissertations.	223	2.26	1.125	9	2.9	0.64
Mean	*223*	*2.21*	*1.34*	*9*	*2.6*	*0.97*

Overall, the students praised the content and provision of resources on the site: "This is really a great step and impressive as a whole, we would not have dreamt of such a thing three or four years ago, the videos are so beneficial ..." To improve this area, they suggested that "It helps if we have a shared discussion to talk about what we have learnt". They also highlighted that they still found it difficult to understand how everything fitted together noting that: "With the skills cards it needs to be clearer as to what happens next, it needs to be more guided, to make it clearer how to progress".

Impact of membership of the GVRE on student networking activities

We asked the students about how they felt they could or had networked using the site (noting that they had only had access for one month so far). Reflecting on their experiences during their studies, one student commented that "it is not very easy to make friends with other PhD students". Reflecting on this another student mentioned that: "It is an interesting idea, we have a lot of [separate] social communities, but we don't have shared programmes where we get together [across the university]". However they agreed that "meeting other practitioners would be very important".

A unique feature of virtual environments was also noted that the "it [the site] is very good for helping when you are not sure. Late at night when you can't get hold of a friend, you can go online", thus the GVRE provides access to 24/7 information and potential support. They could phrase their questions and look at previous responses even when the university was closed. However he also mentioned the danger of using the GVRE as a "time passing mechanism". To overcome this problem, we asked the students what type of meaningful and useful activities that they would like to take part in. Initially one student commented that "We need activities like the management games used on the taught MSc programme", highlighting the need for physical events and also events that would provide an element of icebreaking and socialisation, and, he continued: "Events that are enjoyable and practical leading to discussion could work well". Talking about the GVRE, another student mentioned that "We need incentives for students who make an input into the site". Students highlighted the

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potential for discussion groups around 'hot topics' and also the specific needs of groups of research students as one part time student noted: "Different groups of students have different needs".

Relationships between research skills training programme, individual research and the GVRE.

The students were clear in their comments that they thought that any part of the skills training program had to be integrated into their studies. One student comment that a lot of the onus on their involvement was their department: "departments influence what you do, if you have a lively local community, it helps, compared to quiet departments". The influence of real communities and the benefits of interdisciplinary networks were acknowledged by the students. One student commented "can we have a link between real communities and departments? This would act as interface between communities and enable a record of our findings to be kept". Equally another noted that: "staff need to be involved", and this point was expanded by another student: "students and supervisors interact well, but the community [sprit] between this and other staff is poorly developed". Students also felt that national and international networks were important for sharing practice and research. One student commented and several agreed that: "it would be very good to work with other universities to share videos – particularly of workshops and seminars".

A PhD student who has almost finished commented "The GVRE is fantastic, it would have made the whole process a lot easier". However other students also highlighted how linking together their different goals could be achieved: "we need a focus for the PhD community over time with a productive outcome, this [site] is a conduit for the idea". Encouragingly one student noted that "the university is fragmented into personal interest areas, we want innovation and creativity, set a goal". After some discussion it was suggested by one student that "can we have a discussion on current issues in research – hot topics", we suggested and they agreed that this could be started by an online session led by a prominent researcher.

The use of social media for research

Of our group five of the students used Facebook.com, three used LinkedIn.com, and three had also used the one of these as part of their research, however all the students present felt they could make use of social media in their research given the right tool if face to face communication was not realistic. This is encouraging given the previous comment that research training should be integrated into the research process. The conditions for engagement were: the need for it to be work focused; appropriate for the users (noting that the generation gap between users of technologies is falling); a place of genuine conversation, not preaching; users need to be able to judge the authority of other users; security of data; and a clear vision of how it should be used. With this in place they would use the service to exchange research artefacts, maintain contacts and receive feedback. This model is desirable, so addressing the conditions may lead to increased networking on the GVRE.

Conclusions

The evaluation clearly shows that e-learning is an appropriate medium for research skills training. Both the site statistics and the focus group supported the view that a site that helped them to explore these skills was appropriate and broadly welcomed within the community. The evaluation in terms of networked learning in the virtual sense was less clear, with a need to address more closely the relationship between the learning and the research of the students. The students accepted the need to for networks and work together but initially at least felt that this was best achieved through physical interaction. Further probing revealed that these physical networks, well developed in comparison to Terrell's results, were limited to subject groupings. The students felt that there was value to be gained in creating these networks and that it may be appropriate to make bridges between physical groupings using a virtual environment. However they warned that social forums seemed to be more of a time wasting exercise and suggested that we look for more productive interaction opportunities either virtual or physical. The students raised three main areas that should be improved in the GVRE: (1) A clearer pathway from skills need identification to skills acquisition; (2) Rewards for activities around networking - possibly through credit on the training scheme; (3) Activities that would involve research directly. Careful selection of GVRE activities (2 and 3) could feed into increased networking opportunities. In terms of marketing the resource to doctoral students it appears that important factors are: the ease of access to the site and the overview it gives of the PhD process; and also the value of the site to students around the defining moments of their studies when the students felt they needed additional advice and guidance.

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