

Rhythms of work: Spatially- and socially- located research practices among sciences doctoral students

Abstract

In the doctoral education literature, assumptions are often made about the common nature of sciences doctoral work (Delamont & Atkinson, 2001). However, Cumming (2008) and Bowen & Roth (2007) have challenged this view suggesting that such generalizations reify assumptions about the commonalities of sciences research practices rather than capturing more nuanced representations of variation. One of the reasons for the prevailing view may be that sciences doctoral experience is an under-researched area (Leonard et al, 2006). This study reports an analysis of the rhythms of work of sixteen sciences doctoral students. The analysis demonstrated variation in their work practices including practices situated more frequently in institutional offices and homes than in labs and not necessarily involving a research team. The results suggest the value of undertaking fine-grained studies of research practices.

Goal

This study documented the spaces in which sixteen sciences doctoral students undertook their research over a period of nine months. Space can be conceived as lived bodily spaces, perceived social spaces, and physically mandated spaces (Middleton, 2010). While these three co-occur, we wanted to examine the intersection of physical spaces (offices, labs), and social spaces (teams, peers). Specifically, in what spaces did students advance their knowledge-making practices? What did these practices consist of?

Doctoral work practices and spaces in the sciences

Tom¹'s cameo provides a brief overview of one individual's experience of the social and physical spaces in which he worked.

Tom, 2nd year, evolutionary biology, reported in various weeks working principally in his office, with seminar room, bedroom and the lab mentioned only one time each. His mood during this time varied from feeling cheerful, just going through things to slightly stressed (at not 'fixing' the animals). He read and wrote a draft of an article and his upgrade paper, assembled sequence data, made phylogenetic trees, and did data 'wrangling' in Excel. He also engaged in training master's and undergrads, manipulating embryos, doing molecular cloning, and antibody staining. While he came with an idea for his project rather than taking on one provided by his supervisor, two of the six in his research team are working in similar areas, and "I do quite a bit of my socialising within the lab group ...so teaching, research project, and lab experimental work are all sort of hand in hand and they're definitely taking up the most of my time."

Assumptions are often made about the common nature of sciences doctoral experience (Delamont & Atkinson, 2001). For instance, the team is a mutually supportive environment which meets daily and students spend the day at the bench to produce stable useable results, the student's project is part of the supervisor's research program. While the predominance of these assumptions speaks to their being of some value, Bowen & Roth (2007) and Cumming (2009) argue that fine-grained studies of sciences research

¹ Pseudonyms are chosen by participants.

practices challenge traditional claims of how sciences research is actually practiced. Their studies suggest the value of looking at the rhythms of doctoral work practices and spaces.

Moving beyond work practices in the sciences to doctoral education more generally, there is concern about the degree to which students feel integrated into the academic and social life of the department since this influences progress and completion of the doctorate (Leonard et al, 2006). Further, evidence suggests that presence on-site is important for such integration to occur (Deem & Brehony, 2000). These views about doctoral experience can be conceptualized in terms of workplace learning in which the context for learning is constituted through the interaction between the individual and the workplace (Tynjala, 2008). Thus, we argue that examining the physical (Billett, 2009) as well as social spaces that students inhabit should provide insight into how they learn both the social and intellectual aspects of academic practice.

Method

Doctoral students in different science fields were recruited in two different UK research universities. After consent, they completed a biographic questionnaire (e.g., reason for doing the degree, present work focus, imagined future, etc.). Bearing in mind the prevailing view that sciences students would be part of a team (a *social* space), individuals were asked: a) if they belonged to a research team, and, b) if so, to describe its composition. Then, over a 10-month period, they completed a log of a week's activity (e.g., activities and relationships engaged in, difficulties and pleasures, etc.) every 4-6 weeks. Individuals were asked to report their primary *physical* work space in each week: my lab, my departmental office, my home office, a cafe/coffee shop, the library, another place (please specify), or equal amounts of time at more than one place (please mention all). They then completed a pre-interview questionnaire and the interview included reference to activities described in the logs. The data were analyzed thematically to capture their rhythms of work. (While their previous histories, personal lives and intellectual locations are of keen interest to us, these are not included in this report.)

When the study began (Sept, 2011), three were beginning their degrees, two their upgrade, seven data collection and analysis and three analysis and writing their theses (1 no response). The six females and ten males (robotics, engineering, materials, inorganic chemistry, organic chemistry, zoology, physics and biology) ranged from 23 to 47. Eleven were international students, eight with English as a second language.

Experienced work practices and spaces

1319, 5th years, computing, consistently reported working principally in his home office; he is still doing fieldwork and writing his thesis, and given the length of time in the degree was consistently feeling worried, stressed, and determined to finish. He consistently felt isolated while noting email and skype conversations with his supervisor, noting "it's positive if you can use the isolation to concentrate on a problem and really work on it, but it's...it can be a negative because of feelings of loneliness, feelings of isolation, and opportunity to go procrastinate on something that, if your supervisor were watching you, eh, that wouldn't be allowed to happen." As well, like Tom he came with his own project though is not part of a team. Unfortunately other students do not share his interests so while "they've been encouraging me ...sending me new information that

might be relevant on my thesis ... they work on completely different projects. They can't help me at all. So, my relationship with the other doctoral students is ...tenuous at best."

As is evident from 1319's story, his work takes place in different social and physical workspaces than Tom's. This variation was evident across the group. As regards social spaces, three were not part of any team; three in teams of doctoral students only with one PI; seven in teams consisting of one PI, 1-2 post-docs and doctoral students and undergrads; two in teams of 2 or more PIs (1 with doctoral students only, and one with a mix of students and post-docs); and one in a team of over 100.

As to physical spaces, nine reported working principally in office spaces; four combined lab and office spaces; only two worked solely in the lab. The nine reporting principally office spaces, represented all years, and had varying involvement in research teams (none to medium), with six of these using home locations, e.g., bedroom, as well as institutional ones. Their research practices often involved programming issues – inputting and outputting that wasn't producing the 'right' results. It was in this group that students reported their work spaces as encompassing both institutional and home offices.

Four individuals, 2nd through 4th year, with varied involvement in research teams (small teams to 100) reported working in both office and lab spaces. Here, issues involved difficulties replicating previous results, and dealing with inter-personal communication. Only two students, 1st and 2nd years, in small teams, reported only working in the lab. They experienced the same physical difficulties reported by those using both office and lab. Overall, research practices in home and office spaces tended to involve reading, writing, wrangling with programming issues whereas those in the lab involved physical difficulties with organisms, re-agents and equipment.

Lastly, as was evident in Tom's report, their emotional responses to their work tended to vary from week to week – from excited, pleased, satisfied, or motivated (some experiments going well; currently everything is smooth) to worried, stressed, and frustrated around work due to need to finish, inability to write, problems with model/ programming/ analysis/ faulty reagents.

Conclusion

This study examined an under-researched group, sciences doctoral students (Leonard et al, 2006). The analysis demonstrated variation in their rhythms of work. Further, it was apparent that the fields individuals were in did not designate research work practices, that is, did not necessarily involve a research team and also included work practices situated more frequently in institutional offices and homes than in labs. The results confirm the assertion that the prevailing view of sciences practices as lab-based and revolving around a research team may need reframing (Bowen & Roth, 2007; Cumming, 2009). Further, the reports of working at home resonate with Gornall & Salisbury's (2012) finding that home is increasingly a site of academic work. As Billett (2009) has noted "the socially shaped physical world ...exercises pedagogic properties projected through the physical environment and artefacts that students encounter" (40). In other words, the range of physical and social spaces that students inhabit as they advance their doctorates colours their interpretations of the ways in which academic work is done. There is clearly a need

to explore more substantially the varied rhythms of spatially- and socially- located research practices among doctoral students.

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