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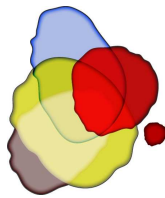
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The curriculum question in doctoral education

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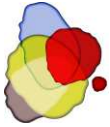
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Abstract

The landscape of doctoral education has changed immensely during the last decades. Different transnational policies, different publics, different purposes and different academic careers all contribute to the need for a new understanding of this under-researched field. Our focus is on explicit curriculum analysis to undertake intentional and meaningful change, especially in terms of the processes and outcomes of doctoral education. We draw on research on doctoral education, as well as the emerging literature on early career researchers (ECRs) and on professional learning, and consider how the concept of curriculum can help us think differently about doctoral education, particularly in relation to processes and outcomes. Finally, we suggest a research agenda for developing the curricula of doctoral education.

Keywords: doctoral education; curriculum; processes; outcomes; professional learning

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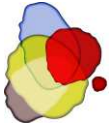
1. Introduction

In recent years there has been a burgeoning of research interest into the experiences of PhD/doctoral students and supervisors, although much of this work is limited to specific models and contexts of doctoral education (e.g., Gardner, 2007; Golde, 2005; Ives & Rowley, 2005; McAlpine, Paulson, Gonsalves, & Jazvac-Martek, 2012; Pyhältö, Vekkaila, & Keskinen, 2012; Scaffidi & Berman, 2011; Vekkaila, Pyhältö, & Lonka, 2013). There has been a clear evolution from the individual focus of the “master-apprenticeship” model to more structured programmes, an increasing number of candidates, growing internationalisation of the academy, and the emergence of new types of PhDs which reconfigure the relationship between research and practice (Brew & Peseta, 2004; Pearson, Evans, & Macauley, 2008; Walker, Golde, Jones, Bueschel, & Hutchings, 2008). As the quality of research and supervision are increasingly recognised as decisive in the process of doing a PhD (and the products that emerge from it), the question of “what a PhD really is” is also under discussion, leading Wellington (2013) and others to explore the possible meanings of “doctorateness”. This research field has struggled to keep pace with proliferating PhD formats and diverging practices. Doctoral contexts such as “practice as research”, professional doctorates, PhDs based entirely on publications, etc. are less well understood than more traditional formats, and are stimulating increasing research interest (e.g. the Carnegie Project on the Education Doctorate <http://cpedinitiative.org/>; Kot & Hendel, 2012; Nelson, 2006). If we look at researcher education more broadly conceived, there has been very little work on the extended ‘adolescence’ of academic researchers, or on the experiences and trajectories of researchers in other professional fields beyond the academy; McAlpine, Amundsen, and Turner (2013) offer one of the few contributions in this area. This raises questions about how far doctoral education succeeds (or perhaps has ever succeeded) in providing appropriate professional preparation and enhancement to those for whom an academic career is a clear motivation.

Even more so than in undergraduate education, the doctoral student has commonly been seen as an apprentice member of a disciplinary community. The PhD degree, once considered the pinnacle of academic achievement, is increasingly regarded as a kind of entry-level global academic passport offering junior scholars access to an insecure career (Pearson et al., 2008). Yet as we have seen, the proliferation of types of doctorate has been partly driven by the demands of careers outside academia. The development of professional doctorates, and the realisation that many, or even most, PhD graduates will experience careers *outside* the academic labour market have given impetus and legitimacy to the inclusion of employability skills in doctoral education (Baker & Lattuca, 2010). These developments have been justified in terms of harmonisation and flexibility, and have borrowed heavily from skills models used in vocational education (see e.g., Vitae); as yet we have little evidence of how effective they are at meeting their multiple (and often unclear) purposes. In practice, this skills-oriented approach to doctoral education tends to meet resistance from subscribers to a more purist view of the university, according to which academic freedom is not compatible with external standardisation initiatives (Kiley, 2014). However these changes also raise important questions about academic judgments and assessment processes at the doctoral level, which are far from standardised and remain, for the most part, poorly understood.

These profound changes are occurring in a context where we have scarcely begun to explore the nature of the formal and informal curriculum of doctoral education (EUA, 2007). The introduction of the idea of curriculum in PhD programmes necessitates urgent discussion among educators from different backgrounds and with different perspectives on doctoral education. We need a clearer understanding of how the curriculum of doctoral education works, how it can be developed to meet changing needs, and how its outcomes can be appropriately assessed.

In this paper our goal is to explore whether an explicit curriculum approach can help us make sense of existing research and practices regarding the processes and outcomes of doctoral education. Our starting point is that, whether we acknowledge it or not, the curriculum is inevitably there; and adopting an explicit curriculum approach will help us to disclose the tensions between the formal/informal, open/hidden, and standardised/pluralised dimensions in doctoral education and brought to our attention by Enders (2002).



These dimensions are summarised in Table 1 and contribute to a research agenda that allows us to develop more nuanced and useful understandings of the doctoral education curriculum. We blend the contributions of an ecological and socio-constructivist perspective (e.g. Bronfenbrenner, 1979, 1986; Lave, 1988; Vygotsky, 1978) with curricular viewpoints grounded in the policy cycle of Stephen Ball (1994) that frame a vision of the curriculum as a contextual and social-cultural phenomenon entailing a continuous meaning-making process in which diverse interpretations struggle to emerge (Lopes & López, 2010).

However, before addressing the above in the context of doctoral education we suggest that it might be helpful as background to outline a more standard approach to curriculum, the sort of approach we might see in texts related to coursework degrees at the tertiary level (e.g. Kiley, 2014; Print, 1987).

While the starting point in curriculum is generally contested, one might begin with examining the aims for the course or program. This is where a question such as: what is the teacher/ faculty/ university aiming to achieve with this course? Engaging staff in answering this question often uncovers many of the implicit, as well as explicit, views held by participants. At the doctoral level, asking what might appear to be such a simple question is likely to highlight a wide and complex set of responses.

Again, while curriculum development is rarely linear, for the sake of argument, the next question that can be asked is: what knowledge, skills and attitudes is it expected that the learner will be able to demonstrate following engagement in this program? This stage is often termed “learning outcomes” and at the doctoral level it is again contested with comments ranging from employment skills through to higher level cognitive skills and an original contribution to knowledge.

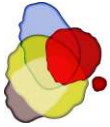
A logical next step in light of having determined the potential learning outcomes is the identification of the possible learning content and activities that are to be provided to allow the learner to engage in appropriate learning. In some cases this is referred to as the syllabus. Again at the doctoral level, the notion of content for learning is wide and varied often depending on country, discipline, and type of doctorate being undertaken.

Linked to the content is the consideration of pedagogy. It is during this stage in curriculum development that questions are posed regarding the teaching approaches to be used. Until recently pedagogy was a term that was rarely used in relation to doctoral education (Boud & Lee, 2009). Rather, there was an assumption that the supervisor/mentor/adviser would work with the candidate in private and mysterious ways until the candidate had achieved a level of doctorateness (Trafford & Leshem, 2009).

The concept of achieving doctorateness brings us to the next stage of curriculum development, that is, assessment. In much of the curriculum literature there is discussion of the concept of the aligned curriculum, that is, where the assessment strategies closely align with the espoused learning outcomes (Biggs, 2003). At the doctoral level there are various practices ranging from the inclusion of the results of coursework in the assessment through to examination of the written thesis only, or the inclusion of assessment of the candidate’s performance in an oral examination.

The final stage in this formalized model of curriculum development is evaluation where the various stages, activities and outcomes are evaluated in an ongoing fashion.

Following this formal and somewhat stylised discussion of curriculum we now discuss the concept of the curriculum in doctoral education in more sophisticated and complex ways, and then address the processes and outcomes of doctoral education. The analysis of research and practice suggests that there is a strong need for a research agenda that will help reconfigure the notion of curriculum in doctoral education.



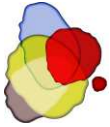
2. The curriculum in doctoral education

As noted above, it is relatively unusual to speak of “curriculum” in relation to doctoral education. Jones, in his review of 40 years of research on doctoral education (Jones, 2013), does not use the term at all, though it is implicit in several of the themes he identifies, such as programme design, doctoral writing and research, and socialisation; this obliquity is echoed too in Calma and Davies’ (2015) review of the history of one key higher education journal. The fact that the curriculum in doctoral education is not explicitly discussed does not make it less significant. However it may hinder our recognition of how the curriculum can generate and reproduce inequalities, and of the need for change and adaptation to the new challenges of doctoral education. Moreover, a focus on the curriculum must acknowledge the particularities of doctoral education, and in particular the possible incompatibility between current tendencies towards regulation and structure, and the flexibility and plurality inherent in doctoral education (Enders, 2004; Pearson et al., 2010). This is only possible if we recognise the curriculum as the unacknowledged “elephant in the room”.

In theories of formal education, the curriculum is often understood as a structured selection of propositional knowledge and/or skills which learners need to acquire in order to meet the aims and objectives of the learning programme (e.g. Eraut, 2000; Print, 1987). With aims and outcomes clearly defined and made explicit, it is then possible to “align” these with appropriate learning activities and assessment strategies (Biggs, 2003). However, as Colley, Hodkinson, and Malcolm (2003) argue, “formal” learning activities are only ever one strand of any learning situation and cannot be extricated from the social context in which they take place. Although there may be broad learning objectives for higher education programmes, it is expected that learners will develop a degree of self-direction, and will inevitably emerge from the process with differing understandings of the academic content and with varied mastery of research skills. Thus educational researchers have turned increasingly to a range of alternative approaches to the curriculum to analyse what is learned at university, and how it is learned (e.g. Brennan et al., 2009). Doctoral education specifically entails a further shift of emphasis away from the standardised formal curriculum (see Table 1), and towards a highly complex set of structures, practices and expectations from which doctoral students and their supervisors create new and unpredictable learning. This complex and pluralised perspective, seeks to address the diversity of training needs and career preferences by adjusting not only to labour concerns but also to students, supervisors and administrators. However, social and labour claims for specific needs may lead into the development of standardised programs. Thus, curricula in doctoral education may struggle to find a balance between these two perspectives that contribute to defining their orientation.

Therefore, a curricular perspective cannot ignore core changes and challenges doctoral education entails. Pearson et al. (2010) point out that in the current context of doctoral education, “opportunities for researchers, or employees with enhanced research skills, now arise inside universities and in non-university settings where knowledge and professional industries develop their capacity to carry out work that draws on specialist knowledge and research skills (e.g. contract research, university administration, school teaching, nursing and business)” (p. 348). Discussing the dilemma between standardisation and pluralism, described in Table 1, the same authors advise that “any attempt to resolve [it] must draw on a fully accurate and up to date picture of the contemporary doctoral experience and address the goals, motivation and expectations of the increasingly diverse doctoral population. Particularly important is recognition that the connection and integration of work and learning is an issue for research education, as for other forms of higher education” (Pearson et al., 2010, p. 349).

A curricular perspective on doctoral education may then take into account the new ecology of doctoral education, considering that students’ experience is framed by (and frames) what happens at the different levels of the ecological system. In Bronfenbrenner’s (1979, 1986) ecology of human development, for example, curriculum can be seen as an interaction system constituted by different “nested” subsystems: microsystem (in this context, what happens within typical classes in doctoral programs), mesosystem (what happens within universities, research centres or professional industries), exosystem (educational policies regarding doctoral education), macrosystem (cultural models in a certain period, such as representations of doctoral education and the mandates of universities or the significance of professional PhDs) and



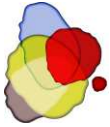
chronosystem (changes that result from specific non-normative events, such as the Bologna process in Europe).

This is surely a good departure point that must be reinforced with two additional features: on the one hand, the representations, contents and meanings that mark the interactions between each ecological system, and on the other, the experience of students in their journey through the doctorate. Ball's policy cycle (1994), particularly as reinterpreted by Lopes and Macedo (2011) is helpful in addressing the first feature. Ball's studies (1989, 1994; Ball, Bowe, & Gold, 1992) focus on micro-political processes and the need to articulate macro and micro levels in curricular studies. Lopes and Macedo (2011) insist on the non-hierarchical character of the policy cycle in the field of the curriculum, emphasising the circularity of its three contexts: the context of influence, i.e., of policy-producing; the context of policy text production, and the context of policy practices. This perspective assumes that the curriculum is in itself the struggle for meaning (Lopes, 2012) and reveals how the context of policy practices can drive, and is driven by, the other contexts.

Broadly social-constructivist and situated perspectives on learning can be helpful in identifying significant features of the curriculum of doctoral education that are relevant to understanding the journey of doctoral students (e.g. Brown, Collins, & Duguid, 1989; Greeno, Collins, & Resnick, 1996; Lave, 1988; Rogoff, 1998). The influence of Vygotsky (1978) is apparent in a number of alternative theorisations of learning processes, and indeed Vygotsky's social-cultural approach to learning offers the basis for rich understandings of the contextual and relational dimensions of the curricula. Where learning is seen as situated, knowledge is immersed in and generated by the activities, relationships, tools, contexts and culture that occur in daily activities. This implies recognising the collective, participative and social nature of cognition (Rogoff, 1998), and this emphasis on social engagement and communication has significant implications in a context where the PhD has increasingly become an interactional rather than a solitary endeavour. The notion of communities of practice is of particular interest here; the development of an identity as a researcher can be clearly understood as legitimate peripheral participation through engagement in research activities within a research group or disciplinary community. This attention to how "informal" practices and messages are produced and conveyed has been taken up in the literature of learning in the workplace, and theories of social learning developed to explain workplace practices have increasingly been applied to educational settings as well (e.g. Lave & Wenger, 1991; Billett, 2009). Doctoral students, from this perspective, are situated as both learners and emerging practitioners in the discipline, increasingly inhabiting the identity and responsibilities of professional disciplinary researchers in an academic workplace (and the extent of these responsibilities varies in different national systems of doctoral education) or highly qualified and innovative professionals in a hybrid academic and professional context. Indeed, an emphasis on inclusion in research communities or networks and the creation of collaborative knowledge-sharing environments appears to be a significant trend in doctoral education (Johnson, Lee, & Green, 2000; Malfroy, 2005; Pyhältö, Stubb, & Lonka, 2009). This view of doctoral education emphasises the pluralised approach to curriculum and specifically the impact of the social context in which training take place (Table 1).

The "landscape" metaphor proposed by Clandinin and Connelly (1995) can also be useful in analysing doctoral students' experiences as they construct their identities as researchers. Within this metaphor, learning involves a double transaction (biographical and relational) that results from the relationships between people, places, and things, and this view of the "landscape" of professional development as being inherently relational (in itself made up of relations), provides a gateway for relating the study of identity to the study of curriculum (Lopes & Pereira, 2012). Recent work on socio-material understandings of learning (e.g. Fenwick, Edwards, & Sawchuk, 2012) suggests that the "landscape" metaphor can be extended to include all of the actors and practices present in a learning setting – social, material, technological, pedagogic, symbolic – and a close attention to their multiple, complex connections and interactions. The fact that the profile of doctoral students and doctoral programs has changed also implies that issues of identity development will also change (Baker & Lattuca, 2010).

The consensual current distinction within curriculum theory, between "formal", "informal" and "hidden" curricula (Pacheco, 1996) seems to assume a special relevance here (see Table 1). The formal curriculum refers to qualifications frameworks, course syllabi; the informal curriculum relates to what is



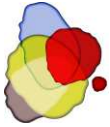
really done through teaching and learning processes, such as readings and discussion, interactions with researchers in the context of classes; and the hidden curriculum represents the unintended learning, often in regard to class and gender roles, social expectations, etc., that emerges from structures, relationships and practices in the educational setting, revealing the pedagogy of the learning context, rather than its intended content (Apple, 1971). Doctoral education clearly involves codified objectives of degree programmes, as well as a complex web of structures, practices and expectations far beyond the more explicit/formal dimension.

Solem, Hopwood, and Schlemper (2011) explore what kind of events made students feel an “academic and belonging to a departmental community” (p. 10) and conclude that mostly these are “informal events [that] include conversations [and] social events” (p. 12): some doctoral students mentioned joint coffee meetings or lunches as significant experiences. However, these events might be experienced very differently by different students. Margolis and Romero (1998) find “patterns of interaction with intended and unintended consequences that make it particularly difficult for students of color, women, and students from working-class background to survive and thrive in graduate school” (p. 2). Gender relations also appeared relevant in the study by Solem et al. (2011), with women expressing more extreme evaluations of support that interfered in their perception of progress in their own work; international students and non-white minorities also seem to report more troubles and feelings of isolation. Margolis and Romero consider Apple and King’s (1977) notion of the weak (related to professionalism) and strong (related to socialisation) hidden curriculum, concluding that the formal curriculum (e.g. affirmative action policies) often contradicts these hidden dimensions at the expense of successful experiences for minority students.

Implicit in all of these alternative approaches to understanding learning as social and situated, is the fundamental problematisation of any notion of a stable set of knowledge and skills to be learned and assessed. Guerin (2013) argues that “rhizomatic” models of knowledge structures as proposed by Deleuze and Guattari (1980) may be a more appropriate way to understand knowledge-content and research cultures at doctoral level: “In effect, this alternative model acts as a licence to try out *new combinations of ideas*. Thus, a rhizomatic research culture is characterised by heterogeneity, multiplicity, proliferation, flexibility, non-linearity, connection and non-hierarchical networks” (Guerin, 2013, p. 139, emphasis added). Alternative conceptions of knowledge as emergent in social practices (e.g. Hager, Lee, & Reich, 2012), socio-material assemblages (Fenwick & Nerland, 2014) and hybrid or interdisciplinary research fields (Clausen, Pohjola, Sappasert, & Verspagen, 2012), all offer further possible starting points for a more nuanced analysis of the complexities of the processes and outcomes in the doctoral curriculum. However, some departmental cultures seem to emphasise the PhD as a solitary endeavor which students should be able to cope individually (Solem et al., 2011). In the next two sections, we turn our attention first to a more detailed discussion of the processes and experience of the doctoral curriculum, and then to the assessment of its outcomes.

3. Doctoral education processes – how the curriculum is experienced

The analysis of the lived curriculum of doctoral education should firstly consider doctoral students’ experiences during their candidature. Recent studies suggest there is quite a high variation in how ECRs experience the doctoral study process, but there are also strong indications that good progress and satisfaction with doctoral education are more likely where candidates experience factors such as good supervisory relationships, belonging to an academic community, and/or being able to contribute new knowledge in science (Ives & Rowley, 2005; Zhao, Golde, & McCormick, 2007; Overall, Deane, & Peterson, 2011). It is clearly difficult to identify what emerges from the formal or informal curriculum, or to distinguish formal from informal learning within student experiences. However, some results suggest that when doctoral students talk about their most meaningful experiences, they tend not to emphasise formal studies or other activities that might be seen as constituting the formal curriculum (Virtanen & Pyhältö 2012,



Vekkaila et al. 2013); Anderson & Anderson (2012) also indicate that the curriculum does not always work as intended. From the perspective of doctoral students, it seems, the curriculum appears undefined and lacking in focus, but further research is needed to explore specific conceptions about the curriculum and its manifestations in different contexts.

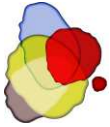
A wide range of activities influences students' experiences during their doctoral journey, these activities shed light about the different manifestations of curriculum (see Table 1). The way in which curriculum is experienced goes beyond institutional policies; beliefs and expectations have a main role, which can create tensions between students' expectations and supervisors and administrators' perspectives about doctoral training.

A recent study on postdoctoral researchers (postdocs) who had already successfully completed their doctoral studies suggests that career planning should ideally have been included in their doctoral education from the beginning of the doctoral study process. These postdocs also stressed that formal study and other academic activities should have been designed with a view to supporting their future careers. These findings are in line with those of Scaffidi and Berman (2011) who argue that for postdocs to have the best chances of prospering in academia, industry, or elsewhere, they need to plan their future careers strategically. Analysing the experiences and conceptions of post-doctoral researchers (Pitcher & Åkerlind, 2009) is essential to promoting their future career development after the PhD; thus rethinking the curriculum of doctoral studies is vital not only from the perspective of doctoral students themselves, but also from that of higher education researchers. Åkerlind argues for "varied" and "flexible" provision to enable postdocs to make "informed career decisions" (Åkerlind, 2009). Others have proposed a reconceptualisation of postdoctoral research pathways to produce a better "fit" between training and professional interests and skills (Berman, Juniper, Pitman, & Thomson, 2008). Thus a review of the curriculum of both doctoral and postdoctoral preparation is acknowledged as an essential task.

A "hybrid curriculum" model to address the connections among university, profession and workplace, is proposed by Lee, Brennan, and Green (2009) as a way of adapting the curriculum for diverse doctoral needs. This idea has also engendered further studies reviewing the purposes of doctoral education, and taking into account the changing needs of the "knowledge economy" in academic, professional, social and labour domains. This questioning of assumed and hitherto tacit purposes has also encouraged the development of alternatives to traditional doctoral programmes, such as practitioner or professional doctorates for those who are engaged in leading practice and introducing change in tandem with their academic research (Lester, 2004).

Utilising research on networking learning, and on students' socialisation in disciplinary communities and in other professional fields (e.g. Vaessen, van den Beemt, & de Laat, 2014; Boden, Borrego, & Newswander, 2011) could also strengthen the development of interdisciplinary curriculum structures, enabling ECRs to construct and assume their professional roles taking broader labour market needs into account. Studies of the academic transitions experienced by junior researchers could also deepen our understanding of the academic and professional practices needed to offer more appropriate training and support to ECRs, enabling them to make the transition from doctoral education to other careers (McAlpine & Emmioğlu, 2014).

Where the focus is clearly on preparation for an academic career, the quality of supervision emerges as key to supporting doctoral students' developmental processes (Roulston, Preissle, & Freeman, 2013). In this context the supervisory relationship is of fundamental importance to how students experience the "doctoral journey" (Pyhältö et al., 2012; Zhao et al., 2007; McAlpine et al., 2013); students' learning experiences and satisfaction are closely related to the nature of the relationship developed between students and supervisors, so the role of the supervisor is critical to constructive doctoral preparation (Lee, 2008). Solem et al. (2011) emphasise how "timely, proactive, and supportive advising and mentoring from faculty, peers, and program committees" (p. 13) are essential elements for preventing difficulties. Yet the practice of supervision (and often of pedagogy more generally) only becomes a developmental focus *after* students have completed their thesis, thus presenting a clear obstacle to their development as future academics. As



McAlpine et al. (2013) point out, this means that doctoral supervision is a long-term and collective process, and this needs to be acknowledged in the structuring of the curriculum.

Existing research on doctoral students reveals a high degree of variation in the experience of doctoral study processes (McAlpine & Mckinnon, 2013) and further work is needed in order to understand how the curriculum shapes and influences these experiences, particularly with regard to the study of the experiences that are promoted in formal, informal and hidden curriculum and how these experiences affect students' training as well as the role of supervisors and administrators. This could include longitudinal studies to examine how doctoral programmes are currently developing and how far this development aligns with changes in industry and the employment market. This could then inform discussions of how far the doctoral curriculum and the training of doctoral students can or should be adapted to meet the changing and multiple purposes of the PhD. The academic and professional socialisation and disciplinary networking of doctoral students also merit more extensive study; this remains a relatively under-researched area (Anderson & Anderson, 2012), despite its key importance to students and to their future careers.

4. The outcomes of doctoral education – assessment and employability

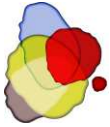
The question of how the outcomes of doctoral education are assessed cannot be avoided in any discussion of the doctoral curriculum, particularly in the light of the ongoing diversification of programmes and career paths. In this section we consider two of the outcomes of doctoral education: assessment and employability.

In spite of commonalities in terms of formality and structure, assessment varies significantly by discipline, country, institution, and supervisor. In addition, the “core competences” of a PhD may serve both academic and non-academic careers; these multiple purposes have complex implications which are not yet fully understood, and which may not be susceptible to standardised or comprehensive solutions.

The final examination is only one aspect of the complex assessment processes occurring at the doctoral level. For example, we have forms of assessment at entry to a doctorate, and ongoing assessment during the candidature. Depending on the country or the disciplinary context, this may take formal shape through the marking and grading of coursework, or structural milestones such as confirmation of candidature seminars, annual reports of progress, mid-term and final seminars. Informal assessment occurs throughout candidature as judgments are made by the supervisory team on the quality of writing and thinking candidates display, and peers reach verdicts on the quality of research papers submitted to journals and conferences.

These various strategies vary by institution and country. For example in some systems an advisory committee additional to the supervisor/s will have an overview of the quality of the candidate's work and progress, and meet to assess key milestones. Some institutions have developed rubrics to use for assessing these various milestones. Others require candidates to provide reflective essays on learning, or to develop a portfolio, or to produce a number of peer-reviewed publications prior to completion. All of these assessment strategies support the expectation of experienced examiners that the thesis they are about to examine is passable (Golding, Sharmini, & Lazarovitch, 2014; Mullins & Kiley, 2002).

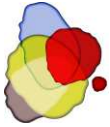
Despite the variety of formal and informal assessment strategies employed during candidature, the most common formal assessment at doctoral level is the final examination, known by a number of different names and exhibiting a wide range of types (Hartley, 2000; Morley, Leonard, & David (2002). Variations in Vivas: Quality and equality in British PhD assessments, 2002). For example, in parts of Europe and Scandinavia, following examination and approval of the written thesis, the candidate publicly defends her/his thesis before an audience of academics and others. This process is in stark contrast to the UK model where the written thesis is generally examined by one internal and one or two external examiners, and then a private *viva voce* is held, in some cases in the presence of a neutral chair who oversees the process. While an oral examination is held in Canada this is generally a semi-public affair, often with four to five supporters



joining the candidate. The US model is different again: the candidate has a “committee” with whom they interact on occasions throughout their candidature, and when the supervisor thinks the candidate is ready, the committee conducts a private oral examination where the candidate “defends” the thesis. A very different model exists in Australia and South Africa, where the written thesis is the sole examinable item (although universities offer the option of an oral if the examiner requires one). A high level of confidentiality is maintained; the candidate does not know who the examiners are, and the examiners are generally unaware of each other’s identity, and do not discuss the work among themselves. Each university has a process for bringing together the various reports into a single recommendation, as a journal editor might do with reviewers’ reports (Kiley, 2009).

Given the diversity of approaches to assessment, in the complex settings of various approaches to curriculum in doctoral education (Table 1) one particular question arises: what is being examined? When the written work is examined, one could argue that it is the candidate’s demonstrated ability to be a researcher that is being assessed, judged by the quality of the research and its presentation. With the oral component, it is arguable that other qualities are being assessed, such as the candidate’s broader knowledge of the discipline, and their ability to deal with challenges to their work. However, in view of curriculum considerations and the substantial international developments in doctoral education outlined above, we suggest that there may be other assessable outcomes of the doctoral learning experience which are not yet fully developed, and are not currently the focus of formal assessment. International research in this area is in its early stages; we suggest that it is time to reconsider formal and informal types of assessment for future academic researchers, as well as for those in, or aiming for, other kinds of professional employment. Future research will need to take into account the specifics of such forms of assessment in terms of the demands of different disciplines, sub-disciplines, academic and professional fields, and will also need to recognise the significance of local settings and histories. At the simplest level we are asking: are we assessing the candidate or their research? And is this assessment formal, informal or a mixture of both?

Finally, the question of how the curriculum of doctoral education enhances employability is of key interest, and not only from the doctoral students’ point of view. Academic communities – both universities and disciplinary organisations – have increasingly been concerned to support career development for early career researchers and diversify their employment opportunities, recognising that their training is often predicated on the assumption that will pursue an academic or research-only career (Åkerlind, 2005). Yet there is still little reliable evidence regarding the employability and the career pathways of ECRs, particularly in relation to careers in industry and other non-academic settings, and in the increasingly international labour market. This situation calls for a clearer understanding of multiple doctoral pathways and a review of curriculum structures within doctoral education that might facilitate diverse transitions. The tacit assumption of many supervisors, also implicit in many doctoral programmes and in the popular press (Economist, 2010; Cyranoski et al., 2011), is that the PhD is a training ground for the next generation of academics. This encourages graduates to aspire to, and apply for, academic research positions (Manathunga, Pitt, & Critchley, 2009), though only a minority will get a position in academia. This situation constricts the scope of academic training and skill development by focusing on a narrow range of labour market possibilities, and promotes a perception that many doctoral graduates have effectively “failed”. This problem accentuates the relevance of exploring the changing relationships between university and social and professional spheres (Lee et al., 2009), and ensuring that ECRs are aware of and willing to pursue options other than the academic role. This in turn requires the development of new academic cultural practices (Boud & Tennant, 2006) based on a much clearer understanding of the ‘fit’ between the doctoral curriculum and the doctoral labour market.

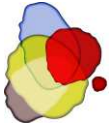


5. Developing a research agenda





This paper has explored some emerging themes in doctoral education from a curricular perspective. This focus on the curriculum is significant not only because it might help to uncover existing tensions, but also because it allows us to face and reinterpret current challenges to doctoral education by undertaking intentional and meaningful change, especially in terms of the processes and outcomes of doctoral education. Whilst recognising that knowledge and practices in this field are situated in historical and cultural contexts, we suggest here a number of possible themes for a future research agenda:

1. The diversity of training programmes developed for researchers around the world calls for a review. We need to improve our understanding of the historical context of current curriculum models and their impact on the training and experience of doctoral students and ECRs.
2. Despite the extensive research already conducted on the changes in doctoral education, in terms of public policy, internationalisation, formats, etc. there is a need for more research on how these changes are being dealt with at the level of the formal, the informal and the hidden curriculum.
3. In order to avoid the unintended and perverse reproduction of inequalities, we need to explore the central role of departmental cultures and practices (involving both weak and strong elements of the hidden curriculum) in the integration and progression of doctoral students, and the diverse ways in which these are perceived by students from different backgrounds.
4. Networking and professional socialisation have become increasingly important strategies in the development of doctoral students as researchers. These elements need to be explored as part of the doctoral curriculum, and supported by research on the roles of communities of practice and networks in supporting the construction of early career researchers' identity.
5. In the light of the issues addressed in this paper, there is clearly a need for more research on the process of "becoming a supervisor", and a review of the training and support available to doctoral supervisors and examiners.
6. Assessment is a core curricular process in doctoral education, and yet there is very little research evidence on assessment practices (compared to, for example, the extensive literature on assessment in undergraduate education). Our understanding of assessment needs to incorporate critical analysis of formal and informal practices and the variety of purposes which they fulfil. The fluidity of the "knowledge economy" presents new challenges to traditional forms of assessment, raising the possibility of replacing or extending traditional examinations with more flexible assessment models more appropriate to the diversity of ECRs' academic and professional futures.
7. The current evidence on the destinations of ECRs illustrates the need for further research on the new relationships developing between universities and the labour market. From an international perspective there is a lack of evidence on the employability, career aspirations and mobility of ECRs, particularly those who do not follow academic careers.
8. The new demands of the labour market suggest a need to address the competencies of ECRs and a critical appraisal of the career pathways enabled through doctoral and postdoctoral education.

This paper has been shaped very much by the interests and experiences of its diverse group of authors, and we recognise that consequently, any proposed research agenda is likely to be partial and incomplete. We welcome further discussion of the themes raised here and wider contributions to this important debate.



Keypoints

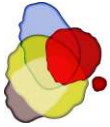
-  The PhD has become a “global academic passport”, although doctoral education practices are increasingly diverse; we argue for the need of an explicit discussion of what constitutes the “doctoral curriculum”, including its formal, informal and hidden dimensions.
-  Review of the doctoral curriculum should consider how PhD students experience the curriculum, including identity as researchers, supervision, insertion in research networks, and the role of departmental cultures.
-  Review of the doctoral curriculum requires further research on assessment practices and the preparation of supervisors and examiners, and a consideration how these can be improved.
-  Review of the doctoral curriculum needs to take account of the multiple purposes of the PhD and the divergent professional pathways of doctoral graduates, both inside and outside the academy.

Acknowledgments

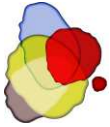
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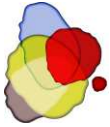
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Table 1

Dimensions of various approaches to curriculum, and the specific themes/questions arising from them

	Dimensions in 1	Dimensions in 2	Arising themes/questions
1 formal – 2 informal	Refers to qualifications frameworks, course syllabi - aims and learning outcomes defined - activities: workshops, supervision, seminars, conferences -includes regulations for candidature -e.g. affirmative action policies	Relates to what is really done through teaching and learning processes, such as readings and discussion, interactions with researchers in the context of classes. -activities: peer interaction, dialogues in academic community -impact of the social context in which training take place	The role of academic practices in learning outcomes: -peer learning -social media (e.g. Thesis Whisperer blog) -departmental practices (e.g. Golde, 2005) - disciplinary networking (e.g. Deem & Brehony 2000) - allocation of teaching duties/other work - professional conventions/ expectations in particular subject areas
1 open – 2 hidden	Refers to such contents in doctoral training that are defined but variable in individual level, e.g., prescribed reading, research methods provision, seminars etc. which doctoral candidates are expected to attend. -learners' degree of self-direction and the social context in which training take place embedded	Refers to unintended learning, often in regard to class and gender roles, social expectations, etc., that emerges from structures, relationships and practices in the educational setting, revealing the pedagogy of the learning context, rather than its intended content (Apple 1971)	What is students' role (active/passive) in developing their doctoral training? -departmental practices (e.g. Mills & Paulson 2014) -dyadic dynamics in the supervisory relationship (including gender etc., plus reputational/prestige issues which are very intangible) (e.g. McAlpine & McKinnon, 2013, Johnson et al., 2000)
1 standardised – 2 pluralized	Refers to systems such as PhD programmes (i.e. with prescribed taught elements preceding thesis), and also skills programmes, e.g. Vitae Researcher Development Framework. -an inflexible system -intended learning outcomes laid down in policy documents (e.g. QAA)	Refers to a highly complex set of structures, practices and expectations from which doctoral students and their supervisors create new and unpredictable learning. -flexible -impact of the social context in which training take place -learners' degree of embedded self-direction	The purpose of doctoral degrees in relation to working career and employment (Enders, 2004)