

## **Evaluating the Doctoral Curriculum**

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Concerns about the quality and breadth of research training in Australian universities have been expressed in a number of government reports and inquiries (Review Committee on Higher Education Financing and Policy (West Report), 1998; Kemp, 1999; Gallagher, 2000). However, these same issues have been raised across national boundaries and fields of study, indicating that, rather than being a problem in any particular system of higher education or research training, the concerns signal deep-seated and wide-ranging challenges to the traditions of the doctoral curriculum (Association of American Universities, 1998; Economic and Social Research Council, 2001; Office of Science and Technology, 1993; Raber, 1995).

In response to these concerns, doctoral education has been the subject of an active program of research and reform. Yet the recent literature on doctoral education has primarily focused on the processes of supervision and delivery rather than on the content and outcomes of doctoral study itself. Apart from the system of external examination of theses, the evaluation of doctoral programs has emphasised the quantitative analysis of outputs of research (publications, etc.) and programs (graduation rates, time to completion, etc.), and the pedagogical processes and resources of the doctoral experience, the 'how' of supervision or the level of support services.

The focus on pedagogy in doctoral training has been a significant shift, since it reflects the changing emphasis from seeing the PhD as a process of producing a research work (the thesis) to one of research training and the development of skills and expertise, or what has been termed a shift from a scholarship to a training model of the PhD (Deem and Brehony, 2002, p. 150).

However, studies of supervision and pedagogy do not directly address what might be called the doctoral curriculum – what it is that graduates learn in their courses of study, as distinct from how they learn or issues of program delivery. The argument here is that there is value in considering doctoral training as an issue of curriculum as well as one of pedagogy. Deem and Brehony (2002, p. 156) touch on this in their description of research training cultures.

Research training cultures include the values and practices informing the curriculum and pedagogies of training, the content of the courses, the conceptual basis for the legitimation of training, provision of symbolic meaning, shared aims and purposes, the use of resources such as information technology and the social relations around training provision.

However, while acknowledging the importance of content, concepts, meanings, purposes and intended outcomes of research training, what is here called the doctoral curriculum, the research culture studies, with certain notable exceptions (Pole, 2000), have focussed primarily on the cultural processes and relationships which operate to form researcher identities, rather than the knowledge or skills which are the drivers and/or the outcomes of the process.

One aspect of the doctoral curriculum which has received increasing attention is the examining process for PhD theses. While these studies again tend to focus on processes and policies (such as the selection of examiners or the role of the viva), they also provide insights into the criteria used by examiners in judging the quality of theses, an issue much closer to the present interest in curriculum (Mullins and Kiley, 2002; Winter, Griffiths and Green, 2000; Tinkler and Jackson, 2000). The research suggests that while there is considerable

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agreement in general about what constitutes quality in a thesis, at the level of specifics there is much greater diversity, as well as evidence of idiosyncratic interpretation of criteria by the examiners themselves, and some doubt about the extent to which these criteria are used at all by staff or students.

McWilliam and Singh (2002) note that the conventional association of curriculum with courses of study might lead to the assumption that it applies only to coursework degrees, but they argue that guiding individuals in enacting research curriculum can be seen as a form of curriculum. Similarly, Burgess (1997, p. 15) recommends that research into postgraduate education link with enquiries into curriculum, including the structure and content of postgraduate research. As McWilliam and Singh (2002, p. 4) point out, there is 'a strong press to *think* curriculum as a necessary part of research', especially given that the 'rationalities emanating from government, the 'knowledge society', and organisational logic are rendering the processes and products of higher degree research more *calculable* to stakeholders within and outside university settings'.

From this perspective, the traditional doctoral curriculum has been viewed as an introduction to the craft of research, through what Chubb (2000, p. 18) has referred to as an 'osmotic process', determined primarily by the views of individual supervisors about the purpose and outcomes of a PhD. Pearson (1996, p. 304) attributes concerns about quality to this 'highly individualistic nature of research and supervision', describing it as a barrier to efforts to examine and discuss research training across disciplinary and departmental boundaries.

The key argument of this paper is that the doctoral curriculum has been largely taken for granted in the traditional approach to doctoral research training, based as it was on an apprenticeship model, a focus on tacit knowledge, and an assumption that the primary destination of doctoral students was the academy. As this model has been put in question by new demands and pressures on doctoral education, there is increasing need to consider the nature and purpose of the doctoral curriculum.

### **The context of the doctoral curriculum**

Recent concerns about doctoral education reflect wide ranging changes in the context of and influences on research and research training. The traditional model of the PhD is being challenged by new demands and pressures on the doctoral degree, which can be summarised as follows (Gilbert, 2002):

- government, industry and the community, as consumers of research outcomes, are demanding closer attention in research work to problems generated in the practices of everyday life;
  - there is a press to multidisciplinary as the research context which is most productive of innovation and discovery;
  - changing conceptions of knowledge are challenging the compartmentalized approach to research training which has been institutionalized in university academic structures;
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- traditional university processes are being tested by the increasing pace and dispersal of knowledge production and innovation, including the increase of research activity outside the university sector, and a more diverse notion of knowledge and expertise;
  - new roles are proposed for academics, experts and intellectuals, derived from ideas of entrepreneurship, knowledge work, the public intellectual and advocacy for science and research;
  - the forms of the doctorate are increasingly diverse with an increase in the role of coursework and the establishment of professional doctorates in many fields;
  - debates over competing research paradigms and methodological issues have created tensions in a range of fields which complicate the construction of the doctoral curriculum;
  - concerns for the outcomes of doctoral research training have produced a widespread focus on the development of generic or transferable skills.

These issues are important considerations (actual or potential) in the planning of programs of doctoral research training. They give weight to the view that the doctorate warrants scrutiny to assess its capacity to respond to these challenges, and to ask whether the aims, programs and outcomes of current research training are meeting them. In curriculum terms, they imply a need to scrutinize what counts as knowledge in doctoral training.

### **Changing conceptions of knowledge**

The changing relationship between universities and their social, cultural and economic contexts needs to be viewed in terms of more fundamental changes in the nature of knowledge itself, and the processes and practices in which it is produced.

Such an approach soon uncovers a diversity of forms of knowledge, and the inadequacy of traditional classifications and hierarchies. For instance, Seddon (1998, p. 13) refers to a pluralisation of knowledges, accompanied by 'a pluralisation of people who produce knowledge and who claim the status of authorized knowledge producers'. This 'has meant that, increasingly, different knowledges are recognised, each produced according to different standards of good practice in knowledge production and justified on the basis of different criteria for valuing knowledge'.

The traditional model of the PhD has been sustained by a separation of the processes of research, development, application and innovation into an hierarchical sequence of distinct categories. The West Report (Review of Higher Education Financing and Policy, 1998) endorses Boyer's (1990) account of these distinctions, which identifies four interlocking activities of scholarship: discovery (basic research in a discipline); integration (linking disciplines); application (of knowledge); and teaching. Similar distinctions are found in the OECD Frascati Manual for measuring resources devoted to research and experimental

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development, which comprise activities of basic research, applied research and experimental development (OECD, 1995).

The widespread discussion of Mode 1 and Mode 2 knowledge (Gibbons et al., 1994; Gibbons, 1998) challenges this hierarchical model. Mode 1 is 'university-based, pure, disciplinary, homogeneous, expert-led, supply-driven, hierarchical, peer-reviewed'. Mode 2 knowledge is 'applied, problem-focused, trans-disciplinary, heterogeneous, hybrid, demand-driven, entrepreneurial, accountability-tested, embedded in networks' (OECD, 2000, p. 61). Mode 2 knowledge is not created from the simple application of Mode 1, as the linear model of knowledge production would have it. Rather, it evolves within the context of its application. 'Individual creativity is the driving force of Mode 1 knowledge; in Mode 2, creativity is based in the group' (OECD, 2000, p. 61).

These developments suggest that the contribution of Mode 1 knowledge to innovation does not lie in some simple application process, but rather requires a distinct form of knowledge production with its own processes and criteria. Research aimed at solving 'real world' problems would need to acknowledge the importance of Mode 2 knowledge. Some will be wary of such a view. The promotion of Mode 2 knowledge has been seen as part of a changing priority from public ownership in universities to the private appropriation of knowledge by corporations (Goodson, 1999), and its affinity with the model of information exchange among business organizations has been noted (Cunningham et al., 2000).

The implication of these various arguments is that the innovation process involves distinctive forms of knowledge and research practices, which may be overlooked by assumptions about a simple linear and hierarchical relation between basic research and its use. If, as the ARC (2000) has proposed, the 'exploitation' of research is to become an integral part of the research process, then the implications of these arguments lead to a more thorough-going review of doctoral training than a simple add-on to the end of the traditional process.

This focus on types of knowledge has led to a range of analytical distinctions and frameworks. In his discussion of the role of knowledge in the economy, Johnston (1998) reviews various attempts to classify forms of knowledge which may be useful in conceptualizing the kinds of knowledge to be developed in the doctoral curriculum. While these classifications are proposed as a result of conceptual analysis rather than empirical studies of knowledge practice, they are useful in their attempts at comprehensive and systematic description. A synthesis of these and other classifications (Blackler, 1995; Clegg, 1999; Collins, 1993; Fleck, 1997, cited in Johnston, 1998; OECD, 2000) suggests the following major forms:

- 1 Abstract propositional or declarative knowledge – knowing about facts, theories, generalizations, concepts – often codified in formulae or textual or diagrammatic form;
  - 2 Abstract procedural knowledge involving conceptual skills and cognitive abilities of analysis, explanation, and problem solving;
  - 3 Action knowledge involved in performance, interpersonal communication and psychomotor skills;
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- 4 Tacit or habituated knowledge involved in expert practice and professional judgment;
  - 5 Cultural understandings of the perspectives and experiences of others, including empathising and working with others through shared understandings;
  - 6 Embedded knowledge residing in systematic routines, technologies and procedures, including tool and instrument use.

These categories do not act independently. The process of research is likely to involve all of them, either simultaneously or serially. Some will be closely linked in their operation, such as aspects of action and cultural knowledge, or of procedural and embedded knowledge. Further subdivisions would be possible, such as the distinction between interpersonal skills and psychomotor skills as part of action knowledge. Finally, particular knowledge acts or events can occur within different forms at different times: for example, a statistical analysis may begin as an explicit application of abstract procedural knowledge, but may through practice and experience become habituated and part of tacit knowledge. Barry's (1997) research points to a problem here in the area of information skills, where she found that such skills have become 'second nature' to academics, so that they take them for granted, do not value them, and often do not give them the attention that students need.

Evaluating the doctoral curriculum will involve addressing forms of knowledge such as these. Their interpretation and the priority given to them in different contexts are important questions in the construction of the doctoral curriculum.

### **Knowledge and the doctoral curriculum**

Responses to these pressures for change to doctoral education have included a range of reforms and recommendations. Important among them have been attempts to identify the tacit knowledge which underlies the conduct of research, and the recognition of the value of generic or transferable skills.

There has been a tendency among the proponents of the traditional doctorate to argue that the capacities required for successful research, and therefore for successful research training, are ineffable, an evasive quality which can be recognized only by its products, and which will be inadequately captured in any attempt to articulate it. Phillips (1993, p. 16) quotes a supervisor who said that since PhDs are unique products, it is hard to generalize about them, though it is easier to identify bad examples. The supervisor went on to say that 'Experience teaches one to feel what is interesting and exciting'. Pearson (1996) identifies in the literature on the qualities of the PhD graduate an image of a professional researcher who has the 'astuteness' to identify opportunities to make a useful contribution, the ability to evaluate one's work, to reframe problems in new ways, and to judge when to act. Not surprisingly, Pearson notes that, while these 'matter of "feel" and judgement' were referred to by students in her study, they were not well articulated (p. 307).

A similarly subtle ability is found in Smart and Hagedorn's call (1994, p. 255) for an emphasis on the 'imaginative abilities and sensitivity to the feelings of others, and reduced attention to assimilative strategies with their dominant focus on abstract ideas and concepts as opposed to people'. Raber (1995) reports calls for increasing versatility rather than

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specialization in US science and engineering programs, and Pearson and Brew (2002) add resourcefulness and adaptability to the list of desired qualities.

In attempting to clarify these diverse and vague proposals, one response has been to classify forms of knowledge involved in the research process. Such analyses are central to any concept of the doctoral curriculum. In an extensive study of UK doctoral students and supervisors, Pole (2000) identifies four types of knowledge which comprise a 'typology of achievement' of the outcomes and processes of the doctorate:

- substantive knowledge involved in becoming an expert in the discipline;
- technical skills and techniques developed as a result of conducting the research;
- craft knowledge involved in the capacity to manage the range of aspects of developing and implementing a research project;
- personal and social skills in communicating with team members and developing the self confidence and sense of identity to initiate research.

Pole concluded that successful doctoral candidates recognized the technical skills and craft knowledge as the most important and worthwhile outcomes of their doctoral study.

Another response to calls to identify outcomes of PhD programs has been the attempt to specify and develop generic skills, to identify certain core requirements which can be expected of all research training programs. These are usually of two kinds. First, there are elements of the research process itself which are said to be common across fields of study; second, there are additional needs common to all students arising from the choice (real or implied) of research as a career.

The skills so identified form a long and diverse list (Adams and Mathieu, 1999; Green, Shaw and Hammill, 2001). A typical statement is that from the Council of Australian Deans and Directors of Graduate Studies (1999), which distinguished skills it considered necessary for postgraduates to be successful in research and employment, identifying project-specific skills, cognitive skills, discipline-specific skills and career and professional practice skills. In elaborating these, the Council identified:

- skills for research and thesis preparation
- communication skills (writing, oral presentations, electronic communication)
- information skills (identifying and searching information sources, managing information, data analysis and presentation, bibliographic skills)
- project skills (project management, working with ethics, safety and intellectual property guidelines and regulations, teamwork, leadership, negotiation, decision making, grant application skills, dealing with outside agencies, business planning, marketing and entrepreneurship)
- cognitive skills (analysis, evaluation, synthesis and application of arguments and evidence, research design and methods, language skills)
- professional development and career preparation (tertiary teaching skills, developing employment and career opportunities)

While they are said to be general outcomes of all doctoral programs, the very idea of generic skills is problematic for a number of reasons. First, if, as is likely at this highest level of learning, the skills are abstract abilities like problem solving, they will be manifest in different

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ways in different fields of study. As a result, it is reasonable to ask whether some of these abilities can genuinely be regarded as common skills at all. Problem solving in history and engineering may have certain things in common at the most abstract level, but graduates are unlikely to be able to apply the process to the same kinds of problem, and are likely to approach a common problem in very different ways. Consequently, it is reasonable to ask in what sense this can be considered a generic skill.

Second, if generic skills are not abstract abilities, but rather specific skills like writing, communication, and basic research skills, the question arises as to whether these should already be established before a student enters a doctoral program. An added difficulty is finding consensus on the range of generic skills appropriate to doctoral study. This will often be achieved only by a combination of skills which are either so abstract as to have questionable value, or so specific and unobjectionable as to be mundane. Despite these caveats, it is difficult to conceive that doctoral graduates would not have such basic and important skills, or that they should not be a consideration in constructing the doctoral curriculum.

### **Evaluating the doctoral curriculum**

The issues raised here suggest that universities need constantly to evaluate the doctoral curriculum to ensure that it is relevant to changing contexts and needs. In particular, these developments have implications for the desirable content and outcomes of the doctoral curriculum, what it is that graduates have learned as a result of the program of study and/or the production of a thesis. Seen in this way, evaluating the doctoral curriculum involves questions and a conceptual framework derived from curriculum evaluation.

Curriculum evaluation has conventionally recognized two types of evaluation (Scriven, 1973; Norris, 1998). Extrinsic or 'pay-off' evaluation is built on the conventional ends-means question of judging the extent to which espoused aims and objectives are achieved. The process is one of operationalising the stated objectives which a particular educational program seeks to achieve, and developing assessments based on these. However, extrinsic evaluation typically assumes (and requires) that the outcomes of a program are stated in relatively unequivocal and measurable terms. It will generally ignore objectives which are not so stated, which are broader than the operationalised outcomes or which are unintended. Further, since its assessment begins with the program objectives, it also fails to evaluate the worth of the stated objectives themselves.

On the other hand, intrinsic evaluation asks questions about the worth or value of the stated objectives themselves, and about the consequences, outcomes and implications of programs which may not be explicitly stated in the program objectives.

In designing an evaluation of the doctoral curriculum, the objectives focus of the extrinsic approach is inadequate. This is in part because, as has been noted, the intended outcomes of doctoral programs are only vaguely articulated, and there is considerable difference of interpretation of priorities among those most closely engaged in the research training process. In addition, the extrinsic approach requires an operational specification of its objectives. This is complicated in the case of the doctorate by the need for originality in the contribution of the doctoral thesis to the field of research, and in some fields by the tradition

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of deconstructive critique, which, in its most sophisticated form, may subvert the very criteria on which conventional understandings of a field are based. Finally, the aims of the doctorate are usually most explicit at the institutional level, but this requires that they be so general as to make extrinsic evaluation inadequate if not impossible.

Nonetheless, if the doctoral curriculum is to be evaluated for its responsiveness to the challenges arising from changing contexts, some attempt at extrinsic evaluation will be needed. In particular, it will be useful to ask how the broad statements of purpose in doctoral degrees are translated into an enacted curriculum at the level of the field of study and supervisor. Equally importantly, intrinsic evaluation will be needed to evaluate these broad goals and the programs developed in their name in light of current and developing needs.

Consequently, an evaluation of the doctoral curriculum would ask:

- 1 What are the goals, content and learning experiences which are given priority in doctoral research training programs as they are translated and implemented in particular fields of research?
- 2 In any field of research, is there consensus about these goals, and the kinds of program which are in place to achieve them? If not, are there systematic variations in goals and programs which reflect significant issues for research training in the field?
- 3 How do the goals and program content, the procedural and propositional knowledge of research training in particular fields of research relate to the challenges to the doctoral curriculum outlined earlier, and in particular to developments in knowledge forms and generic skills?
- 4 How do the goals and programs of research training in particular fields meet the needs of students and other interested parties relevant to research in those fields?

To answer such questions, research will need to identify how general statements of goals of doctoral programs are translated in the practices and priorities of particular universities, schools and supervisors, and what forms of knowledge are enacted in the process. The task will be one of making explicit the implicit curriculum of doctoral research training.

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