Research Training and Supervision Development

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ABSTRACT  Research education, or training, as it is often termed, is attracting greater scrutiny as research itself is seen of greater importance in the global knowledge economy. In turn, concerns to improve the effectiveness and efficiency of research supervision are leading to the introduction and extension of programmes for supervisor development. This article presents a framework for an approach to supervisor development, based on the assumption that in order to discuss supervisor development it is important to understand what supervisors do and why. The article examines the nature of the educative process for research students in the current research environment. It articulates the generic processes supervisors need to engage in for effective supervision, if students are to develop in differing institutional, disciplinary and professional contexts the appropriate expertise and attributes for employment; and presents an outline of what might constitute a flexible professional development programme for supervisors in this context.

Introduction: a new agenda

As research becomes increasingly recognised as vital to innovation and national economic growth, research education has become a matter of more concern for both government and public. In Australia and elsewhere, there is an increased emphasis on efficiency and quality, and on the wider context of the national research enterprise and its links to the international research community. In this context, ‘research training’ is emerging as an important part of a new agenda for research and research funding being promuligated by the Government (West, 1998; Kemp, 1999).

The changing terminology reflects these pressures to change approaches to postgraduate and research education. References to ‘doing a PhD’ or ‘course of study’ or ‘candidature’, all of which referred to individuals pursuing a research programme or project, reflected a situation where what went on under the rubric of postgraduate education was left to the care of universities. The focus at policy level in Australia is now, however, on three areas. The first area is that of employment outcomes, which includes the use of research and scholarship in academia, industry and professional practice. Second, there is a shift in educational approach to give more emphasis to explicit skills formation, including the skills of future researchers and those in other modes of employment. Third, the quality of research education is highlighted, measured by timely completion (efficient use of government money), student satisfaction, adequacy of resources and attention to the effectiveness of supervision/supervisors (Gallagher, 2000).
These political pressures are giving added impetus to ongoing debates about the purpose of the PhD and research education in general. Research students are being expected to complete their degrees in minimum time and meet new demands for developing a broader skill set for future employment, which is increasingly likely to be outside universities. At the same time, there is concern from research students’ associations that the term ‘research training’ is part of an attempt to make research education a narrow form of competency-based training and to ignore the contribution students make to the production of knowledge (Smith, 2000). In this context, supervisors are under pressure to improve their practice. This translates variously into calls to improve student throughput, be more flexible in an open system and provide students with more support. More institutions, in response to these demands, are looking to introduce or extend programmes for supervisor development, but just what they should comprise is unclear.

This article presents a framework for an approach to supervisor development in this context. It is based on the assumption that, in order to discuss supervisor development, it is important to understand what supervisors do, and that to understand what supervisors do is dependent upon an understanding of the nature of research training. The article first examines the nature of the educative process for students in this changed context. It then considers the various tasks and activities supervisors need to engage in if supervision is to be appropriate to the needs of present and future students. These discussions are a prerequisite to discussing the framework for the supervisor development programme which follows. Within this framework, the article presents some ideas as to how this would translate into practice in a course to develop supervisors.

**Defining Research Training**

The move to more explicit skills formation in ‘research training’ has come from a number of stakeholders. Industry and employer groups have been calling for a broader skill set for research and related employment in industry. Some students are looking for career preparation in an increasingly fluid job market. Within academia, there is concern that research education has become too narrow and concerned with producing research results at the risk of limiting the educational function. This is seen to be more likely where students are being used to carry out funded research work on grants of various kinds, including commercial projects (Cullen et al., 1994; LaPidus, 1997; Gumport, 1999).

To be a member of a team directed by a distant and very busy leader, building just one technical link in a complicated experiment, is an inadequate apprenticeship to the art; it is as if the pupils of Rubens were to be accounted artists after five years of painting-in the buttons on his larger compositions. High technical standards may be achieved by the student, without a grasp of the deeper intellectual issues. (Ziman, 1968, quoted in LaPidus, 1997, p. 2)

For those wanting to build in a broader skill set for research students, there is a tendency to focus on what is perceived as missing. In Australia and the UK, this is often identified as the area of so-called ‘generic’ or ‘employable’ skills. For example, an Australian industry view on postgraduate skills, presented in Mullins & Kiley (1998, p. 4), is contained in the following list:

- good communication/presentation skills;
- good work practices and collaborative skills;
- information technology/computer literacy;
The ability to use fundamental and technical knowledge to applied systems;
occupational health and safety, and hazard analysis;
good manufacturing practice;
inventional property management skills;
highly developed skills to adapt to new areas of activity;
a reasonably broad practical knowledge;
familiarity and knowledge of broader literature;
skills in the scientific method and linkage to the broad context;
experimental design, modelling, statistics;
good laboratory practice.

The difficulty with such lists is that they range from the general to the particular, and mix technical research skills with those supposed to enhance employability more generally. The lack of any conceptual framework of what constitutes research training underpinning such lists means that it is difficult to identify priorities, to identify appropriate training strategies, and to decide who has responsibility for what aspects of a research training programme. In a booklet on skills training for postgraduates, Cryer (1998, p. 2) gives a schema (Fig. 1), which categorises different skill sets and maps their overlap, with a view to promoting an integrated but targeted approach to implementing training. This is valuable in that otherwise distinguishing between skills for employability and those for research can lead to the problem of seeing them as distinct tasks. The danger of seeing skills as ‘extras’ is to subscribe to an ‘add on model’ in which the extra skills are seen as extra content competing with the existing curriculum (a replay of the debate over coverage at the undergraduate level), and posing for students a problem of conflicting priorities in the use of their time and effort. Where skills are presented in short courses or modules, particularly if credentialled, this problem could be exacerbated.

Another difficulty with defining sets of generic skills like time or project management is that this neglects to consider that what is needed is a complex outcome; i.e. a skilful performer rather than someone who can list their skills; someone who not only knows about what to do but knows how to apply that in practice. One attempt to map the skilful performer given by a practising scientist, in conversation with one of the authors, identifies the ‘compleat scientist’ as someone who will:

be an expert in their particular area; be resourceful and able to search out what they need to know and use; have a grasp of the bigger picture and networks to use so they know what’s what, and relevant; be adaptable/prepared to change techniques and/or research areas.

A strategic spin on this is given by Phillips & Pugh (1994, pp. 19–20) in their manual for student success. They present attributes of the professional researcher who:
has something to say that peers want to hear;
• has command of the subject, so can evaluate the worth of what others are doing;
• has astuteness to discover where a useful contribution can be made;
• has mastery of appropriate techniques currently being used, and awareness of their limitations;
• is able to communicate results effectively in the professional area;
• is able to operate in an international context; and
• has the ability to evaluate their own work and that of others in the light of current developments, so can grow with the discipline.

In both of these examples, from the practising scientist and from Phillips & Pugh, postgraduate skills are seen as more than ‘add ons’, and acknowledge that the skills for being a complete and professional researcher are already being acquired by research students. However, as identified by Cryer (1998), this is usually through implicit processes that are unarticulated. Such an understanding underlies the list of attributes drawn up by the Committee on Science, Engineering and Public Policy (COSEPUP) (quoted in Osborn, 1997, pp. 188–189), which is based on views of academics and industry representatives in science and technology fields in the USA. They prize individuals who:

• are educated to think and to solve problems inventively;
• are broadly based, rather than narrowly oriented to a specific technology;
• can communicate effectively to non-experts as well as peers, both orally and in writing;
• understand technology transfer and can develop as well as initiate ideas;
• are able to work comfortably in a collaborative group environment, and have respect for the employment milieu and their place within it.

These attributes include those that are important for professional lifelong learning, for adaptability is part of being professional. The COSEPUP attributes also foreground social capabilities such as the ability to communicate, work with others and perform in different work roles. Acceptance of such attributes as desirable outcomes demands a holistic approach to defining the curriculum of research training, one that makes the full range of desired outcomes explicit, and integrates the acquisition of the relevant skills and capabilities with the research process itself.

This being so, for the institution and those with responsibility for the quality of research training and its coordination, supervision becomes a matter of providing a high-quality research learning environment for the student. Issues arise as to whether there is access to the resources (including expertise) essential to conduct high-quality research; over the flexibility/choice of learning and research conditions; opportunity for engagement of students with practising researchers and a community of peers/experts/others; and responsiveness to students’ career goals and the opportunities and demands of relevant employment markets (Pearson, 1999, p. 282). In this complex environment, with competing demands on students’ time, it will be even more critical for supervisors to assist then in navigating a viable pathway suited to their individual learning needs and career goals.

**Supervision Practice**

The next step is to define what supervision actually means in practice in this context. This is a step that runs counter to the tradition of supervision as a set of implicit and unexamined processes. Indeed, pedagogy has been the ‘absent presence’ in the ‘supervision’ relationship, where the role of the supervisor as researcher has taken precedence over other roles (Evans
& Green, 1995, p. 2). It was in reaction to this traditional approach that the teaching role of the supervisor has been emphasised:

the relationship with a supervisor is different from that between two academic colleagues working on related research projects. It has to be seen as a form of teaching. Like other forms, it raises questions about curriculum, method, teacher/student interaction, and educational environment. (Connell, 1985, p. 38)

This teaching role, as discussed in Evans & Pearson (1999), is a complex one, which can include the roles of the mentor and ‘master’ (as in master and apprentice), and, where research students are highly experienced in their professions or industries, the role of:

a ‘critical friend’ guiding the ‘student’ through the scholarly maze to the doctoral examination and graduation. Or maybe as a ‘gate-keeper of science’ ... who ensures that the ‘student’ completes all the necessary conditions before entry. (Evans & Pearson, 1999, p. 196)

Elaborating the roles of the supervisor can be useful for supervisors in discussion of their practice. However, it is not so useful for determining the content of a supervisor development programme. Not only is the role of the supervisor complex, as research practice changes and supervisory arrangements become more varied, it is also changing (Pearson, 2000). Another danger of a focus on roles is that it can lead to a strengthening of the focus on personal dyadic relationships, a feature of traditional informal and implicit research training practice. A focus on roles does not provide sufficient grounds for discriminating among various responsibilities and practices in research arenas, where many others may be involved in supervision in addition to the formal principal supervisor. A more productive approach is to focus on what supervisors are doing and why (Cullen et al., 1994). This grounds discussion in the practice of supervision and the behaviour of participants, ensuring that their learning is situated in their particular research contexts.

A focus on the purpose of supervisory practice frames the process. If it is agreed that the overriding goal of all those with supervisory responsibilities is to facilitate the student becoming an independent professional researcher and scholar in their field, capable of adapting to various research arenas, whether university or industry based, then the supervisor needs to foster explicitly such development. Holdaway (1996, p. 71) distinguishes between ‘primary’ activities (such as: research, required coursework, reading; reflecting, discussing, and writing) and secondary activities (such as: optional coursework, teaching, publishing, preparing conference papers and research proposals). Just what is appropriate, central or peripheral, for an individual student will vary. However, seeing the development of a relevant programme of study as being dynamic and dependent on negotiation between the individual student and their supervisor avoids the trap of setting general priorities which may not suit all students. At another level, this negotiation will take place within an iterative cycle of critical reflection and action, both in respect of the research project and in respect of intellectual and career development—a conversation, in effect, on what the student is doing, what they are learning, and their evolving career goals.

This approach to postgraduate training draws on two traditions. Approaches which have been developed in the field of adult learning (Ryan, 1996) are likely to assist in structuring relationships. Research into the ways in which adults learn (Boud & Griffin, 1987; Salmon, 1992) questions the appropriateness of taking a paternalistic stance, which is common with supervision models based on experience in undergraduate teaching. Developments taking place in the undergraduate curriculum to ensure greater autonomy for students in their learning, drawing on adult and work-based learning approaches, do not appear to have
influenced supervisors’ attitudes to higher degree supervision (Ryan, 1996). Yet, strategies developed in this arena, for example, the use of negotiated contracts, elements of independent study and problem or scenario-based approaches, are highly relevant. These strategies address the need to recognise the very wide range of individual differences among students, for example, as regards gender, age, ethnicity and life circumstances.

Models for achieving skilful performance, with an emphasis on developing expertise, can be found in craft and professional education. Some of the desired teaching strategies for postgraduate education are often referred to as coaching. Similarly, the process of ensuring that students expand their intellectual horizons, learn to network professionally, and enrich their learning experience for their future careers is the content of mentoring. However, the distinction between coaching and mentoring and their nature and purpose is usually obscured by their being ill defined in the context of research supervision. For example, coaching can have many meanings and is often associated with sport in Australia, and more recently with personal management counselling. In the literature and discourse on research supervision, coaching is used more in a metaphorical sense rather than as referring to an educational strategy, and is often related to the notion that students are apprentices. Articulating coaching and mentoring as tasks for supervisors to engage in allows for clearer differentiation of responsibilities and elaboration of what is involved in helping students learn the craft of research (Pearson, 2001). For it is part of the responsibility of the supervisor to provide the intellectual and professional leadership and facilitation of research students’ learning within the workplace (as in many laboratories or a design studio for example), or in various distributed settings (on/off campus) and in co-supervisory and panel arrangements (Pearson, 2000).

Collins et al. (1989, p. 457), in an approach which they call ‘cognitive apprenticeship’, define ‘coaching’ as consisting of observing students carry out a task and offering hints, feedback, reminders and new tasks aimed to bring their performance closer to expert performance. They locate coaching within a complex model, where there is a set of core methods designed to help the student acquire an integrated set of cognitive and metacognitive skills; including modelling, where an expert carries out a task, possibly verbalising their thought processes, so the student can observe and build a conceptual model of the process required to complete the task; and scaffolding, referring to providing supports such as cue cards or intermediate level tasks to help the student perform the task. The removal of such support is termed fading. Thus, at one level the supervisor may be coaching a student in specific techniques. However, that is not sufficient for passing on expertise and the ability to address new problems and situations. Students may, especially if left unsupervised, limit their learning to a narrow acquisition of techniques and miss the opportunity to extend their expertise and develop their ability to evaluate their own work, which is central to developing professional judgement.

The responsibility of the supervisor is to ensure that more than technique is learnt. To do this, the student needs to learn not only current practice but how to address the problematic and the unknown. Schön refers to this as ‘an art of problem framing, an art of implementation, and an art of improvisation’ (Schön, 1987, p. 13). In his approach, the student learns through doing and through critical reflection on that experience in conversation with experts, who can draw on their extended repertoire of skills and strategies. Similarly, in Collins et al.’s cognitive apprenticeship model, modelling, coaching and scaffolding are located within the context of students being encouraged to externalise their learning processes so that they can gain conscious access to and control of their own problem-solving strategies by articulating and reflecting on their knowledge, reasoning, or problem-solving processes and by exploring new avenues of interest to themselves. It is in
critical reflection on the process of doing research, with a supervisor and informed others, that the student is most likely to clarify or discover what they really know and become able to transfer their new expertise to different problems and contexts. If the supervisor locates hands-on coaching within a wider context of reflective practice, which is increasingly common in professional education, then it is possible to see this meta-level reflective process as the major challenge.

Mentoring, too, is a task which can operate on a number of levels. It can concern supporting the student in managing their candidature, in the context of their evolving personal and intellectual development and career goals. Part of the mentoring conversation would include looking at differing cultures and values in different research arenas in which a student might operate, and providing opportunities to experience research in other situations through exchanges and placements. It will include providing access to relevant research and professional communities, for in a time of rapid growth of knowledge, ‘knowing who’ is as important as ‘knowing how’ (Johnson, 1998, p. 12).

Mentoring can also involve supporting students with the emotional dimension of their experience, as they learn how and when to assert independence. This may mean broadening the range of assistance offered, for example, to include personal development as well as help with content, methodology, etc., or widening the kinds of support relationships which the supervisor is prepared to have in order to take account of the maturity of particular students (Salmon, 1992). Reason & Marshall (1987) suggest that doing a PhD may be a bid for personal development. Clearly, students learn a lot from doing a research degree, including much about themselves. The willingness, and indeed the ability, of supervisors to support and encourage, even when they are worried that a student may be going down successive blind alleys, is a rare skill. It assumes mature awareness, flexibility and a level of trust on the part of the supervisor, for supervisor anxiety can lead to constraining their students’ research focus. In the face of such constraint, it appears that students will do one of two things. Either they will give up or they will stay within the boundaries of what their supervisor has defined as acceptable, and encounter ‘the problems of having to reduce an exotic, once in a lifetime anthropological experience to a dry as dust thesis format’ (Phillips, 1992, p. 32). In order to mentor students effectively in emotional matters, supervisors have to be open to examining their reasons for constraining particular students, and become aware of the effect of their own anxiety on their supervisory practices. This anxiety can often be related to concerns about the supervisor’s ability to complete research projects, and the effect of student failure on their reputation (Kramer, 1996, p. 217).

Discussion of coaching and mentoring may seem to indicate an implicit assumption of dyadic relationships. Yet, research students can and do depend on a range of people to provide various forms of assistance in learning research expertise and how to be a professional researcher. These significant others can be those in a department, a laboratory, a disciplinary network, or a university and its resources. In particular, some coaching has always been carried out by people who do not have formal supervisory responsibilities, e.g. post-docs, other students and technicians (Pearson, 1996). Recently, McCauley & McKnight (1998) have highlighted the important contribution of librarians in the electronic age. The significance of these interactions becomes the greater, if we extend our view of what constitutes research training to include as outcomes social attributes, such as those given by Phillips & Pugh and COSEPUP. It is, therefore, important to look at some conceptualisations of research and research training that explicitly see the process as a social practice.

From studies of research practice in different disciplinary contexts, Delamont et al. (1997) argue that the key to understanding what happens in research groups in science is the concept of ‘pedagogic continuity’. Pedagogic continuity comes not from explicit instruction,
but from a process of ‘enculturation’ during which newcomers (i.e. PhD students) learn the socialised skills of laboratory work, and through which research problems are transmitted. This process is one to which various participants contribute over time, so that the continuity is from the process, not from individual participants who come and go, for example, post-doctoral fellows who nonetheless play an important part in the overall training process (Delamont et al., 1997, pp. 324–325).

There are similarities in Delamont et al.’s model with the approach to apprenticeship developed by Lave & Wenger (1991). They situate learning in communities of practice encompassing a range of participants with differing histories of membership, from apprentices, established and relatively new masters, and ‘journeymen’. Learning occurs through participation in the social practice of the community. The apprentice is a participant in a community of practice, with a special status, that of a legitimate peripheral participant (LPP) who is legitimised by a master or sponsor to participate as a potential member and access the practice without being fully expert. In such settings:

opportunities for learning are, more often than not, given structure by work practices instead of by strongly asymmetrical master–apprentice relations. (Lave & Wenger, 1991, p. 93)

Under these circumstances, it seems typical that apprentices learn mostly in relation with other apprentices. Further conceptualisation of ‘communities of practice’ by Wenger provides additional understandings of the complexity of how people learn ‘on the job’, and the relationship of more structured training where the learner learns ‘about what to do’, with the learning that occurs in practice where participants ‘do things together, negotiate new meaning, and learn from each other’ (Wenger 1998, p. 102). The value of this approach to apprenticeship according to Guile & Young (1999), is that it offers a conceptualisation of learning that avoids the separation of learning from knowledge production, a concern raised by student groups (Smith, 2000).

Lave & Wenger are careful to insist that communities are not static nor necessarily peaceful. They acknowledge unequal power relations, raise issues of hegemony of resources, and intergenerational conflict, suggesting that:

communities of practice are engaged in the generative process of producing their own future. Because of the contradictory nature of collective social practice and because learning processes are part of the working out of these contradictions in practice, social reproduction implies the renewed construction of resolutions to underlying conflicts. In this regard, it is important to note that reproduction cycles are productive as well. (Lave & Wenger, 1991, p. 58)

Conceptualising research communities as communities of practice provides rich insights into the complexities of the social relationships affecting supervision and research practice, as well as giving guidance for the creation of productive learning environments. The approaches described by Lave and Wenger do not mean there is no role for the supervisor. It is the supervisor who provides access to resources, expertise and learning opportunities, which are critical for the student. Pearson & Ford (1997) give examples of initiatives that focused on bringing together the collectivity of researchers and students in a field for this purpose rather than emphasising dyadic relationships. Similarly, Zeegers & Barron (2000) use the idea of legitimate peripheral participation as a conceptual structure for organising a student-led conference, which was not an aggregation of experts talking, but attempted to create a ‘community of practice’ during which research students and expert researchers worked together.
Supervisor Development

In turning to supervisor development, we can draw on similar pedagogical theories to those which have already been discussed. However, it is important to ensure that drawing such parallels does not lead to simplistic approaches to what is a different set of responsibilities, in a different organisational location, with different career and institutional pressures. Research supervisors, like managers and leaders, are educating, motivating and leading others. Management and leadership education (or training) is, therefore, of particular interest. As with learning research practice there is more to it than developing technical skills. In the private sector and government departments, there are well-established programmes for leadership development, and in many cases the learning approaches have been noticeably innovative (Schön, 1983; Kolb, 1984; Pedlar et al., 1986; Senge, 1990). There are many strategies which are relevant, and similar to those in the field of adult learning.

What is important is that supervisors expand their repertoire of skills as educators and leaders. Supervisor development for research training in the new context of higher education has to focus on enabling supervisors to become adaptable. Being locked into one model and set of behaviours is no longer acceptable. Earlier, we noted that what is central and what is peripheral in a student’s programme of study and research depends on what the student is trying to achieve. We suggested that the learning and career outcomes need to be negotiated between the student and the supervisor. Supervisors have to extend their understanding of the nature of research and supervisory practice in order to deal with variations in these learning and career goals of different students, and in differing institutional, disciplinary and professional contexts. This is the curriculum which has to be negotiated.

Of particular relevance is the emphasis on learning through self-awareness. Where development programmes accept the principle that managing oneself is an essential requirement for managing others, gaining feedback on performance and personal reflection is encouraged. This can mean more than focusing on interactions with others and communications skills. First, a leader has to understand how they operate themselves and this means looking at what Argyris & Schön (1974) refer to as ‘theories-in-use’ as opposed to ‘espoused theories’. Senge uses a similar concept, that of ‘mental models’, in explaining why good intentions and plans fail:

new insights fail to get put into practice because they conflict with deeply held internal images of how the world works, images that limit us to familiar ways of thinking and acting. That is why the discipline of managing mental models—surfacing, testing, and improving our internal pictures of how the world works—promises to be a major breakthrough for building learning organisations. (Senge, 1990, pp. 174–175).

In the case of supervisor development, this can be taken at two levels: one is the need for supervisors as researchers to surface their mental models of research practice; the other is, as supervisors, to surface their mental models of supervision. As argued in Pearson (2001), there is a need for supervisors to reflect on their own practice and critique research education. Such a critique might include the scrutiny of ‘specific findings, concepts, theories, frameworks of assumptions, practices, truth criteria, fundamental perspectives and orientation’ and even ‘the entire apparatus of the discipline as a whole’ (Barnett, 1990, p. 44). A promising initial task is for supervisors to reflect on their conceptions of research practice, as a basis from which to engage in the critical questioning of their own preferred approach. An emphasis on different aspects of research or scholarship obtains from different understandings of what research is. With any given phenomenon, different people notice and
interpret different things, but since they share a common language and culture, there are relationships between all of the different ways of experiencing that phenomenon. So when academics talk about research, different aspects are in the foreground of their awareness and other aspects recede to the background. Disciplinary differences are frequently used to explain this process, but other interpretations are possible. It is important for supervisors to be clear what understandings of research and scholarship they are talking about, because different ideas about what research is and what scholarship is, have differing consequences for supervisory practice.

A framework for examining a range of implications for supervision is provided by an investigation of senior academics’ conceptions of research. Since, in the investigation, academics sometimes used the concept of scholarship to describe their understandings of research, it was possible also to identify different conceptions of scholarship in the data. The findings of this study have already been reported (Brew, 1998, 1999, 2001). However, a brief description of the resulting framework of conceptions is presented, in order to provide clarity in the discussion that follows concerning the implications of different ideas about research for supervision of research degrees. Table I presents four qualitatively different conceptions of research, labelled the domino, trading, layer and journey conceptions, which delineate the variation in how this concept is understood by academic researchers. It will be noticed that what is being described here is what researchers experience research as being. It does not describe the ways researchers go about doing it.

Based on the same data set, Table II presents dimensions of five qualitatively different ways in which the concept of scholarship is understood. They are labelled the quality, preparation, creating, integrating and research conceptions respectively. The preparation, creating and integrating conceptions share a basic orientation to scholarship, with increasing complexity of conception as one moves from reading to creating to integrating each one, incorporating the activities foregrounded in the previous less complex one. For example, the creating conception includes the idea of reading but adds the addition of new knowledge; the

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<th>Table I. Dimensions of conceptions of research</th>
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<td>Structural dimension (What is perceived and how the elements of what is perceived are related to each other)</td>
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<td>Domino conception</td>
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<td>Layer conception</td>
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<td>Journey conception</td>
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TABLE II. Dimensions of conceptions of scholarship

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<th>Dimension of conception</th>
<th>Structural dimension (what is perceived and how the elements of what is perceived are related to each other)</th>
<th>Referential dimension (the meaning given to what is perceived)</th>
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<td>Quality conception</td>
<td>What is in the foreground are activities describing careful work: accurate footnoting, critical thinking, logicality, etc. They are linked through the concepts of rigour and meticulousness.</td>
<td>Scholarship is interpreted as the way academics demonstrate professionalism.</td>
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<tr>
<td>Preparation conception</td>
<td>What is in the foreground is the background literature and the activities of reading and learning. They are linked through the idea of providing a context for the research.</td>
<td>Scholarship is interpreted as the preparation for research.</td>
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<tr>
<td>Creating conception</td>
<td>What is in the foreground are the background literature plus the addition of new ideas and discoveries. They are linked through the idea that the new knowledge has to be fitted into the existing knowledge.</td>
<td>Scholarship is interpreted as the process of adding new knowledge to the existing literature.</td>
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<tr>
<td>Integrating conception</td>
<td>What is in the foreground are the background literature, the new ideas and discoveries and the processes of dissemination, including publication and teaching. Scholarship is viewed as the integration of these.</td>
<td>Scholarship is interpreted as the process of making a contribution to society through the integration and dissemination of ideas and knowledge.</td>
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<td>Research conception</td>
<td>What is in the foreground are confusions, including ideas from university policies and conceptions of research. There is an effort to try to make sense of confused ideas.</td>
<td>The concept of scholarship does not make any sense on its own. It is equated with research and interpreted as not being a useful concept in itself.</td>
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integrating conception includes reading and new knowledge but adds dissemination. On the other hand, the quality conception is quite distinct. In relating to the way things are done rather than what is done, it is holistic in that it can be applied to the other three conceptions. The research conception demonstrates the not inconsiderable confusion surrounding the concept of scholarship.

A somewhat surprising finding of this study was that different conceptions of research are not tied to disciplinary differences, although this was initially anticipated. For example, in scientific and technical disciplines, all four conceptions of research were present, as they also were in the humanities. This is consistent with Becher's (1989) analysis of the culture of academic departments. He demonstrates that individuals’ conceptions of research are a function of a complex set of factors, of which disciplinary allegiance is only one. A further finding of the investigation was that researchers carrying out similar kinds of research—for example, laboratory-based research, collaborative team-based research, individualised investigations—did not necessarily share the same conceptions. This has considerable implications for supervision. It means that the supervisor cannot assume that the student has the same idea as themselves about what they are doing when they are carrying out research.
These categories are not a self-consistent set. They either have an orientation outwards, focusing on external products or an orientation inwards, focusing on internal processes. The categories are also differentiated according to whether the researcher is in the focus of awareness or is essentially absent from it (see Table I). So, for example, the domino conception is focused externally on solving problems or answering questions through a synthetic process of combining separate elements. The person doing the research is conceptually kept separated from the research, which is wholly oriented towards the ideas, techniques and/or activities. The trading variation, similarly, is focused externally on products, yet here the researcher is consistently present to awareness through the recognition or reward which follows, or the social networks in which the researcher is engaged. In the layer variation the focus of attention is on the analysis of data being researched with the intention to understand what lies beneath it. There is, thus, an internal focus on the process of coming to understand the phenomena being researched, but the researcher is absent from the focus of awareness. The journey variation is also oriented inwards, yet here the focus is on the personal interests and issues of the researcher. The presence of the researcher is the primary focus of awareness.

The identification of such variation in the conceptualisation of research both challenges stereotypical notions of the nature of research in different academic domains, and provides a language to talk about and clarify ideas and implications in particular contexts. Supervisors will need to be open to exploring different conceptions of research and scholarship and to examining a full spectrum of implications, for focusing uniquely on one way in which research or scholarship are understood may limit the possibilities for successful research and supervision.

As regards supervisory practice, there is evidence to suggest that supervisors frequently base their approach on their own, often unexamined, experiences as a research student (Cullen et al., 1994; Lee & Williams, 1999). What is important, however, is not simply reflecting on past practice, but reflecting critically in the light of research evidence and theoretical frameworks derived from a knowledge of the literature on supervision. The importance of supervisors developing a repertoire of knowledge and understanding about different aspects of supervisory practice cannot be too strongly stressed. If the supervisor is to be effective, it is necessary for them to be capable of carrying on a critical conversation about supervision itself with colleagues and with students. This conversation will also need to encompass a critical appraisal of the supervisor’s interpersonal and communication skills. This requires the supervisor to be open to gaining critical feedback on their skills and performance as coaches and mentors.

This level of skill and reflexivity goes way beyond traditional notions of the knowledge required for supervision, enshrined in conventional supervisor development programmes. Such programmes tend to focus on issues such as the importance of understanding institutional rules and procedures for supervision, examination requirements, a knowledge of the institutional structures to support students and their supervisors, and an understanding of occupational health and safety and animal and human ethics issues and procedures, with some limited effort to explore the student-supervisor relationship. Although these are all important to any supervisor development programme, they have to be seen in the wider context of professional development for the supervisor as outlined here.

**Conclusion: a programme of professional development for supervisors**

So what can we conclude from this discussion about the nature of a course to develop supervisory practice? What would such a professional development programme for super-
### Learning outcomes for supervisors

- enhanced competency in interactional and communication skills, e.g. negotiation, giving feedback which is supportive and challenging
- enhanced understanding and leadership skills for the facilitation of learning in one-to-one and group settings
- experience of, and familiarity with, the range of IT mediated communication for strategies for supervision on/off campus, e.g. listservs, chatrooms, discussion groups, etc.
- knowledge of the literature on the scholarship of supervision pedagogy, and of relevant policy issues in research education
- up-to-date knowledge of expectations of stakeholder groups, e.g. relevant employers, student associations, etc., and strategies for maintaining dialogue

### Topics

- My research practice, supervisory goals, and previous experience as a student and a supervisor.
- The components of a productive research learning environment, on-campus or distributed.
- The basic stages and responsibilities for supervising a candidature within reasonable time limits.
- Strategies and structures for negotiating the research student’s programme of research and study, and the supervisory relationship.
- The pedagogy of supervision.
- Practising interactional and communication skills.
- Leadership and management of research groups/postgraduate research programmes.

### Approaches to learning

- Opportunity for experiential learning, reflection and coaching made available for supervisors by pairing new supervisors with experienced ones within a structure for feedback and reflection
- Online access to literature and knowledge of institutional requirements.
- Clinical supervision whereby new supervisors discuss their relationships and critical incidents with an experienced supervisor in a developmental programme
- Workshops for supervisors with opportunity to rehearse strategies and discuss them with others.
- Online discussion groups

### Forms of evaluation

- feedback from students and from senior staff and stakeholders through questionnaires
- feedback from focus groups
- 360 feedback instruments
- exit interviews

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**Fig. 2.** Components of a course for supervisor development.
visors encompass? In this final section, as a way of demonstrating how the ideas developed in this article could translate into practice, we sketch the beginnings of a course outline which would be appropriate for the development of the skills, knowledge and competencies of supervisors. Such a course outline would include the course rationale, learning outcomes for supervisors, the topics to be covered, the approaches to learning and the forms of evaluation to be used (Fig. 2).

Much of the rationale for such a course has already been discussed in this article. It would include the changes in what we understand research to be, developments in research training policy and the need to satisfy student employment outcomes. Concerns about the quality of research training and the move to professionalisation would be other major factors. In the complex world in which we are now situated, it is important for supervisors to understand the problems of the research learning environment more generally. As the nature of research changes, so the pedagogy of supervision has to change also. We can conceptualise the anticipated learning outcomes as being focused on the development of supervisors’ knowledge base, their skills and their orientation to their practice.

The critical issues for supervisor development (as indeed for students) are priorities and time. In the current context of pressure on students to achieve a range of outcomes, it is incumbent upon supervisors to undertake the necessary professional development to prepare themselves for the complex task of supervision. However, no single supervisor nor any one individual student will wish to achieve all that we have outlined in this article as desirable outcomes. Neither will they have the time to do this.

The supervision course outline sets out the components of a comprehensive programme to give an indication of the full range of possibilities. The actual professional development programme of any individual supervisor, or person with responsibilities for the coordination of postgraduate research programmes, will vary in scope, sequence and presentation. For this reason, it is essential that opportunities for professional development be provided flexibly. For example, a programme could be organised as a series of modules which supervisors can access at times and in modes convenient to them. This will enable supervisors at different stages of their careers to access development programmes and activities which best meet their individual needs.

Whatever the path any individual supervisor takes, the important outcome from such a programme would be the development of adaptable, flexible supervisory practice based on an awareness of the broader issues associated with the induction of research students, not only into the academic community, but into a world, as Barnett (1997) puts it, characterised by multi-complexity, uncertainty and plurality.

Acknowledgements


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